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Signature.....*Peter Hall.*
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Signature.....*Torben Iversen*

Signature.....*Suzanne Berger*
(M.I.T.)

Date: **July 24, 2006**

The Pin Maker and the Entrepreneur:

How Politics Conditions Industrial Change

A dissertation presented by

Robert Douglas Fannion

To

The Department of Government in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the subject of Political Science.

Harvard University
Cambridge. Massachusetts

July, 2006

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The Pin Maker and the Entrepreneur:
How Politics Conditions Industrial Change

Advisor: Professor Peter Hall

Author: Robert Douglas Fannion

Abstract

One of the most important tasks of political economy is to explain the relationship between firms and their institutional environment. In this project, I demonstrate that both the competitive behavior and political action of firms are in part determined by the production technologies they employ and the ways in which their institutional environment allows them to mobilize and control resources. When firms attempt to use a new technology, they often find that there is a mismatch between the demands it imposes and the ways in which they are allowed by law and regulation to draw the factors of production from their environment. Faced with such a situation, firms are forced to become institutional innovators, creating or modifying social institutions in order to gain access to and managerial control over the resources they need. This process is inherently political: in order to gain the institutional or regulatory tools they need, firms must enlist the public authority of the state. I examine how firms and industry associations do this, negotiating both with the government itself and other interest groups in society to make the use of new production technologies possible. Specifically, I use detailed historical studies of the banking and automobile industries in the United States to develop an argument that explains why firms succeed or fail in the face of technological change based on the correspondence between technological imperatives and institutional constraints. When these are mismatched, the success of firms often depends on the political opportunities available to them for altering their institutional or regulatory environment.

The kind of lobbying engaged in by firms seeking access to new resources has not been adequately studied in political science or in economics, which are dominated either by rent seeking models of firms' political behavior or transaction cost models that assume institutions are created or modified in a rational process that responds to changing needs. Viewing adaptation as an institutionally constrained political process helps resolve enduring puzzles in political economy, such as why the comparative advantage of industries shifts over time or why long-standing regulatory standards can suddenly become politicized.

Table of Contents

Acknowledgements v

Chapter 1: Introduction 1

1.1 Overview 1
1.2 The Context of the Argument 6
1.3 Production and the Politics of Resource Governance 16
1.4 New technologies in the American Automotive and Banking Industries 27
1.5 Outline of the Project 32

Chapter 2: Technology, Production, and Politics 38

2.1 Overview 38
2.2 Technology, the Production Process, and Governance Mechanisms 46
2.3 Technological Change and Resource Governance: Organizational and Political Strategies 74
2.4 Applying the Model in the American Context 98

Chapter 3: Lean Production in the American Auto Industry 104

3.1 Introduction 104
3.2 The American Automotive Industry in Transition 112
3.3 Defining Lean Production: Organizational Technology and Governance Mechanisms 128
3.4 A Summary of the American Response 154
3.5 Political Strategies 168
3.6 Firm Strategies: Failure and Innovation 215
3.7 Conclusion 278

Chapter 4: Electronic Data Processing in the Commercial Banking Industry: 1960-1972 284

4.1 Introduction 284
4.2 Commercial Banking in the United States 294
4.3 Electronic Data Processing and Resource Governance 336
4.4 Governing Labor and EDP Equipment 352
4.5 Political Strategies and Economies of Scale 372
4.6 Conclusion 417

Chapter 5: Conclusion 427

Bibliography 439

Acknowledgements

Any academic project is a creature of its intellectual environment, to a greater or lesser degree reflective of its virtues, partaking in its vices, and suffused with its conventions. I feel immensely fortunate that I have been able to produce this dissertation in an environment graced by my colleagues and the friends I have made in Cambridge, Berlin, and California. Too many people have provided insight, encouragement, and perspective to make it possible to thank them all; knowing the kindness they have shown me in the process of research and writing, I can only be further grateful that the many people not mentioned here will forgive me the omission. Of those whose contributions loom exceptionally large, my academic advisors deserve a central place. Without Peter Hall's knowledge, his patience, and his enthusiasm for this dissertation, it would not have been written. Torben Iversen's brilliance and his generosity with constructive feedback have greatly improved my argument and forced me to articulate and defend it more effectively. And both this dissertation and I would be intellectually much poorer without the advice, criticism, and challenges offered by Suzanne Berger. All three have my very sincere thanks.

I am also grateful for the intellectual contribution of many other colleagues who have assisted me over the last several years. Providing an intellectual contribution almost as great as my advisors, Christian Brunelli has also offered a valued friendship. Chris Adolph, Steven Vogel, Scott Greer, Magnus Feldmann, Alison Post, Mark Vail, and Carol Diane St. Louis have also provided exceptionally valuable feedback, perspectives, and comments. Many others have helped to shape my thoughts and contributed indirectly to this project through their intelligence and generosity, and though I do not list them individually I do offer them my gratitude. Much of my research was also facilitated by the exceptional organizational help of Isabela Mares and David Soskice, whose extremely kind efforts in offering me institutional support and access to world-class research facilities while away from Cambridge have been appreciated. I would also like to thank the staff and affiliates of the Minda de Gunzburg Center for European Studies, which served as a stimulating and productive intellectual home during most of my research and writing.

In addition to those whose intellectual contribution deserves acknowledgement, I would also like to thank my family – especially my mother Beverly, my sister Catherine, and my grandmother Betty for their encouragement and support. This is also a role played by so many good friends that it would be impossible to name them all. I will mention only Gerhard and Monika Schuecker, Endre Tvinnereim and Elisabeth Ivarsflaten, Suzanne Nielsen, Andrew Karch, Alan Silverleib, Diego Miranda, Victor Shih, Isabelle Ferreras and Fiona Barker.

And finally, I would like to thank Piret Loone, whose kindness, patience, and help I have treasured more than I can express.

Chapter 1: Introduction

1.1 Overview

Joseph Schumpeter wrote that the task of an entrepreneur is to organize the factors of production, to bring them together in a specific way to produce a final product. This project is concerned with how firms accomplish that task. Because firms must gain access to the factors of production and exercise power over them in order to put them to productive use, this task is necessarily built on a political foundation. It is the political system that determines what means firms may use to control the human and material resources they require. The state defines the rights that make up ownership and sets limits on the kinds of agreements among private actors that can be created and enforced. When firms must bargain with other groups in society such as unions, schools, other firms, or agents of the government for the resources they need, the state defines the terms under which these bargains will be struck and the kinds of bargaining power that will be wielded by each side.

If economic production involves gaining and exercising power over a set of resources, it is important to understand the mechanisms by which that power can be used. What tools does the state provide to firms for controlling the factors of production? Are these tools universal to market economies, generic to a given nation economy, or are they specific to an industry or region? More fundamentally, by what process are these tools created or altered over time? Are they fixed in nature or can they be modified by political choices? These are among the most basic questions in political economy, and

our answers affect how we understand competitive advantage, the role of firms in politics, and the driving forces of economic development.

I address these questions by presenting a model of production that emphasizes how firms control resources. In order to gain access to these resources and manipulate them in the ways required to produce goods and services, firms use institutional tools that are created and legitimated by the state. My argument begins with the nature of a production process. When firms create such a process, they divide it into a set of discrete tasks. The role of the managers who run a firm is twofold; they must first insure that these individual tasks are performed correctly and then link each task into a chain that ends with their finished product. The nature of these tasks, the resources required to fulfill them, and the optimal way to integrate them are not devised by an individual firm. Instead, most of the basic decisions regarding the people and material to be brought together and how they are to be combined are dictated by the production technology used by the firm. Most firms in an industry share a common general pattern of production – a constantly revised recipe for using available human knowledge most efficiently to create their chosen products. Schumpeter argued that the great task of the modern economy lay in the creation of these production technologies. Entrepreneurial genius lay in imagining the process that transforms inputs into a final product and then codifying that process into a repeatable pattern. After this has been done, others need only follow the entrepreneur's recipe to achieve the same results. Bringing together productive resources was "a performance of a special kind only when the factors are combined for the first time – while it is merely routine work if done in the course of running a business."[1]

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[1] Schumpeter 1934 (1961 ed.), p. 76

I argue that Schumpeter was incorrect: the task of bringing together productive resources requires creativity and initiative even after a technology had been reduced to a replicable production process. This is because the human and material resources called for by such a process do not exist in a vacuum. Instead, these resources are embedded in social and political institutions that determine how they can be accessed and controlled. Firms are able to unlock and use these resources only through the *governance mechanisms* that are supported and legitimated by the coercive power of the state. When a firm attempts to employ a new production technology, it often finds that existing governance mechanisms are inadequate to meet the demands of the new process. This can occur either because the resources it calls for are not generated in the firm's environment or because the production technology requires that existing resources be controlled in ways not allowed by available governance mechanisms.

When an industry faces this situation, the decision makers within firms – the *organizational* rather than technical entrepreneurs – are forced to either adapt existing tools of governance to new ends or attempt to co-opt the power of the state to create the governance mechanisms they require. While the political and organizational strategies firms choose are affected by a range of factors, I will show that these strategies are influenced primarily by two variables: the compatibility of the new production technology with existing governance mechanisms and the political opportunity structure faced by the industry. By understanding how firms' choices are conditioned by their organizational and political environments, three important questions can be addressed. First, what kinds of strategies will industries adopt to deal with technological change? Second, when will firms turn to the state in an attempt to modify the rules that govern

how they can organize production? And third, what circumstances are likely to make these political and organizational strategies successful?

In answering these questions, my argument serves larger goals. Private corporations and the modern, bureaucratic state are the defining social organizations of the developed world. Since their simultaneous emergence in the 19th century, social scientists have recognized the importance of understanding how these two pillars of the modern social order interact. Researchers have used Marxist, institutional, and pluralist frameworks to interpret what business wants from the state and how it goes about getting it, but the most common answer today would come from economics. Based on a compellingly simple set of assumptions, work in this tradition asserts that when firms turn to the state, they are engaged in some form of rent extraction.[2] My argument challenges this perspective. Gaining new organizational tools to control the factors of production is a necessary element of business, whether this involves extending commodification and market relationships to new resources or manipulating how non-market social institutions create and allocate those which already exist. This broader view of business lobbying can enhance our understanding of how regulatory and interest group politics operate.

More fundamentally, my argument presents a micro-level mechanism that can help explain how national economies develop over time. As new technologies, organizational forms, and industrial processes are introduced, producers attempting to implement them will encounter the limits of existing means for governing resources. Old

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[2] Broadly speaking, this perspective on business as lobbyists represents a synthesis of Olson's (1965, 1982) deductive arguments about interest group formation and the rent extraction hypotheses put forward by Stigler (Stigler 1971; Stigler and Friedland 1962; Peltzman 1976).

ways of creating and managing human and physical capital are proven inadequate to the needs of new divisions of labor and must be modified. The solutions that these producers seek to their specific problems will depend not only on the needs of technology – which would suggest that countries with similar patterns of economic development should display an isomorphism of governance mechanisms – but also on the political structures through which their demands are expressed. A pluralist political system will generate political bargains that allow firms different tools to control productive resources than would a statist or corporatist system. In some cases, the political side of an adaptation strategy might be as simple as convincing local law enforcement to look the other way while hired enforcers break up labor unions to create an atomized labor market. In others, the use of a new technology might require explicit changes in what the law allows firms to do. The structures through which firms and industries influence the state and the character of existing governance mechanisms – upon which new organizational forms must be built – will determine the kinds of changes that can be implemented.

Firms and industries that pioneer these new organizational forms create precedents and models for those that follow, even in other sectors of the economy. Over time, this process builds up a set of organizational tools that serve as the raw materials from which future firms will construct solutions to their own challenges of governance. While a specific firm might never engage in conscious political action to change how it is allowed to govern productive resources, most aspects of its production process could be traced back through history to a politically contested origin. Because the process that links new technology to regulatory change is iterative and path dependent – patterns of resource governance developed in the past limit what can be done in the present – my

argument can contribute to an explanation of why nations differ in how they organize and regulate their economies.

1.2 The Context of the Argument

Tracing the linkage between technological change, resource governance, and the political strategies of firms and industries offers important insights into both the history of industrialization and structural changes in the contemporary economy. Consider the historical dimension first. The creation of an industrial economy required fundamental shifts in the social order. The general pattern of this transformation is fairly consistent: human beings, materials, and knowledge must be transformed into the factors of production and allocated to specific tasks. Historically, this was done through either the commodification of these resources – which were then set adrift in newly created national markets – or by embedding them in non-market systems of organization and distribution. Social change on such a scale in a compressed period of time could only be accomplished using the power of the modern state – itself growing in power and expanding its regulatory scope.[3] But the actors responsible for these transformations and the ways in which they captured the power of the state to achieve their goals are often obscure. Among the first countries to undergo industrialization, the institutional structures of capitalism appear to have been built without blueprints by engineers whose motivations

[3] While the role of the state in creating markets for land, labor, and capital has been addressed by well known authors (e.g. Polanyi 1944;. Gellner 1983), this is only one category of governance mechanisms. Examples such as the adaptation of the ancient Roman device of the corporation to serve as the primary organizational form of commerce (e.g. Mark 1987; Rogers 1902; Butler 1985; Berle and Means 1968; Roe 1994), the development of systems of non-market training systems for labor (Thelen 2005), and the allocation of credit by German *Kreditbanken* (Gerschenkron 1962; Neuburger 1977) show that the state and private interest groups had no necessary devotion to market structures as the only ways of solving the problems of resource governance that emerged in capitalist economies.

and strategies we can only be inferred. This has encouraged theorists of capitalist development as diverse as Hayek and Marx to explain the creation of market economies in functional terms. Using a governing metaphor of evolution, these explanations are centered on processes rather than actors.

By focusing on how firms organize production in response to new technologies, it is possible to place actors on this empty stage, establish their specific motivations, and identify the tools available to them for pursuing their goals. Firms' needs to control resources in specific ways can explain the historical process that spread commodification to broader areas of social life by incremental changes in regulation and. More importantly, this framework can address the question of why business coalitions supported commodification and the creation of markets for some productive resources but not for others. To the degree that technology requires specific forms of governance to be used most efficiently, the political goals of firms can be inferred.

This model of adjustment to new technologies is also useful in understanding the effects of globalization. As larger segments of national economies are exposed to international competition, the importance of rapidly adopting global best practice technologies increases. Where these technologies are bound up with specific mechanisms of resource governance, competitive advantage should shift to nations capable of implementing them. If this is true, competitive advantage is dynamic in two distinct ways. The first is intuitively obvious: competitive advantage in a given industry will shift as the best practice production technology changes. In some periods, technology will favor the mobilization of resources through mechanisms that operate efficiently in a given country, allowing that national industry to prosper. If the best

practice technology changes to require that resources to be governed in ways not supported by existing institutions, the industry's competitive strength in that nation will wane. This argument based on the combination of technological change and mechanisms of resource governance can be useful in explaining why competitive strength seems to shift over time. Arguments identifying different institutional foundations of competitive advantage (e.g. Shonfield 1965; Johnson 1982; Katzenstein 1984, 1985) are not mutually exclusive. Instead, they should be seen as snapshots of how dominant technologies at a given moment mesh with congeries of governance mechanisms supported by national institutions and forms of regulation.

But there is a second dynamic at work as well. Governance mechanisms are facilitated by the state through policy and regulation as well as more basic economic institutions. If a technology demands governance mechanisms that cannot be used in the existing environment, it is possible for firms to modify that environment by influencing government and other interest groups. For this to be effective, firms must be able to gain the cooperation of the state to implement regulatory or institutional changes.[4] Their ability to do this will depend on the structures that transmit industry preferences to various actors in government; that is, the political opportunity structure. This gives firms facing competitive pressure created by new technologies a choice aside from simply seeking protection against foreign competitors. Instead, firms may choose to lobby for regulatory changes that can them to use the governance mechanisms that the new global best practice requires. If the political opportunity structure is favorable and the required

[4] Unlike the situation during early industrialization, the generic institutions of national capitalism are likely to be protected by entrenched interest groups who systematically benefit from them (cf. Olson 1982), making fundamental institutional change difficult and confining lobbying industry-specific policies and regulations.

changes are relatively small, firms can use the power of the state to open up new options for resource governance and create an environment that allows them to produce competitively.[5]

The argument I will develop operates at the industry level and draws on three traditions in political economy that address how firms control and coordinate factors of production. Each of these traditions contributes important insights, but they do not, individually, explain the political processes that underlie industrial change. The oldest perspective on economic production that examines how firms control resources grows out of classical economics. In its modern incarnation, this approach is best developed in work on transaction cost economics pioneered by Commons (1931), Coase (1937, 1998), and Williamson (1979, 1985*a*). Most work in this area identifies formal contracts as the mechanism by which firms control resources and assesses these contracts largely on the basis of their static efficiency. This perspective on the organizational task facing producers is compelling and analytically useful. It offers a vocabulary to describe production in terms of the governance or coordination of resources (Williamson 1996, 2002) and provides a rich analysis of the strategic interaction between firms and groups that control the resources they require as contracts are created and executed.

Though it emphasizes coordination of resources and places strategic action by firms at the center of the study of economic organization, the transaction cost school faces serious problems interpreting the real behavior of firms. Two core assumptions are responsible for most of these problems. First, transaction cost economics is based on the

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[5] In an era of highly mobile capital, it is worth noting that firms may choose to move production to a different national environment that already has the institutional and regulatory conditions called for by their production technology. This was not a viable option for the industries I examine, but should be considered when applying the argument to the contemporary world.

same behavioral and institutional foundations as classical microeconomics. In this framework, transactions are voluntary, they take place between autonomous parties based on rational calculations of material self-interest, and they are enforced by a neutral and efficient system of contract law. Even within hierarchical organizations, no role is played in this analysis by power or coercion, despite the emphasis on strategic interaction and incentive structures (Alchian and Demsetz, 1972). While economic actors are viewed as enormously inventive in developing contractual and organizational systems to deal with opportunism and information problems (cf. Granovetter 1985), this takes place in an environment where firms can make no use of public power beyond the enforcement of voluntary contracts (Williamson 1975). This is a telling omission in a field that describes itself as studying "governance" and "private order."[6]

The second misleading assumption is that the rules governing transactions form a neutral and unalterable characteristic of the environment. Though transaction cost economics has been rightly sensitive to the importance of how the "rules of the game" are structured, the field has focused primarily on the efficiency of regulation, property rights, and contract law rather than the ability of firms to alter their environment to gain new mechanisms for mobilizing and controlling resources.[7] Taken together, these

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[6] See Williamson (2002*a*, 2002*b*). The degree to which coercion or power asymmetries have been stripped from transaction cost economics is clear from Williamson's description of the concept of governance. Rather than an exercise of power, "governance is the means by which to infuse *order* thereby to relieve *conflict* and realize *mutual gain*."(p. 439, emphasis in original). Bowles and Gintis (2000) offer a partial critique of this idealized model of contracting by pointing out that the necessarily incomplete nature of contracts and problems of imperfect enforcement leave room for the exercise of power. In actuality, the structure of contract law and the range of government regulation dictating what can be agreed upon by private actors as well as how those agreements can be enforced should be seen as manifestations of power crystallized into law and custom in the manner described by Bachrach and Baratz (1962).

[7] Transaction cost theorists tend to regard regulatory regimes and the institutional infrastructure that supports various kinds of productive relationships in functional terms, being called frictionlessly into existence by the efficiency requirements of firms or by an objective "public interest" concern with market

assumptions prevent transaction cost economics from explaining how firms alter their own regulatory environment or addressing the role of power in transactions between structurally unequal partners.

The second tradition that approaches production in terms of controlling resources is explicitly concerned with power asymmetries and the ability of economic actors to alter their environment, but sacrifices both the sensitivity to institutional constraints and the focus on firms' strategic choices that characterize transaction cost economics. Marxist analyses view the firm as an arena for class conflict and see management as a proxy for the class interest of capital.[8] This perspective offers an important insight that should be incorporated into a theory of production. Marx recognized that firms influence the political order and co-opt its coercive power to create tools that are used to control productive resources. In classical Marxist thought, the primary manifestation of this was the commodification of labor and the breaking down of "feudal" barriers to its allocation through a labor market (Marx 1978 [1848]; cf. Polanyi 1944). The claim that political power underlies the mobilization of the factors of production, however, has implications beyond class interest that are useful to my argument. The role of political action in controlling resources is neither limited to the commodification of labor, nor is it confined to the construction of markets as the preferred tools of business to access and coordinate resources. Firms able to manipulate the regulatory power of the state may choose to

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failure or externalities (the normative perspective that underlies both Pigou (1938) and Coase (1960)). Excellent examples of this reasoning can be found in Glaeser and Schleifer (2003) and, in a more political context, by North and Weingast (1989). Derived from transaction cost theory, the modern field of Law and Economics is heavily influenced by efficiency-based reasoning about the origins of social institutions (e.g. Williamson 1979). It is interesting to note the conflict between these analytic assumptions and theories of regulation that portray government as auctioning off rents to industry (see footnote 2).

arrange privileged, non-market access to resources rather than trying to create fluid markets for them.[9] In American history, firms wielded the coercive power of the state to dominate and extract obedience from their labor forces (Weiss 1986; Johnson 1976; Taft and Ross 1969). In other areas, bureaucratic or negotiated control of non-labor resources was gained by the use of government power. This took a number of shapes, including such extremes as land grants to railroads in the 19th century or international agreements to secure rubber for auto and tire manufacturers in the 20th.[10]

This focus on the ability of firms – albeit as agents of a broader social class – to control the factors of production by exercising political power is important, but the Marxist perspective ignores or minimizes institutional and strategic factors that sharply limit how this power can be wielded. Unlike the abstract class forces identified by Marx, business in a modern state is neither monolithic nor politically omnipotent. The resource mobilization needs of a given firm – and therefore what they seek from the political system – depend on the production technology of their industry. This means that in a diverse economy, the political demands of business will be expressed in a cacophony of voices calling for highly idiosyncratic policies. Representatives of one industry might lobby for tax changes that favor the purchase of capital equipment, while another might

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[8] The control of the labor process by owners of capital is the key to this analysis. For an empirical development of this argument, see Braverman 1974. The elements of state power that underlie this are both explicit – the use of police power to discipline labor – and implicit in the enforcement of property rights.

[9] Standard explanations for establishing such non-market mechanisms emphasize the ability of these arrangements to be used to deny competitors access to key resources, making them an example of barriers to entry easily comprehensible to microeconomic theory. I would suggest that this may also be done in an attempt to generate, preserve, or control those resources in a specific way that cannot be achieved through market mechanisms.

[10] The conditional ownership rights given to private firms to promote railroad construction are examined by Ellis (1945). Galey (1979) reviews the abortive plan to establish plantations in Brazil to supply American

want the elimination of a safety regulation that affects its products. These demands, though carrying greater weight in a pluralist system for the reasons described by Lindblom (1977), are also set against competing interest groups and mediated through a complex process of interest aggregation and deliberation. Taken together, the diversity of business interests and the power of institutions to shape political conflict mean that a Marxist perspective cannot develop specific hypotheses about the political demands of businesses, the mechanisms that firms will cultivate to control the factors of production, or how those mechanisms will change over time.

The third approach that considers these questions focuses on the national character of economic institutions. Research in this area examines how the behavior of actors in the private economy is shaped by national systems of rules and the organization of interest groups. Differences in how capital markets, labor relations, or other basic segments of the economy are structured produce systematic differences in macroeconomic outcomes such as inflation, unemployment, and trade balance. The important insight of this work for my argument lies in how these macro-level outcomes are generated. The overlapping and mutually reinforcing institutions of a national economy operate as a system of incentives and constraints on firms (Streeck 1997*b*; Vogel 2003). Responding rationally to these incentives, firms that operate in such an environment solve the problems of economic coordination in similar ways (Hollingsworth and Boyer 1997; Hall and Soskice 2001). In the language of my argument, firms find that their institutional environment makes some forms of resource governance much less costly or more efficient than others. Whether dealing with systems

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firms with rubber, an episode especially interesting because it involved attempts by the Ford Motor Company to use the coercive power of two states to gain control over resources.

of labor relations, financial institutions, or relations with suppliers, these national institutions structure both how resources are generated in the economy and how firms are able to access them. The ways in which exchange relationships with suppliers of resources can be structured involve both the formal institutions of the national political economy and the set of norms and reinforced behaviors that co-evolve with them (Aoki 2001). Firms responding to these environments produce similar patterns of resource governance, creating the foundation of various national models of capitalism.

Though this national models approach identifies many of the institutions that facilitate resource governance and places these institutions in a political context, there are three reasons why it is misleading as a basis to explain firm strategy and shifts in competitive advantage. First, by emphasizing the constraining effects of national institutions on firm behavior, it suggests that there is little scope for firms to make meaningful strategic choices. To the strong institutionalist attempting to explain competitive success, the character of national institutions becomes the fate of national industries; if the best practice production technology demands that resources be mobilized and governed through mechanisms not supported by existing national institutions, the industry will simply be unable to use that technology efficiently. Protectionism, subsidies, or other policies might conceal the underlying lack of competitive strength, but it cannot be overcome.

Second and closely related, the strong institutional approach suggests that national systems allow for relatively little diversity across sectors or industries. This is based on the importance of institutional complementarities between aspects of law, regulation, and the social organization of the factors of production (e.g. unions, the national education

system). These complementarities create an interlocking system that is highly intolerant of change or the "defection" of some firms or industries from the national norms (Sorge and Streeck 1988; Hall and Soskice 2001; Vogel 2003). This would be a powerful argument if two conditions held. First, the national institutions looked at in this literature would have to affect every industry in a national economy symmetrically. Second, the behavior of firms would have to be influenced primarily by a relatively small number of institutions. If these conditions do not hold, then industry-level outcomes will be determined by the constraints imposed by a larger number of institutional and regulatory factors. Some of these might influence large segments of the national economy, while others affect only a one industry or even a subset of firms in that industry.

Third, the strong institutionalist approach offers only limited insight into how institutions change over time. Just as theories describing national models focus on a small number of macro-level institutions and argue that their complementary nature makes it difficult for any firm to escape their influence, it also suggests that changing the institutions themselves should be exceptionally difficult. From this theoretical perspective, institutional systems emerge from repeated patterns of cooperation or bargaining among national-level interest groups and the state. The arrangements that emerge from this bargaining work to the advantage of politically powerful interests (Knight 1992) and tend to become entrenched as the actors who benefit from the arrangement allocate resources to defending it (Olson 1982). Both the institutions and the patterns of cooperation that are formalized through this process are therefore remarkably durable over time. Work in this tradition attributes institutional change to either an incremental updating that occurs continuously or to the effects of an exogenous

shock that forces the underlying bargains among interest groups that create and sustain institutional systems to be recast (Thelen 2005).[11]

1.3 Production and the Politics of Resource Governance

My argument builds on these traditions by proposing a model of production based on technology and resource governance. In this model, firms face a set of organizational tasks that are determined by their production technology. Since these tasks require the mobilization and control of productive resources, a firm's ability to accomplish them efficiently depends on the availability of the "right" set of governance mechanisms – organizational or administrative tools for mobilizing and coordinating the factors of production that match the functional needs of the new technology. If congruence between the demands of the firm's production technology and the governance mechanisms available in its environment is a necessary condition of competitive success, we can make certain inferences about the firm's behavior. Specifically, creating and sustaining this congruence across waves of technological changes will be an important part of a firm's competitive strategy. This will dictate important elements of both its organizational form and its political behavior.

Consider a firm that is forced by competitive pressure to adopt a new production technology. The challenge facing such a firm will be to find organizational tools that will allow it to meet the resource governance requirements imposed by the new technology. If the firm is fortunate, the demands made by their new technology can be met using

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[11] For excellent examples of how these seemingly contradictory approaches can be used to explain specific instances of institutional change, see Soskice (1999) and Vogel (2003). In both cases, the authors argue that the response to an exogenous shock is strongly influenced by existing institutions that shape the preferences and strategies of interest groups and governments.

mechanisms that are either generic to the national economy or that have already been developed for their industry. Because firms operating in a modern economy have a range of general purpose institutional tools available to them that have been built up by previous generations of producers, this is the most common situation. These generic mechanisms of control include the ways in which contracts can be made and enforced, systems of direct or mediated ownership, and frameworks within which firms can negotiate the behavior of their suppliers and ensure compliance with the agreements reached. If a firm has access to sufficiently flexible means of controlling resources or finds that the governance needs imposed by its production technology are not completely binding – that is, the technology can be used with a variety of functionally similar governance tools – then the task it faces is entirely organizational.

Despite the flexibility of a national economy's generic governance mechanisms and the specialized variations of those mechanisms that coevolve with most industries, they are not always sufficient to meet the needs of new production processes. When a new technology emerges that demands forms of resource governance unavailable in the firm's environment, managers must turn to the state to provide them with new ways of extracting and coordinating the use of resources in their production process. This is true even in cases where the political dimension of innovative resource governance is not immediately apparent. For example, in situations where the use of a new technology requires the ability to negotiate new forms of exchange between private actors or the expansion of purely market relationships, government must be engaged and its acquiescence secured. Property rights and the enforcement of private contracts are

underwritten by the coercive power of the state, and the range of agreements that can be negotiated by private actors is set by political choices.

The demand for this kind of regulatory change is created by a disjuncture between the forms of resource governance required by a new technology and the capacities of existing organizational mechanisms. But the existence of such a disjuncture is not sufficient to explain how political action becomes part of a firm's production strategy. In order to understand this, the supply of regulation provided by the state must be examined. Firms that lack the ability to mobilize or control the resources required by a new technology must first determine what regulatory changes they require and then evaluate the best strategy to gain those changes from the government. The first step is cognitive and deliberative. Where the firm is not the pioneer of a new technology, it examines how other firms in different regulatory environments have addressed the resource governance tasks imposed by the technology. Managers evaluate possible substitutes for the governance mechanisms unavailable to them. Where such forums exist, firms consult industry associations, trade journals, and the opinions of industry specialists or academics. This deliberation results in a common understanding of the resource governance tasks imposed by the new technology and establishes at least a contested and incomplete consensus as to the regulatory changes that are required.[12]

As this consensus develops around specific regulatory demands, firms evaluate the political opportunity structure through which they can achieve these goals. The political opportunity structure should be understood as both the set of access points

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[12] The importance of public deliberation through these forums is difficult to overstate. In cases where firms lack the internal capacity to research the new technology and evaluate its implications, the conclusions reached in these forums provide managers with a template that defines the technology, establish the

through which firms can affect government policy and the range of political resources possessed by firms that can be mobilized and directed toward influencing the political system. One of the first elements of this will be the ability of firms to formulate a common set of political goals and coordinate a collective strategy for their industry. For the type of business lobbying of interest here, collective action is facilitated by the symmetric impact of technology. Simply put, a common definition of the new technology and agreement on the regulatory changes that are required to use it effectively help to set collective political goals and establish strategy to achieve them. The institutions that create and propagate this common understanding will also serve as a forum for political mobilization. A strong industry association, for example, can serve both of these purposes. The association first provides a forum in which firms define the new technology and share information about the governance mechanisms that would facilitate their organizational responses to it. As this deliberative process develops, leading firms or elites within the association can use it as to mobilize members around those political goals. More independent or less formal institutions such as trade journals or academic debates can serve a similar purpose, though in most cases less efficiently. The internal organization of the industry determines how political resources will be mobilized and the degree to which the industry will address government with one voice.

The choice of how to apply political resources is made based on three closely related factors that establish how firms can legitimately pursue their political goals and set out the institutional landscape that can cause an industry to favor some political strategies over others. For firms, the most important considerations are the kind of

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organizational and resource governance tasks that must be undertaken to adopt it, and facilitate collective political action by small firms. See the role played by the American Bankers Association in Chapter 4.

regulatory change sought, the nature of political resources that can be mobilized, and the access points made available by the state. The first of these factors is clear – lobbying will be focused on the groups in government that have the power to bring about the desired changes. This might require engagement with party politics to influence a legislature, petitioning an administrative bureaucracy to alter how regulations are applied, or initiating legal challenges to existing regulations through the courts. The second criterion is more subtle, but equally important. Firms as political actors have ready access to certain resources such as money, specialized knowledge, and the threat of poor economic performance.[13] The availability of these resources and the relative difficulty of mobilizing other forms of political power affects the political strategies business will choose. Even where a specific power resource is ill suited to a political task – attempting to mobilize large numbers of voters through the expenditure of money, for example – having that resource in abundance can incline a political actor to think about exercising power on its terms. The third factor that shapes the lobbying behavior of firms and industries is more familiar to social scientists and arises from the ways in which government is functionally organized. Political systems are designed to accept inputs in certain specific ways. Information is gathered through hearings, the formation of special committees, and the commissioning of reports by groups of experts. Power is assigned based on the input of the electorate through the franchise in structured ways. Campaigns

[13] Though difficult to measure, the indirect power wielded by business in the form of poor performance is an extremely important influence on both of the cases I examine (for a theoretical examination of this indirect power, see Lindblom 1977, 1982). In the American auto industry, the employment consequences of making any regulatory decision that could harm Ford, Chrysler, and General Motors hangs over nearly every aspect of policy making except those that take place in the courts. In the case of retail banking, the importance of banking to the economic health of local communities combined with the federalist structure of regulation and the geographic nature of American legislative representation to make individual banks tremendously powerful within specific congressional districts or states.

and parties are open to influence through resource dependencies in labor, organizational skill, and money in ways that are regulated by law or internal rules. The interface between government and society is structured by this combination of institutional structure, law, and organizational rules. To gain the changes in regulation or institutional structures that they need to control the factors of production, firms must examine this boundary and choose the most favorable channels of access to for their goals.

Taken together, the political and organizational strategies allowed by firms' environments have important effects. At the most basic level, the success of a national industry responding to a new technology will be largely determined by them. This will be manifest in the competitive performance of an industry facing international competitors or the relative efficiency of an industry protected from rivals embedded in different regulatory environments. Consider the two situations that a firm might encounter when an exogenous technological change forces it to re-organize its production process. If the new technology imposes resource governance demands that can readily be met in a firm's environment, then a necessary condition for competitive success has been fulfilled. My argument does not guarantee competitive success for a firm in this position; adapting existing resource governance mechanisms to work with the new technology will still require an intelligent organizational strategy and favorable market conditions. But once this task of organizational entrepreneurship – again distinct from the technical entrepreneurship described by Schumpeter – has been accomplished and the production technology has been implemented in a given regulatory environment, other firms in that environment will be able to imitate that form of production organization. Only then will organizing production for firms in the national industry become "merely routine work."

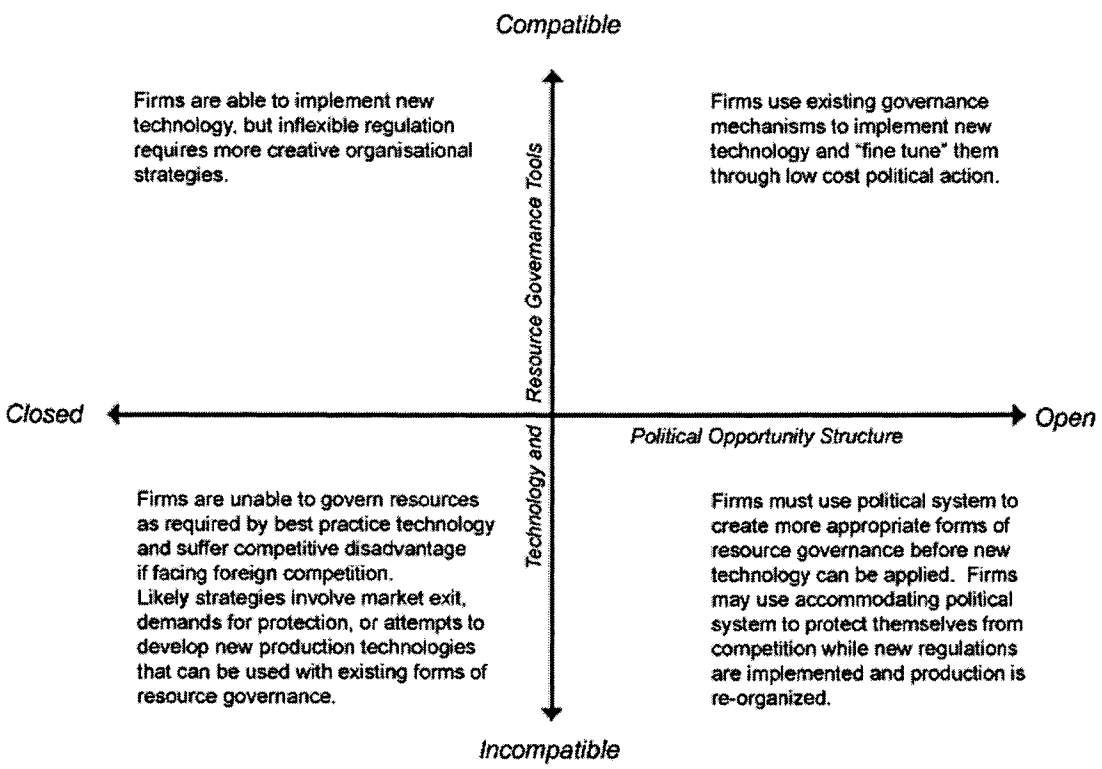
The implication of my argument for a case such as this is that a firm's organizational strategy will be powerfully influenced by interaction between the resource governance needs of the new technology and the mechanisms of resource governance available in its environment.

The alternative situation is more interesting. Firms challenged by a new global best practice technology often find that the resource governance tools available in their environment are inadequate to use the new technology efficiently. In this situation, organizational strategies relying on the innovative use of existing forms of governance will be insufficient. Instead, competitive success for a firm in this position requires a third kind of entrepreneurship. Firms must turn to the state and try to harness its rulemaking power to create governance mechanisms that meet the functional needs of the newly dominant technology. Success in this task opens up the possibility of implementing a successful organizational strategy and applying the new technology in a competitive manner.

It is in this case that all of the variables examined in this project come into play. The political strategy – crafted by an individual firm or pursued collectively by the industry – will reflect the functional demands of the new technology, the changes in governance mechanisms that would have to be made in order to use it, and the political opportunity structure through which firms can influence government regulation. By examining these factors, both the firm's success in exploiting a dominant technology and its strategies for doing so can be understood. On the political side, it becomes obvious that firms do not enter politics only for the purpose of rent-seeking, but for instrumental reasons. They seek a specific delegation of the state's coercive power in order to

facilitate the production of goods and services. These delegations of power are then bound up with firms' organizational strategies to determine how the new technology will be adopted.

Figure 1: Patterns of Response to New Technology



Based on the variables listed, it is possible to provide more exact answers to the questions of what a firm seeks from government and which avenues it will use to achieve those goals. We can expect firms to behave opportunistically, with their choices of how to lobby determined by the political assets available to them and their approach to the state determined by the institutional organization of government, the division of regulatory competencies, and the ways in which the political system structures the legitimate activities of interest groups.

When their political goals are contested or their access to government is limited, firms will seek the smallest and most incremental regulatory changes necessary to achieve their objectives. If control over a needed resource can be gained through a change in existing regulation rather than the creation of new institutions, the pressure to support the former are strong. The reasons for this follow from the literatures on business lobbying and social learning. Most obviously, resource governance mechanisms affect how power is exercised over people, objects, and groups embedded in a complex society (Suchman 1995). The greater or more radical the change proposed in such power relations, the more likely an attempt to implement it will produce counter-mobilization among affected interest groups. Because of this, it is usually easier to achieve smaller or less noticeable changes than larger ones. Second, the political assets most easily mobilized by business – money, time, technical knowledge, and the persuasive power of claims about competitiveness or efficiency – are better suited to influence regulators, bureaucrats, or committees than a large and diverse legislative body.[14] This biases business to operate in political arenas where these assets are most effective rather than seek to build large scale coalitions to push changes that would require the creation of new institutions or pushing major initiatives through a legislature. These forums are generally limited in power and overseen by more democratically accountable bodies, making their

[14] This is exceptionally important in combination with the first point about legitimacy and counter-mobilization. The forms of power exercised by business are inherently bound up with certain forms of legitimacy. Property and contract rights combine with a justification from efficiency and the satisfaction of consumer needs to ground managerial claims to power. Claims based on these arguments can be challenged more easily in a legislature that is grounded on democratic legitimacy than in a court of law where authority is based on the interpretation of rights in light of precedent or before a technical committee bound to respect technical expertise and claims of efficiency.

policy outputs more likely to be incremental or technical.[15] Third, the value of their own experience using existing institutions to govern resources will lead firms to favor the smallest changes consistent with use of a new technology. Like complex physical tasks, the efficient use of social institutions to direct an array of human activity requires learning by doing on the part of managers. The costs associated with using an entirely new form of resource governance are difficult to evaluate in advance and will bias firms toward ways of meeting the demands of new technology that are related to existing institutions.

In summary, we can predict that firms' responses to new technologies will be play out in two related ways. The centerpiece of a firm's response will be an organizational strategy that attempts to meet the resource governance requirements of the new technology by the creative use of existing social institutions. Depending on the technology being employed, the kind of regulation that affects the industry, and the flexibility of the generic mechanisms of resource governance available in the economy (e.g. contract law, systems of labor arbitration, or types of common ownership allowed), this organizational strategy may be insufficient. Under these circumstances, firms will turn to the state and attempt to modify their regulatory or institutional environment to allow the use of the governance mechanisms demanded by the new technology. The strategy firms use to accomplish this will depend on the political opportunity structure

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[15] The functional power of this argument – that business seeks to interface with government in forums where their particular forms of political power are more effective – is illustrated by the literature dealing with policy subsystems or iron triangles in regulation. This literature shows that business regulation tends to be made in insulated and low-visibility arenas even in the relatively pluralist American system. In political systems with more formally corporatist models of interest group representation (e.g. Austria, where it is manifest in the constitutionally protected position of the Chamber of Commerce), the tendency of business to seek a niche in the policy process where their political assets can be most effective is formalized and counter-mobilization made even more difficult. For a review of this literature, see Baumgartner and Jones (1991)

they face. Industry structure will determine the degree of political coordination possible between firms, the institutional design of government will determine how firms can gain access to the power of the state, and the political resources available to firms will limit how they can transmit their desires to government. The advantages enjoyed by business in the political arena are enhanced when seeking these regulatory changes when a plausible claim can be made that they are not engaged in (explicit) rent seeking but demanding the tools to compete with foreign competition or to fully utilize a new technology.[16]

While I have separated the political and organizational strategies pursued by firms for analytic clarity, it is important to study them in relation to one another as part of a single response. This is necessary because the purpose of political action is to provide the tools needed to implement an organizational strategy; the environmental conditions that place limits upon a firm's organizational strategies will define its political goals. By the same token, a firm's organizational entrepreneurship is limited by what can be achieved through politics. Even the most innovative organizational strategy requires a certain set of organizational tools to control the resources demanded by technology. Political action is therefore incomprehensible without an understanding of the broader context of the firm's response.

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[16] It is worth again highlighting the contrast between the purely distributional politics described by economists such as Stigler (1971) and Peltzman (1980) and these demands for regulatory change. While granting firms new powers to govern resources may have distributional implications and might be transmitted through mechanisms similar to those examined by capture theory, the political logic will be noticeably different. The motivation for claims made on government, the perceived legitimacy of these

1.4 New Technologies in the American Auto and Banking Industries

To test these claims about firms' organizational and political strategies, I have examined the responses of two industries to significant and organizationally disruptive technological changes. In the automobile industry, the introduction of the lean production (LP) system pioneered in Japan forced Ford, General Motors, and Chrysler to seek governance mechanisms that could control existing resources in new ways. In the commercial banking industry, the introduction of electronic data processing (EDP) forced a large industry made up of thousands of tightly regulated banks to pioneer ways of creating and governing entirely new productive resources. In each of these industries, a new best practice technology forced firms to change their production processes in ways that could not be accomplished using existing resource governance mechanisms. Adjustment in each industry involved both organizational and political entrepreneurship, making it possible to study how the decision to engage the state was made and how that choice was related to other changes.

Given the complexity of the causal variables I have identified and the dependence of my argument on the context of specific industries, detailed case studies are the best way of evaluating it empirically. The general pattern of firm responses that I outline will take different forms depending on how an industry is organized, what types of governance mechanisms must be created or altered to make use of a new technology, and how the political opportunity structure allows firms to influence government. It would be difficult to simplify these variables to the point that they could be coded for a study of correlation between types of technological changes, characteristics of the political

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claims, and the ways in which thy are coordinated with broader firm strategies all point to a different politics of business lobbying in this area than in those put forward in market models of regulation.

environment, and the outcomes I predict. An attempt to do so would produce results that were extremely sensitive to initial definitions and reflected contestable decisions about how different cases should be interpreted. The first step of identifying a discrete technological change and determining what resource governance mechanisms it calls for requires a detailed knowledge of how technology and the division of labor is understood in a given industry. Determining whether a firm faces an open or closed political opportunity structure will obviously depend on the kind of regulatory change a firm seeks and the nature of opposing coalitions. For example, a firm might find that the political system is structurally accommodating to demands for protection against imports, but resistant to regulatory changes that would weaken unions. This makes it difficult to construct a numerical index of the causal variables and apply them in a meaningful large-N study.

Since the argument must be tested through case studies, I have selected technologies and industries that display the a wide range of variation. That is, variation exists both between the two cases and among the strategies implemented by individual firms in each case. Consider first the technological changes being examined. Electronic Data Processing was introduced in the banking sector in the early 1960's after being developed in cooperation between large American banks and a small number of office equipment manufacturers. To adopt the technology, banks were forced to eliminate most of their labor force involved in bookkeeping and replace them with a mix of computer programmers, technicians, and data entry personnel. In addition, the computer equipment available could only be operated efficiently recording and processing much higher numbers of transactions than was common for small banks. In order to use the

technology, banks had to develop cooperative relationships with computer manufacturers, create and manage an entirely new labor force,[17] and multiply the numbers of transactions they processed. Lean production, by contrast, was an organizational technology developed by Japanese auto makers to adapt Fordist mass production to their regulatory and market environment. Using LP did not require that firms liquidate and replace existing physical and labor assets. Instead, the technology demanded that auto makers develop new ways to govern existing productive resources – specifically their relationships with upstream suppliers and the management of their work force.

The industries applying these technologies were also quite different. At the time LP was introduced, the automotive sector represented the largest manufacturing industry in the United States. It competed in its domestic market with a number of less successful international competitors. The industry was made up of four large firms dominating a range of independent and affiliated suppliers, featured one of the most comprehensively unionized labor forces in the United States, and was regulated primarily by the federal government. The commercial banking industry operated in every state of the union and produced a non-tradable service the use of which had become universal in the postwar era. Almost every aspect of the banking sector had been explicitly and tightly regulated since the 1930's by state as well as three federal agencies. Because of this, its management tended to be conservative and suspicious of innovation. Its labor force was atomized and prior to the introduction of EDP the only significant inter-firm relationships in the sector were structured by the Federal reserve and correspondent bank systems.

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[17] Since banks led most industries in office automation and operated in many areas with restricted labor pools, no market existed for the kinds of skills this technology called for.

In addition to these differences, the competitive outcomes in the two cases I examine were quite different. Despite structural disadvantages and a lack of foreign competition to spur investment, leading firms in the banking sector successfully adopted EDP and gained the full efficiency benefits of the new technology. By contrast, the American auto industry never successfully implemented LP. While the industry remained profitable through a range of strategies involving product differentiation and the innovative use of market incentives to reduce costs, the organizational technology of lean production simply could not be used in the United States.[18]

This variation between cases allows us to make inferences about the forces that produce industry strategies and those that determine competitive success. In both cases, technological change required that firms employ new governance mechanisms. In each instance, this imperative caused firms to adopt linked political and organizational strategies to gain access to these tools for controlling resources. This suggests that the pattern of searching for appropriate governance mechanisms and using political power to create or modify them as necessary is not contingent on the character of the industry or the specific resource governance requirements imposed by the new technology.[19] At the same time, the failure of the auto industry to implement LP suggests that one or more of

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[18] This strong conclusion about the impossibility of fully implementing LP in the American institutional and regulatory environment is supported by the relative costs of Japanese manufacturing facilities that were opened in the United States during the 1980's. See Chapter 3.

[19] The use of different cases can not provide more than suggestive evidence of causation when dealing with complex variables and a small number of cases, but it does allow one to eliminate alternative explanations for the common result – in this case, the focus by firms on securing new governance mechanisms and the use of political action to provide them – that are linked to the character of the technology or the nature of the industry. For a discussion of causal inferences based on case studies, see Ragin (1987) and the debate between Lieberson (1991) and Savolainen (1994). For a classic general discussion of causal inference in political economy that reflects on Mill's methods of agreement and disagreement, see Viner (1917).

the qualities that vary between the cases affects the ability of firms to use new technologies.

The variation within each case permits further inference about both strategy and success. Because individual firms pursued different strategies to implement the new technologies, we can see in each industry a competitive process where a dominant strategy is developed and spreads – albeit imperfectly – through imitation or market selection. Like the processes of industry cooperation and imitation that lead to the diffusion of technical innovations, an optimal organizational strategy will be copied by other firms facing a similar environment. Global best practice technologies are transformed by this process into national or regional best practice forms of production, varying based on the regulatory, institutional, and market environments faced by firms. In the banking sector, for example, firms tried a range of strategies to increase the volume of their transactions to reach levels that could support EDP systems. Banks formed cooperatives to share data processing at one location, created joint ventures that attempted to sell data processing services to banks and other firms, and expanded the range of services they offered to increase the transaction rates of each customer. These strategies met with some degree of success, but a dominant strategy of consolidation and branch organization eventually became the standard industry response despite the fact that it required substantial changes in government regulation. In the auto sector, attempts were made to organize LP style relations with the labor using existing contract law, negotiations with the United Auto Workers union, and factory-level councils. Both tighter vertical integration and quasi-ownership means of achieving coordination with suppliers were tried. In one instance, direct government intervention and tripartite

bargaining were attempted during the federal bail-out of Chrysler. The failure of each of these attempts to create the governance mechanisms required by the new technology or devise functional substitutes for them makes it possible to eliminate many possible reasons why American firms could not use LP.

The most important benefit of using case studies is the ability to supplement inferences based on variation of outcomes with a detailed examination of the chains of decisions, strategies, and conflicts that produced those outcomes. I have examined the records available from trade journals, industry association meetings, government reports and statistics, corporate policy statements, newspaper accounts, academic studies, and contemporary interviews to determine why managers made specific decisions. Placing these statements – many of which are admittedly mistaken or self-serving – in a historical context based on which plans were implemented and what claims were proven accurate helps us to transform a functional and highly rationalist theory of firm behavior into the substance of organizational and political entrepreneurship. The process by which firms define a new technology, determine what resources the use of that technology demands, and then devise strategies for gaining access to and control over those resources is complex and idiosyncratic. I believe that my cases demonstrate that there is a logic to this process that allows us to use a common framework despite these idiosyncrasies.

1.5 Outline of the Project

The dissertation is divided into three core chapters. Chapter 2 provides a theoretical examination of technology, the production process, and the concept of resource governance. Though the concept of resource governance that I use to describe how a firm functions has a long history in economic theory and is gaining popularity in

political economy, it still requires development and the establishment of context. With the definitions that underlie my model of production established, I will defend the two claims that drive my argument: that the organization of a production process is an artifact of how the demands of technology interact with available governance mechanisms and that these governance mechanisms are almost always created and sustained through the delegation of the power of the state. Once these points are made, the necessary relationship between technological change, the organization of production, and government regulation should become clear.

In the next chapter, I will use this framework to interpret the American auto industry's attempt to apply lean production (LP) between 1979 and 1993. This will involve three steps. First, the history of the auto industry and its condition in 1979 will be examined. This background information is vital because both the established forms of resource governance used by auto makers and the industry's regulatory environment constrain firms' adjustment strategies. Second, I will define LP and explain why the technology was linked with very specific forms of resource governance. This will involve an examination of the Japanese institutional and regulatory environment in which LP emerged and a review of the reasons why it was difficult to create functional equivalents of those governance mechanisms. Third, I will review the political and organizational attempts made by the three American auto makers to deal with LP. To do this, a range of strategies must be examined, only some of which involve direct attempts to create governance mechanisms that would facilitate the use of lean production methods. This examination of other strategies is necessary because attempts to use LP in the United States failed. The resource governance mechanisms required by the

technology could not be created by private or public action despite several a range of attempts. As these failures played out, American firms adopted a range of other strategies to mitigate the effects of failure. Though this was immensely expensive and disruptive, American firms were able to survive competition Toyota, Honda, and Nissan through product differentiation, political demands coordinated with labor unions that the Japanese build cars in the United States, and changes in organization that built on the governance mechanisms that *were* available to them.

The fourth chapter examines the introduction of electronic data processing (EDP) in the commercial banking industry. This case plays out in a more straightforward manner than the auto industry, and the successful implementation of the new technology allows me to trace each aspect of my argument more clearly. Like the previous chapter, this case begins with an examination of the history and structure of the banking industry. This historical context is more important in the banking case, however, because the industry was among the most highly regulated in the United States at the time EDP was introduced. The history of commercial banking is also linked to the way the industry was organized politically through the American Bankers Association and the Federal Reserve System. These organizations are critical to the industry's adjustment to EDP because they served first as forums in which the technology was defined and response strategies were formulated and then as an avenue through which banks organized relations with equipment suppliers and lobbied government. Virtually unique in the American economy, commercial banking was organized in an almost corporatist fashion through these two organizations, and this defined the political opportunity structure faced by firms in trying to create the governance mechanisms required by EDP. The next section

of the chapter examines EDP and explains the resource governance requirements that it imposed on banks. The development of EDP provides an excellent illustration of the social construction of technology and the degree to which a technology's inflexible 'requirements' can be created and reinforced by arbitrary decisions and the mechanisms by which the technology diffuses. Though the determinacy of the technology in this case was in part created by early adopters and the strategies of computer makers, this determinacy was nonetheless real – banks were forced to develop the governance mechanisms required by the technology as it was presented to them.

With the regulatory environment and the resource governance demands of EDP established, I will examine how the industry responded organizationally and politically to meet these demands. A range of organizational strategies were attempted with varying degrees of success, and all of them involved some change in regulation that had to be accomplished through the political system. Ultimately, the introduction of EDP was a key factor in breaking down the entire New Deal regulatory regime in banking, because it changed the internal balance of interests within the industry and gave large and small banks a common interest in allowing consolidation. This realignment of interests broke a stalemate within the industry that had prevented banks from coordinating their lobbying for deregulation. Though the full consequences of this shift are beyond the scope of my study,[20] this is worth noting because it demonstrates a larger implication of my argument; the regulatory structure of an economy is influenced at least as much by firms seeking

[20] Large banks had always wanted unlimited power to expand through mergers, but small banks had opposed this and effectively prevented any lobbying on the issue by the American Bankers' Association since the 1920's. Though it was not the only factor, the main reason why this stance changed in the 1960's was that small banks felt that consolidation was necessary to adopt EDP. The trend toward inter-state bank mergers, the removal of restrictions on interest rates, and the elimination of investment oversight that has

means to control the factors of production in ways that are dictated by technology as by government planning or by simple rent seeking by firms. The chapter also highlights the role of the courts in enabling new uses of contractual mechanisms or new interpretations of existing regulation. This could be considered merely the legal ratification of a creative organizational strategy that uses the generic governance mechanisms of an economy in new ways. In this case, however, the courts play an explicitly political role and are used strategically by banks to change the meaning of regulation and to apply political pressure on other regulators.

The conclusion reviews the theoretical significance of the two case studies and suggests areas where the argument might supplement our understanding of the historical development of capitalist economies or change how we think about the role of the state in developing and transition economies. By recognizing that legal systems of property rights, contract enforcement, and dispute resolution are manifestations of historical political conflict generated by firms responding to new technologies, the question of government regulation is thrown into a new light. Rather than asking whether government interferes in the operation of the market, we see that markets are only one mechanisms by which socially embedded human and material resources can be mobilized and turned to productive tasks. The usefulness of market mechanisms in any specific case will be contingent on the needs of production technology and the ways in which those resources are generated by and embedded in social institutions. To believe that the full commodification of resources and their governance exclusively through classical contracts is universally the most efficient means of organizing an economy ignores both

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reduced the stability of the banking industry since the 1980's can all be traced to the breakdown of banking regulation that began with this shift in political coalitions.

industrial history and the real demands made by firms when translating technologies into the systems of production and distribution that structure the modern economy.

Chapter 2: Technology, Production, and Politics

2.1 Overview

In the developed world, firms are among the most influential actors in the economic, political, and social worlds. Firms' decisions about how and where to operate determine patterns of employment, the goods and services that are available, and the magnitude of economic growth. To the degree that these basic characteristics of society are the concern of government, the behavior of firms will have a political dimension and be subject to government regulation. At the same time, the decisions of government are of critical importance to business. This is true not only in the sense that government regulation can limit the behavior of firms and reduce their range of strategic options, but more importantly because the state empowers firms to interact with their environment. Firms possess only a fictional existence that is defined and limited by law. They can exert power over objects or people only in ways that are legitimated and supported by the power of the state. From the interpretation of the contracts it negotiates to the enforcement of its property rights and the generation of many of the basic resources it uses, a firm's ability to command the obedience of its workers or the cooperation of its suppliers depends ultimately on what is allowed and enforced by its government.

Though the symbiosis between government and private firms operates in a variety of ways, this project focuses on how it affects the organization of production and the strategies firms adopt to combine materials, systems of organization, and labor into final products. In order to produce the goods or services that they sell, firms require specialized inputs that must be drawn from their environment and integrated into the

production process. In order to accomplish these two tasks – extracting highly differentiated resources from their environment and manipulating those resources in a specific way to combine them with other inputs – firms use a set of organizational tools that are created and sustained by the state. These tools, which I will refer to as *governance mechanisms*, are ways of assigning to firm managers the power to organize the activities of the individuals and groups that must operate together in order to take advantage of the division of labor.[1] Governance mechanisms may include property rights enforced by the police power of the state, various types of voluntary exchange that can be formalized through contracts, or informal agreements between a firm and groups in society that control or generate productive resources (e.g. schools, other firms, or unions).

My objective in examining how firms use and modify these governance mechanisms is to twofold. First, I intend to explain how these organizational tools are created and changed over time. It is commonly acknowledged that modern economies are organized around different economic institutions. They rely on complex and socially embedded systems to allocate labor, intermediate between savings and investment, and resolve disputes between firms and other economic actors. These differences have wide-ranging implications that are important to political economists, shaping how a national economy responds to economic shocks, how it generates and distributes resources, and

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[1] The term "governance mechanisms" is based on the theoretical work of Campbell, Hollingsworth, and Llindberg (1991), Hollingsworth and Boyer (1997), and Kitschelt (1991), though the concept can be traced to Commons' (1931) discussion of persuasion, obedience, and institutional psychology and Penrose's (1955, 1959) emphasis on the organizational capacity of firm managers. We can identify social relationships as governance mechanisms based on both functional similarity – in each case control is being exercised over productive resources as part of a production process – and the ultimate appeal to the coercive power of the state to interpret and enforce them. This emphasis on control over steps in a production process by managers within one firm should be contrasted with the term "coordination mechanism" used by authors such as Soskice (1999), Hall and Soskice (2001), or Aoki (1990). Governance mechanisms are used deliberately by a unitary actor implementing a production strategy. In

how it creates and adapts new technologies (Hall and Soskice 2001). While national economic systems are characterized by certain generic governance mechanisms that are used by most industries and allow us to usefully describe economies in terms of national models,[2] there is also considerable sub-national diversity of governance mechanisms across industries and regions. Despite the extensive literature describing the institutions that define these systems both theoretically (e.g. Williamson 1996, Alchian and Demsetz 1972, Boyer and Hollingsworth 1997) and empirically (e.g. Chandler 1962, Gerlach 1992, Streeck 1997*a*), the question of how they develop is not well understood. This project offers a theory of how firms adapt existing governance mechanisms to new purposes and enlist the power of the state to create new ones in response to the resource governance demands imposed by changing technology.

In addition to explaining one way in which governance mechanisms are created and changed over time, I argue that an understanding of the "fit" between governance mechanisms and the organizational demands of a specific technology can explain changes in competitive advantage. If firms are able to mobilize and control the resources they need efficiently, the national industry to which they belong will be well positioned to compete internationally. Though poor strategic choices or cost differences produced by national factor endowments might prevent that country's firms from being important players in international markets, having the necessary governance mechanisms available is a necessary condition of competitive success. Even in non-tradable industries, resource

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the model I develop this actor is an idealized firm manager that can be thought of as similar to Schumpeter's (1934, 1939) entrepreneur.

[2] Well known examples of such generic governance mechanisms would include the *Hausbank* system in Germany, the common law framework for contracts in the United States, and the *Keiretsu* clustering of firms by cross-ownership in Japan.

governance is a useful way of thinking about economic outcomes; the ability of firms to produce in the most efficient manner affects price levels, consumer surplus, and other important aspects of the economy.

These two arguments connect with one another when firms implementing new technologies attempt to create the governance mechanisms they require. To understand this, consider the two possible situations that a firm might encounter when a new technology forces it to re-organize the ways in which it produces goods or services. If the new technology can be implemented using the governance mechanisms already available, then its adoption will present primarily organizational problems. In terms of resource governance, all of the tools needed to build the new production process are already available in a form that requires no substantial changes or adaptation. If industrial adjustment in this case has a political dimension, it will involve compensation for groups that are disadvantaged by the economic disruption – labor released or retrained, depreciation of obsolete capital equipment, or the subsidization of new investments. Broadly speaking, a conventional economic theory of regulation or a theory of state centered industrial adjustment can explain the forms of compensation or protection that will be used.[3]

The second situation is more theoretically interesting and will be the focus of this chapter. If an industry is forced to implement a new technology requiring governance

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[3] Political action as a form of rent extraction is examined by a substantial literature including Stigler (1971), Peltzman (1976), and Hillman (1982). Alternately, theoretical frameworks presented by Bhagwati (1982), Katzenstein (1984), and Dore (1986) as well as broader work on industrial policy (e.g. Johnson, 1982, Woo-Cummings 1999) suggest that industries exposed to exogenous shocks seek government assistance to either subsidize new investments that are necessary to remain competitive or to compensate owners of disadvantaged productive resources. In the arguments made by both Katzenstein and Dore, this kind of compensation is seen as one element of national economic strategies rather than ad hoc responses to industry lobbying. While this kind of political action is common, it does not involve modifying governance mechanisms and is not central to my argument.

mechanisms that are not available in its environment, firms must behave in a more entrepreneurial way.[4] Specifically, in order to implement the new technology in an manner that captures its benefits, firms must either adapt existing governance mechanisms to the needs of the new technology or they must use the power of government to create the governance mechanisms that they require. The first strategy can be thought of as organizational entrepreneurship. It involves using existing governance mechanisms as functional substitutes for those required by the new technology. The second strategy can be though of as political entrepreneurship. It involves co-opting the power of the state to create new resource governance mechanisms. The ability of firms to do this will depend on the way that political access and influence are structured, by the kinds of political resources available, and the kinds of regulatory changes required to achieve their goals. Put simply, the ability of firms to create their own resource governance mechanisms depends on the political opportunity structure.[5] Organizational and political entrepreneurship should be understood as ideal types, with adaptation by firms and industries in the real economy requiring elements of both to be effective.

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[4] The term entrepreneurial should be understood as part of Schumpeter's (1934, 1939) contrast between the entrepreneur and the "mere manager." The entrepreneur is engaged in a transformative project that changes the way an existing production process is organized or creates an entirely new one, while the task of the manager is merely to copy such a process by following a formula developed and codified by the entrepreneur. A fascinating review of this contrast between leadership types and their social implications is offered by MacDonald (1965). In the context of my argument, it is worthwhile to distinguish between a technical entrepreneur (the type described by Schumpeter) and either an organizational or political entrepreneur. The latter two forms of entrepreneurship are necessary to implement a technical innovation *in a given institutional environment.*

[5] A political opportunity structure should be understood as the set of institutional and resource constraints that determine how private actors can influence the use of public power. Such a structure is defined by the formal institutions of government (e.g. elections, the legal system), the informal practices of political groups (e.g. access to elected representatives through social networks, common understandings of the proper use of government power), and the apportionment of political resources (e.g. money, knowledge, the organization of voters). Though this concept was formally developed by Kitschelt (1986) and Tarrow (1994) to explain the behavior and success of mass movements, it can be usefully applied to the political

The purpose of this chapter is to set out a theory that explains these two phenomena. To do this, I will begin by presenting a simple model of production that focuses on the institutional tools used by the firm to manage and integrate the division of labor. The conception of the firm that underlies this is based on Schumpeter's (1934) description of firm management, Penrose's (1995 [1959]) model of the firm as an administrative organization, and the resource dependency school in organizational theory (Pfeffer and Salancik 1978, Wernerfelt 1984).[6] Developing this model serves three goals. First, it identifies the firm as a strategic actor embedded in a complex social environment. An analysis of the strategic choices made by the firm in response to technological change and the political opportunity structure are the core of my argument and structure my analysis of the auto industry and banking cases in chapters 3 and 4. Second, this model sets out the core task of the firm as creating and managing a production process and defines that process in terms of technology and the functional division of labor. Though firms engage in other activities, this model addresses only their role as producers of goods or services for sale. The production process implemented by a firm is defined by the state of technology and is made up of a series of functional steps that must be overseen and coordinated by the firm. Third, this model emphasizes the importance of governance mechanisms as the structures that mediate between a firm and its environment, allowing the firm to control the steps in its production process and coordinate between them. They do this by empowering the firm to control and

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strategies of more coherent and narrowly economic interest groups where collective action is less problematic.

[6] These models should be contrasted with the firm as a simplifying assumption in pure price theory, the interpretation that motivated Coase (1937) to develop the basic elements of transaction cost economics. For a discussion of competing theories of the firm in neo-classical economics, see Machlup (1967) and Demsetz (1988).

manipulate resources found in its environment in a way that is backed by the coercive force of the state. This provides the firm with the tools needed to extract those resources from the social relationships in which they are embedded and direct their integration into a production process.

Once this model of the firm and the production process has been established, the third section of this chapter will expand the concept of technological change and explore how firms respond to it. If we understand a production process as a set of functions defined by a technological 'recipe,' then a change in production technology will have two effects. In some combination, new technology changes the content of these functional steps or alters how they are to be linked across time and space. Within the model of production I develop, this can be interpreted as changing the resource governance requirements facing the firm.[7] Confronted with the need to tap new resources or to exercise control over existing resources in new ways, firms construct strategies that include organizational and political aspects. Organizationally, firms attempt to meet the resource governance needs of the new technology by adapting existing governance mechanisms. The degree to which this is possible depends on the flexibility of existing generic mechanisms and the specific requirements of the new technology. While this may seem indeterminate, the cases examined in chapters 3 and 4 demonstrate that it is possible to establish some parameters for what can be done within existing systems of regulation. Politically, firms can act collectively or individually to gain the cooperation

[7] Translating a complex and socially constructed technological change into changes in resource governance requirements obviously represents an enormous simplification. It is intended only to describe the effects of technology on a production process in a functionalist and theoretically tractable way. In section three of this chapter, I discuss some of the reasons for thinking about technological change in this way. In addition, both of the case studies include sections describing the respective technological changes and tracing how each technology was developed and how it came to be understood by collectively by firms.

of the state in creating the governance mechanisms required by the new technology. This kind of business lobbying should be distinguished from rent extraction or protectionism (c.f. Stigler 1971, Peltzman 1976). Rather than directly seeking resources or adjustment assistance from the state, firms attempt to gain certain specific powers from the state that will allow them to govern resources more effectively.[8]

In most real world cases, firms in an industry facing new technological demands will pursue both strategies at once. To meet some of the demands imposed by the new technology, they will restructure their governance of resources within the existing regulatory framework. To meet others, they will lobby for changes in the regulatory framework that would allow them to mobilize and control resources in ways that fit better with their changing needs. These strategies can also be pursued in combinations that offer synergies to the affected firms. For example, negotiating with a powerful union over more flexible job descriptions for its members can be done more effectively if the firm's bargaining position is improved through the liberalization of labor laws (or even the plausible threat of such liberalization).

The chapter will conclude with a set of general propositions addressing how firms choose their adaptation strategies and why those strategies tend to converge to create a general strategy for the industry. Though it is clear that firms will combine organizational, political, and protectionist strategies in some way, it is important to understand how the balance between these elements is stuck. I will suggest that the

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[8] Economic theories in this tradition model regulation as completely redistributive and interfering with the natural function of the market (e.g. Buchanan, Tollison, and Tullock 1981; McChesney 1997). These theories ignore the role of government in *creating* both the market and non-market governance mechanisms needed by firms. While they provide some insight into rent-seeking behavior by firms, these theories could only provide a comprehensive model of business lobbying in a world of extant perfect markets and complete commodification of all possible productive resources.

choice of which aspects of adjustment to favor or slight depends on the firm's environment and the nature of the demands imposed by the new technology. The key variables that will be examined include the flexibility of existing governance mechanisms and the avenues through which firms can gain access to the specific areas of government authority relevant to the governance mechanisms they wish to change. The division of state administrative and rule-making authority is possibly the most decisive aspect of this. Some governance mechanisms can only be altered in one political venue, while others can be influenced by different kinds of lobbying involving different political resources.[9] To take two obvious examples, a federal regulatory structure and a pluralist system of interest group organization are more likely to provide opportunities for selecting favorable venues for lobbying than more centralized forms of authority or representation.

2.2 Technology, the Production Process, and Governance Mechanisms

Nearly everything that we use in our daily lives rests at the end of a chain stretching from ourselves back to a widely dispersed collection of raw materials and people holding unrelated sets of skills. This chain connects a cup of coffee with a plantation in Colombia and a dress shirt with a small subcontractor making buttons in South Carolina. In manufacturing, the links that make up this chain tend to be discrete and easily identifiable: physical materials are processed and combined in steps that

[9] In a modern bureaucratic state, the kinds of regulation that industries seek to influence is often divided among policy subsystems (Freeman 1965, Heclo 1978, Berry 1989, Baumgartner and Jones 1991) that develop idiosyncratic relations with affected interest groups (e.g. capture theory, policy community theories). Many of the strategic decisions made by firms involve how to gain access to the relevant subsystem or – if that subsystem is dominated by opposing interest groups – how to achieve a comparable political result in another venue. For example, chapter 4 describes how commercial banks – structurally one of the most corporatist industries in the United States – attempted to subvert restrictions on consolidation using the courts, lobbying of state legislatures, and a close relationship with one of the three relevant federal regulatory bodies to achieve goals that could not be met through Congress.

increase the complexity of the item until it has a clear use value for the consumer. The physical movement of materials makes the existence of a production process intuitively clear. Though it is less obvious in a physical sense, this way of thinking about economic activity is useful in understanding the service sector as well. The manipulation of information required to use a credit card or the interlocking set of activities required for a hospital to deliver the skilled service of a doctor can both be broken down into steps that form a coherent organizational chain connecting information and purposive action to produce a final product.

Since the argument being developed is built on this understanding of what productive activity is and how it is organized, it is important to provide a clear definition of a production process and explain how such a process is shaped by technology. This section will describe production processes in general terms, explain their relationship to technology, and establish that the core task of a firm is to mobilize the resources required for production and coordinate the activities that turn those resources into something that can be sold to consumers.[10] To produce anything, a firm in the modern economy faces two related tasks. First, it must mobilize the physical and human resources required by each of the specialized steps that go into fabricating a final product – the individual links in the chain running from raw materials to the consumer. Second, it must create a system of organization that binds these links together across space and time. The way in which these two tasks are undertaken is a production process.

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[10] The model of production presented here can be applied to upstream producers that sell goods and services to corporate purchasers or governments. For analytic clarity and to mesh with the case studies presented later, however, it is easier to refer to the production process in the generic sense as terminating with a consumer.

The nature of a production process and the functional content of each step in it are defined by the state of technology. For the purpose of this argument, a slightly modified version of Galbraith's definition from *The New Industrial State* is most useful: technology should be understood as the systematic application of organized knowledge to the task of producing goods or services.[11] This definition focuses on the techniques that are used to transform human and physical capital from a less to a more useful form. From this definition, technology should be seen as the applied subset of human knowledge that relates to modifying the physical or social environment. For example, within the science of biology and the subfield of heredity, the application of this knowledge to create a specific program to breed animals for human consumption would be a technology. Based on a desire for efficiency arising from competitive pressures or organizational constraints, the knowledge that is embodied in technology will represent not only a scientific understanding of the world turned to the task of production, but a compromise between what is understood to be possible and the constraints of cost effectiveness. Organized knowledge makes a vast array of activities and techniques possible, but entrepreneurs will turn only a few from theory into practice. That is, only some areas of organized knowledge bridge the gap and are turned into production technologies.

These technologies divide production processes into discrete functions that must be performed in sequence and combined. It might not be immediately obvious why production processes should be broken down by function based on divisions of knowledge, or even what is meant by the concept. To explain this, it is helpful to think

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[11] Galbraith (1966), p. 24. For a more detailed examination of how technology and specialization are related to the organization of knowledge and social relations, see Pacey (1983).

for a moment about the division of labor and the concept of specialization. When Adam Smith offered his example of the pin-maker to demonstrate how specialization could increase efficiency and output,[12] he did not consider the reasons *why* pin-making could be divided into the steps he listed. He referred to the "distinct operations" involved as though their number and definition were an intrinsic aspect of pin-making. In fact, both the exact number of steps and the ways in which those steps were combined varied among manufacturers. This omission is significant, because Smith's formulation implies that the optimal way to break down a manufacturing process is in some way natural or objectively knowable.

In reality, the steps used by Smith's pin-maker were dictated not only by the definition of the product being made but also by divisions between areas of knowledge; like the definition of a pin, the process to produce one was socially constructed. Using the tools required to roll wire was a separate skill from measuring and cutting the wire to a standard length. Casting and mounting the heads required different skills and the use of different tools. Economies of scope between areas of knowledge might cause the manager of a pin-making firm to combine these steps in a certain way – the same skills and metalworking tools required to cast the wire might make one an efficient cutter as well – but the division of knowledge manifest in both skills and tools comes to be reflected in the organization of production.

There are two important points to be drawn from this example. First, the way a production process is divided reflects not only the objective properties of what is being

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[12] Smith (1979 ed.), pp. 109-110. The observation that specialization and efficiency are linked is not original to Smith, but the attribution of systematic changes in productivity to this and its explicit link to technology make Smith the most important source. For a brief examination of this intellectual history, see Kindleberger in Wilson and Skinner (1976).

produced, but also the way knowledge is divided and passed on by society. Had the 18th century state of the art in training divided or bundled knowledge differently or had the tools in use been adapted from other tasks, the eighteen separable operations Smith described might have been a dozen or twenty five. Second, production processes are consciously designed by firms that define and coordinate each step as part of an interlocking system that results in a useable final product. The first point is subtle, but important. Because a pin must be sharp to be useful, some method of sharpening is a necessary aspect of producing them – the objective character of the item being produced dictates in a general sense what the production process must involve. This kind of constraint is important, but it can not by itself dictate how the production process will be organized. Knowing that a pin must be sharp cannot tell an observer what tool will be used to sharpen it or how the task of doing so will be fit into the overall manufacturing process. More important in answering these questions is the way in which society organizes technical knowledge, and in this area the modern firm must deal with different constraints than Smith's pin maker. In the eighteenth century, human knowledge was organized in relatively idiosyncratic and path dependent ways. Technical knowledge was organized around skilled trades that were descendents of the guild system, and tools were made and improved on an ad hoc basis by workers or adapted from the work of pure scientists.[13] This led Smith to conclude that the steps in a production process developed

[13] Smith's remarks on the origin of technical innovation suggest that he held a very "demand-driven" attitude toward improvements in production technology. Though he recognized the importance of new tools and techniques originating in what could be considered the scientific community, his focus was on labor saving expedients devised by workers and managers. Marx's critique of this account and his attribution of technical advance to the efforts of capital attempting to reduce the autonomy and power of labor presents an interesting alternative (Marx, 1976 [1867] p. 468, especially fn. 19). This question of whether and to what degree technological advancement arises from the work of specialists employed by managers or by the ingenuity of workers engaged in practical tasks is the central point of debate surrounding Taylorism and the scientific management movement (see Taylor, 1911). For reflections on the

in an organic manner based on experimentation within the firm, observation of rivals, and learning by doing. Under such a system, the division of a production process into discrete steps – what Williamson (1985*b*) referred to as "technologically separable interface[s]" – will appear natural based on how the firm is set up and how it develops the skills of its workers.

Today, knowledge is divided in more complex and formal ways by the education system, the definitions of academic and technical fields, and other ways in which society "clusters" information and skills. When a product requires the combination of technologies that are functionally divided in the broader society, a firm's production process or even its internal organization tends to be broken up along these fault lines.[14] The existing divisions among areas of knowledge and the specific technology are then reflected and perpetuated in the resulting production process. To take a modern example that supplements Smith, consider an ordinary light fixture. A lamp can be functionally divided between a frame or shell, a simple electrical circuit built around a switch or transistorized dimmer, and the bulb. The specialized knowledge required to construct these components is drawn from at least three fields that are separated in education, training, and organization. In this case, various specialties in the field of industrial design

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history of this debate, see Landes (1986). For purposes of clarity, my argument treats technological innovation as exogenous to avoid considering the possibility that firms will respond to a technology that cannot be used with their resource governance mechanisms by simply generating a competing technology that can. The implications of relaxing this assumption are explored briefly in chapter 3 with regard to the American auto sector's changes in supplier relations.

[14] Becker and Murphy (1992) explicitly relate the degree of labor specialization to the forms of organization that can be used to coordinate complementary tasks, invoking several frameworks for thinking about team work organization. The various forms of labor coordination and the linkage between this and the organization of knowledge can be seen as governance mechanisms operating within the boundaries of a firm. Surprisingly given the historical orientation of their argument, the authors do not consider how the social institutions in which labor is embedded contribute to the ways in which the specialization of knowledge/skills increases. A comparison of their arguments with Granovetter (1985) is useful in this regard.

provide the technologies that make the metal, wood, or plastic body of the lamp while the lighting circuit is designed and built using technologies from the field of electrical engineering. There are few economies of scope between these fields, and in manufacturing lighting fixtures, they are functionally and organizationally separated.[15] More interestingly, the way in which the market for electric lights developed in the early 20th century defined the removable and replaceable light bulb as separate from the rest of the lamp. This created a cluster of technologies based on the skills, tools, and techniques involved in making light bulbs that were organizationally segregated from other areas of electrical engineering.[16] Interchangeable, standard design light bulbs – as opposed to proprietary designs usable only in one company's fixtures – are the result of a contested legal and intellectual history, and this imposes constraints on the process of manufacturing them.

This social clustering of knowledge and skills is second only to the nature of the product in determining what a production process will look like. Contemporary firms face a preexisting landscape of knowledge, the contours of which cannot easily be reshaped. The social organization of knowledge in modern society is both more complex and more rigid than that described by Smith. It is reinforced by the institutional structure of education and research, divisions between industries and their respective ways of funding knowledge creation, and the power of the state in the form of intellectual

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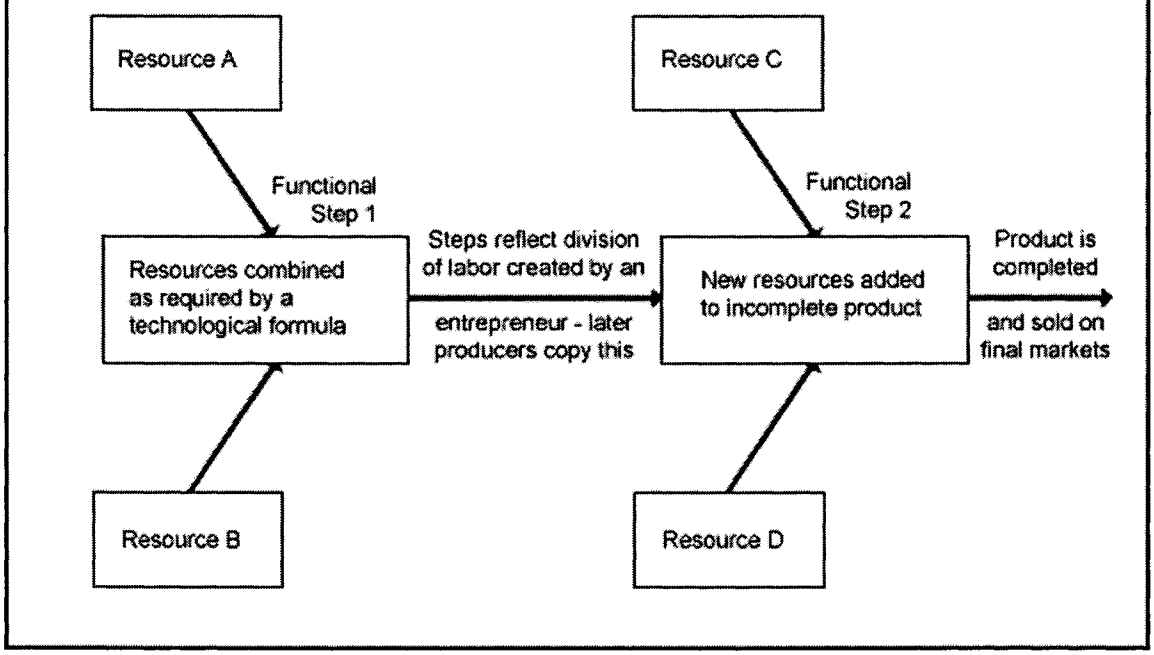
[15] In practice, the actual manufacturing process today would be divided based partly on the kinds of machine tools available that can be adapted to set up a highly automated assembly line meeting the design specifications of the lamp design. For the purposes of illustration, I will ignore this organizational spillover from the divisions of labor that dominate the machine tool industries.

[16] The product definition of the light bulb was largely a result of how intellectual property was defined and protected by Thomas Edison and the early managers of what became the General Electric corporation. This pathway was reinforced by the corporate strategies pursued by GE in the 20th century. For a brief review of the interaction between corporate strategy and legal institutions that produced this, see Reich (1992).

property law and its own role as a producer and consumer of knowledge. Firms in this environment are therefore more likely to accommodate themselves to existing patterns of specialization than to create their own based only on how they feel production could be most efficiently organized in a functional sense. More fundamentally, technological innovation emerges from this landscape of clustered and embedded knowledge. This means that new technologies that fundamentally challenge existing divisions of knowledge are unlikely to appear.

When the objective character of a product is pulled through the filter created by the social division of knowledge, it emerges as an ideal form of a production process: a formula that identifies what materials must be brought together and directs how they are to be combined to produce the product or service.

Figure 1: A Simplified Schumpeterian Production Process



Creating this ideal production process is the entrepreneurial task identified by Schumpeter. The entrepreneur "bring[s] about a different use of national resources in

that they are withdrawn from their traditional employ and subjected to new combinations."[17] The resources involved can be raw materials, tools, partially finished components, or labor possessing specific sets of skills. In this simplified version of the model, resources are combined in stages that reflect the division of labor. The primary task of the entrepreneur in this model is to determine what resources are required and exactly how they must be combined. Once those questions have been answered, the task of overseeing the production process enters the demesne of the "mere manager" and ceases to have significance for a dynamic economy.

But this model of the production process is incomplete in a critical way. The task of organizing production involves not just creating a formula for combining productive resources, but also finding ways to grasp and manipulate those resources efficiently. In order to create an interlocking division of labor, the people and materials that are to be combined must be controlled and directed, often in highly specific ways. Finding the best ways in which to mobilize and control resources *in a given environment* can be thought of as an act of translation between an ideal production process and the limits imposed by the environment on the power of the entrepreneur. Alternately, this task can be thought of as organizational entrepreneurship – a function in economic production requiring as much creativity, vision, and forcefulness as Schumpeter ascribes to the technical entrepreneur.[18]

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[17] Schumpeter (1934), p. 74

[18] It is worth noting that Schumpeter did consider the core tasks of the entrepreneur to be organizational as well as technical. Examining history, he correctly emphasized that the entrepreneur's actions in mobilizing and controlling resources that were previously engaged in other tasks would produce social disruption (see MacDonald 1965). He did not, however, describe how this change in the employment of resources would be achieved or what power the entrepreneur would have to exercise to bring it about. Schumpeter, like Coase (1937: p. 390), makes the unexamined simplifying assumption that resources would be available as commodities, allowing the entrepreneur access to them through simple market transactions (Schumpeter

The tools with which the organizational entrepreneur must work to grasp and manipulate productive resources will be referred to as governance mechanisms. Governance mechanisms are institutions created and sustained by the state that can be used by firms to access and control factors of production. Markets are one form of governance mechanism, though the generic term subsumes an immense range of ways in which power can be exercised depending on how property rights are defined and contracts interpreted. In a world where the human and material components of a production process are seldom perfectly or completely commodified, markets are only one possible tool for controlling resources. Examples of other governance mechanisms might include partnerships with other private organizations, the coercive power of a political authority, hierarchies constructed around contracts and property rights, professional or social networks, and kinship.[19] They are necessary elements of a theory of production because they determine how a firm is able to interact with its environment and therefore whether it is able to gain access to the skills, materials, and forms of organization required to implement a production process. With the right governance mechanisms, a firm can translate an ideal production process into an actual social

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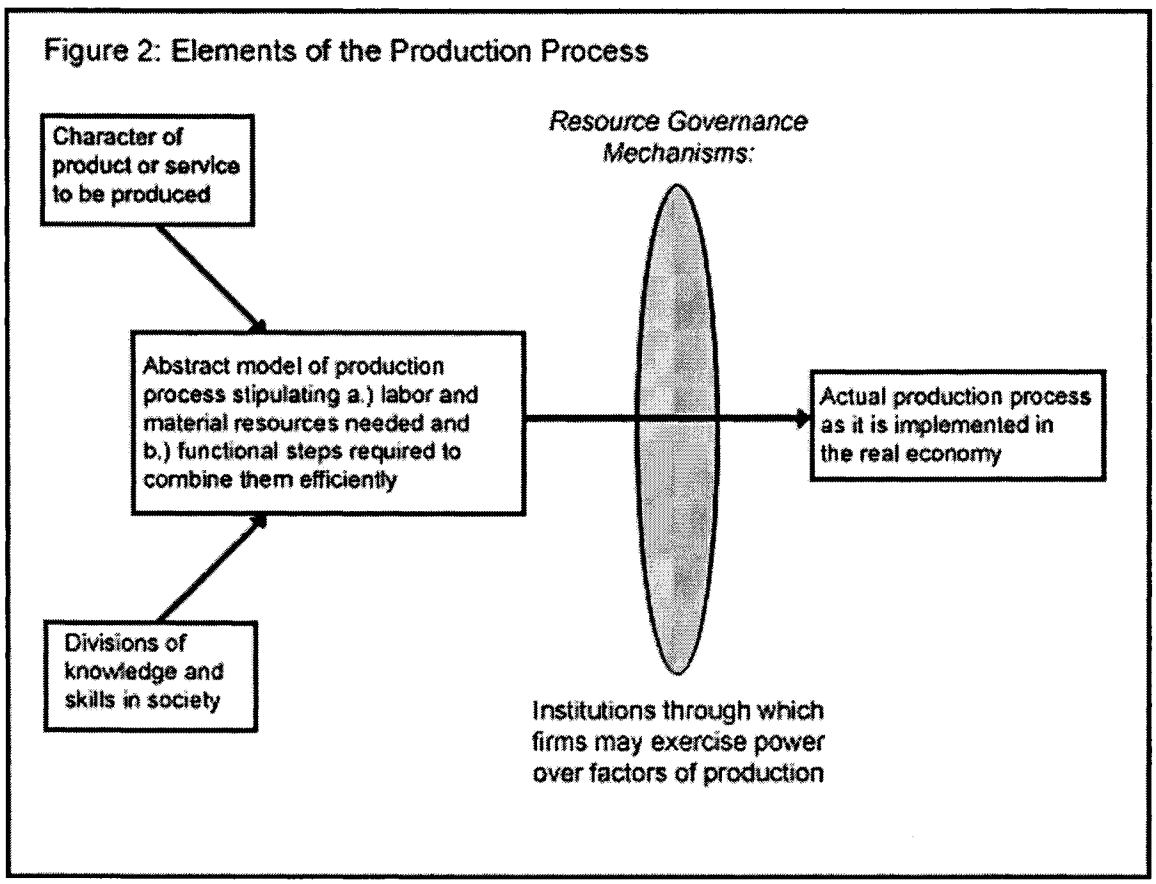
1934, p. 129). Much of the theory that follows can be seen as adding an explicit consideration of how resources are controlled to Schumpeter's basic model.

[19] Granovetter (1985) provides a useful summary of the role of social relations in shaping economic behavior at the micro level. Though his observations apply to economic decision-making in a general sense and address a broader agenda than simply the exercise of control in a production process, they illuminate some of the social bases of obligation that allow non-market institutions to structure behavior that is normally considered strictly economic. It is important to note that, while most of these governance mechanisms operate autonomously, my argument focuses on the foundation that these mechanisms have in the power of the state. The power of government coercion can not create well-functioning social mechanisms from scratch under any system less oppressive than state socialism, but the role of government in creating, enforcing, and legitimating governance mechanisms in cooperation with other economic or social actors is indispensable.

organization that draws resources from its environment, subjects them to modification through a set of linked labor processes, and produces goods or services for sale.



There are two functions performed by governance mechanisms that are vital to a theory of production. First, they extract socially embedded resources from the firm's environment, mobilizing them to be used in a production process. This is necessary because, contrary to the assumptions of neoclassical economics, the resources needed for a given production process are not always available. In a world of perfect markets, all resources would exist as atomized commodities for which a firm could bid frictionlessly. The act of commodification required to create this world – of converting people, skills, and materials into these atomized objects of transactions – would have done the work of

extracting resources and making them available for production and allowed firms to use only the price system as a governance mechanism.

In the real world, productive resources are created and used in complex social environments that affect how firms obtain and use them. Highly specific resources such as skilled labor or specialized tools may not be generated in a firm's environment or may be generated in ways that embed such assets in other production processes or social relationships. Firms must deal with this imperfect commodification even where the legal and property rights frameworks exist for buying and selling the resources they require. From an economic perspective, this social embeddedness is seen as "friction" that prevents the efficient operation of the price mechanism (Williamson 1985*b*). In transaction cost economics, the attempt is made to measure these barriers as one possible "cost [...] of using the price mechanism" (Coase 1937) and to compare these costs with other ways of governing resources. This perspective is analytically useful, but can be misleading if applied uncritically. In some cases, a resource can only be generated within a specific set of social relationships (e.g. advanced technical degree programs at universities).

Under these circumstances, the embedded resource cannot be separated from the cost of using a non-market mechanism to extract it (e.g. a long term relationship between a firm and an academic department that produces highly skilled labor). In other cases, a resource is partly defined by its non-market social characteristics and *can only be used* if those are retained. Labor that must be certified by a public agency or private association is bound up with the certifying body. Intellectual property can be held by individuals, governments, or private actors. Rights to access a common pool resources are often held

by regulatory bodies or public corporations. Complex or highly specific capital goods are embedded in networks of knowledge and practice that co-evolve with the technologies that produce them. To access these resources, simple market transactions are seldom sufficient, and a range of governance mechanisms are used to supplement them.

The governance mechanism used to gain access to a socially embedded resource will be chosen based on the firm's own capacitates as well as the institutional environment in which the firm operates. Intellectual property might be available through a licensing agreement, through the substitution of a similar technology that falls outside of legal protection, or through a joint venture or merger with the organization that controls it. Use rights to a public resource might be available only through a bureaucratic process of application and negotiation that offers the firm resources only on a conditional or contingent basis. Industry associations, joint ventures that exploit spin-offs from government research, or cooperation between university researchers and private firms would fall in this category, as would some kinds of joint ventures where the distribution of benefits can not be easily formalized. A firm evaluates its social and legal environment to select the best mechanism for extracting resources, and in most real world cases the availability of a range of options beyond simple market transactions makes the task of an organizational entrepreneur easier.

The second role played by governance mechanisms is more complex and more pervasive. In addition to mobilizing productive resources that are embedded in the firm's environment, governance mechanisms also allow firm managers to direct how these resources are employed in the production process. In order to implement the technological formula of a production process, a firm must have the power to specify

how the factors of production are combined or transformed at each technologically separable step and how these steps will relate to one another. If the first function of coordination mechanisms is to acquire all of the pieces required to complete a puzzle, the second is to maneuver those puzzle pieces together to form a complete image.

The ways in which firms exercise this control over the steps in the production process vary enormously, but they can be identified by their function and their ultimate appeal to the coercive power of the state. The most obvious mechanism that fulfills this directive purpose is ownership and property rights. The bundle of legal prerogatives that define property can be employed by a firm to use, alter, or manipulate physical resources, intellectual property, or aspects of the natural world. Though it is seldom necessary to enforce these rights through the formal power of the state, the legal system is able to do so and can direct the state's police power to this purpose at the request of a firm. Though property rights as a tool of controlling productive resources may seem unambiguous and universal, both the formal content of those rights and their enforcement differ cross-nationally and among different forms of property.[20] Indeed the nature of corporate property rights has been contested historically in both the Anglo-American and continental legal traditions.[21] The ways in which law transforms physical objects into

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[20] Property rights, though by definition a manifestation of state power, generally operate without intentional or directed action on the part of the state. The legal enforcement of property rights can be thought of as an autonomic function of a political body – no more a matter of policy than breathing and pumping blood for a human body. The deliberate use of property rights as a tool of state policy toward the economy, by contrast, is most common in countries undergoing industrialization and attempting to create incentives for specific economic activities. For an examination of property rights as a "passive" mode of governance, see Scheiber (1981). For an examination of property rights as tool of economic development wielded by the state, see Campbell and Lindberg (1990).

[21] The historical development of corporate identity and the property rights that can be exercised by such an entity bears directly on the question of resource governance, but it is beyond the scope of this project. Dewey (1926) provides a classic exploration of corporate identity in the Anglo-American legal tradition that emphasizes the role of law in rationalizing political settlements. For a review that focuses on the

commodities, the nature of the bundled prerogatives that define ownership, and the character of the legal system that enforces these rights will all affect how firms exercise power through ownership in practice as well as the desirability of using property rights to exercise control over resources in a given production process.

While ownership as a form of governance is adequate for most basic material resources, a production process also involves purposive action by human agents and social groups as well the use of capital equipment that must be used in specific ways. To direct these persons and groups and insure that tools are used efficiently requires other mechanisms. These mechanisms must concern political economists because the productivity of complex resources is bound up with the *incentive systems* under which they operate and the *relationships* between the various steps in a production process. This makes the character of governance mechanisms an important factor in whether a firm can implement a production process in a specific environment.

To understand why this is, it is worthwhile to look at two bodies of theory that address firm behavior: transaction cost economics and social systems of production. The general definition of governance mechanisms that I use builds on Williamson's (1975, 1985*a*) discussion of transactions as the basic unit of a micro-theory of the firm. Transaction cost theory addresses how firms organize human activities by treating firms as a nexus of contacts (Williamson 1996, Jensen and Meckling 1976). This framework is then used to describe both markets and hierarchies in terms of obligations and incentive

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intellectual history of this field in the United States, see Mark (1987). For comparison, a brief history of the development of continental corporate doctrine through the 19th century is provided by Machen (1911).

structures entered into freely by atomized individuals and formalized through legally enforceable agreements.[22]

Though this is a flexible theory built on powerful simplifying assumptions, my model of governance mechanisms departs from it in two important respects. First, governance mechanisms include a broader range of social tools than those formalized as contracts between individual rational agents. This is necessary because the transaction cost framework emerges from a critique of pure price theory and is burdened by some of its limiting assumptions.[23] The most significant of these is the assumption that transactions take place between atomized agents without a social context and that these transactions can be measured by a single monetary value. This framework can not accurately describe the relations between a firm and groups that control productive resources because it is not possible to collapse the kinds of exchange relationships involved into a monetary value or to treat them as a series of spot market transactions. To clarify this, consider an employment relationship. In the Alchian and Demsetz framework, a manager has no more power over a worker than do the authors over their grocer. While this may reflect the legal character of the relationships in each case, the pattern of incentives under which each operates is entirely different. An employee subject to the threat of dismissal for failing to obey a manager faces at least a loss of

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[22] Alchian and Demsetz (1972) follow this reasoning to its logical conclusion, rejecting the concept of power in a production process and treating all resources used by a firm as fulfilling temporary contracts. Cheung (1983) formulates this perspective most clearly, stating that the only analytic difference between markets and hierarchies lies in the type of contract being entered.

[23] See Coase (1937) and Commons (1931, 1934). For an explanation of the intellectual task that these early institutional economists were undertaking and the importance of the critique of pure microeconomic theory, see Coase (1988*a, b*) and Rutherford (2001). A very revealing attack on the early institutional economics from the mainstream perspective is offered by Homan (1932), which demonstrates many of the objections to the classical institutionalism of Veblen that the "new" institutionalism in economics was intended to address.

income, the search costs associated with a finding a new job, loss of seniority, the cost of learning the operating patterns of another firm (assuming the new job is in the same industry performing the same kind of labor), the possibility of having to move geographically to find a new position, the psychological and social disruptions of searching for a job, the loss or movement costs of any non-wage benefits associated with position, the disadvantage of lacking a positive reference to offer a new employer, and the social stigma of unemployment. In any understanding of power based on the ability to impose asymmetric costs (e.g. Bachrach and Baratz 1963), such a relationship is certainly pregnant with it. A similar though less clear cut logic of power can exist between firms or between a firm and social groups that control resources it requires.[24]

The purpose of this example is to highlight the fact that transactions often involve relationships that are multidimensional both in terms of the media of exchange and the temporal perspectives of participants. Non-monetary factors such as security, prestige, cognitive simplification of complex situations, and socially determined values create patterns of incentives and constraints that link participants in the production process in ways that cannot be expressed in terms of currency changing hands. In addition, where potential exchange relationships are characterized by few participants and specific investments – as is often the case in a complex production process between suppliers and

[24] The exact nature of power relations among participants in a production process can be complex. In a relationship between a firm and its suppliers, dependency based on the availability of alternate suppliers or customers can mean that relative power operates in either direction. For example, General Motors in the late 1980's was able to extract concessions from its upstream suppliers based on the specificity of those suppliers' co-investments, its status as a monopsony purchaser, and its size (see chapter 3). By contrast, the dependence of the American Locomotive Company on General Electric to supply after-market services for its early diesel electric locomotives represented the power of a supplier over even a large customer (Churella 1995). When supplier relations involve more complex forms of learning or are structured through different mechanisms that define how resources are shared, the nature of this dependence can be even less clear and the resulting relationship between firms more complex.

producers or workers and employers – the importance of a long-term relationship grows. The attempt to model such a relationship in game theoretic terms as a repeated interaction is misleading, because major decisions that have multidimensional social consequences are made based on future expectations (e.g. where to live and raise a family on the part of workers or whether to purchase or create a specialized subsidiary on the part of a firm). Relationships in a production process sometimes have more the character of co-evolution between organizations than of repeated interactions in a free market.

This line of criticism is associated with management studies as well as empirical work in law and economics, and it seeks to analyze the effect of choosing a specific organizational form (what I refer to as a governance mechanism) on how firms or groups coordinate economic activity. These authors point out that transaction cost economics identifies markets and hierarchies as ideal types of coordination, but fails to account for the incentive and social effects of *how* a specific market or hierarchy is formally structured.[25] To put this another way, the "make or buy" decision that is at the core of much transaction cost analysis cannot be resolved in the abstract because the costs and benefits of each option will depend on the institutions through which the resource would be made or bought. Since these institutions vary both cross-nationally and among sectors, the actual decisions made by firms must be examined in their own context.

Second, the transaction costs framework has difficulty in escaping unrealistic assumptions about the universality, efficiency, and completeness of contracts as a

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[25] Zajac and Olsen (1993) and Monteverde and Teece (1982) provide case studies that challenge the assumptions of the transaction cost framework , while Kogut (1988) offers a theoretical challenge based on information and joint learning processes between firms. The general pattern of objections that these authors apply to joint ventures and vertical integration can be applied to other resource governance relationships. It is important to note that Williamson (1991) rejects this diversity by suggesting that any

governance mechanism. In reality, many exchange relationships are defined by motives and types of cooperation that cannot be formalized and enforced through a cumbersome and time consuming legal or administrative system. Though the structures within which these relationships exist are legitimated and ultimately supported by the coercive power of the state, they can only operate efficiently when monitoring and enforcement are supported by non-contractual forms of social organization.[26] In production processes that are characterized by small numbers of actors, the creation of specific assets, and environmental uncertainty, contracts are a poor mechanism for organizing cooperation. The most obvious manifestation of this that is addressed by the transaction cost school is the problem of contingent or incomplete contracts. Though it is acknowledged that some kinds of coordination may only be possible under incomplete contracts (Williamson 2002*b*), the forms of organization that supplement or replace contracts have been poorly integrated into this field.

It is worth noting that some of this bias toward the analysis of formal contracts is based on the development of the field in interpreting the American economy. Partly because research in this area has historically been carried on in the distinctly American field of law and economics, examples and cases have tended to be drawn from the United States. More fundamentally, the importance of the judicial system, the development of the corporation as a fictitious person, and the weakness of other state and quasi-public administrative organs in the United States (and to some extent in the other common law

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form of coordination can be characterized as a simple hybrid having some mixture of the characteristics of market and hierarchy.

[26] Theories of production that emphasize network organization and social density as systems that allow efficient firm and inter-firm organization without contractual forms of monitoring and enforcement tend to diverge considerably from the assumptions of the transaction cost school. See Coleman (1988) and Walker, Kogut, and Shan (1994).

countries) makes the lens of legal contracting an intuitively plausible way of thinking about economic coordination. The formal, legalistic mode of analysis used in transaction cost economics offers little insight into the administrative, cooperative, or informal coordination used in other capitalist economies.[27] This point is relevant because the two cases I examine in the following chapters take place in the United States. The fact that non-contractual governance mechanisms are critical even in cases where the general (national) institutional environment is most adapted to formal contracting suggests the value of the theory I develop.

A broader understanding of economic coordination as the product of social institutions is developed by Lindberg, Campbell, and Hollingsworth (1991) and Hollingsworth and Boyer (1997). Their conception of coordination mechanisms goes considerably beyond transaction cost economics and provides a theoretical vocabulary to describe more than the organizational space between markets and hierarchies. Drawing on organizational sociology and the French regulation school, authors in this tradition describe a range of coordination mechanisms that include industry associations, joint ventures, quasi-governmental organizations, networks, informal hierarchies, communities, and formal state bureaucracies.[28] The focus in this research is on the macro-level institutions that determine how production is organized in an entire national economy. Aggregated across a region or nation, these institutions define what the authors refer to as a social system of production (SSP) – a system of complementary and

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[27] For an examination of differing legal systems in the U.S. and Germany and the tendency of coordination mechanisms to vary in ways related to those differences, see Casper (2001). For a less theoretical examination of inter-firm relationships in Japan that rely on incomplete contracts nested in other social institutions, see Ahmadjian and Lincoln (2001).

[28] See Hollingsworth and Boyer (1997), pp. 8-19.

mutually reinforcing institutions that determine how productive resources are coordinated. Within this framework, specific research seeks to define how the elements of an SSP interact, how such national systems perform on distributional and efficiency grounds, and how they develop over time.

This theoretical tradition examines a broader range of institutional forms and places them in a larger intellectual context than the transaction cost approach. While this sophistication and breadth provides a more realistic view of economic relations in different national environments, the SSP framework cannot provide a micro-level explanation of how institutions relate to production processes for two reasons. First, a social system of production refers to a national or regional economy.[29] This ignores differences between industries that derive from the production technologies they use, the markets in which they compete, and the kinds of resources that they must mobilize and coordinate. Researchers in this area are not blind to differences across sectors, but they believe that nations can be characterized by a core set of institutions that apply to most economic activity. So, for example, labor is assumed to be mobilized by a national education and labor relations system, capital is allocated by a dominant institutional form (e.g. securities markets or banks), and state intervention in the economy follows a consistent pattern.[30] Even if these national SSP's are not universal, they are argued to shape the "core sectors" of the economy and are therefore a valid basis for a typology of national models.

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[29] Schmitter (1997), pp. 312-313. Schmitter identifies the importance of geographic regions both smaller and larger than the nation, but the key assumption is that SSP's should be understood as collections of institutions that govern *all* economic activity within a given territorial unit.

[30] See Boyer and Hollingsworth (1997), pp. 190-193.

Constructing national models in this way suggests that differences between industries are relatively unimportant and that all social systems of production within a country will bear the common stamp of national institutions. In the language that I have developed, this is to claim that neither the technological requirements of a production process nor the strategic choices of firms are as important in determining how resources will be governed as is the national institutional environment. This is useful for cross-national comparisons, but the generalizations on which it relies break down quickly when considering specific industries.

The cases I examine will show that the generic national governance mechanisms that the SSP approach identifies are often not the governance structures that determine how firms access critical resources. Because the specific steps in a production process and the resources that those steps require are determined by the division of labor created by the best available technology, firms seldom have the luxury of using only the 'generic' resource governance mechanisms that their national institutions facilitate. Both the technical requirements of the production process and the opportunities afforded by the firm's social environment are best analyzed at the level of the industry rather than the nation. Production technology is industry-specific, and that technology dictates what resources must be mobilized. These resources, in turn, are embedded in relationships that can best be accessed using different and often idiosyncratic institutional tools. This is the area where a national model or SSP perspective breaks down, because these arguments generally accept the simple division of factors of production into land, labor, and capital inherited from microeconomic theory.

Once one accepts that the resources actually needed by producers are more complex than this, it becomes imperative to account for the fact that these resources are governed by a wider range of institutions than those examined in national models. So, for example, a German firm seeking labor with a specific set of skills is not guaranteed to find it through the national apprenticeship systems that figure prominently in cross-national analyses (Streeck, 1992). This cooperatively administered and financed national training system provides vocational training for only about half of the population entering the workforce, concentrated in a limited number of industries.[31] This must leave firms with labor requirements the system does not anticipate (or firms requiring certified labor in numbers beyond those generated) to either modify the system or seek those skills through other coordination mechanisms. For the large number of industries that are poorly served or ignored by the coordination mechanisms that are generic to their national model, the task becomes one of replacing, supplementing, or expanding on those mechanisms. Doing this requires strategic choices and the investment of scarce resources.

A more generic example would involve labor with unusual or highly specific skills that are only generated in certain social institutions such as universities or research institutes. Faced with a need for such skills and evaluating the ways in which they are generated and governed, a firm might find that this resource is best mobilized by developing a long-term relationship with one of those institutes.[32] This strategy might

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[31] Berufsbildungsbericht 2005, especially summary data on pp. 7, 37, 93.

[32] This phenomenon is often noted in cutting edge research areas such as biotechnology (for example, see Zucker, Darby, and Brewer, 1998) and as a contributing factor in industrial clustering (see Piore and Sabel, 1984, pp. 286-287 and Saxenian 1994). It is often not recognized how common such long-term relationships between business and universities as a form of labor recruitment are in the broader economy.

involve a costly, negotiated transaction that constrains the firm's behavior or structure. It could require the investment of time and money, participation in a set of advisory committees, the development of new bureaucratic procedures to work with the academic partner, or agreeing to forego recruitment from rival institutes. If the firm is accustomed to hiring labor from a relatively open market, managers may find these investments and constraints frustrating, but these costs represent the keys required to unlock a needed resource from its environment, and they must be paid.

The situation is even more complex when considering the physical materials and components that a firm requires. Most production processes require sophisticated manufactured components or capital equipment. The more complex and industry-specific these requirements become, the less likely that they can be purchased on a simple factor market. The institutions that mediate between suppliers and assemblers then become important. Joint ventures, long term or complex contracts, administration through an industry association, or vertical integration are only a few of the coordination mechanisms that might be used to gain access to components produced by a specific firm. The critical point is that firms have a choice from among these mechanisms, and that that the institutional environment creates incentives that make some options more attractive than others. For example, anti-trust laws might make the formation of a joint venture that controls access to an upstream a less desirable strategy than vertical integration.

This leads to the second problem with the SSP approach: the lack of scope for strategic choice among coordination mechanisms by firms. By making firms an

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For example, multinational firms seeking labor with foreign language training often develop relations with language departments (Hayden, 1980) and a wide variety of firms support and recruit from engineering or computer science departments (Angel, 1989). These relationships can be viewed as supplementing rather

outgrowth of the institutional landscape rather than an actor operating within it, this framework highlights the role of governments, unions, and other organizations in shaping the production process. This comes at the cost of both parsimony and clarity. Creating and administering a production process becomes only one of many goals being pursued by various actors, and the production process itself becomes a blur of complementary social relations. The problems this presents for firm or industry-level analysis are acknowledged,[33] but the goals of description and classification are viewed as more important than the micro-level tractability of the resulting theories.

Given the importance of what I refer to as organizational entrepreneurship, it is clear that a theory of production should be based on the firm as a strategic actor operating in an environment where resources are governed by complex institutions. A simple metaphor can be useful in clarifying this. The task of choosing coordination mechanisms in response to the demands of a production process has some significant similarities to the choices facing a primitive household economy. In a subsistence household, needs for food, shelter, and other survival imperatives are met by searching a diverse environment for basic resources that are then worked into usable forms. The environment around the household might include a lake, forest, or fields, setting out the universe of possible resources that can be drawn from it. To obtain some kinds of food, the members of the

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than replacing labor markets, but they involve a set of institutional interactions that must be understood in non-market terms.

[33] Lindberg, et. al. (1991) write "If we tried to specify all the actors, all their problems, and all the governance mechanisms they employed, analyzing governance in a sector would become an overwhelming task." (p. 6). In the Hollingsworth and Boyer (1997) volume, the analyses are explicitly cross-national, and sectoral examples are used mostly for illustrative purposes.

household might plough the land and plant a monoculture crop. For others, they might develop techniques for fishing or hunting that are effective in their local environment.[34]

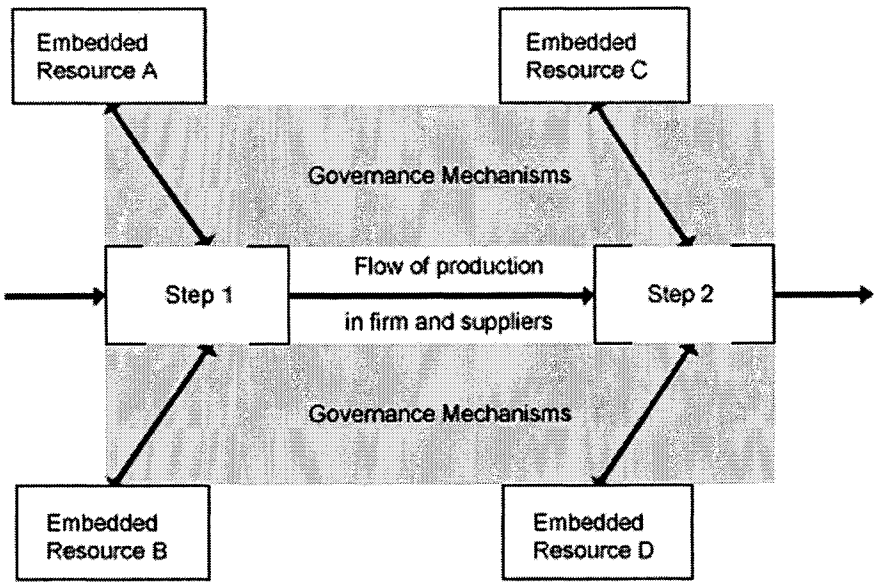
The key insight to be drawn from this metaphor is that the household interacts with its environment in an opportunistic way. It balances its needs and the skills of its members against the opportunities presented by its environment to gain the necessities and comforts of life. The household would be at a serious disadvantage if it only used one mechanism to access natural resources. Focusing on farming exclusively, members of the household would find it more difficult to achieve a healthy diet based only on its crops. Perhaps more significantly, this strategy would place the household at the mercy of one failed crop. Once the household has determined a stable and effective balance of skills in hunting, fishing, gathering, and farming to meet its needs, it will specialize and build on these skills until it uses these in the most effective way possible. Optimization based on environment and survival needs create the pattern of household specialization.

If we wished to develop a theory to explain the survival and prosperity of some households, it would be counter-intuitive to begin by ignoring the character of its environment and abstracting away from the kinds of resources drawn from it. A model that only identifies inputs as food and shelter would offer no insight into the choice to plant a garden or weave fishing nets. Similarly, a model that treats firms as a production function drawing capital and labor from an environment where each of these inputs is governed by only one type of institution cannot explain why some firms prosper and

[34] Though the metaphor breaks down at some point because firms in the same industry are constrained from high levels of cooperative specialization, it is also possible to imagine limited members of different households working together to cultivate specialized resources.

some fail. Based on the importance of resource governance for firms, it is possible to amend the basic model of the production process developed in figure 1:

Figure 3: A Production Process Requiring Control of Socially Embedded Resources



In this model, the Schumpeterian process of combining resources in specific steps dictated by the available technology remains, but the linkages between the steps in the production process and the resources that must be mobilized are mediated through specific governance mechanisms. These mechanisms are necessary to translate the abstract production process that reflects an ideal technology into an organizational system that draws resources from its environment and manipulates them in specific ways. In figure 1, the unidirectional arrows connecting resources with steps in the production process were assumed (implicitly) to be perfectly functioning factor markets. In terms of the model that I have developed, that would depict the mobilization of resources as occurring through markets for things and skills that are fully commodified while ignoring the problem of directing them as part of the production process. The gray areas and two-

directional arrows emphasize both that the task of resource governance can require a range of institutional tools and that it must involve both mobilization and direction of those resources in ways that will depend on how the resources are generated in society and how they are embedded in other social relationships.

While the governance mechanisms that are used will be chosen by a specific firm,[35] the general pattern of this process should be similar among firms operating in the same industry in the same institutional environment. The primary reason for this is functional – firms facing the same resource governance needs imposed by their common technology will tend to solve organizational problems. Nearly as important as this functional reason for isomorphism among production processes using the same technology in the same environment is a process of social learning and conscious imitation among managers. In this way, the distinction Schumpeter draws between the entrepreneur and the "mere manager" is replicated in my theory at a lower level: organizational entrepreneurs experiment with various governance mechanisms and construct a production process that best reconciles technology with environment. This practical compromise between technology and resource governance is then imitated by competing firms.

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[35] The use of the word "firm" should be understood in this context as the locus of strategic decision making in a production process, what Schumpeter referred to as entrepreneurial and managerial functions (see also Penrose 1995 [1959], especially pp. 31-41). While some production processes (or small segments of complex production processes) can be better explained by the unplanned coordination of actors with only circumstantial knowledge connected across technologically separable stages by the price mechanism (Hayek 1945), most modern production processes are consciously constructed under the direction of a managing body (Chandler 1962). The assumption that one firm organizes the entire production chain from raw materials to final market is a simplifying device, but it is both analytically useful and sufficiently accurate to justify its employment here.

2.3 Technological Change and Resource Governance: Organizational and Political Strategies

The model of production that I have developed to this point is descriptive and static. It explains what firms do when organizing a production process and provides a functional definition of the tools they must use. Based on this model, the first step in my argument should be clear: a national industry's competitive advantage exists because it is able to govern resources in ways that meet the specific demands of its production technology. When all of the resources called for by an ideal production process can be mobilized and controlled by existing legal, social, and organizational tools, an industry can compete effectively with firms in other countries using the same technology. This is not to say that a specific firm for which production technology and institutional environment mesh will prosper. Factor costs, poor strategic choices, or other circumstances can prevent a firm from competing effectively even when the means to govern resources efficiently are available. The match between governance mechanisms and production technology, however, establishes a necessary if not a sufficient condition for competitive success.

In order to understand the second stage of my argument, it is worthwhile to consider two of the simplifying assumptions used thus far. To this point, firms have been treated as takers of both institutions and governance mechanisms. Technology and the specific resource governance demands that it poses are given by the state of applied human knowledge and is not subject to change by an individual firm. Governance mechanisms have been treated as arbitrary characteristics of a firm's environment, created by the state or by social groups that control resources and presenting the firm with opportunities and constraints that can be exploited but not changed. To return to the metaphor of the household economy, we assume that neither human needs nor the

physical environment can be changed by the actions of the household. If this model were accurate, any change in technology would present firms with one of two possibilities. If the new technology could be used efficiently with the governance mechanisms available in their environment, then it could be implemented and firms would prosper. If, on the other hand, the new technology imposed resource governance requirements that could not be met in a given institutional environment, then would be unable to use that technology on a competitive basis.

These assumptions obviously do not hold in the real world. Technology is constantly changing as a result of the innovative activities of firms and the application of research in other areas, while the political and social institutions in which resources are embedded evolve as a result of legislation, the growth or decline of social actors that control resources (e.g. labor unions or a worker training system), or changes in how government regulations are interpreted and applied. The next step in my argument involves trying to model some of these dynamic processes. Specifically, I will argue that firms responding to changing production technology do not passively accept limitations on how they can organize and control the productive resources they need. Instead, they act strategically – both individually and to a lesser extent collectively – to gain the tools of resource governance demanded by new technologies. This process accounts for both how resource governing institutions change over time and the ability of firms to generate competitive advantage by deliberately creating the organizational tools needed to use a new and more productive technology.

When changing production technology forces an industry to access new resources or control existing resources in new ways, firms have few options but to seek out

governance mechanisms that can meet these needs. For purposes of this argument, technology will be treated as something imposed exogenously on firms. This assumption is justified by the fact that technology is generated by complex and socially embedded processes over which an individual firm seldom has any influence.[36] In many cases, the core characteristics of a technology are drawn from another industry or from another country. Competitive pressure from foreign firms, the threat of other domestic firms adopting the technology, or a desire to capture rents as a first mover provide firms with both positive and negative incentives – carrots and sticks – for the adoption of whatever is understood to be the best available production technology. This generally constrains the choices available to any given firm and forces managers to deal with technological shocks in the way that I will describe.

Treating technological change as an external imposition from the perspective of most firms does not mean that technologies and the resource governance demands that they impose should be understood as completely arbitrary. As technologies are diffused across industries, international borders, or clusters of firms (Wilkins 1974, Nasbeth and Ray 1974), they must be defined, interpreted, and cast as models by managers before any kind of strategic plan to adopt them can be created. The cases I examine suggest that diffusion is best understood as a collective learning process on the part of firms. The ways in which this learning process is structured – by academic research, trade journals,

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[36] For a brief examination of attempts to endogenize technological change in the context of economic theory, see Rosenbloom (1981), Dosi (1982, 1988), and Utterback (1971). Ruttan (1997) points out that the three dominant models – induced innovation, evolutionary theory, and path dependency – have failed to produce a general theory of technological change or to establish consistent connections between technological change and other factors. The emphasis on contingency and complex patterns of path dependence (e.g. Rosenberg 1994) suggests that such a theory may be impossible. Alternate research traditions that examine innovation as a more socially embedded phenomenon (MacKenzie and Wajcman 1985; Winner 1986, 1993; Podolny and Stuart 1995; Vergragt 1988) show that the development of new technologies is both more complex and more contingent than economic theory allows.

an industry association, or researchers within dominant firms – are important to my general argument because how a technology is defined will determine the formula firms believe they must follow to replicate it. This will be examined in more detail as part of the model that I develop.

The creative task of reconciling resource governance and new technology will involve two related types of activity, and an industry responding to technological change will employ some mixture of both as part of its overall strategy. First, firms can attempt to use existing resource governance mechanisms to meet the needs of their new production process. Where the exact institutional tools called for by the technology are not available, this will involve finding governance mechanisms that can fulfill the same functions despite operating differently or finding ways to adapt a national economy's generic governance mechanisms to new tasks. Generic governance mechanisms such as contract law, structured labor co-determination, property rights regimes, or hierarchical management structures are tremendously flexible, and these can be used in ways that were not foreseen by the political and social actors who created them.[37]

Despite this flexibility, the creative or dynamic use of existing governance mechanisms is often insufficient for firms to accomplish all of the governance tasks imposed by a new technology. When firms face this problem, their only option is to attempt to create new governance mechanisms using the political power of the state. Just as the innovative use of existing governance mechanisms could be thought of as

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[37] As an example, consider the use of the trust – a legal mechanism intended to govern inheritance that traces its roots in English common law to the late medieval period – as a means of corporate governance. The analytical distinction that I draw between innovative use of existing law or institutional forms to govern resources and the process of creating or modifying such institutions through political action is difficult to apply to the evolution of legal standards in the Anglo-American tradition (see Figure 4 below).

organizational entrepreneurship to emphasize its creative aspect and distinguish it from simply following a technological formula, the turn to the state involved in creating new governance mechanisms can be considered political entrepreneurship. Like other activities of the firm, I assume that the turn to politics is part of a boundedly rational process and that firms approach the task of bringing about political change by using the least effort to bring about the changes they desire.

This turn toward the state by firms attempting to implement new technology poses a challenge to traditional theories of business lobbying. As in the classical economic models (Stigler 1971, Peltzman 1976, 1980) and more recent work in the pluralist tradition (Grier, Munger, and Roberts 1994), business interest groups responding to technological change are attempting to gain favorable policies by influencing political actors. Beyond this basic point, however, existing models are misleading in two ways. First, they rely on an unjustified assumption about the political goals being pursued by firms. In most work on economic theories of regulation, firms are seeking to maximize rent extraction or government redistribution of economic surplus (e.g. McChesney 1991). While this is useful as a general simplifying assumption, it offers an incomplete picture of what firms facing technological changes actually want from government. For example, in response to a technological change that they are unable to emulate, firms might seek protection from competition in ways that economic theories of regulation would predict. This seldom represents their entire strategy. In both of the cases I examine, firms undertake political action as part of a broad production strategy aimed at

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For an example of this ambiguity, see Scott's (1922) examination of the historical evolution of trust doctrine in American law.

using new technologies, not simply to protect themselves against the need to respond to them.[38]

In order to account for this, existing models of business lobbying must be expanded to describe a more realistic set of business interests. Firms want complex things from government, and inferring their resource governance needs from their production technology provides an important guide to how firms formulate their own political goals. In more formal terms, firms should be thought of as having a set of goals as producers and not simply as profit maximizing units without context. When Alfred P. Sloan famously declared that the purpose of General Motors was to make money and not cars, he was discussing ways to minimize production costs through design improvements, not expressing indifference to the production side of the industry.[39] As organizations with both structural and human investments in the productive activities that define their industry, firms will tend to construct their strategies – both organizational and political – in ways that are colored by their roles as creators and sellers of goods and services rather than simply as profit maximizing units. If this is true, then firms turn to the state for an entire range of reasons that are poorly described by existing theories. A firm seeking the power to negotiate different kinds of labor contracts, assert property rights in a novel

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[38] I do not intend to argue that lobbying should be seen *only* as an aspect of firms' production strategies. Threatened industries often seek several policies at once from government, making a range of demands in the hope that some will succeed and leaving their options open to build competitive strategies around whatever opportunities emerge. The model of business lobbying presented here is intended to supplement existing theories by explaining types of lobbying that make little sense as pure rent extraction. For example, banks implementing electronic data processing systems lobbied to lift restrictions on the kinds of services they could offer their customers in order to use their new computer equipment more efficiently (see Chapter 4). While it is possible to think of such a regulatory change as the use of government power to extract rents, it would be difficult to argue that this is an efficient way to do so.

[39] Sloan (1963), p. 64.

way, or form a joint research consortium with its competitors is clearly not engaged in simple rent extraction.[40]

Second, most theories of business lobbying describe an exchange relationship. In the American context, this is usually modeled in terms of campaign contributions for legislators (e.g. Wright 1990, Hall and Wayman 1990) or future career opportunities for bureaucrats (Schneider 1993, Adolph 2004). These models of political influence are intuitively appealing because they allow political actors to be modeled as rational agents engaged in some form of simple maximization and because material exchanges have empirical implications that are easy to observe and test through correlation. If a firm donates to the re-election of a specific representative who then sponsors or supports legislation desired by the firm, this provides a smoking gun to measure the exercise of political influence. Similarly, if a bureaucrat passes through a "revolving door" between government and private industry, there is a powerful basis to infer that regulatory decisions are subject to some kind of *quid pro quo*.

When firms turn to the state as part of a strategy to change how productive resources can be mobilized and controlled, models based on trading money or services for access and influence provide an incomplete image of the political power being exercised. While material resources often play a role, the cases I examine suggest that

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[40] If the assumptions behind rent extraction theory are taken to an extreme, any political action by a firm that is intended to increase its profits can be explained. Just as Coase (1972) pointed out that an economist could always find some tenuous connection with monopoly to explain firm behaviors that deviated from the expectation of price theory, so it would be possible to argue that any regulatory change sought by a firm is intended to establish its own control over scarce resources in a way that serves to reduce competition and generate rents. This line of argument, however, reduces rent extraction to a tautology rather than a useful model of firm behavior. In addition, it encounters a problem in explaining lobbying that creates or opens markets in ways that ultimately increase competition or benefit competitors. An example of this can be seen in small commercial banks lobbying to eliminate the restrictions on branching that protected them against competition from large, urban financial institutions (see Chapter 4).

this is neither the most common nor the most effective way of bringing about regulatory change. Instead, the lobbying process in these cases is a much more collaborative and embedded process in which perceptions of legitimacy, information asymmetries, and concerns over the implications of business failure or disadvantage cast powerful shadows over policy choices. In few other areas is Lindblom's (1977) argument about the privileged position of business more valid. When an industry can claim that it requires regulatory change in order to remain internationally competitive or to take advantage of more efficient technologies that will ultimately benefit the public, structural and ideational forces align in its favor to give it greater political influence than would a similar request for advantageous but competitively irrelevant regulatory change.

The political bias in favor of firms' regulatory needs is deeply embedded in history and can be tied to the growth of state power over civil society during industrialization (c.f. Polanyi 1944). Though a historical analysis of state development is beyond the scope of the present argument, the cases examine in the following chapters show that the privileged position of business is neither an accident nor the result of material corruption of government.[41] Unlike the demands for direct wealth transfers or the creation of economic rents emphasized in the economic regulation literature, successful developmental states view meeting the resource governance needs of firms as a legitimate public interest. By conflating firms' abilities to employ new technologies for economic production with the interest of the public in economic growth, the arena of political conflict is slanted toward the regulatory desires of business. The underlying

[41] The role of the state in industrialization is most commonly understood in terms of capital accumulation or the targeted promotion of investment (c.f. Gerschenkron 1970, Johnson 1982, Wade 1990). Inferring a similar process from the cases I examine, the role of the state in providing usable governance mechanisms

logic of a market system lends credibility to the demands of firms seeking higher productivity and pushing outward the frontiers of technology.

These divergences from mainstream theories of business lobbying have important implications, but before considering them in more detail, it is worthwhile to review the process through which business engages the state on issues of resource governance. This simple model of business lobbying can be thought of as applying primarily to Lowi's (1964) regulatory "arena of power."[42] In general, this can be divided into three steps. First, these firms must determine what their new resource governance needs are and how they can best be facilitated through regulatory change. This is a deliberative process that usually requires some mechanism for building a consensus among managers at different firms. Industry associations, academic opinion, the existence of regulatory models to emulate,[43] and the structure of the industry (e.g. whether there a clear leading firm that is seen as a standard setter) can facilitate the creation of this consensus, but they can not guarantee its emergence. Gridlock or dissensus between firms at this point can fracture a potential political coalition and force each firm to pursue alternate and probably less effective political strategies (see chapter 3).

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to developing industries – often explicitly modeled on those used in countries from which production technologies are taken – is equally important.

[42] See Lowi (1964) pp. 691, 695-699. See also Hayes (1978). Lowi's distinction between regulation and redistribution highlights the problems I identify with the economic theories of regulation that have generally been applied to business lobbying (see footnote 8 above).

[43] Models – as a distinct part of the process of defining firms' strategies – play an important role at this stage in the process. Based on comparisons with the same industry in foreign countries (e.g. a desire on the part of American firms to emulate the German worker training system) or on other domestic industries facing similar resource governance needs, models serve the purpose of allowing firms to coordinate on a common understanding of the regulatory changes they require. The choice of what model to apply exerts a powerful influence on both the organizational and political solutions that will be chosen.

Once the nature of the needed governance mechanism is identified, firms in the industry evaluate their political resources and examine the relevant processes of rule making, interpretation, and enforcement. This evaluation must take into account whether and how collective action problems within the industry can be overcome and the ways in which regulatory competence is distributed by the structure of government. The critical question at this stage is how open the political system is to industry influence at various points where desired changes can be made. Some regulatory decisions are within the competence of independent bureaucrats, while others require formal legislation. In still other cases, firms might find that an interpretation of law could be overturned to clear the legal path to their goals.[44]

The selection of a forum in which to concentrate lobbying effort is based on a comparison of where the political system is most open to the kinds of influence wielded by firms and where the changes desired can be most effectively brought about. Simply put, firms choose the arena in which to pursue their regulatory goals based on how effectively the actors in that arena can address their needs and how much influence they can wield over those actors. To take an obvious example, a firm might decide that formal changes in legislation would be the most direct way of achieving their goals, but find that exercising influence on the legislature is best accomplished by mobilizing the voting public – a form of power in which business is relatively weak. As a result, industry lobbyists might pursue the same goals through indirect means by trying to influence the interpretation, enforcement, or penalties associated with existing laws.

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[44] The non-democratic nature of the American legal system and the importance of courts in establishing binding interpretations of conflicting statutes or ambiguous jurisdictions make this a preferred political forum for businesses seeking relatively minor regulatory changes. Both of the case studies that follow

In addition to maximizing their influence on the political actors best able to meet their needs, the goal of firms in selecting a lobbying venue is to position themselves for the third stage of the process. In this stage, the industry's political influence is actually applied to the relevant decision makers to achieve the regulatory changes being sought. In most cases, this will involve direct conflict with other social or business groups that represent competing interests. If the forum for this conflict has been chosen wisely, industry lobbyists will either be able to exclude rival groups from the process of decision-making or will enjoy a structural advantage over those groups in the ensuing conflict. The former situation is typical of the non-democratic areas of policy making and interpretation. For example, the structure of a legal system can deny most parties a voice in the decision-making process. Rules that govern standing, narrow the range of evidence that can be examined, and exclude groups not directly party to the case at hand can be used to set up the most favorable forum for firms to gain their objectives. Similarly, bureaucratic decision-making that takes place within the forum of a subgovernment or policy network allows the selective use of technical information, exclusion of some factors from consideration by fiat, and reliance on the expert opinions of specialists drawn largely if not exclusively from within an industry. In either case, the forum chosen for rule-making or interpretation has the effect of structuring political conflict by identifying the parties to that conflict and privileging certain kinds of political resources in how the conflict will be resolved.

In all of these arenas, firms seeking regulatory changes to facilitate the use of a new technology enjoy one specific form of political influence that is seldom explicitly

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provide examples of court challenges being used as one (though seldom the only) element of business lobbying strategies.

examined but is exceptionally important in the kinds of regulatory lobbying that I examine. In order to understand this form of power, it is necessary to think of the state in another way. Thus far, I have treated the state as a set of interlocking arenas in which political conflict over how its formal powers will be used is played out between various interest groups. This perspective – drawn from modern, interest group pluralism (Lowi 1964, etc.) – is the most useful for understanding how firms seek regulatory change and will remain the primary lens through which I firm strategies are interpreted.[45] The influence firms are able to wield in seeking new forms of resource governance, however, is enhanced by the fact that autonomous or semi-autonomous actors representing the state are supportive of their goals. In general, the agents representing the state in most of the arenas where firms seek regulatory changes favor the resource governance aims of industry even where they would be indifferent or hostile to its redistributive goals: while firms engaged in rent seeking are supplicants before the state, those seeking to respond to new technologies are in some sense its allies.

There are two reasons why government is biased to help firms pursue new forms of resource governance. The first involves what Lindblom called the public functions of

[45] The general argument that I construct regarding firm strategies should apply in any political environment; the ways in which interest group power is structured is less important than the degree to which changing technology dictates the *goals* firms pursue in lobbying government. The framework of interest group pluralism is used here because it is sufficiently broad to accommodate general claims about how firms will pursue their political goals and because it is especially suited to the American environment from which my cases are drawn. The hypotheses regarding how political goals are developed within an industry, the selection of the most favorable venue for exercising influence, and the inclination of government to collaborate with firms creating new governance mechanisms should apply in formally organized systems of interest group representation as well (Schmitter 1974). This is supported by the differences in interest group structure between the banking and auto sectors: the former is represented by one of the most powerful and coherent associations in the American economy and is affiliated in a corporatist manner with the quasi-public Federal Reserve, while the latter has no formal structure at all.

business.[46] The ability of firms to produce goods and services efficiently is not only a matter of interest to managers and investors seeking a maximum rate of return. Instead, the performance of private industry determines levels of employment and output that generate a rising standard of living. Though the decisions that produce these outcomes are made by private actors throughout the national and even global economy, modern states rely for their legitimacy on general economic prosperity.[47] Governments therefore must take into account the likely consequences of political decisions on the behavior of business. Because the public functions of business that concern the state have to do with production and employment rather than profitability, government will be more sympathetic to resource governance demands than pressure for direct rents or redistribution. In a sense, business lobbying for regulatory change provides the state with information about the best ways to structure access to the factors of production to meet the needs of the best available technology.[48] This information allows the state to deliberately adapt law and regulation to changing technology and facilitate economic growth. While states pursue a range of goals in the pursuit of an ill-defined public interest, insuring that economic growth is possible by allowing entrepreneurs to take

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[46] This characterization of business-government relations id drawn from Lindblom (1977), with the core of the argument presented on pp. 171-172. While Lindblom focuses on the structural privileges that the state grants to representatives of business as a result of this fact, its importance for lobbying over resource governance mechanisms is greater still

[47] It is arguably the case that democratic systems are less vulnerable to crises of performance based legitimacy than are authoritarian systems (Löwenthal 1984) due to the procedural legitimacy given them by popular election. If this is the case, we would expect that the weight given to the resource governance needs of business would be even greater in authoritarian systems.

[48] It should be clear that this argument addresses systems in which production is organized by private, profit-oriented firms and economic relations are generally structured by markets. In countries with significant public enterprises or central economic planning, a parallel function of providing the regime with technical information about how the requirements of production should be met through law and institution-building must be preformed by managers acting explicitly as public functionaries.

advantage of new technologies is an important function of the state as overseer of a market economy.

The second motive for the state to act in partnership with private industry as it responds to technological change is strategic and relies not on the state's legitimacy with its own population, but on concern over its international standing.[49] By most measures of international influence, a strong economy capable of using the most productive technologies contributes to security and power. A strong economy can provide a basis for avoiding financial or resource dependence on other countries, meet the technical or industrial needs of a strong military, generate money or technical resources to influence the behavior of other states, and support prestige that enhances "soft power"(Nye 1990). In contrast with the concern for employment and general prosperity, an international motivation for adaptive industrial policy is likely to focus on strategic industries and to involve more direct, explicit collaboration between policy-makers and business representatives.

The ability of business to wield this special form of political power depends on the credibility of the technical claims that are used to justify regulatory change and the political importance of the industry involved. Of these, the political importance of the industry to the relevant political actors is most important, and examples appear repeatedly in the cases I examine. The American automobile industry's concentration in Michigan combined with the scale of employment it created within the economy overall to make

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[49] The economic dimension of international power and the reasons for the state to be concerned with the comparison between its economic productivity and those of international peers are reviewed in Skocpol (1979) (cf. Tocqueville 1998 [1856]). Though the specific mechanisms that Skocpol claims motivate states to undertake structural economic changes – which my framework would identify as modification of governance mechanisms – no longer operate in the manner she describes, the importance of industrial

the crisis it faced in the early 1980's politically salient in the national legislature, leading to the Reagan administration's attempts to roll back safety, fuel economy, and environmental regulations in an attempt to restore corporate profitability. In addition, the auto sector's role in the defense industrial base as well as the danger of a regionally concentrated economic collapse helped to justify the bail-out of Chrysler, a massive experiment with industrial policy that put a union leader on the company's corporate board and consciously emulated the German *Hausbank* system of investment oversight. By contrast, the politics of the commercial banking industry were shaped by its co-evolution with the American federal system: local banks wielded exceptional power over local politics. This made the political system relatively more responsive to small banks in rural areas than to the financial giants in urban areas. In both cases, the political resources available to firm lobbyists to achieve changes in governance mechanisms were determined in part by the ways in which the political system measured the role of the industry in the broader political economy.

There is one other aspect of creating governance mechanisms that must be treated before moving on. This is the creation of entirely new institutions through which firms govern resources. Most of the organizational and political strategies examined so far have involved either changing existing governance mechanisms or extending them to apply to new resources. For example, an organizational strategy alone might involve renegotiation of work rules with unions to allow labor to be paid on piece rates or included in a profit-sharing program that alters work incentives. Shifting resource governance in this way might require no political changes because existing contract law

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policy to military security (Hooks 1993, Basiuk 1983) and broader conceptions of economic power (Sandholtz et al. 1992, Duchene and Shephers 1987) is still believed by policy makers to exist.

can accommodate the new arrangement, or it might require that labor law be changed to allow the new contract to be negotiated. In either case, the calculations a firm will make in deciding to attempt it and the means that will be used can be understood within the framework I have developed.

The creation of an entirely new governance mechanism, by contrast, usually involves both political and organizational changes conducted in concert with one another. This is necessary because the new institution requires the both the creation of a set of rules and a settlement that establishes cooperation between firms and the social groups that control the desired resource. That is, not only must the relationship between firm and resource-holder be structured by some set of enforceable guidelines that limit opportunism and narrow the range of negotiated behaviors (c.f. Williamson 1993), but the substance of cooperation needed to sustain efficient coordinated behavior must be arranged. While in principle this process could work through a form of tripartite bargaining between firms, the state, and groups that generate or control needed resources,[50] as a matter of history such institutional creation has generally used the coercive force of the state.

Since governance mechanisms by nature establish and regularize the exercise of power, both the need for coercive force and the obstacles to its use in a developed political economy should be clear. For example, during the early period of industrialization the creation of a mass, low skilled labor market required both

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[50] When applied to labor, this can be thought of as the ideal toward which neo-corporatist strategies of economic adjustment strive (Schmitter 1974, Katzenstein 1984). In this model, political opposition to meeting the resource governance needs of industry would be muted by a combination of government compensation and active training and labor market policies. This would allow businesses to use different kinds of labor organization as production technology dictated without paying the full costs of institutional

organizational choices by firms as well as the creation and enforcement of a range of laws. Coercive power was used both by firms and the state in order to destroy clusters of socially embedded skilled labor, break existing craft unions, and block retaliation by displaced or disadvantaged workers.[51] The social disruption involved in creating mass labor markets was enormous, and it is reasonable to argue that it was only possible in that historical context because the groups that suffered initially lacked the means to resist the process through political means. This would be consistent both with the framework I have developed and with the kinds of strategies actually adopted by firms. The political opportunity structure in the United States in the 19th century offered firms several venues from which the holders of the desired labor resources (poor, largely immigrant groups lacking political resources such as education, organizational skills, and money) were excluded. This historical window of opportunity closed with the mobilization of workers through unions and the political entrepreneurship of the Democratic Party in the 1930's, but the basic institutions required to embed market mechanisms in the American system of allocating labor had been established and both law and custom had solidified around them.[52]

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change. In practice, opportunism and the difficulty of combining market incentives with strong guarantees to labor makes this model problematic.

[51] For a general examination of this process, see Polanyi (1944). For examinations of the process in the historical context of the United States and exploration of the link between creating fluid labor markets and technological change, see Glocker (1915), Douty (1937), and Taft (1937). A more theoretical examination of this process is provided by Lazonick (1981*a*, 1981*b*). Though it is beyond the scope of my argument, it is interesting to note that there is evidence that *technologies* were in some cases chosen by firms because they reduced the role of skilled labor in a given production process or facilitated the creation of fluid labor markets (see Edwards 1979 and Clark 1984), reversing the causal chain that my argument identifies *from* technological necessity *to* specific forms of resource governance.

[52] A useful comparison would be the transfer of adjustment costs under the classical gold standard to workers. Eichengreen (1992) argues that the gold standard became untenable after the First World War primarily because the groups most harmed by the deflationary adjustment process it required had gained the political resources to oppose it through democratic means. The differences between the cases are

The growing inclusion of the political process, by increasing the ability of social groups to defend existing economic prerogatives, also explains why national economic models become socially embedded and difficult to alter.[53] As Olson (1982) recognized, groups that benefit from a given institutional arrangement often have the resources or structurally privileged position from which to defend that it. Under these conditions, attempts to replace existing mechanisms of resource governance on a large scale generate their own resistance as potentially disadvantaged groups counter-mobilize. Despite their concern for economic performance, contemporary states lack an incentive to engage in social disruptions and economic uncertainty on the scale that has been historically required to set up and sustain new institutional configurations. This produces a pattern of adjustment that is strongly biased toward modifying existing governance mechanisms rather than creating new ones.[54]

When the organizational and political aspects of how firms adjust to new technology are combined, a general model based on the concept of resource governance emerges. This model describes the set of interlocking decisions that a firm must make when faced with technological change, made under sharply constrained information.

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illuminating as well. Unlike labor markets, the gold standard had not become embedded in both the structure of economic activity (i.e. how firms organized their production processes) and the system of contract law supported by the courts. The gold standard was a policy choice with macroeconomic implications that could be abandoned, while fluid labor markets in the United States were institutional preconditions for the production technologies used in the industrial economy, making them impossible to simply discard.

[53] Though national economic models are identified by more than the institutions I refer to as governance mechanisms (e.g. Hall and Soskice 2001, Crouch and Streeck 1997), one of the key sources of resistance to change in the last decade can be found in opposition to increased use of market mechanisms to allocate labor and other productive resources (Streeck 1997*b*, Vogel 2006).

[54] This bias feeds back into the ways in which firms perceive their political opportunity structure, leading them in many cases to try to find functional substitutes for forms of resource governance that exist in other environments (see American attempts to emulate the Japanese system of labor incentives examined in Chapter 3).

Firms begin with the decision of whether the new technology can be adopted at all. The answer to this question will depend on the competitive pressure that they face and their evaluation of the resources that the technology demands. If the competitive pressure is high and resources readily available, then adopting the new technology is clearly the best choice. If the task of mobilizing and controlling resources seems insurmountable, competitive pressure can lead instead to the classic search for protection, undertaken through government action, product differentiation, or licensing/market sharing arrangements between firms.

Once the decision has been taken to implement the new technology, a complex set of investments in both organizational and political changes must be made. The rational evaluation of these investments is made more difficult by the fact that the return on each investment is contingent and the firm is lacks perfect information about both the technology they are implementing and the political environment. This is the point at which imitation of successful first movers, the development of an industry-wide consensus on how to implement the technology, and internal research become important. Though the strategic decisions are made by each firm, the role of an industry association, trade press, or a single firm that acts as technological leader can be important in establishing a general pattern of strategic response that is then copied by most firms in the industry. Firms will tend to cluster around a single response strategy because of the potentially high costs of experimentation, a desire to simplify the cognitive task of adjustment by using any models available in the environment, and the second-mover advantage of evaluating the performance of an industry leader. In addition to its analytical utility in making it easier to apply a theory that relies on firm choices to an

entire industry, this clustering is also useful to the industry itself. By making information an excludable good that motivates participation, leading firms or an industry association can shape political strategies for the entire industry.

The next stage separates organizational and political strategies. If it is possible to meet the needs of the new production process using existing resource governance mechanisms, that course will generally be preferred. This will involve applying the country's generic governance mechanisms to the specific resources called for, mobilizing and controlling them through market mechanisms or some form of negotiated cooperation with the relevant groups. These strategies are preferable in part because they take advantage of existing competencies possessed by firms. By using existing institutions – even in novel ways – the firm is able to draw upon the experience and tacit knowledge of its managers and employees.[55] In addition, the firm's own organizational structure is likely to accommodate the use of existing governance mechanisms with little disruption. For example, the purchasing department of a major manufacturer represents an enormous center of expertise and experience in collecting bids, monitoring the performance of vendors, and tracking expenses. The advantages of having this organizational resource within the firm provides a powerful incentive to use a market-mediated process to acquire new resources and integrate them into a production process

[55] In addition to classic examinations of adaptive patterns and learning in complex organizations (Cyert and March 1963, Nelson and Winter 1982, etc.), recent work has focused on the character of embedded knowledge and adaptation over time (Nonaka 1994, Grant 1996). They key point for my argument is that the efficient use of specific governance mechanisms can be embedded in organizations existing within a firm. These organizations represent not only the rational basis from which to experiment with adapting forms of governance already used, but also a potential influence on how the firm conceptualizes new resources governance tasks. That is, if decision makers within a firm are trained to see resource governance tasks in a specific way (e.g. as tasks to be organized within a vertically integrated hierarchy), they are likely to resist alternatives even if evidence suggests that they are necessary elements of effectively using a new technology.

rather than attempting to generate new ways of coordinating activities between suppliers and assemblers that will require internal reorganization and the acquisition of a new set of competencies to be effective even under the best circumstances.[56]

Despite the preferences of firms, it is often impossible to adapt existing forms of resource governance to the tasks dictated by new technology due to government regulation or the specific rules that stipulate how governance mechanisms can be used. This can occur when firms require a resource that is not generated by their social environment, when no suitable mechanism exists to extract existing resources from their present uses, or when resources must be controlled in a specific way to meet the needs of a production process. To take an extreme example, the provision of enormous land grants to railroads in the American west in the 19th century solved a problem of resource mobilization by a conditional transfer of ownership rights (Mercer 1972). This is not to indicate that all resource generation requires a turn to the state; banks attempting to use electronic data processing faced a complete lack of qualified computer programmers, technicians, and data entry personnel that was resolved through cooperative educational programs organized jointly with computer manufacturers such as IBM (see Chapter 4).

With this turn to the state, political opportunity structures and the ability of firms to act collectively becomes relevant. When this occurs, the considerations discussed above come into play: creating a consensus within the industry, the choice of the best venue for exerting political influence, and the nature of opposing interest groups. While the question of exactly what determines a firm or industry's political strategy is highly

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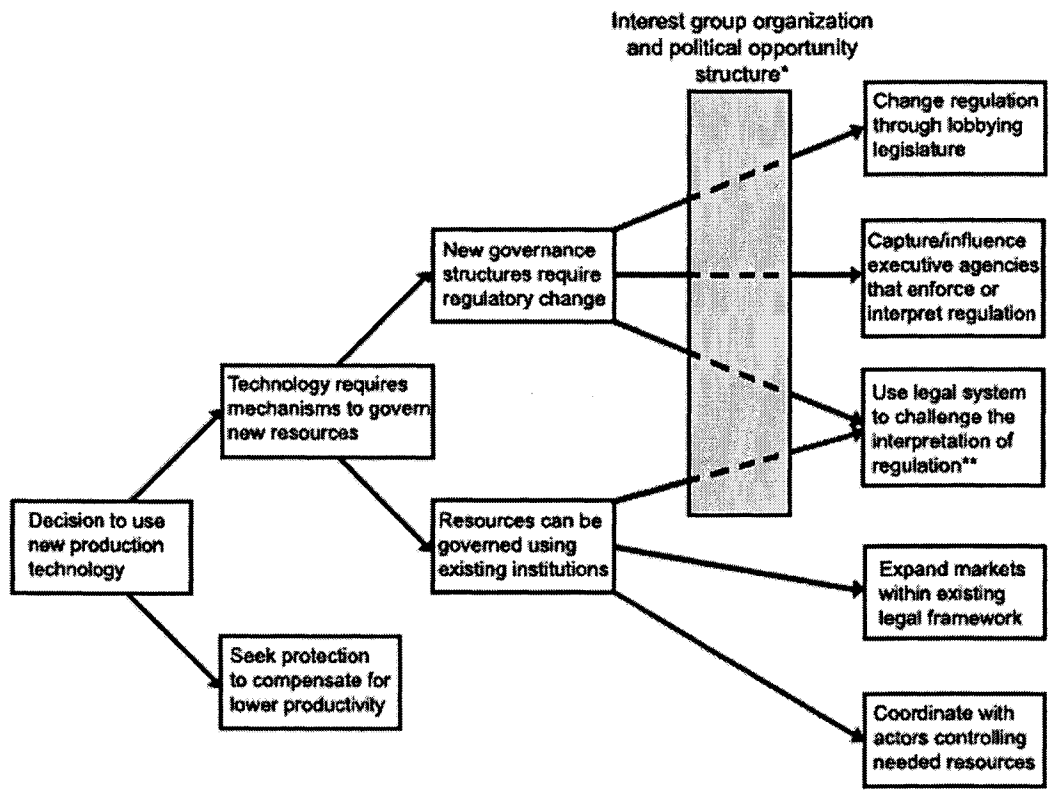
[56] The example of General Motors' attempt to reform its supplier relations under the leadership of J. Ignacio Lopez suggests that even dramatic reorganizations within an existing institutional system can be highly disruptive and create unforeseen costs (see Chapter 3).

contingent, the fact that this strategy emerges from a rational calculation constrained on the one hand by the resource governance demands of the technology and on the other by the industry's political landscape provides a framework in which to analyze specific cases.

The general balance of organizational and political calculation can be expressed as a decision matrix:

Figure 4: Resource Governance Strategies in Response to New Technology



* Strategies to alter regulation can be applied at various levels of government, with the choice of venue in the United States based on the federal division of regulatory competence and estimates of where influence can be most effectively applied.

** The American legal system exists in a gray area between the use of existing governance mechanisms and the creation of new ones. When the courts are used to challenge regulatory decisions, they are closer to the latter. When they are used to create and enforce Williamsonian complex contracts, they are closer to the former.

In this chart, firms do not make mutually exclusive decisions that will place their final strategy in only one of the boxes on the far right. Instead, firms use overlapping

combinations of strategies that supplement and reinforce one another. So, for example, a firm barred from vertical integration by anti-trust laws might attempt to demonstrate to regulators that their behavior is not anti-competitive in light of their production technology, conduct the actual integration through a partly owned subsidiary, and prepare a legal strategy to challenge an anti-trust decision in the courts. This would involve three of the general strategies listed on the right side of the chart as complementary elements of one strategy. In other cases, firms' calculations of costs and benefits or the impossibility of using a given technology access to a specific form of governance will dictate only one set of strategic choices and the survival of a firm will depend on the success of one organizational/political plan.

As should be obvious, the chart as it is presented here describes the strategic choices firms face in the United States. Though the general model I have presented should apply to a variety of political and institutional environments, the application of the model to a specific environment should make the kinds of decisions being made at each stage more clear. In addition, the case studies that follow examine two technological changes affecting industries in the American context, allowing this chart to be used to help structure thinking about the industry strategies that follow.

While the cases I examine are confined to one national environment, the implications of the argument I have presented should extend both across nations and into history. The ability of firms to respond to the imperatives of technology is important both for understanding sector-specific national competitive advantage and for modeling institutional change. In the first case, new technologies that demand organizational and political strategies that are too costly for existing firms to undertake are likely to result in

competitive failure if the industry is subject to international competition and costly relative inefficiency if it is not. Similarly, the degree to which best practice technologies can be implemented through such strategies will have a powerful influence on global competition. This makes competitive advantage contingent not only on the serendipitous coming together of resource governing institutions and a particular dominant technology, but also on the ability of firms to use the political process to create these globally competitive matching of institutions with technologies. This demands that theories of competitive advantage be based not only on the merits of a nation's generic resource governance mechanisms, but also on the ability of its political system to modify those mechanisms in response to demands from industry.[57]

While the implications of my argument for debates on national competitive advantage are important, their implication for the development of national institutional systems is more significant. By providing an addition to economic theories of business lobbying, my argument provides a lens with which to reexamine industrialization and reconsider how choices are made between different ways of structuring economic activity. A resource governance perspective on production can be applied to industrialization to generate hypotheses about why some institutions become dominant in a given economy. Like Gerschenkron's (1962) theory regarding the capital requirements of dominant industries at the time of industrialization, my argument implies that the resource governance demands of production technology in dominant sectors of the economy during the period of initial industrialization will determine the kinds of generic

[57] From the perspective of democratic theory, the possibility that economic development is best served by granting a structurally privileged position to firms both reinforces Lindblom's (1977) concerns about the compatibility of democracy with a market economy and raises an increased danger of uncontrolled rent-seeking by business under the guise of increasing productivity.

governance mechanisms that a country will develop. If this is true, contemporary developing countries should be able to choose certain combinations of industries and institutions that will place them on one or another developmental pathway, offering a moment of choice between what Hall and Soskice (2001) call liberal and coordinated market economies.

2.4 Applying the Model in the American Context

This model of how firms respond to technological change through a combination of organizational and political strategies serves as the basis for the two case studies that follow. In each, I have examined how an important industry responded to new technologies that imposed a clear set of resource governance demands on firms. To deal with these demands, both the auto industry and the commercial banking industry pursued a range of strategies that were determined by the character of the new technology being implemented, the generic governance mechanisms available to them, and the openness of the political system to their desires for regulatory change.

Each case study is organized into five main sections. After a brief introduction, I present a historical summary that examines how production was organized in the industry prior to the introduction of the new technology and the ways in which government regulation had influenced the industry over time. After this, the character of the technological change will be considered. The purpose of this section is to establish what resource governance requirements were imposed by the new technology by considering its technical character and the ways in which the technology was socially constructed by the industry. For each case, this involves understanding the environment in which the technology was initially developed and how the industry constructed and propagated a

common understanding of the technology.[58] Understanding how this is done is vital because it determines what organizational and political problems firms will then attempt to solve. The third section examines the political strategies pursued by the industry in an attempt to either facilitate new forms of resource governance or to otherwise deal with the competitive challenge posed by the new technology. While these political strategies – especially in the case of lean production in the auto industry – include attempts to gain protection and improve the competitive strength of individual firms along with the kind of regulatory lobbing addressed here, the cases provide insights into what causes firms to choose one form of lobbying over another. The fourth section addresses firms' organizational strategies. This focuses on how firms try to use existing governance mechanisms to meet the resource governance needs of their new technology. In practice, political and organizational strategies are linked with one another, so these sections frequently overlap. In the final section, the response of each industry will be summarized and the two outcomes of interest will be reviewed: was the industry able to adopt the technology successfully? Did firms succeed in altering the resource governance tools available to them?

Though both case studies take place in the context of the American national economy and its political system, they were selected to offer significant diversity in both the character of the technological change being dealt with and the venues of political

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[58] No technology is developed in an institutional vacuum. This means that when firms try to interpret a best practice technology that was developed in another institutional environment (i.e. in a context where different resource governance mechanisms shape firm strategies), their first task is to create a model of the technology that abstracts it away from the governance mechanisms around which it was developed. In order to generate what I call an abstract model of the production process (see Figure 2 above), firms in an industry must collectively or individually define the new technology in a way that sets out its functional steps and suggests how they can best be accomplished in the new environment. Understanding how this is done is vital to set up the organizational and political problems that firms will then attempt to solve.

action available. The American auto industry in the 1980's was a globally dominant manufacturing industry made up of three enormous corporations and constellations of suppliers. It was relatively geographically concentrated in the Great Lakes region and had only recently been subject to specific regulatory regimes dictating standards for fuel economy, safety, and environmental protection. It was also one of the most heavily unionized industries in the United States, with the United Auto Workers (UAW) being both a dominant partner in negotiations over wages and benefits and a powerful political actor supporting the Democratic Party. The technological challenge that it faced from lean production arose clearly from the fact that Japanese firms had developed manufacturing and labor relations techniques that were tightly bound up with mechanisms for governing labor and upstream suppliers that did not exist in the United States. American firms were forced to deal with this technology by overwhelming competitive pressure in the form of imported Japanese vehicles that were made even more attractive by the fuel crisis and economic downturn of the early 1980's.

By contrast, the commercial banking industry was among the most comprehensively regulated industries in the United States in the early 1960's when electronic data processing became available as the first manifestation of the computer revolution in service industries. Unlike lean production, electronic data processing was an American invention, being developed by two of the nation's largest banks in cooperation with researchers and computer manufacturers seeking new markets outside of government and academia. The problem of resource governance mechanisms was more complex in this case, arising from the fact that the technology had been developed by some of the world's largest banks. The cost of capital equipment and the problem of

creating the required skilled labor force were important resource governance challenges created for small banks by this technology, but the core problem arose from the fact that EDP equipment could only be operated in a cost effective manner for extremely high volumes of transactions. While this aspect of the system's architecture fit the needs of large branch banks perfectly, it could not easily be used by the small banks that made up the majority of the sector. The logic of the technology favored consolidation: the merger or acquisition of many small banks into larger regional chains that could pool their data processing needs. But the entire regulatory system – created during the Civil War and reinforced during the Great Depression – blocked consolidation and favored large numbers of small, independent banks serving individual communities. Other aspects of the complex system of banking regulation made alternatives such as pooling data processing between several banks or offering data processing services to other businesses difficult. In order to use the new technology effectively, firms would have to engage in lobbying that would allow them to either grow in size or otherwise increase the volume of work done by their computer systems. This case presents a fascinating example of a search for solutions, with different banks trying different combinations of organizational and political strategies until two optimal courses emerged and were propagated through a powerful industry association.

These cases show that the central aspects of my argument can apply to different kinds of technology in a range of industry environments. Each industry engaged in a process of collective learning that attempted to reach a consensus definition of the new technology and to establish what steps would be required to employ it in their environment. In the banking industry, this process took place through the American

Bankers Association and was dominated by the large banks that had developed the technology, leading to a consensus that favored consolidation and the regulatory changes required to allow it. In the auto industry, the process was less formal and involved industry and academic studies of Japanese techniques such as the Harbour Report and the National Research Council. After a series of experiments and failures, a rough consensus was reached despite a general conviction that lean production could not be implemented in the United States and failures.

After the new best practice production process had been defined, firms in both cases created strategies to implement this that involved both organizational and political changes. In the banking industry, political action was initially hobbled by disagreement among banks about breaking down the regulatory system that protected small banks from competition. This internal debate between large and small banks had been going on since the turn of the century, but in this era large banks were able to claim that their preferences were now supported by the needs of a superior technology. This allowed them to dominate the ABA and eventually push through the first phase of bank deregulation. By the mid 1970's the American commercial banking sector had largely implemented EDP and was in the process of consolidation. The technology had been successfully adopted and the regulatory changes needed to employ it had been accomplished.

In the auto sector, attempts to implement lean production in the United States failed. The bail-out of the bankrupt Chrysler Corporation represented an explicit attempt to copy Japanese forms of resource governance by placing a labor representative on the company's board of directors, restructuring relationships with suppliers, and providing a government subsidy for investment in a new vehicle design. This is an excellent example

of an attempt to use existing governance mechanisms to create functional substitutes for types of resource governance that can not be directly copied. The institutions did not exist in the United States to copy Japanese forms of labor governance and *Keiretsu* supplier relations, so functional substitutes using contracts and special federal legislation were created. Though this experiment was successful in the short run, the American institutional environment could not support these forms of resource governance once the immediate crisis was gone and labor, management, and suppliers began to reassert their interests in traditional ways. Aside from this and General Motors Saturn program, few large scale attempts were made to copy lean production directly. Evaluating their political environment and the degree of internal organizational change that would be required to implement lean production, American firms decided on an alternate strategy. While still pursuing halfhearted experiments in Japanese style organization on the shop floor, American firms pursued a strategy of product differentiation, protectionism, and organizational experimentation to try to find ways to use market forms of resource governance to match Japanese productivity.

Chapter 3: Lean Production in the American Auto Industry

3.1 Introduction

Though it was developed over a period of 20 years in the Toyota Motor Corporation's Koromo assembly plant, American auto makers only became aware of lean production in 1979. Unable to imitate the globally dominant Fordist production system in impoverished postwar Japan, a team of managers and production engineers had created a new system that utilized labor and structured relations with suppliers differently. This new manufacturing system allowed Toyota and other Japanese auto makers to produce higher quality cars at a fraction of the cost of mass production firms. This technological advantage was ignored or misunderstood by the American auto companies until 1979, when the second oil crisis increased the attraction of the small cars produced by Japanese companies and consumers began to respond.

Over the next fifteen years, General Motors, Ford, and Chrysler – the "Big 3" that had dominated the American domestic market in the postwar era – attempted to deal with the Japanese advantage created by lean production. In this period, they invested over $60 billion in new capital equipment, reorganized relations with labor and component suppliers, altered the physical layout of factories, and revolutionized how their cars were designed. Government assistance was marshaled for the industry during two recessions, while indirect support was provided by regulatory changes and import quotas on Japanese cars that operated through mostof this time. The federal government organized a joint research program to assist domestic auto makers, pressured Japanese firms to enter joint ventures with their American counterparts to facilitate technology transfer, and even experimented with a direct industrial policy modeled after Germany.

Despite this, American firms failed in to adopt lean production and match the plant-level productivity of their Japanese competitors. Between 1979 and 1993, seventeen final assembly plants in the United States would be shut down, employment would decline by a net 96,000 – a number that conceals nearly 80% labor turnover – and American firms would be forced to the margins of the compact and economy segments of the market. During the same period, the smallest American auto maker would disappear, the bankruptcy of Chrysler would only be averted by a massive and controversial bailout by the federal government, and the regional manufacturing economy of the upper Midwest would be devastated. By the early 1990's, the profitability of the American auto makers would depend almost exclusively on expanding sales in market segments where the Japanese were only beginning to compete – trucks, vans, and sport utility vehicles.

The purpose of this chapter is to explain the failure of America's largest manufacturing industry to adopt lean production (LP) and examine the structural reasons for that failure. Though the Big 3 were unsuccessful, their attempts to copy lean production followed the general pattern described in Chapter 2. Their failure can be traced on the one hand to incompatibility between technology and resource governance mechanisms and on the other to a political opportunity structure that made changing the resource governance mechanisms impossible. In addition to explaining the failure of the American firms to adopt lean production, the availability of certain resource governance mechanisms and venues of political influence also shaped the competitive strategies they were able to adopt. Each of the three most successful strategies adopted by American firms – reducing costs by relying more on market mechanisms in purchasing; shifting their product mix to trucks, sport utility vehicles, and vans; and using import restrictions

to force Japanese firms to set up production in the United States – were chosen to take advantage of opportunities made available by the American environment. While this environment prevented General Motors, Ford, and Chrysler from using the new global best practice production technology, it did provide them with both political and organizational options to avoid commercial extinction.

Though complex, the general strategies adopted by American firms can be broken down analytically. Facing an enduring productivity disadvantage relative to Japanese firms using LP, American firms adopted four general responses. First, they avoided direct competition with Japanese firms by focusing on segments of the market where Japanese firms could not initially compete. Though American firms were prevented by regulation from completely abandoning small car markets, this strategy can be thought of as market exit.[1] Second, they joined with the powerful United Auto Workers' Union to force Japanese firms to relocate their factories to the United States where they would face the same institutional barriers to using LP. Though this strategy was based on a misunderstanding of the Japanese productivity advantage – believing that Japanese firms were successful because of lower wage rates in Japan – it was successful in forcing the Japanese firms to produce in an institutional environment that was unfavorable to lean production.

Third, American firms attempted to develop new technologies specifically to take advantage of their institutional environment, innovating their way out of the

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[1] Corporate Average Fuel Economy (CAFE) standards, imposed in 1978, required that the entire fleet of cars produced by a given firm have meet or exceed a certain average level of fuel efficiency. Rather than improve the fuel efficiency of all vehicles they produced, American firms chose to meet the required average by producing unprofitable small cars in order to "cancel out" their larger vehicles. One of the auto makers' most important political successes of the era involved exempting vans, trucks, and sport utility vehicles from the regular CAFE requirements (see Section 3.4 below).

technological trap set for them by LP. This can be interpreted within the framework I have presented: if the key to competitive success lies in compatibility between resource governance mechanisms and the needs of production technology, it is logically possible to bring them into alignment in two ways. For analytic clarity, my theory has focused on changing resource governance mechanisms to align them with production technology. This is a defensible simplification because it is the more common reaction; it is usually easier for firms to do this than create new technologies on demand. In addition, the political process that alters governance mechanisms is more consistent and amenable to modeling than the process of technological innovation. When using the political system to do this is too costly, however, altering technology to match the available forms of resource governance might be possible.[2] The most important of these technologies involved developing computer networks that lowered the costs of sharing information and coordinating with suppliers even without the close relationships that facilitated this for LP producers. This is critical because it allowed American producers to gain some of the advantages of *Keiretsu*-type relationships with suppliers while still allowing them to use competitive bidding to impose cost discipline on them. In essence, American firms used a new communications technology to gain the advantages Williamson (1975, 1985*a*) associates with both markets and hierarchies.

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[2] The experience of the American auto sector supports this general proposition. The new technologies developed by auto makers were the product of a costly trial and error process that involved several failed attempts at using robotics, multiple corporate reorganizations to increase and then decrease vertical integration that did not increase productivity, and several years of failed experimentation with network technologies before sharing information electronically across steps in the production process became more than an expensive public relations exercise. Given the wasted time and money and the large number of technological blind alleys followed by auto makers, the assumption that firms will prefer to alter governance mechanisms rather than technologies where possible is difficult to avoid.

The availability and relative efficiency of markets as a governance mechanism in the United States also shaped less successful strategies and innovations. Among these, the case of labor is the most interesting. Though LP is undermined by fluid labor markets and requires a high level of participation from workers, American auto makers were unable to use the United Auto Workers union (UAW) to achieve this despite repeated attempts and a remarkable level of cooperation from union leadership. Instead, their attempts to hybridize LP involved eliminating external labor markets by building new plants in depressed regions where labor would lack an exit option. In cases where this was not possible, auto makers used plant closures and outsourcing to non-union suppliers to weaken the UAW and drive down labor costs, attempting to increase productivity through strategies that did not require cooperation with labor.[3] Without the legal and political infrastructure to support union attempts to protect labor prerogatives, the incentive effects of having a fluid national labor market trumped even the most powerful of American unions, allowing the Big 3 to pursue a strategy of plant closures, layoffs, outsourcing to non-unionized suppliers, and re-locating production facilities. The importance of American market institutions in determining successful corporate strategies is revealed by the failure of Chrysler's attempt to implement partial worker co-determination as a condition of the 1980 government bail-out. This explicit attempt to emulate the German labor model by using negotiated, non-market coordination between employers and the union was supported by attempts to use contracts to create functional

[3] There are several apparent exceptions to this generalization, most prominently among Japanese "transplant" assembly facilities and certain American factories such as the Spring Hill Saturn plant. These cases, however, are somewhat misleading. In most, unions have already been eliminated or weakened to the point where it is difficult to characterize shop floor relations as cooperative rather than imposed. In addition, almost all of these facilities exist in locations where labor's exit option has been eliminated.

equivalents of some German institutions such as profit sharing and direct union representation on the Chrysler board, but its eventual failure was taken as evidence that the kind of cooperative labor relations required by LP could not be emulated in the U.S.

Similar to attempts to use labor more flexibly, internal reorganization by managers at the plant, division, and corporate levels were undertaken in an attempt to find systems of purchasing and internal communication that would increase productivity. This process, though tremendously wasteful, was important both in creating the hybrid versions of LP that American producers ultimately managed and in implementing a host of new technologies that eroded the importance of LP in determining competitive advantage. In other words, internal reorganization enabled the organizational and technological responses by reducing the power of groups within the companies opposed to them. Internationalization – a direct result of the political demands made by auto makers and the UAW – became part of this broader strategy of reorganizing production as new communications technologies were used to combine the benefits of cost control through market discipline with the efficiency of specialization. This strategy changed the degree of vertical integration of auto makers and allowed them to achieve the greatest cost savings enjoyed by American firms during this period.

In order to understand both the importance of the new technology and the political opportunity structure facing American firms, this chapter will begin with an overview of the auto industry in the postwar era and a brief summary of the period from 1979 through 1993. This is necessary to put the discussion of firm strategies and political choices in a general context. After setting the political and economic stage as it existed in 1979, it will be necessary to return to postwar Japan in section 3.3 and examine in detail the

organizational revolution led by Taiichi Ohno at Toyota. This will involve explaining how lean production (LP) was developed and interpreting it in terms of resource governance. The key to this interpretation lies in the institutions that allowed Japanese firms to coordinate the activities of both labor and upstream suppliers, integrating them more efficiently into the production process.

Once the American environment and the resource governance needs imposed by LP have been established, the response of American firms will be examined in three sections that focus on political and organizational strategies. Because these strategies are formulated and implemented as part of a general response by firms and other interest groups, sections four and five of the chapter will overlap in some areas. Section 3.4 will provide an overview of organizational, political, and rent-seeking strategies that will provide context for the two sections that follow. The central point developed in these sections is that the American auto makers' response strategies followed the pattern identified in Chapter 2, even though they resulted in failure. The auto industry struggled initially to define and interpret the technological challenge, failing to respond effectively at first because the Japanese advantage was attributed to low labor costs, government subsidized dumping, or cultural characteristics of Japanese industry. This process of interpretation and model building was facilitated by academic investigation, the work of independent consultants, and government-funded research, but the enormous size of the American auto makers meant that each relied mostly on its internal resources to define the competitive challenge. Only haltingly was a technical consensus reached, and the internal processes of each firm produced incoherent and personality-dependent initial responses.

As the two main elements of LP came to be understood in the early 1980's, American firms pursued different initial strategies that only converged to a common pattern as a result of trial and error. Organizationally, they attempted to find functional substitutes for the Japanese coordination mechanisms. At the factory level, this involved trying to reorganize labor relations in ways that copied the work incentives supported by Japanese company unions, lifetime employment, and complete lack of horizontal labor mobility. Across a large number of factories, only a few that faced particularly favorable local labor markets were able to achieve even marginal success. At the level of the industry, this organizational response involved trying to copy Japanese supplier relations. Informal agreements for single-source purchasing, partial ownership, and a range of contingent or long term contracts were tried as means of copying LP supplier relations without Japanese institutions that supported long-term cooperation and co-investment. These attempts failed, largely because auto makers were always able to defect from a relationship that was temporarily unprofitable. Over time, the solution adopted was to push in the opposite direction by using information technology to foster global markets that pushed down component prices and reduced costs to levels even below LP producers.

Politically, firm strategies were determined by the divided control of the federal government during most of this era and by the power of the UAW with Democrats in Congress. This partisan divide produced a two-prong lobbying strategy that sought different policies from each party and the branch they controlled. In Congress, the Big 3 attempted to form limited coalitions with the UAW when pursuing import restrictions. In the executive branch, auto makers lobbied sympathetic members of the Reagan and Bush

administrations to weaken labor and eliminate costly health, safety, and environmental regulations. Given the pervasiveness of market mechanisms – embedded in the psychology of the auto makers as well as in law and regulation – and the status quo bias of the divided federal system, institutional changes that would have allowed the auto makers to directly emulate LP were flatly impossible. The Chrysler bailout was the only attempt to directly copy the governance mechanisms that made LP possible, and despite its intriguing initial success this model could not be sustained in the American environment.

Once the political and organizational strategies of American firms have been detailed in sections 3.5 and 3.6, the chapter will conclude by considering how useful the theoretical framework developed in Chapter 2 is for understanding both the failures and successes of the American industry. While the model provides an excellent explanation for the primary result – the failure of lean production in the American institutional environment based on incompatible resource governance mechanisms – the relatively successful adaptation strategies put together by American firms are more difficult to incorporate.

3.2 The American Auto Industry in Transition

Auto manufacturing represents the signature American industry of the 20th century. Though German and French inventors pioneered the automobile, firms in the United States made it the defining consumer product of modern world. From the moment that the first Model-T came off of the moving assembly line at Ford's Highland Park plant in 1914, American auto makers refined the mass production system and used it to dominate the world in productivity, volume output, and consistent product quality. Over

the intervening decades, the mass production system shifted labor in America toward high wage but low skill manufacturing, accelerated the concentration of industry by making economies of scale the most important element of competitive advantage, and provided consumers with the highest standard of living in the world. By the end of the 1970's, roughly 10% of the American labor force produced automobiles or worked in the constellation of related industries. In addition to their domestic success, American firms competed strongly in foreign markets, with Ford and General Motors running large, successful divisions in Europe and South America.

Aside from pioneering the model of production that would be adopted by virtually every manufacturing industry in the 20th century, American auto makers created a social revolution in personal mobility and urban design. With the growth of suburbs after the Second World War and the Federal-Aid Highway Act of 1956, auto makers literally created American society in the image of their product. At the same time, the United Auto Workers union extracted one of the highest manufacturing wage scales in the industrialized world from the American automobile oligopoly, helping to create a blue collar middle class that symbolized prosperity and economic opportunity for a generation. The postwar American consumer market and the Big 3 developed together, and by the end of the 1970's there were over 102 million privately owned passenger cars on America's roads – one automobile for every 2.2 people in the country. And 85% of those had been built by one of four American firms.

Nineteen seventy eight was a final golden year for the American auto sector. The erosion of domestic market share by fuel efficient imports that had followed the first oil

crisis in 1973 had been halted, if not reversed,[4] and consumer tastes seemed to be swinging back toward the market segments that American producers dominated: large, rear wheel drive luxury cars with powerful, high volume engines. The economy was in its third year of an expansion that appeared to be accelerating, growing strongly at a rate of 5.1%. Inflation was high by historical standards at 9%, but from the perspective of auto makers this was not a serious problem; inflation had the effect of encouraging consumers to purchase vehicles on credit, making up for the cost increases imposed by the industry's inflation-indexed wage contracts with the UAW. Across the country, fifty one final assembly plants turned out 9,170,743 passenger cars and 3,718,921 trucks that were sold to the public. An estimated 5% of America's manufacturing labor force was directly employed building these vehicles and as much as 10% of the overall labor force worked in related upstream and downstream areas. By measures of market share, profitability, and technical standards, American firms dominated their domestic market and were generally considered to set world standards for manufacturing efficiency in mass production.

Historically, the dominance of GM, Ford, and Chrysler in their domestic market had been challenged twice in the postwar era; both times by foreign producers pushing into the market for small cars.[5] While domestic competition such as AMC, Willys, and Studebaker had held a share of this market segment for decades, both its importance and

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[4] For trends in import penetration, see Ward's Auto Yearbook (WAY) yearly statistics. A useful analysis of these trends during the 1970's is provided in Ward's Auto World (WAW) 10-79.

[5] In the discussions of product market segments that follow, it is important to note that there are no precise, generally accepted definitions for the various classifications of cars. Even within the industry press, classification of a specific model as subcompact, compact, or standard change over time, generally in response to the descriptions used by that auto manufacturers themselves. Throughout this chapter, the

profitability were considered too small by auto executives to justify production at economically viable runs of several hundred thousand units. Similarly, some imported cars from Britain, Italy, and Germany captured specialty or high-end segments of the market. Though more galling in terms of prestige, this import penetration was also largely ignored for the same reasons: demand for specialty vehicles was simply not large enough to justify the scale economies at which mass production operated. The first challenge to Chrysler, Ford, and General Motors in market segments they considered large enough to contest had been the influx of small foreign cars in the late 1950's led by the Volkswagen Beetle. In 1959, foreign penetration in the American market reached a record 10.2%. Domestic producers dealt with this through a two-pronged strategy of introducing smaller models and "re-importing" the small cars produced by their own European subsidiaries. Within five years, foreign imports had been cut in half and the small car lines that American producers had introduced were allowed to atrophy.[6]

The second import challenge had begun during the first oil crisis in 1973, when a wave of Japanese imports established a strong presence in the small end of the market based on fuel efficiency and low cost. Following the response pattern that had worked in the late 1950's, the Big 3 pursued a similar dual strategy of re-importing from their

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definitions of size and fuel-efficiency classes reflect conventions used by the industry press (Crain's Automotive News and various Ward's publications) at the time.

[6] Market penetration statistics from Ward's Auto World, June 1970 (hereafter in format: WAW, 6-70). The American cars built in response to this wave of imports – the Corvair, Falcon, and Valiant – were not as small or as fuel efficient as the Beetle (2,000-3,000 pounds weight compared with 1,650 for Volkswagen) and became notorious for safety concerns. It is interesting to note that the Corvair – the most successful of these 1960's import fighters – was the vehicle that motivated Ralph Nader's *Unsafe at Any Speed* in 1965. The speed with which this model was designed and produced to respond to the import challenge contributed to the vehicle's handling problems. The charges of unsafe design publicized by this book and the subsequent Congressional investigation increased the reluctance of American firms to enter the small car market a decade later. Despite this, the claim that Nader's consumer activism is causally linked to the competitive failure of the American auto industry by increasing the costs associated with making small cars safe is not supported by available evidence.

European divisions and designing competitive models to be released within five years. Though the imports' rate of sales growth flattened after gasoline prices dropped in late 1974, Toyota, Honda, and Mazda (Toyo-Kogo) continued establishing themselves in the American market during the boom years from 1975-1978. This provided a chance for the Japanese producers to build up the infrastructure of sales and repair networks that were necessary to compete in the American market, focusing on building up sales and repair networks in western states. Though it was not clear to their American competitors, the Japanese challenge had been in place and building strength for six years before the shift in consumer tastes that followed the second oil shock in 1979.

Gradual erosion of market share in the small car segment was not a great concern to the three members of the American oligopoly. The profitability of small cars in the United States was low relative to larger models,[7] and no innovative strategy was considered necessary to deal with Japanese imports. As in 1958, plans were made by GM and Ford to introduce new models of small cars within five years – this time based on designs of their European subsidiaries – while filling the near-term gap through increased re-importation of vehicles such as the Plymouth Cricket and the Lincoln-Mercury Capri from European subsidiaries.[8] American auto makers interpreted the oil embargo of October, 1973 as a singular event that would have no enduring effect on consumer preferences for the large, powerful luxury cars that represented their highest

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[7] A discussion of the cost curves relative to automotive weight and features as well as the historical development of American production processes that created these curves can be found in Abernathy (NRC 1982), pp. 65-68

[8] The use of the European market as a platform from which to develop more fuel efficient vehicles is worth noting, since it provided a basis to finance design and testing work for many of the technologies needed to compete in small, high-mileage vehicles. The failure of American firms despite this should be contrasted

profit margins. Once gasoline prices returned to their "normal" levels, the reasoning went, American consumers would discard the small, spartan Japanese cars and return to vehicles that the Big 3 were already producing.

This attitude toward oil price shocks does not mean that American auto makers were unaware of the likely long-term trends in oil prices. Most senior planners in the industry had recognized since the early 1970's that secular increases in oil prices would lead to higher demand for fuel-efficient vehicles. These planners, however, dismissed the importance of short-term supply shocks and anticipated a transition period of at least two decades that would be characterized by incremental increases in fuel prices. During this period, it was expected that a range of new technologies would become available, including lightweight synthetic materials and new engine designs. Since only the leading firms in the industry would have the funding and concentration of technical knowledge to research and implement these technologies, it was expected that General Motors, Ford, and perhaps the largest of the European auto makers would dictate the pace of technological advancement in ways that reflected their own production and investment plans.[9] Given this long transition period and their undisputed technical and financial dominance of the industry, American firms expected to be able to adapt faster and

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with the Japanese entry into the American-dominated markets for light trucks, mini-vans, and SUV's in the late 1980's and early 1990's that is examined below.

[9] This model of research and development as a planned, incremental process controlled by large organizations in government and industry was dominant in the 1970's. As a common understanding of economic growth, this model drew on a tradition that had been central to American thought since at least Veblen (1983[1921]) and Schumpeter (1934, 1939). In the postwar era, it was supported further by growing concentration in the American economy and widely read books such as Galbraith (1952, 1967). It was literally difficult for auto industry executives to imagine that the locus of innovation in their industry could be anywhere aside from Detroit, and their planning reflected this (Halberstam 1986, Yates 1984).

establish control over the technologies that would be important in a future of slowly rising oil prices.[10]

This strategy – shaken by the 1973-1974 oil embargo but still dominant – left the industry unprepared for the oil crisis that followed the fall of the Shah of Iran in 1979. The sudden increase in oil prices translated into a doubling of gasoline prices at the pump between December 1978 and March 1981[11] and raised the specter of gas shortages and rationing. Aside from the immediate effect on the economy and on overall car sales, which entered a 3-year recession, this event marked an enduring shift in consumer preferences away from intermediate and full size cars. Between 1977 and 1981, the market share of subcompact cars sold in the United States increased from 8.5% to 19.5% while the share held by intermediate and full sized vehicles dropped from 51.8% to 35.4%.[12] Unlike the spike in demand that had accompanied the 1973 oil shock, this trend toward smaller cars did not end when oil prices began dropping again. Instead, consumer preferences in a substantial fraction of the American market continued to run strongly toward high mileage vehicles through the early 1990's. Over the course of a few months, this shift in consumer demand placed American firms in the position of offering a product mix that was radically out of balance with demand. In 1979, only five final assembly plants in North America had been building subcompact cars and, given the

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[10] An industry analyst summarized this attitude by explaining that "The auto industry had planned on a basis of gradualism, " (WAW January, 1974) and was caught unprepared by the first oil crisis. Lee Iacocca, former President of Ford, described the planning at Ford: "All of us thought gas would get to $1 a gallon by 1985. A funny thing happened: it moved up six years." (WAW 12-79, p. 73).

[11] Gasoline prices are based on various WAR estimates published in 1982.

[12] Figures from WAR January, 1982. Note that luxury cars are counted as full sized for this comparison. Direct numerical comparisons of market segmentation after 1982 become more complex as auto makers began to re-classify vehicles into smaller size classes as part of various marketing campaigns (See WAW 01-84 p. 26).

relatively inflexible nature of Fordist assembly line production, shifting more of total production capacity to these lines of cars was impossible in the short term.

While the Big 3 did not offer the small, fuel-efficient vehicles that the American market suddenly demanded, Japanese firms did. Having slowly built up dealer and service networks for small cars in the United States since 1957, the three main Japanese producers were positioned with the right cars at the right time to benefit hugely from the shift in consumer taste toward fuel efficiency.[13] Though their geographical penetration in the United States was uneven, vehicles by Toyota and Honda had developed excellent reputations on the west coast for fuel economy, reliability, and quality through the 1970's. This presented a noticeable contrast with the American-made small cars available during this period. The Chevette and AMC Spirit (1979 successor to the notorious Gremlin) – the only two domestic vehicles comparable in size, price, and fuel efficiency to the Honda Civic and Toyota Corolla – were markedly inferior in design, quality, interior room, and comfort.

While the enduring advantage of Japanese producers lay in the higher productivity of lean production, the sudden shift toward subcompact vehicles in 1979 was the proximate cause of the crisis facing American auto makers in 1979. As import sales grew, the domestic market share of Chrysler, Ford, and General Motors began the long-term decline that came to define the market for more than a decade. Because market segmentation shaped how American firms initially interpreted the competitive challenge

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[13] For a description of Toyota's early marketing in the United States, see Kawahara, pp. 25-31. A reliable dealer and service network are critical in auto sales, with the failure to provide adequate dealer support explaining the failure of Italian and French imports in the same period. It is interesting to speculate about the market effects of the 1973 oil crisis had Toyota and Honda established their dealer and service networks five years earlier.

and how they formulated their responses, it is worth examining in detail. In a real sense, no single market for automobiles has existed in the United States since the 1930's, when Ford's strategy of producing inexpensive, utilitarian cars for the low end of the market was proven less profitable than the General Motors strategy of targeting sales at different socio-economic groups.[14] Since then, the passenger car market has been made up of several partially overlapping categories differentiated by vehicle size, features, styling, and targeted advertising. Though the boundaries between market segments are not perfectly defined, consumers do not view them as close substitutes. This creates strong product differentiation that shapes how automobiles are designed, marketed, and sold.

In 1979, these market segments were not defined strictly in terms of vehicle size and fuel efficiency, but generally correlated with it. Greater weight was required for interior room, styling gimmicks that gave higher priced cars a distinctive appearance, greater stability while driving, and luxury features such as air conditioning and automatic transmissions – which in their early incarnations added several hundred pounds to gross vehicle weight.[15] Japanese automobiles were not only positioned differently on the curve trading off between reduced weight (the major determinate of fuel efficiency) and features, but Japanese manufacturers had pushed this curve outward through the use of

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[14] For a brief summary of Alfred P. Sloan's "ladder of consumption" strategy and the history of its success in defining the consumer market for passenger cars between 1929 and 1950, see Rubenstein, pp. 183-216. A more detailed examination can be found in Sloan's (1963) autobiography, *My Years With General Motors*.

[15] Vehicle and feature weights from WAW Yearbook tables. For a historical examination of the relationship between weight and vehicle features, see Abernathy (NRC) (1982), pp. 65-71.

lighter materials, innovations such as the CVCC engine,[16] and more efficient manufacturing.

As gas prices increased, consumers who would have been expected to purchase luxury or mid-sized cars migrated out of their "natural" market segment and began buying small or economy cars. This became a crisis for American manufacturers because their production system was based on producing a specific mix of products that could not be easily changed. The product mix that the Big 3 produced was inflexible due to the nature of the mass production system. Plants dedicated to producing one model could not be changed to produce another without shutting down and being completely retooled. In addition, orders from component suppliers were planned several months in advance and laying off unionized workers was nearly as costly as keeping them at work. The system of auto dealerships and advertising campaigns were also planned in advance around yearly sales projections in each market segment. Once these decisions were made, it was only possible to make marginal changes to output at the cost of laying off workers and idling production lines for large vehicles while increasing the number of shifts at the plants producing small vehicle lines. Such changes were enormously costly in the short run as the logistics of purchasing and delivering thousands of components to assembly plants would have to be reorganized in an ad hoc way, generating bottlenecks and

[16] Honda's revolutionary CVCC engine, characterized by a second combustion chamber and a fuel mix that burns at lower temperatures, is also an example of Japanese industrial policy that would be difficult to emulate in the United States. After Honda developed the engine in an attempt to meet American emissions standards in 1973, licensing agreements with other Japanese firms were arranged through the government. The American Big 3 had been fearful of licensing and joint research programs in the wake of Senator Philip Hart's anti-trust crusade in the early 1970's.

delivery problems while building up large and unusable inventories.[17] For several months, the inflexibility of the manufacturing system meant that American auto makers would continue producing tens of thousands of large, inefficient cars for which there was no demand while being unable to meet the demand for compact cars that exceeded even what Japanese firms could produce.

It is worth noting briefly how the structure of supplier relations in the auto industry distributed the costs of this short term adjustment crisis. What little flexibility assemblers possessed in altering their product mix was gained by shifting the costs to suppliers and workers through the labor and components markets.[18] These market relationships had historically diffused the business cycle risk faced by assemblers, allowing them to maintain nominal profitability during recessions. A side effect of this system was to retard long term investment in skills or research by component suppliers, which had proven to be more vulnerable to cyclical changes in demand than their customers during each recession since 1958. Given this industrial organization, the combination of a large cyclical downturn and a shift in consumption patterns that affected over one million vehicles per year was devastating. As will become obvious, this system would later make emulating the Japanese practice of close cooperation with upstream suppliers much more difficult.

Even once the American product mix had been corrected, the loss of market share continued. Between 1979 and 1983, the import share of the American market – driven

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[17] Though not its most important advantage, LP was characterized by a much higher level of production flexibility than the American firms, allowing Toyota and Honda to rapidly expand their production for the American market in response to increasing demand. For a brief discussion of the reasons for this flexibility, see Section 3.3 below.

almost exclusively by subcompact sales –increased by nearly 13% to a total of 29.3%. Though dramatic, this figure understates the real competitive disadvantage of domestic producers because Honda and Toyota lacked distribution and support networks in several areas of the country. This left large areas of the Midwest and south as almost exclusive preserves for domestic producers. In the large and trend-setting California market, where the Japanese dealer and service networks created a roughly level playing field, imports claimed 51.3% of the overall market.[19]

This initial drop in market share was driven by the oil crisis and recession, but absent a more fundamental disadvantage this should have presented only a short term problem for three of the largest manufacturing enterprises in the world. In the medium term, it was expected that production and distribution systems could be shifted to smaller cars, new models could be designed to compete directly with the Japanese, and the retooling of factories could deal with whatever technical innovations the Japanese possessed. In the mean time, the auto makers adjusted in ways normally associated with a cyclical downturn. Factories were either suspended or shut down, while General Motors began a large-scale investment program in newer, automated plants. As in both of the previous periods of foreign competition, European subdivisions of American firms increased their output of compact cars for export to the American market. The smaller, front wheel drive cars designed in response to the 1973 oil crisis and fuel economy regulation were sped into production and advertising campaigns to win back customers

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[18] Reducing cyclical employment risk through layoff wage guarantees was one of the important concessions the UAW demanded from producers.

[19] Import penetration levels from *Automotive News* and *Ward's Automotive Yearbook*. The differences in import penetration by geographic region in 1979-1982 are quite striking, reinforcing the degree to which

from Japanese imports were crafted. Dealers were able to switch the lines of cars they carried and advertisers shifted their campaigns to focus on fuel efficiency and quality rather than horsepower and styling.

These measures, essentially implemented by 1982, were insufficient. The market share held by Japanese producers stabilized in the mid-1980's as a result of the Voluntary Restraint Agreement (VRA) negotiated by the Reagan administration, but virtually none of the small car market share lost to the Japanese during the oil crisis and recession could be recovered. As Toyota, Honda, and Nissan moved into other market segments and began manufacturing at new factories in the United States, the erosion of market share slowed but did not reverse.[20] More tellingly, this trend continued and even accelerated in the mid- to late 1980's when the Plaza Accord led to the dramatic increase of the value of the Japanese Yen. It had been plausible for auto makers in the early 1980's to argue that their competitive failure came from the strong dollar policy pursued during the early Reagan administration and low Japanese wages relative to those demanded by the UAW. As the decade passed, these claims ceased to be credible as American market share continued to erode in the face of a 50% increase in the value of the Yen and rising wages in the Japanese auto sector:[21]

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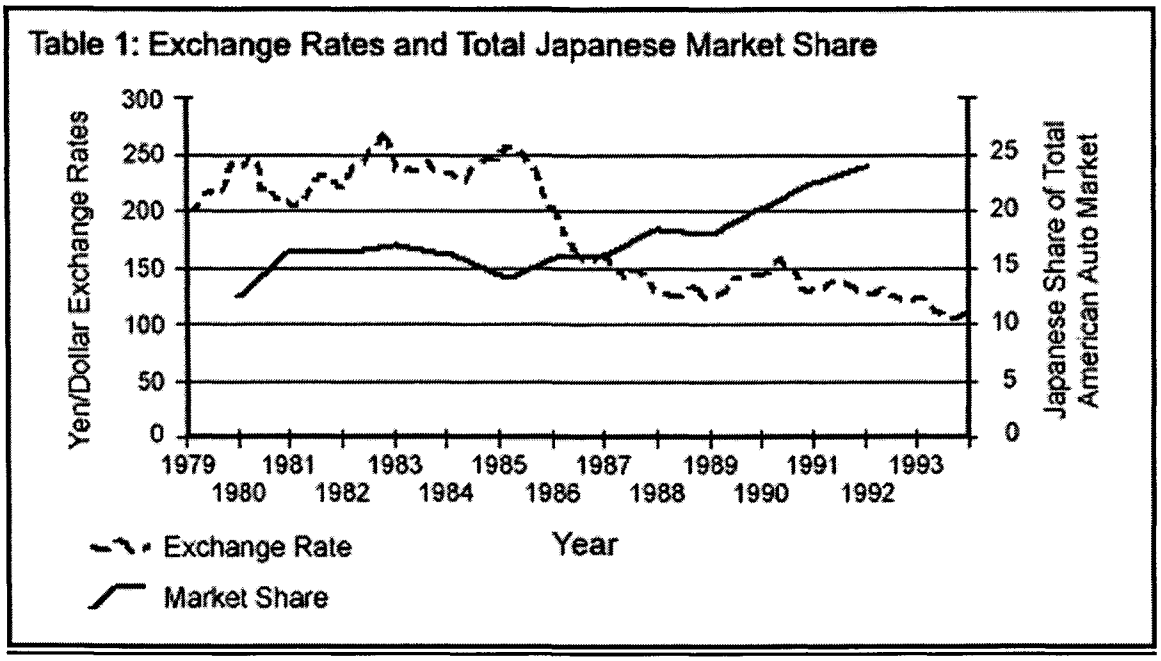
market segmentation and the costs of sales and service infrastructure make the auto sector imperfectly competitive.

[20] The primary effect of the VRA was to force Japanese producers to locate factories in the United States. Like the American Big 3, these American factories were unable to fully implement lean production and remained less productive than factories in Japan. Despite problems of resource governance in the American environment, these "transplant" producers were among the most competitive facilities in North America. The reasons for this examined below include greater success in finding functional substitutes for the forms of governance required by LP, the use of newer capital equipment, locating production in depressed areas where labor costs were lower, preventing the UAW from organizing their facilities, and "Design for Manufacturing" vehicle design.

[21] The market share levels shown on this chart are for passenger cars produced by Honda, Nissan, and Toyota (data are from Federal Reserve Board Governors and WAY 1982, 1986, 1992). During this period,



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As this graph shows, currency policy cannot explain the success of Japanese producers. Other explanations based on macroeconomic conditions or "dumping" sponsored by the Japanese government were similarly disproved, though these claims continued to be made for rhetorical purposes to bolster demands for protectionist policies until the end of the decade.

The fact that American firms faced a systematic cost disadvantage at the level of manufacturing was recognized within the industry only slowly, and the process of defining that disadvantage took longer still. In 1981, James E. Harbour's consulting firm produced an in-depth study of final assembly plants in the United States and Japan that demonstrated and quantified on a plant-by-plant basis what manufacturing engineers had perceived even before the oil crisis: Japanese manufacturers were capable of producing a small car that had fewer defects using fewer man-hours than even the newest and most

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wage rates for Japanese labor also increased from roughly 55% of American levels to more than 75% (WAY 1991, p. 70; WAY 1993, p. 59)

technologically advanced factory in the United States. More importantly, they could do this for roughly $1500 less per vehicle, even accounting for differences in labor cost.[22] Though Harbour's comparisons of cost and productivity shocked auto executives, they were incomplete as measures of the real productivity advantage offered by LP. They fail to convey differences in quality and features that are critically important in a the highly differentiated auto market. By focusing on the actual assembly line, Harbour-style comparisons also direct attention away from advantages that arise from supplier relations and the integration of manufacturing and design that made Japanese cars easier and less expensive to assemble. These differences contributed to the $1500 cost advantage identified by Harbour, but were difficult to locate in the simplified, five-step breakdown of production used.

For American auto executives, the truth of Harbour's estimate was reinforced by the outright failure of the GM compact J-car line introduced in the same year and the tepid success of even the well designed and price competitive Ford Escort. These small cars were the best that the American firms could produce, designed over several years specifically to compete with Toyota and Honda. They were heavily advertised and were supported by dealer incentives and a range of rebate and credit programs. Despite this, consumers recognized that they were inferior in quality, design, and performance when compared with their Japanese competitors while still costing nearly $2000 more. The sales performance of the various J-car lines seemed to reflect Harbour's conclusions. The

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[22] Harbour Reports (1981, 1982, 1990), especially (1982) pp. 14-17. These estimates focus on plant level productivity and provide measurements primarily in terms of workers or labor timer per vehicle. Despite the problems with this metric, it is useful both as a baseline for understanding the cost advantage created by LP and as a tool for interpreting how the American auto industry conceptualized the problem. For a brief critique of the Harbour measurements, see footnotes 25 and 29 below.

excuse that American firms had not put a real effort into competing in the small car market was gone.[23]

In the face of this and other reports produced by industry groups and government, the real competitive advantage of Japanese firms could no longer be denied or avoided.[24] The problem was clearly understood to lie in the auto industry's system of mass production, and the self-identified task of American auto makers in the 1980's would be to deal with this productivity gap or face marginalization in the domestic market. The short term adjustment measures to deal with the 1979-1982 industry recession – including the closure of several assembly plants and layoffs of up to 40% of the industry workforce – were important elements of their adaptation strategy. Political pressure that gained the industry 'voluntary' import restrictions and the relaxation of government regulation were also central to the industry's response. These strategies combined with the cyclical recovery from 1983-1989 created a period of high profitability for domestic auto makers that allowed them the time and resources to undertake the medium and long term task of matching the productivity of Japanese producers.

Judging by sales, manufacturing output, and the Harbour Report's plant level productivity indices, they achieved only partial success. By 1993, domestic auto makers had achieved the closest approximation of lean production possible in the American institutional environment, as demonstrated by the fact that several American plants displayed superior productivity to competing Japanese "transplant" assemblers, though

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[23] See Yates (1983). The first chapter examines General Motors development and introduction of the J-car line in detail. Though Yates focuses on the design of the vehicles rather than the production process, the examination of the psychology of GM executives and the direct cost and style comparisons are useful.

still roughly 25% lower than assemblers located in Japan.[25] Despite fifteen years of adjustment and attempts at adaptation that included corporate reorganization, massive investment in new manufacturing technologies, and dramatic changes in the design and balance of products offered, American firms were unable to match the productivity of their Japanese competitors. The next section examines why this is by outlining lean production and – by tracing its development in postwar Japan – demonstrating how this organizational technology related to specific forms of resource governance available in Japan but impossible to use in the United States.

3.3 Defining Lean Production: Organizational Technology and Governance Mechanisms

To understand the task that faced American firms between 1979 and 1993, it is necessary to examine the organizational technology created by the Toyota Motor Corporation in their Koromo plant in the 1960's. With the benefit of hindsight, it becomes clear that the sudden crisis of the American auto industry in 1979 was actually the manifestation of a variety of conditions that had been developing for several years. Its proximate cause was the second oil crisis that followed the overthrow of the Shah of Iran. Unlike the oil embargo of 1973-1974, this event created enormous uncertainty about both the price and availability of gasoline, given vivid reality for consumers by televised scenes of gas lines in California. This uncertainty combined with the duration of

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[24] Other academic reports contributed to the developing diagnosis of LP techniques, including Abernathy's examination of innovation in the domestic auto industry, and various technical investigations conducted by the National Research Council in 1982.

[25] See Harbour Report (1992), pp. 45-46 and 51. See also Harbour (1990) for direct comparisons of North American facilities. The comparison with assembly plants in Japan can be found in Harbour (1990), p. 207. Note that these are plant-level comparisons based on labor hours per vehicle and do *not* fully capture efficiency in supplier relations. In additions, differences in vehicle type, design, and division of labor

the crisis to have a profound effect on consumer demand for small cars.[26] Unlike the 1973-1974 oil shock, from which consumer tastes for larger cars recovered quickly, a substantial fraction of American consumer preferences shifted durably in favor of smaller, fuel-efficient cars. This shift in consumer preferences was reinforced by government mandated fuel efficiency (CAFE) standards that imposed fines on auto manufacturers whose fleet average miles per gallon (mpg) was above a set and gradually decreasing limit. In 1979, American auto makers offered only a few models of small cars, most of which were inferior to Japanese imports in quality, fuel efficiency, styling, and reliability.

This explanation, while dramatic and compelling, obscures more than it reveals. It provides a basis for understanding the initial crisis in 1979, but it sheds no light on the serial failure of American small cars in recapturing this market segment over the following eight years: only after the imposition of the voluntary restraint agreement (VRA) by Japan in 1981 would any of the several new American compact cars make good the Japanese gains of the oil crisis years. An explanation based on currency values or cost differences between Japan and the United States similarly fails, since import sales survived both the price increases caused by VRA's and a substantial upward adjustment of the yen in the mid-1980's (see above). Other arguments that rely on macroeconomic conditions have similar flaws.

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among assemblers and manufacturers of sub-assemblies make these labor-based plant comparisons useful only as an approximation.

[26] The contrast with the 1973-1974 crisis illuminates the importance of uncertainty rather than simply higher prices. The nature of the consumer psychology was understood in the wake of the first oil crisis, as consumer preferences quickly shifted back to large, inefficient vehicles after an initial spike in demand for compacts. Oscar Lundin, GM Executive Vice President, argued correctly at the time that "...in a reasonably short period, the gasoline scare will be out of people's minds. If people can be assured of

It is only possible to explain the competitive advantage of Japanese auto producers during this period by considering the differences in firm organization and manufacturing practice that are referred to collectively as lean production (LP). The existence and importance of this productivity advantage is demonstrated both *directly* from comparative analyses of production costs and *indirectly* by the persistence of Japanese cost advantage across a period characterized by differing macroeconomic and political conditions.

Despite its importance in explaining the cost differences between American and Japanese firms, two factors make it difficult to accurately measure the advantage offered by LP at the factory level. First, there are few specific factories that can be considered truly comparable. This is the case both because of differences in the product mix produced by plants in the US and Japan and because LP involves differences in vehicle design that change the nature of the manufacturing task performed at the assembly plant.[27] This means that the task of assembling a 1982 Honda Accord is intrinsically less labor intensive – while requiring a very different mix of skills – than assembling a Ford Escort from the same year. Second, the productivity advantage enjoyed by Japanese firms was manifest not only in greater measurable factory output at lower cost, but also in higher quality products. This quality dimension is not captured in most comparative production statistics, but results in three advantages. It reduces the need for after-

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getting gasoline conveniently when they need it, we don't think there will be a great shift – any violent change – in the market." (WAW June 1974, pp. 37-38)

[27] This difference between not just the production processes but also the characteristics of the actual *vehicles* produced by Japanese and American auto makers in this period is largely based on differences in the vehicle design process that will be examined as an endogenous aspect of LP in this chapter. In brief, these differences involve greater Japanese emphasis on design for manufacturing (DFM) and modular assembly. In terms of the governance mechanisms involved in LP, this difference in design is facilitated by

assembly inspection and repair in the factory, reduces the number of recalls or after-market repairs that must be paid for by the manufacturer, and it contributes to the sales advantage arising from a reputation among customers for higher quality.[28] Despite these caveats, most analyses of the productivity advantage for Japanese firms in small cars at the beginning of this period agreed with the Harbour estimate of roughly $1,500 per vehicle.[29] It was this advantage, more than the oil crisis, American recession, innovations in Japanese regional marketing in the United States, the under-valued yen, or coordinated dumping of vehicles that explain the enduring success of Japanese firms.

The term "lean production" was coined by John Krafcik – former engineer at the joint GM-Toyota NUMMI assembly plant – during work for the MIT International Motor Vehicle Program's 5-year study comparing Japanese auto production with competitors around the world.[30] In the original context, it refers to the production processes developed by Eiji Toyoda and Taiichi Ohno for the Toyota Motor Company over a 20 year period from roughly 1953-1971. Their original intent was to literally replicate

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the close relations between suppliers and final assemblers discussed below. Revealing comparisons of the relative ease of disassembly are made in WAW (11-92).

[28] Estimates of the cost of such inspection and defect correction at some American plants in the early 1980's were as high as $329 per car (Harbour Report (1982), p. 11). The importance of the quality reputation to consumers is emphasized by Yates (1984), Keller (1993), and is supported by the results of annual dealer surveys conducted by *Ward's Auto World*. The same factors are considered by Kawahara (1998) from the perspective of Toyota's management and sales personnel working in the United States.

[29] These estimates are given by Harbour (1981, 1982). Though specific estimates vary, the general range of cost advantage is supported by the results of the *Ward's Auto World* 1982 survey of manufacturing engineers. For a survey of the various sources from the early 1980's on manufacturing cost differences, see Cole and Yakushiji (1984) pp. 111-118. For a different methodology of analyzing the Japanese cost advantage that rejects Harbour's division of the plant-level labor process but reaches broadly similar conclusions, see Krafcik (1988).

[30] Womak, et. al. (1990), p. 13. Krafcik's own research is presented in his unpublished master's thesis (Krafcik 1988)

Ford's vertically integrated River Rouge plant[31] at the Toyota facility in Koromo, Japan, but was modified based on considerations of capital availability, geography, culture, and the impracticability of achieving Ford's level of high-volume production. The specific problems that had to be solved by Ohno's team were products of the postwar Japanese environment, but in solving them he created system for organizing production in manufacturing that achieved higher levels of productivity than the original.[32]

As a compromise between the organizational imperatives of Ford's model and the governance mechanisms available in contemporary Japan, lean production is a complex system that is deeply embedded in the postwar Japanese institutional context in which it developed. Some elements of the system can be considered cultural, while others are associated with the direct form of industrial policy pursued by the Japanese government. Though Ohno explains the system in terms that do not lend themselves easily to abstraction and generalization – employing comparisons with *Ninjutsu*, chess, and the intellectual construction of the dialectic process – the productivity gains associated with the system can be analytically simplified into a useful model for comparison with mass production. This simplification imposes a cost in accuracy – specifically ignoring the social attitudes toward work and cooperation that help to enable LP. A careful examination of the two structural characteristics that define LP suggests that both are facilitated by the social environment and cultural milieu of postwar Japan, but I believe

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[31] Halberstam (1986), p. 88, quoting Eiiji Toyoda.

[32] Both Ohno (1988 [1978]) and Kawahara (1998) emphasize that lean production should be thought of as an extension of Fordism rather than a departure from it. Specifically, Ohno describes most of the key elements of LP based on direct quotes from Henry Ford (pp. 97-100) and argues that Ford's principles were better and more fully applied by his team than Ford himself was able to achieve in the United States.

that the simplified model of LP I will construct is adequate to the task of understanding the American response.[33]

For the purpose of this chapter, I will describe LP as an organizational technology that is defined by two key characteristics:[34]

- **Supplier relations**: close relationships between upstream components suppliers and final assemblers create a hybrid form of partial vertical integration. This relationship increases manufacturing flexibility by sharing information and personnel, facilitates the coordination of design and manufacturing practices, and allows common inventory management to reduce waste (the *kanban* or "just in time" inventory control process).
- **Labor motivation and flexibility**: workers on average possess a broader range of skills, greater discipline, and higher levels of initiative in contributing to the improvement of the work process. This is facilitated by team organization and the incentive system under which Japanese workers operate.

Based on this definition, the purpose of the balance of this section is twofold. First, the meaning of these two characteristics will be explained in greater detail and their relationship with mass production techniques examined. Second, the role of specific resource governance mechanisms in exerting control over both suppliers and workers will be examined and the operation of those mechanisms in Japan outlined. This will highlight the regulatory and institutional barriers in the United States that made it

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[33] For an analysis of Japanese inter-firm networks –a central element of LP – that is more explicitly cultural, see Dore (1983). Other culturally-linked aspects of LP include labor discipline (see Kamata, 1973) and the personal relationships that underlie investor-management relations (see Aoki, 1988).

[34] This definition of lean production in terms of labor practices and supplier relations is based on Ohno (1988 [1978], especially pp. 34-36, 41-42, and 67), Harbour (1981, supplemented by 1989 and 1990), Dohse, Jürgens, and Malsch (1985), Cole and Yakushiji (1984) and Womak et al (1990). It is supplemented by published interviews with Japanese designers and managers, especially the Ward's Auto World 1984 engineering survey (WAW 3-84, pp. 43-53) and Ward's Auto Reports' analyses of the *kanban* system (6-82). In applying this concept to the American auto makers, it is also worth noting that these two characteristics should be understood in the context of *changes* to the mass production model on which LP is based.

impossible to adopt LP successfully without changes imposed through the political system.

The most important element of the LP system involves the relationships between final assemblers and their suppliers. Production in the auto industry, like most complex manufacturing processes, requires assembling several thousand parts and subassemblies that make up the finished product. A fundamental question facing manufacturers in any such industry involves how many of these components should be produced under the organizational or ownership aegis of the firm and how many should be purchased from specialized contractors. In the auto sector, "upstream" suppliers range from steel mills producing the sheet metal that will be stamped into body panels to makers of electronic fuel injection assemblies that will be attached to piston heads during engine assembly. Each component must be manufactured to exact specifications in order to fit correctly into the assembled, standardized whole and must be delivered to the final assembly plant on a schedule dictated by the assembler's production plan. Coordination of suppliers and assemblers is critical in meeting both of these goals. If parts are defective or built to improper specifications, the finished product will not function correctly. If components or subassemblies fail to arrive at the final assembly plant on time, the entire production process will be stopped and the manufacturing schedule disrupted.

Using the model of production developed in Chapter 2, this technical requirement raises the question of how assemblers can control the various steps in their production process. The classic answers in the American context involve a choice between vertically integrating along the supply chain to allow for administrative, hierarchical control over specifications and delivery or the use of some form of contract to purchase components

from independent suppliers. In the traditional economics of organization, the relationship between suppliers and assemblers is treated as a dichotomous variable of ownership: either a supplier is vertically integrated into the production process through complete ownership by the assembler or components are purchased in a market from independent firms.[35] In the real world, governing productive resources can take place through a much wider array of institutions, each one of which offers specific advantages and disadvantages that mesh more or less well with the needs of a specific production technology. The LP system requires close, long term relationships between semi-independent suppliers and assemblers – a form of semi-independence that preserves flexibility but fosters both the sharing of information and cooperative investment in designs and specialized equipment.

Before examining how these semi-independent relationships are created and maintained, the importance of close coordination between suppliers and assemblers is worth reviewing. Though they represent only two idealized forms of resource governance and their characteristics will always depend on the institutions of property rights and contract enforcement (see Chapter 2), it is useful to begin by thinking about resource governance in terms of markets and hierarchies. In the case of vertical integration, it is necessary to organize a formal bureaucratic system that can coordinate the design, production, and shipping of the roughly 10,000 components that make up an automobile. Systems of this size and complexity are subject to enormous inefficiency

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[35] For a theoretical discussion of vertical integration in manufacturing, see Williamson (1985, 2002), Williamson and Winter (1991), and Coase (1937, etc.) (my own treatment is offered in Chapter 2). For a historical perspective on the development of vertical integration, see Chandler (1977). For examples from the history of the American auto sector, see Langlois and Robertson (1989). It is interesting to note that the paradigmatic case study of vertical integration – the acquisition of Fisher Body by General Motors in 1919

based on the difficulty of internal oversight, overlapping or ambiguous areas of responsibility, imperfect communication between divisions, the development of incompatible practices within departments, and problems of the incentive structures facing employees. These internal sources of friction can be minimized by careful bureaucratic design, effective leadership, and systems of internal communication that enhance oversight, but they cannot be eliminated entirely.

By contrast, arm's length contracting with external suppliers imposes higher oversight costs, creates problems of writing contracts that deal with contingency, and fosters a serious problem of firm specialization and dependence that markets are poorly equipped to overcome.[36] The key problem created by arms length contracting is the apportionment of risk, which retards prospective investment by suppliers in skills or capital equipment that might be rendered valueless if the assembler chooses to award a contract to a competing firm. The problem of balancing or compensating for these risks while retaining the efficiency-enhancing "discipline" of the market is the focus of theoretical literature on contingent or relational contracts.

The supplier relations that characterize LP involve making credible commitments to suppliers that induce them to make investments that are only valuable to the client firm while minimizing the incentives that might foster inefficiency and slacking common in

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– is actually more ambiguous than Coase's interpretation allows. For a critical examination of this case, see Casadeu-Masanell and Spulber (2000) and Klein (1988).

[36] The issues that arise in creating and enforcing complex contracts are dealt with theoretically by Williamson (1979, 1985). The importance of commitment mechanisms to justify investment by suppliers in skills or equipment that are otherwise non-marketable is emphasized in empirical work in manufacturing. The auto industry, featuring components that are often specific to the cars in one firm's line or even one specific model embodies this problem to a high degree. A study by Monteverde and Teece (1982) examining supplier relations in the auto sector found that the degree of engineering complexity and product specificity of components (valid proxies for these theoretical characteristics) were the powerful determinates of whether a component was produced internally or contracted externally.

long-term contracts where payment is guaranteed. In part, the ability of these relational contracts to overcome the problems identified by Williamson et. al. arise from the ownership structure of Japanese firms. Suppliers are often partly owned by an investment group or *Keiretsu* that includes the auto assembler.[37] The long term relationship between supplier and assembler embodied in this ownership structure is reinforced by the sharing of labor between final assembler and suppliers, coordination of engineering teams and product design, and joint planning that increases manufacturability. For purposes of comparison, less of the production work in Japanese auto firms was done within the vertically integrated firm – 29% at Toyota in 1979 compared with 43% at GM and 36% at Ford – while most (74% at Toyota) of the external contract work was done by firms within the firm's *Keiretsu*.[38] These elements of supplier relations produce cost savings both among suppliers and final assemblers that are estimated to account for as much as 33% of the cost advantage identified in the Harbour Report.[39]

This cooperative relationship allows Japanese producers to gain many of the benefits of vertical integration without the problems of organizational inertia, common wage scales, and incentive structures usually associated with consolidated ownership and bureaucratic control. This advantage, discussed in general terms by Goto (1982) and Aoki (1988), is manifest in the auto industry through three aspects of inter-firm cooperation. First, coordination with suppliers is the central aspect of the *kanban* or "just

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[37] For a theoretical overview of the *Keiretsu* corporate ownership structure, see Gerlach (1992) and Lincoln and Gerlach (2004).

[38] Cusumano (1985) p. 190.

[39] Cole and Yakushiji (1984) p. 151.

in time" inventory control system. This system involves arranging for suppliers to deliver needed parts to the assembly plant in small quantities exactly as they are needed for production. Developed by Taiichi Ohno and Toyota engineers, this materials flow system is based on a conscious reverse-engineering of the assembly line process using the surprising model of an American supermarket, with the assembler thought of as the shopper selecting parts at will. The *kanban* system requires that upstream suppliers be able to produce and deliver components in very small lots essentially on demand.[40] The advantages of the *kanban* system involve reducing inventory and overproduction as well as increasing the flexibility of production by dramatically shortening the "lead time" required for changes in output or product features. The small batch production system built around ordering parts as needed eliminates overproduction and excessive inventory. This reduces storage costs, eliminates a major cause of assembly line stoppage, and allows for more efficient utilization of space and movement within the factory.[41]

The *kanban* system requires a flexibility and responsiveness in the relationship between assembler and supplier that must be built up over time and would be exceedingly

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[40] For a discussion of the just in time system, see Ohno (1978 [1988], especially pp. 25-29). It is difficult to overstate the organizational revolution embodied in a pure *kanban* system (*kanban* translates as "signpost" and refers to the informational cards physically attached to parts that dictate quantity, delivery time, and position in the production process). In some ways the most amazing aspect of the *kanban* system is that it is nearly as revolutionary as the assembly line itself while changing the physical organization of production only slightly. Surprisingly, the idea of transmitting inventory information along the production line by attaching a physical card bearing information to each part was not pioneered in Japan. It was originally developed in Ford's Dearborn factory by one of the original production engineers in 1914. The system proved difficult for the semi-skilled line workers to use effectively, however, and was discontinued after a period of experimentation (Sorensen 1956, pp. 39-41). The irony of Ford's deliberate plan to de-skill labor preventing his factory from adopting of the core organizational element of LP six decades before this was recognized as a key aspect of the Japanese competitive advantage is seldom appreciated.

[41] The cost advantages of this dramatically reduced inventory and the reorganization of factory space that it allows was estimated by the original Harbour Report at roughly $94.00 per vehicle (1981, p. 14). Ohno's description of the system implies considerably greater cost advantages in reduced waste that are not easily measurable from discounted inventory carrying costs (pp. 18-19, 27-28).

difficult to formalize in a contract (Lincoln and Gerlach, 2004). Ohno highlights the importance of working closely with suppliers to implement the *kanban* system, describing specifically how Toyota directly trained workers from upstream suppliers and sent their managers to work in those firms until the details of the system were clear and points of friction had identified and eliminated.[42] This pattern of labor sharing continued even after the *kanban* system had been put in place and provided a mechanism to avoid layoffs or the carrying of idle labor during periods of reduced demand.

The second advantage of the LP system of supplier relations involves the ability to outsource more complex and specific components at a lower risk. Japanese assemblers are not reluctant to become dependent on outside suppliers for parts that could not be substituted through purchases from other firms or produced internally in the event of a disruption. Arm's length contracting, by contrast, creates a vulnerability to disruption by forces outside the control or foresight of the assembler. In the American context, disruptions often result from changes in the ownership or management of suppliers, unexpected shifts in the prices or availability of materials, or other production bottlenecks that the assembler could not anticipate.[43] Of more theoretical interest, the dependence relationship between buyer and seller in this situation can allow the supplier to extract a rent from the assembler that rises in proportion to the difficulty of acquiring the component from another source. Under other circumstances this dependence can operate

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[42] Ohno (1988 [1978]) pp. 34-36. Ohno's discussion of the difficulty of training Toyota's suppliers to integrate their own production systems with the *kanban* system is extremely interesting for its emphasis on the usefulness of exchanging personnel (both management and labor) as well as the necessity of close geographic proximity. Both of these factors will be addressed in the American context later.

[43] A manager at Bendix, a first tier supplier to General Motors, expressed the American perspective in 1974: "Once you know how many disc brakes to produce, you produce a little more," to hedge against

in reverse, with a supplier being reluctant to invest in the specific skills and capital required to produce for one customer if there is a danger that the customer will abandon the supplier if another option presents itself.

In the mass production environment characterized by a choice between arms length contracting or vertical integration, the risks of these relationships influence the entire process of designing and manufacturing automobiles. Final assemblers in the United States tend to hedge against non-performance by only purchasing components that are fairly generic or simple to manufacture. In cases where vertical integration is not practical but components must be built to complex specifications, these firms often set up "captive" suppliers that are nominally independent but wholly owned by the assembler. For obvious reasons, this is an imperfect solution that compromises the gains to be made from external contracting while creating another level of bureaucratic overhead that imposes additional fixed costs. In contrast, Japanese firms operating within a *Keiretsu* relationship have exploited their organizational advantage by purchasing more complex subassemblies and modules from their suppliers than has been normal for American firms.[44] It is likely that this aspect of supplier relationships accounts for the efficiency that Japanese firms gained from earlier adoption of modular assembly and easier integration of complex subassemblies.

The third competitive advantage of the close relationships between suppliers and assemblers that characterize LP arises from the ability to share design work and to achieve designs that are more easily manufacturable. This process, identified by

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disruptions. A competitor at Eaton Corp. stated that the constant concern is to be certain that "no one piece of machinery puts us out of business." (WAW 4-74, p. 50)

American auto manufacturers as simultaneous engineering (SE) or design for manufacture/design for assembly (DFM/DFA), is enormously facilitated by the supplier relationships common in Japan. The problem of inefficient (from a manufacturing viewpoint) component design is surprisingly common both in vertically integrated and externally contracted supply chains in the auto sector. In the former case, it results from a lack of communication and feedback between divisions of the company, with design committees dictating the details of components without reference to potential cost savings that could be realized from slightly different specifications. In arms length purchases, this problem of communication is exacerbated by uncertainty and a lack of institutional channels for coordination between design and manufacturing teams. Indeed, upstream contractors in the U.S. prior to the mid-1980's tended not to employ more than a few design engineers, and these were discouraged from exercising initiative or providing feedback to the design bureaus at the Big 3.[45]

According to a 1989 survey in the United States, "ease of assembly created during the design process" was cited as a means to shorter development times, better designs, higher component quality, and lower cost in manufacturing by 52% of the automotive engineers polled.[46] More importantly, 87% of respondents cited Japanese auto firms as the world leader in simultaneous engineering and design for manufacturing. By

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[44] Smitka (1991) p. 135. For a survey of the use of modular assembly in the U.S. and comparisons with Japan, see Ward's 1989 Manufacturing Survey (WAW 5-89 pp. 34-36).

[45] See WAW 03-89, p. 99 and 101. This will be discussed in more detail below. One of the most important American responses to LP was to adapt network communications technology to facilitate the exchange of information between suppliers and assemblers. This created a partial functional substitute for this aspect of LP without needing to establish the organizational linkages that made such exchange possible in Japan.

[46] WAW (3-89) pp. 52-57.

integrating the design functions of suppliers and assemblers and focusing on designs that will simplify or reduce the costs of manufacturing processes, the LP system encourages not only coordination between suppliers and assemblers, but also feedback between designers and workers engaged in manufacturing.

From a theoretical point of view, the way in which information is shared across a production process is important because it determines how problems of organizational opportunism and the need to target the relevant information efficiently are addressed.[47] The regulatory system, in turn, supports some forms of organization more effectively than others based on how power can be exercised by firms. So, for example, a given problem of information sharing between a supplier and an assembler might require that designers be located in the same place while design work is being performed. In theory, this could be accomplished within a range of organizational structures, including ownership of the supplier by the assembler, joint membership in a design or research consortium, or a contract stipulating how personnel will be shared. Each of these mechanisms is subject to problems of efficiency and opportunism, and the best choice in any given situation will depend on the character of the production technology (i.e. what kinds of information must be shared) and the kinds of governance mechanisms available (i.e. how costly it is to enforce the terms of an agreement in each of the structures listed).

For Japanese auto makers, the problems of cooperation in design were solved by three factors that were difficult to emulate in the United States. First, the *Keiretsu* system

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[47] These two problems exist in some form in all organizational structures (see Chapter 2), and they are solved by different mechanisms depending on how the political system apportions power over resources. To take the classic Williamsonian dichotomy of markets and hierarchies, the former relies on the ability to write and enforce contracts between rights-bearing entities, while the latter relies on the enforcement of property rights and the authority of managers over employers as it is structured by the organization of a given firm.

of partial cross-ownership facilitated the degree of coordination allowed assemblers to ignore problems of information being shared with competitors and simplified the sharing of personnel. Legally, this was facilitated by banking, investment, and ownership laws in Japan that did not exist in the United States. The cross-ownership system reduces the danger that a supplier could be bought by competing firms. With any cooperative investment protected against the loss of intellectual property and with no danger of a dependent relationship being broken by changes in corporate ownership, Japanese firms do not need to weigh these risks when making co-investments with suppliers. Similarly, the reliance on internal or intra-*Keiretsu* networks for allocating labor reduces the danger that proprietary knowledge or highly skilled labor will escape from a supplier network if design work is outsourced.[48] In both cases, the reduced risk arising from a lack of exit options for individuals and firms combines with large-scale cooperative research and development projects overseen by government to reduce the risk associated with cooperation in component design.[49]

By contrast, the structure of labor markets and the market for corporate control in the United States increase the potential costs of sharing design and research work between assemblers and suppliers. The risks against which the *Keiretsu* system guards prevent some forms of cooperative investment by first tier suppliers (suppliers that sell directly to final assemblers) and hinder design input by engineers working for suppliers.

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[48] The lack of an external labor market for managers and skilled labor in Japan during this period is described by Gerlach (1992) p. 13 and p. 228. Lacking an external labor market, the risk of intellectual property loss is minimized. An interesting example of the risks created by management labor markets is the defection of GM purchasing manager J. Ignacio Lopez to Volkswagen in 1993 (See Maynard, Ch. 7 and WAW 5-93, p. 16, 50).

The effects that closer coordination have in LP – improved efficiency of manufacturing and reduced defect rates – are therefore more difficult to achieve. Both assemblers and suppliers in the United States must make investment and coordination decisions under the threat of two forms of opportunism. First, the benefits of cooperative investment might be lost if the ongoing relationship with the supplier is broken. Second, intellectual property rights for subsystems and components can become ambiguous, creating a danger of defection by either supplier or assembler.[50]

The employment and utilization of labor is the second key element of LP as an organizational technology, and it is one that is even more closely tied to the institutional environment. The LP process is referred to by Krafcik as "fragile," in contrast with "robust" Fordism, because it is highly sensitive to disruption – there is very little slack in the system that could serve as a buffer to absorb shocks.[51] Though most true in the literal sense of inventory and excess capacity, Krafcik's characterization is also applicable to the role of labor. The system relies on workers being actively involved in productivity improvement built around teams that share both responsibilities and mutual performance monitoring. Skill levels are higher and workers are 'cross-trained' in different assembly line jobs. Where a mass production facility can replace relatively unskilled labor in a simple, time-motion tested assembly line task without disrupting production, workers in

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[49] Anti-trust law in the United States dampens the willingness of American firms to pursue joint research generally – a point that was central to debates over industrial policy during this period – but for purposes of understanding LP only the aspect of this that applies to supplier relationships should be considered.

[50] Having a purchaser investigate the procedures and proprietary methods used by a supplier and then share that information with a competing supplier is the most common concern in the auto industry. The example of the massive industrial espionage case involving GM Purchasing Vice President Lopez upon his defection to Volkswagen is likely the most prominent case in which sharing proprietary information resulted in a serious competitive loss for suppliers, but similar problems on a smaller scale are common.

[51] Krafcik (1988), p. 38.

an LP assembly line possess a higher degree of tacit knowledge associated with the production process and operate in much closer coordination with one another.[52] It is worth noting that, while labor is more broadly skilled and is used more flexibly in LP, the nature of assembly line work remains the same as under mass production: exhausting, repetitive, and numbing. The psychological and physiological problems of mass production and labor rationalization are not eliminated by LP, even if the impact and distribution of those problems changes.[53] The importance of this fact in how LP was applied in the United States will become obvious.

The higher skill level and flexibility of labor under LP results in productivity gains from two main sources. First, it is possible to operate the assembly line with fewer employees if labor can be substituted across a range of tasks according to immediate requirements rather than treating workers as capable of only one time-motion activity. This reduces the need for non-production specialists such as dedicated equipment operators or maintenance technicians and prevents bottlenecks from forming around any one employee who might be absent on a given day.[54] Related to this, labor that is broadly skilled can be shifted between tasks on the assembly line and even among different firms in the supply chain as a mechanism of transferring tacit knowledge and standardizing procedures. It is difficult to overstate the importance of the skills and problem-solving

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[52] Womak et al. pp. 53-58. For a more critical take on the knowledge-based organization of labor, see Berggren (1992), pp. 32-35.

[53] Jürgens, Malsch, and Dohse (1993) To understand the relentless and numbing character of the original Toyota City factory in the 1970's when LP methods were being fully implemented, see Kamata (1982 [1973]) , 35, 47-48, etc.

[54] The practical benefits of these techniques in a specific factory are discussed in Rinehart, Huxley, and Robinson (1997), p. 31-32.

ability diffused through a stable, broadly trained labor force for the plant-level productivity of a LP manufacturer.

Second, management is able to devolve responsibility for locating and repairing quality defects and process inefficiencies to line workers. This overcomes a serious information problem facing managers in mass production – how to isolate the source of recurring quality problems and eliminate process-related waste. The role of workers in achieving the LP goal of continual improvement is critical; workers are expected to evaluate their own activities and suggest ways to eliminate inefficiency in their own job performance, among their team-mates, and in their environment. Ideally, workers become time-motion experts and apply Taylorist principles to themselves.[55]

Considered from the confrontational labor-relations perspective fostered by mass production, this is a remarkable expectation. In such a system, there is a powerful incentive for labor to resist the imposition of efficiency increases that will speed up the pace of their work by concealing from management any opportunities to save time or increase the pace of work. This incentive operates both through personal motivation and social pressure. In the former case, the system provides no material or moral reward for extraordinary contributions that increase productivity. Workers are expected to engage in a simple, repeated work process designed and formalized by a highly educated engineer and built physically into the structure of the assembly line and they are treated by their superiors as adjuncts of the capital equipment they operate. In the case of the unionized American auto sector, this characteristic of de-skilled mass production was reinforced and formalized through narrow job definitions that served as a barrier to broadening skills

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[55] Ohno (1988 [1978]), pp. 57-59.

or operating in flexible teams.[56] In addition to the dampening effects on personal creativity imposed by the physical structure of work and the incentives of the labor contract, assembly line labor imposes social pressure against anyone who would help managers to reduce the slack of fellow workers or make some jobs redundant.

The goal of LP labor relations is to overcome the incentive problem created by goal incompatibility between management and labor, allowing the creative talent and problem-solving skill of labor to be mobilized and applied to increasing manufacturing productivity, improving work processes, and correcting defects on the assembly line. Where the adversarial or top-down system of worker control would demobilize this knowledge or even turn it toward the purpose of "soldiering" or sabotaging the production process, the LP system at least partly succeeds in mobilizing the knowledge of its industrial labor force and applies it to both constant process improvement and the elimination of manufacturing defects.

This system of labor utilization is facilitated by a set of Japanese institutions that govern labor relations and influence both the attitudes and incentives of workers. The first and most central is the system of labor allocation used by the large auto makers in Japan. The acquisition, use, and internal movement of skilled labor under LP are not

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[56] This highlights an important theoretical question of management philosophy implicit in Taylor (1911). The approach of scientific management experts in the United States has generally been to use engineers and other formally educated specialists to standardize each labor process and then require that workers execute exactly that process without any independent thought. This model is supported by organizational nature of assembly line work – any significant changes in labor processes must be reflected by changing the physical organization and use of capital equipment. In this model, work processes serve capital equipment that in turn fulfills functional steps in the division of labor, and only experts were believed to have the knowledge to alter this inter-dependent chain (Braverman 1974 provides an ideological explanation of this system that identifies these technical constraints as secondary to the main goal of establishing the domination of capital over labor in the work environment). The contrary approach involves assigning more general tasks and allowing workers to develop their own preferred method of fulfilling these tasks. While Aoki (1986) demonstrates that this can in theory produce a more adaptable organization, the physical, social, and psychological barriers to implementing it are extremely high.

accomplished by market transactions between workers and employers. Instead, each major industrial combine has created a sheltered pool of labor that is trained and deployed based on the decisions of management. The most commonly identified characteristics of this system are the "lifetime employment" guarantee, a wage structure based on seniority, and highly cooperative firm-level unions that include both blue collar and white collar workers. All of these institutions are part of a coherent system that originated in the period of labor strife that followed the Second World War and represent important departures from the market mediated or sectorally-bargained patterns of labor relations common in other industrialized countries.[57]

Lifetime employment, enterprise unions, and seniority wages are tightly linked in practice, and their overall effect is to create a core labor force that views its relationship with management more in terms of cooperation to achieve increasing productivity than is normal in the industrialized world. The lifetime employment guarantee is offered primarily by the final assemblers and first tier suppliers to a narrow band of elite, full time workers. Functionally, it generates loyalty to the firm by reducing the scope for opportunistic behavior and providing incentives for workers and management to invest in a set of firm-specific skills.[58]

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[57] The circumstances that created labor relations in the Japanese auto industry were historically contingent, involving the policies of the American occupation force in the late 1940's, the radicalization of nascent sectoral unions under communist leadership, and the careful undermining of these sectoral unions during a series of strikes in the early 1950's. A massive strike in 1950 at Toyota ended with an agreement that established the norm of lifetime employment and the consolidation of the company union's power. For a summary of this labor history and its effects on later development, see Cusumano Ch. 3, especially pp. 138-149.

[58] Lifetime employment can usefully be thought of in the framework of social protection described by Estevez-Abe, Iversen, Soskice (2001), creating incentive effects for investment in firm-specific skills. In the Japanese context, these skills might be thought of as specific to a production process spread among assemblers and first-tier suppliers, but the incentive effect arising from employment security remains.

The lifetime employment guarantee is only one side of the coin, however. Its more important counterpart is the almost complete lack of a labor market for skilled labor. Geographic immobility, a lack of market infrastructure to support the horizontal mobility of skilled labor, the hiring practices of most major firms, and informal anti-poaching agreements among the major industrial combines combine to eliminate the exit option that workers in the United States possess.[59] Hiring for the elite level, lifetime positions in manufacturing takes place only at the entry level,[60] and even if a dissatisfied worker were able to find employment with a different firm, the seniority-based wage structure would insure that this would mean a substantial decline in income, status within the firm, and standard of living. This, combined with bureaucratic friction in hiring and the geographic concentration of industrial groups would make it prohibitively difficult for a worker leaving Toyota to find a comparable job at another major industrial firm.[61]

This lack of institutionally supported options for labor forces workers to focus any ambition or interests on moving up *within* their company or its associated firms.[62] By eliminating any possibility of taking a comparable position at a competing firm, the LP system of labor governance provides both the positive and negative incentives required to force labor to contribute to constant improvement. On the one hand, workers are

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[59] For a summary of the consequences of the constriction of external labor markets, which they refer to as the "dark side" of Japanese lifetime employment, see Gilson and Roe (1999). In addition to examining the mechanisms by which labor mobility is restricted, they suggest some of the institutional complementarities that sustain the system.

[60] Dohse, Jürgens, and Malsch (1985) p. 136

[61] It is worth noting that this example highlights a fact often missed in political economy that is central to the larger theory developed in this project: factor markets cannot be assumed to exist, nor is it always valid to assume that the removal of non-market coordinating mechanisms would result in a market solution being spontaneously generated.

[62] Kume (1998), pp. 20-49.

guaranteed that any productivity improvements they might provide will not endanger their employment prospects because they can be shifted to a different position in the production process wither within the assembler or among its top-tier suppliers. Team-based incentives and rewards for specific contributions supplement this system of positive reinforcement and bind workers to an employment ladder within the firm's supply chain. On the other, workers who fail to meet the expectations of the system risk being pushed off the seniority and, if they were willing to pay the search costs and overcome the reputation effects of having left a good job, would have to begin from entry level at another firm. In addition, the incentive structure created by the LP labor system combined with the organization of workers into teams creates a system of mutual monitoring of effort and contribution that reverses the dynamics of mass production.[63] Workers put in extra effort because they feel an obligation to their peers – whose career prospects to some degree depend on team performance – and fear being thought of as the weak link in their group.[64]

These characteristics of the labor system that facilitate LP highlight the difficulty of achieving the same level of voluntary labor participation in other environments. Among the Japanese transplant assemblers in the United States, the most nearly successful experiments in achieving LP-style labor relations occurred either in geographical areas where external labor markets could not provide an exit option for employees or at times when regional economic conditions were so poor as to make

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[63] Though based on case studies in the United States, Barker's (1993) examination of the incentive effects and implications of social monitoring of work effort through team organization provides some theoretical insight into these methods of labor discipline.

[64] For examples of the psychological pressure this exerts, see Kamata (1982 [1973]), especially pp. 48-49 and 88-89.

alternate employment impossible. Based on the record of the transplant assemblers and the relative success of team labor programs at Ford's Atlanta assembly plant, the emphasis that Gilson and Roe (1999) place on the lack of an exit option as the keystone of the Japanese labor system seems justified.[65] As will be discussed later, this suggests that fluid external labor markets – one of the defining general governance mechanisms of liberal market economies – are a serious hindrance to LP.

The other characteristic of labor relations under LP worth noting is the dualism between this elite force of highly skilled labor that is not subject market pressures and a lower tier of semi-skilled, temporary workers employed primarily at independent or quasi-affiliated suppliers. This auxiliary labor force, paid considerably less than the lifetime employees and lacking job security or fringe benefits, provides an external, market-mediated source of labor flexibility for LP firms.[66] This dual labor force, segregated by skills, wages, and job security, is maintained by labor unions that represent only the core workers in the industry. Unorganized and fragmented, with most of its members working at small firms subcontracted to by first or second tier suppliers, this labor force provides a source of *external* production flexibility to match the *internal* flexibility created by cross-trained, highly motivated permanent workers.

In difficult times, the ability of LP firms to retain their core labor force and sustain their long-term suppliers is partly provided by shifting adjustment costs onto this labor force.[67] Even in high growth periods, labor conditions at this "sub-supply level" are

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[65] See the example of Japanese transplant firms in the United States and the Ford Atlanta assembly plant below.

[66] Lecher and Welsch (1983) and Dohse, Jürgens, and Malsch (1985) p. 118.

[67] WAW 06-83 p. 31

poor: "They have no enterprise unions, do not follow lifetime employment principles (of major companies), and they employ their workers on an hourly basis. These firms may be likened to sweatshops [...] competition at this level is high because entry is easy. Margins are quite low because large buyers can call the shots. Overhead is kept to a minimum by investing in the minimum in facilities and by avoiding all kinds of fringe benefit expenses such as recreation facilities, medical care, and all other costs that large firms accept as part of their paternalistic responsibility."[68]

The ability to segregate the work force in this way offers the LP firm in Japan the best of both worlds, with the productivity benefits of a highly skilled core labor force as well as the ability to impose low-skill tasks on an unorganized, low-wage labor force outside of the firm. This bifurcated labor force is a product of both the system of supplier relations and the system of labor utilization in Japan. Unsurprisingly, this is one of the areas where American firms were most successful in replicating LP. Specifically, the 1980's were characterized by the constant outsourcing of union jobs at large assemblers to non-unionized upstream suppliers. These changes in the degree of vertical integration were carried out with the explicit goal of saving the costs associated with wage levels and benefits that the UAW had extracted from the Big 3.

All of this creates a model of LP that diverges in only a few key elements from Fordist mass production:

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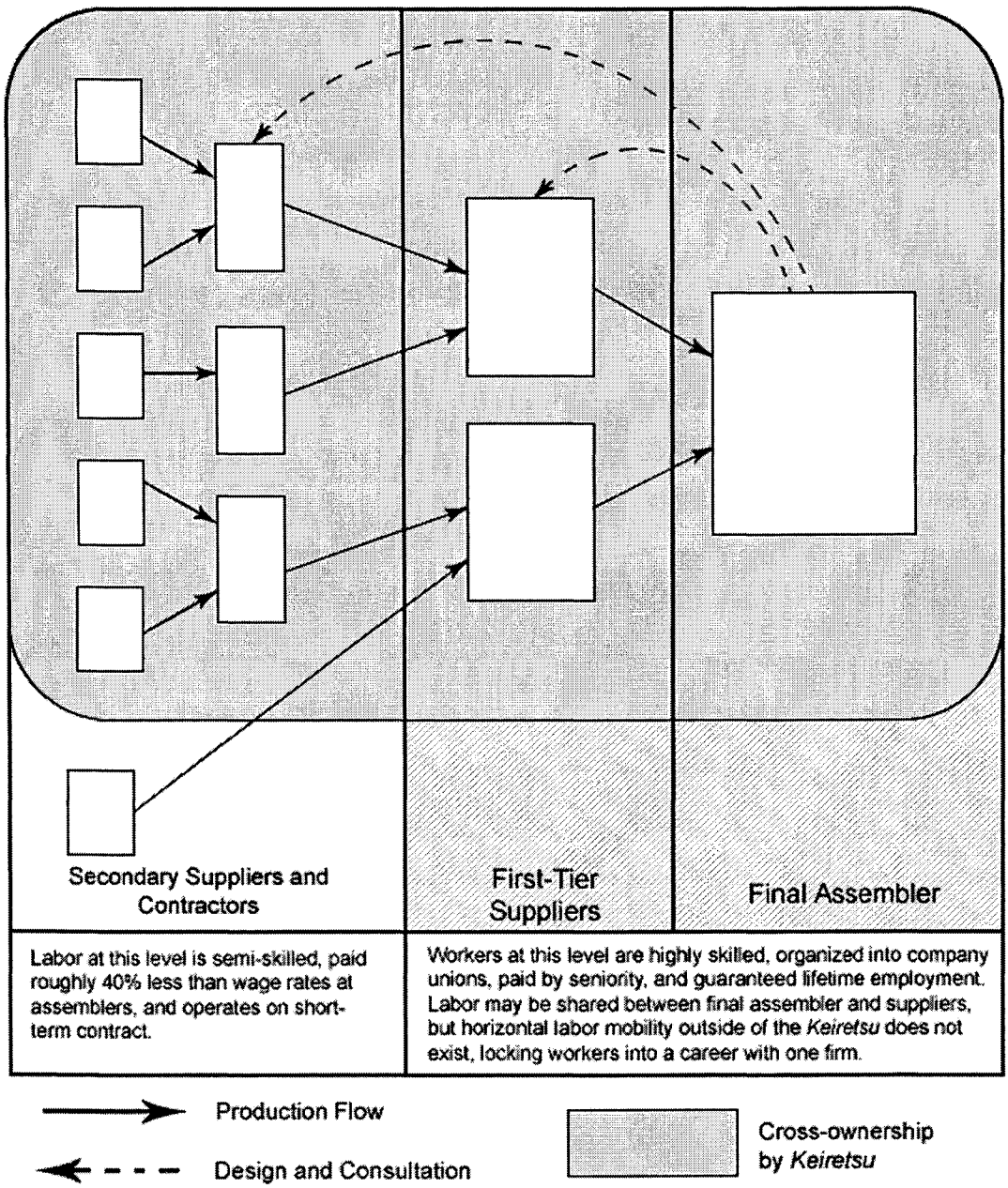
[68] Cited from a 1977 General Motors report on labor conditions at the "sub-supply level" in Japan in ibid., p. 31.

Figure 1: A Simple Model of Lean Production



The cross-ownership of suppliers by one industrial group facilitates cooperation in design (the dotted lines in this diagram) as well as the close communication required for *kanban* style deliveries of components – the "lean" aspect of lean production. The labor force is divided horizontally in this diagram. On the right at the final assembler and some

critical first-tier suppliers, production is carried out by the core group of highly skilled workers motivated by a lack of lateral mobility and the incentive structure of lifetime employment. This core labor force contributes higher levels of energy and initiative than are common in mass production firms and is organized by company unions that serve as partners in the task of raising productivity rather than as advocates for the material interests of workers.

In Japan, each of these characteristics of industrial organization and labor relations were bound up with specific governance mechanisms that allowed the production process to escape the constraints of mass production and operate at a higher level of efficiency. The narrow task facing American auto makers was to either find functional equivalents for these governance mechanisms that would allow them to gain the productivity advantages of LP in an unfavorable institutional or to use the political system to create such governance mechanisms. The next section will examine how American firms attempted and failed at these tasks. It will also examine the strategies American firms used to mitigate this failure and survive the challenge of LP.

3.4 A Summary of the American Response

The response of the American auto industry to lean production generally followed the model presented in Chapter 2. The reaction began with a series of cognitive steps to identify and interpret the source of Japanese firms' competitive advantage. In the wake of the 1979 oil crisis, American producers invoked shifts in consumer tastes, low Japanese wages, an artificially weak yen, and a policy of dumping organized by the Japanese government were invoked to explain the sudden loss of domestic market share. Based on this early interpretation, the success of Toyota, Nissan, and Honda could be

seen as an aberration that would be eliminated fairly quickly, either by the introduction of the new lines of compact cars or by government policies that would establish a "level playing field" in the American market by addressing these specific points.

Though repeated in public statements for several years, these explanations ceased to be credible in the early 1980's as the organizational basis of the Japanese competitive challenge became clear. The process whereby the technological challenge was identified by American firms is worth reviewing because the evolving way in which American managers defined the problem affected the strategies adopted to deal with it. Though the competitive challenge facing the American firms was created by an organizational technology, this was not self-evident at the time. Japanese competition was manifest as a loss of market share and profitability for the firms and as a loss of jobs for the unions. Predictably, executives at Chrysler, Ford, and General Motors defined their competitive environment in terms of certain numerical proxies – sales volume, profit margin per vehicle, and gross manufacturing costs – that characterized the problem they faced in purely financial terms.[69] Manufacturing engineers and technical consultants such as Harbour and the National Research Council came closer to understanding lean production than their employers by examining the problem in terms of factory line speed, volume of inventory held at the plant level, and labor hours required to produce each component and subassembly. These two definitions of the challenge posed by LP lead to very different

[69] A focus on short-run financial performance is institutionally favored in the United States as a result of its system of capital allocation through equity markets (Hall and Soskice, 2001, Hollingsworth, 1991, etc.). Though this incentive effect is blunted in firms where retained earnings are the primary source of investment and shareholder pressure for maximum dividends is fairly low, the 1991 shareholder revolt at General Motors (Maynard 1995) should be seen as evidence that financial conditions were a dominant consideration for the Big 3. Aside from the structural argument, Halberstam (1986) and Yates (1983) identify trends in the auto sector during the 1950's and 1960's at Ford and General Motors that created a corporate culture characterized by financial risk-aversion.

response strategies. If one accepts the former definition, the problem could be dealt with through product market and political strategies that are not related to the manufacturing process. If one accepts the latter, any solution must logically focus on the actual techniques of production.[70]

The fact that they perceived the challenge of LP in financial terms should not necessarily be seen as a failure on the part of American managers. It is clear that this definition of the Japanese competitive threat hindered executive-level understanding of LP as an organizational technology and slowed attempts to emulate it. The same perspective, however, led those executives to some of the more successful commercial strategies pursued during the 1980's, including the shift toward product markets where the Japanese operated at a disadvantage and the formation of a political coalition with the UAW to support import restrictions that forced Japanese producers to manufacture cars in the United States – creating the elusive "level playing field" by subjecting Japanese firms to the same resource governance mechanisms available to the Big 3. Given the institutional barriers to implementing the LP system in the United States, a strong argument could be made that a response focusing entirely on replicating Japanese manufacturing techniques would have been less successful than the steps that were actually taken.

Against this background, the following two sections will demonstrate both that the lack of usable governance mechanisms made it impossible to emulate LP directly and that substitutes for these mechanisms could not be created within the political opportunity

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[70] The report produced by the Committee on Technology and International Economic and Trade Issues of the National Academy of Engineering in 1982 provides an excellent summary of the developing perspective of manufacturing engineers (Abernathy et. al. (1982) pp. 169-185).

structure facing firms. This interpretation of how American firms responded to LP supports the model developed in Chapter 2: despite the political power of the auto makers and their initial position of market dominance, they were flatly unable to implement a production technology that required forms of resource governance they did not possess and could not functionally emulate. Despite changes in organization that were explicitly intended to copy the forms of labor motivation and supplier relations enjoyed by Japanese firms, an exit option through the market always existed.

For labor, this meant that incentives to invest in team effort and continual improvement could not be created. Employers could offer no credible commitment to job security beyond that imposed by the UAW through adversarial negotiation. During each economic downturn, the pressure on manufacturers to cut labor costs through automation, short-term layoffs, and outsourcing to non-union upstream suppliers was overwhelming. In the American environment, the temptation to use markets to govern resources was overwhelming. On the side of the UAW, leaders and negotiators viewed attempts to implement Japanese-style work practices as strategies to weaken workers and impose the costs of economic adjustment on labor, which in practice they often were.[71] So long as management was able to find ways to use market mechanisms to drive down labor costs or use the threat of closing specific plants to extract concessions from the UAW, the level of mutual trust necessary for Japanese style cooperation could not exist. By the same token, attempts to impose high adjustment costs on skilled labor with no immediate

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[71] Parker and Slaughter (1988) provide several valuable case studies of management attempts to implement team organization or other "Japanese" forms of work at American plants from the perspective of labor and union representatives. In most of these cases, workers felt that the changes being forced on them under the banner of lean production were actually intended to force them to work longer hours for no additional reward, break down labor solidarity, or otherwise extract concessions from workers in a zero sum

compensation often resulted in the workers using labor markets to defect to other firms. In both cases, American firms found that lean production labor practices relied not only on the positive role of institutions in facilitating coordination, but also on what Streeck (1997*b*) referred to as "beneficial constraints" – the closing off of an option that is superior in the short run but that undermines the build-up of organizational capacities over time.

A similar story existed in supplier relations, where the problems caused by a lack of commitment mechanisms and short-term thinking were even more clear. Cooperation in component design to optimize manufacturability, just-in-time inventory practices, and co-investment in specialized equipment or molds requires a long-term commitment on the part of assemblers to justify the organizational and financial resources demanded of suppliers. This was recognized by the mid-1980's, and several attempts were made to establish longer term relationships with suppliers that could create the desired investment incentives. The mechanisms by which this was done included longer-term and contingent contracts, the establishment of formal joint ventures to structure investment in product development and quality improvement, and "single supplier" agreements that made assemblers dependent of one source for key components to guarantee cooperation.[72] In some areas, vertical re-integration brought makers of critical parts back within the ownership-based corporate control of assemblers. These agreements displayed some success, but for the most part they were eroded by market-based exit options.

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environment. Even in cases where this was not their intent, the adversarial culture of labor relations was based on the implicit threat wielded by management.

[72] Helper (1991, 1995) provides a summary and critique of these trends based on industry surveys and comparisons with Japan. For examples of specific joint programs, see WAW 07-85, pp. 47-51; WAW 11-90, pp. 51-54; and WAW 03-92, p. 79. A useful general theory of trust and trust-building mechanisms in supplier relations is offered by Dyer and Chu (2000).

Cooperative investment and design in the Japanese style was remained unusual in the United States, and Japanese firms retained an enduring advantage in integrated product design and constant updating of components.[73]

Aside from the general incentive effects of market competition, attempts to establish long-term supplier relationships during the 1980's were undermined by the unintentional creation of a new and much larger supplier market that proved to have cost advantages even over lean production. This began when Japanese suppliers were encouraged by the threat of domestic content legislation to relocate to the United States to serve transplanted Japanese assembly firms. Over time, American assemblers pioneered international sourcing, extending supplier networks to Asia, Europe, and South America based on the more sophisticated purchasing systems. As is often the case, the creation of this market was contingent not only on changing regulations, but also on new technologies. Specifically, American firms developed computer network technology in an attempt to copy just-in-time inventory management systems. These computer networks had been designed to overcome the organizational barriers that prevented the *kanban* system from working in the United States, but they had the effect of not only allowing inventory control to operate across organizations, but also across enormous physical distances. Though beyond the scope of this study, this technical innovation

[73] This characterization of the relative strength of Japanese supplier relations is supported by the results of the annual Ward's supplier and purchaser surveys from 1989, 1990, and 1993 (see WAW 06-89, 06-90, 06-93, and 04-93). Respondents consistently rated price as the most important consideration in contracting and more than one third expected that their partners would defect from a nominally long-term relationship if a competitor were able to offer a comparable product at a lower cost.

created a revolution in other manufacturing industries that is still being implemented by reducing the costs of organizing global supply chains.[74]

While American firms found that they were unable to deal with the two organizational manifestations of LP, they developed relatively successful strategies to deal with the *symptoms* of LP. These strategies used the same mechanisms of organizational and political action that my argument identifies, and an examination of how they were decided upon and implemented will be included in the next two sections. This sets up a significant conclusion that supplements the theory developed in Chapter 2: the same institutional environment that made emulating LP impossible for American firms also created the opportunities to pursue other strategies.

For analytic purposes, the American response can be thought of as having interlocking political and commercial aspects. The primary actors in the political response were the legislative and executive branches of the federal government as they responded to both the macroeconomic effects of the American decline and the direct lobbying of firms and the UAW. Though both branches were responsive to the macroeconomic dangers posed by a crisis in such an important industry, partisan control of each branch brought differing priorities that had to be matched to the different institutional powers available. The legislature, generally dominated by the Democratic Party during this period, was influenced largely by concerns of labor. The executive, Republican for all but two years during this period, responded more directly to the lobbying of the auto makers themselves. The kinds of decisions they made involved

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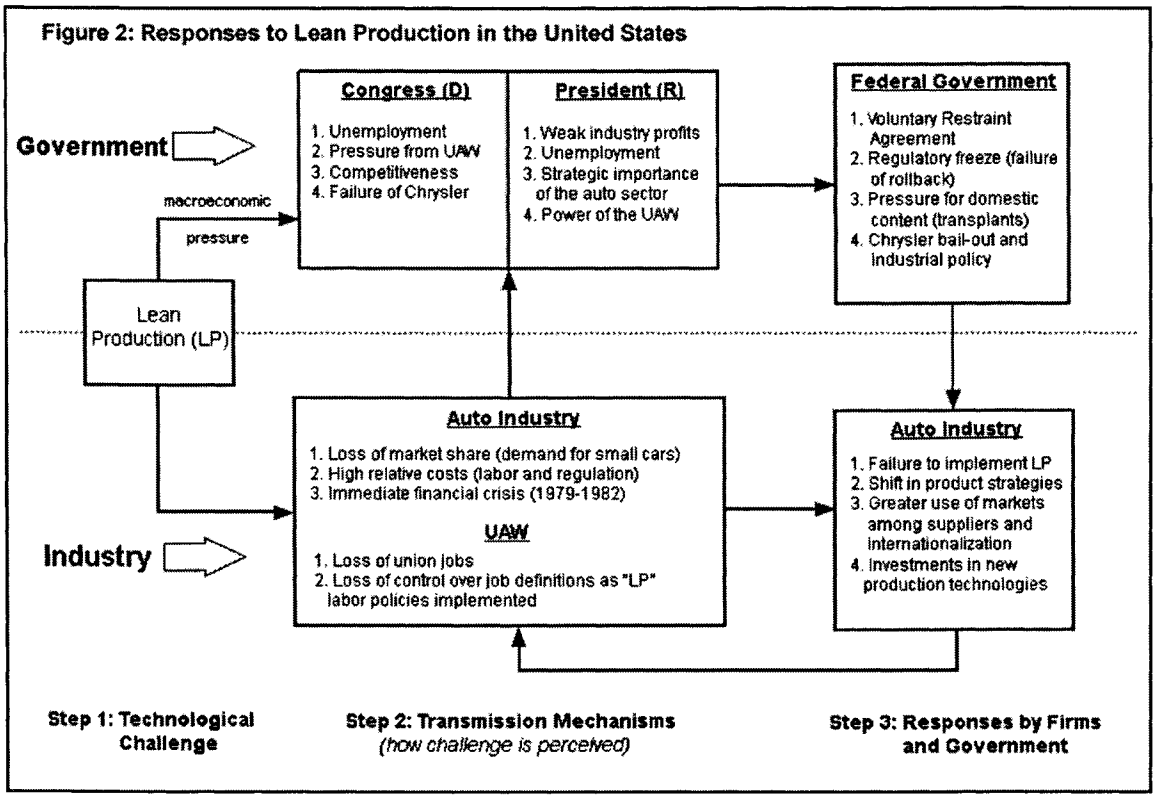
[74] For examples from the end of the period under study, see Howells and Wood (1993) and Holland, Lockett, and Blackman (1992). For a dissenting view that deals with the early development of internet purchasing and focuses on the traditional considerations of economic geography, see Leamer and Storper (2001).

protection against import competition, the formulation and application of regulations, and direct assistance to the industry. The actors in the commercial arena were the Big 3 themselves, with the UAW and upstream suppliers (each linked with one aspect of LP and hence critical to any attempt to implement it) playing a supporting role by responding to the strategies of GM, Ford, and Chrysler.

These two aspects of the American response were closely intertwined. Lobbying produced changes in policy that then altered the environmental constraints on commercial decisions. Firms' strategies, in turn, affected how government perceived the unfolding crisis and contributed to the mobilization of political resources to influence policies. Despite this, treating these two aspects of the response separately is justified by the fact that each involves different primary actors and very distinct causal mechanisms. The most important intersection points between the government and industry responses such as the Chrysler bailout and the adoption of the Voluntary Restraint Agreement (VRA) by the Japanese blur the distinction, but it remains sufficiently useful as a means of organizing the analysis.

Treating these aspects separately suggests two pathways of response and the causal relationships between them:



Aside from considering the political and commercial responses separately, it is also useful to divide the American response into three periods based on the financial conditions faced by the Big 3. The first period, from 1979 to 1982, was defined by the auto sector recession that began with the fall of the Shah of Iran and continued until the broad-based economic recovery in early 1983. This era was characterized by massive financial losses and direct job losses of more than 335,000 workers in the sector.[75] Financial constraints minimized the investments that could be made by auto makers during this period and prevented more than the most immediate adaptation strategies from being implemented. This left most of the important developments in the political sphere, where the threat of protectionist legislation led to the Voluntary Restraint

[75] Singleton (1992), p. 20; many of these job losses came in the form of layoffs, some of which were reversed when the economy improved in 1983. This estimate does *not* include indirect job losses in sales, service, or financial industries that rely on auto sales.

Agreement (VRA) in 1981 and the financial collapse of Chrysler motivated Congress to create the Chrysler Loan Guarantee Board (CLGB).

The second period was defined by the return of high industry profits lasting until the next general cyclical downturn in 1990. This interlude was partly a product of the upswing in the American economy and the dramatic drop in oil prices that started in 1982 and partly a result of the protection offered to domestic auto makers by the Japanese VRA. These years saw relative stasis on the political side, with the Reagan administration attempting to roll back environmental and safety regulations while Congress debated but failed to pass laws on domestic content and an expanded national industrial policy. Relieved from the financial pressure of the oil crisis and recession, however, this was a period of vigorous and diverse organizational responses among the Big 3. American auto makers made investments that served two goals: closing the cost/productivity gap with Japan and differentiating their products in ways that allowed them to charge prices that sustained profitability. Predictably, auto makers took advantage of the VRA to increase prices, but the threat of Japanese "transplant" factories opening in the United States and the "voluntary" character of the VRA created incentives to do more than simply maximize short term profits. Though the Reagan administration did not request its renewal in 1985, the Japanese government retained an essentially symbolic version of the VRA through this period. As the 1980's progressed, a combination of government and industry policies contributed to the dramatic weakening of the UAW, which was forced to concede more and more of their control over wages, benefits and working conditions under the continuing threat of plant closures, outsourcing, and internationalization.

The profitable period of the 1980's was dominated by product strategies that ratified the American competitive failure: the Big 3 retained only a token presence in small car markets while creating entirely new market niches in mini-vans, light trucks, and sport utility vehicles. These market niches provided American firms with a powerful cost advantage based on being the first-mover in these markets and having access to more design experience for these types of vehicles.[76] This decision helped to take American firms out of direct competition with Japanese rivals while Honda, Nissan, and Toyota evaluated these new markets and developed products to compete in them and provided a strong basis for profitable expansion. Like most technical adaptation strategies, this product market decision was bound up with government regulation – the CAFE standards enacted in the 1970's. Much political effort expended by the American producers in this era focused on protecting the exemption of "light trucks" from fuel efficiency standards and insure that each new product developed would be classified as a light truck by the Environmental Protection Agency.

The third era opened with the 1990 recession and ended with the ratification of NAFTA and the "jobless" economic upswing in 1993. Politically, this period saw an end of the ideological opposition to regulation and industrial policy that had characterized the Reagan presidency. Prior to the recession, the Bush administration had indicated its willingness to consider new regulations in the face of renewed environmental and safety concerns in the mass electorate. Facing job losses and a financial catastrophe in the

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[76] Product development in the auto sector is facilitated by experience in the relevant market areas. This fact explains in part the strength of Japanese producers in compact and subcompact markets (Honda's experience with small, high-performance engines was based on work developing motorcycles, generating engineering expertise that transferred readily to space and weight constrained small vehicles) as well as the American advantage in trucks and the jeep-derivative sport utility vehicles.

industry on a scale comparable to the early 1980's, the Bush administration responded with compromises on regulation and a surprisingly interventionist industrial policy. This broke the ideological logjam that had blocked Congressional moves in this direction for a decade. This era also featured the negotiation and ratification of the NAFTA agreement with strong support from domestic auto makers. The long decline in power of the UAW was made obvious during the 1992 election by their failure to impose their opposition to this treaty on the Democratic presidential candidates.

In terms of market performance and the organizational strategies of the Big 3, this period displayed many similarities with the 1979-1982 crisis. The drop in market share suffered by American firms was not as severe as in the previous recession, and relatively fewer jobs were lost in the industry as Japanese transplant facilities employing American workers filled much of the demand for Japanese models. While the macroeconomic effects were smaller, the financial losses to American firms were much larger. To deal with these losses, the American manufacturers adopted an extremely high-risk strategy; they redoubled their efforts to dominate the sport utility and truck markets while retreating further from compact and even mid-sized segments. By 1993, this risk had proven justified, as dropping oil prices in the wake of the Gulf War led to a resurgence in consumer demand for low-mileage vehicles that would continue through the decade. Though profitability returned as a result of this choice, it is worth noting that the competitive strength of the Big 3 in fuel efficient cars had been essentially eliminated by neglect; had oil prices remained high, American firms' product strategies of the previous decade would have led to a disaster fully equal to 1979.

The recession of 1990-1992 saw the product market and organizational strategies of the American producers tested under more intense cost pressure. Product innovation in light trucks, spared from another fuel crisis, continued with the goal of finding or creating market niches in which the Japanese were less competitive. Manufacturing and supplier strategies built around new technologies produced mixed results, with some highly successful projects balanced by the failure of General Motors' capital-intensive "factories of the future." The decade of increased competition among suppliers sparked by the Japanese transplants combined with new communications and network technologies to create a powerful and unexpected cost advantage that partly eclipsed the productivity advantages of LP. This combination of network technologies and international competition among suppliers placed the American firms in a stronger competitive position as the economy improved in 1993. Finally, cost pressures and plant closings allowed American assemblers to further weaken the UAW, which was in most cases reduced to bargaining over the size and allocation of job and benefit cuts.

The choice of 1993 as a cut-off in my analysis is based on two facts. First, the period after 1993 saw the eclipse of LP as dominant aspect of competitive advantage in the auto sector. As will be discussed in more detail below, American firms' adaptation strategies had led to a series of new technologies that reflected the American institutional environment. Finding it difficult to compete with the short product cycles that LP producers enjoyed, American firms pioneered the use of Computer Aided Design and Manufacturing (CAD/CAM). This technical fix to an organizational disadvantage produced a revolution in vehicle design that facilitated simpler vehicle assembly. As the task of vehicle assembly changed, the relative importance of LP techniques as elements

of cost savings declined. The American strategy of outsourcing more assembly work to non-unionized upstream suppliers combined with this design revolution to produce a generation of vehicles that were partly designed as modules. This pattern of substituting technical for organizational innovation is a major element of the American reaction. Where lean production relied on sharing personnel and design work between suppliers and assemblers, American firms used network technologies to facilitate this across greater geographical and organizational distances. The easy exchange of technical information allowed firms in arm's length contracts to capture some of the benefits of lean production's integration of design and manufacturing without the organizational integration that depended on specific governance mechanisms. Though still less productive at the plant level than factories using LP in Japan, American firms had closed enough of the cost gap through a combination of outsourcing and new technologies to keep them afloat in their selected product markets.

Second, the internationalization of the auto industry that had been cultivated by American and Japanese producers as a response to the VRA had made the definition of an American auto industry difficult. By 1993, laws tracking the domestic content of American made vehicles showed that in many cases only 60%-75% were completely domestic in origin. Also by 1993, more than 25% of the new vehicles made in the U.S. were produced by Japanese firms in transplant factories. A majority of Japanese cars sold in the U.S. were produced in the same institutional environment as American cars. Despite their experience with LP and the 'importation' of key suppliers, these Japanese factories faced the same problems implementing LP as their American competitors.

When combined with the high value of the yen and an ongoing recession, Japanese cars produced in Japan retained only a small cost advantage as a result of LP.

In addition, the ratification of the North American Free Trade Agreement had opened up greater competition among suppliers and promoted a round of strategies focused on the international outsourcing of components. This international outsourcing finally provided American auto makers with a functional equivalent to the small, non-union upstream suppliers that had filled gaps in Japan's LP system since the 1950's. By including very low wage producers in Mexico, NAFTA made strategies of upstream purchasing nearly as important as the plant level organization of production in determining costs. The 1992 re-organization of General Motors and the remarkable powers given to their "purchasing Czar" – a man brought in from Europe specifically because of his experience in international sourcing – highlighted this transformation. Though LP remained a dominating organizational form at the plant level and the American cost disadvantage in this area was *not* eliminated, the very nature of auto assembly had been transformed to the point where firm strategies could no longer usefully be interpreted as responses to lean production.

3.5 Political Strategies

The competitive environment in which Chrysler, Ford, and General Motors operated from 1979-1993 was defined by federal regulation and profoundly shaped by government policy choices. Even aside from the legal institutions of the American economy that apply across sectors, the auto industry was affected by a set of federal regulations that established standards for its products and constrained the processes that could be used to manufacture them. In addition to these background conditions, a series

of specific policy choices made by the federal government in the 1980's influenced the strategic choices made by firms, enabling some strategies and closing off others. Both the auto makers and the UAW recognized (sometimes reluctantly) the importance of government and worked to shape federal policies to their advantage, and both groups selected their approach to government based on the venues available to them and the kinds of appeals most likely to be effective in each. This section will examine both the formation and effects of government policy, focusing on the ways in which firm strategies and the institutional structure of government combined to determine how public power was used in response to LP. The incentives and constraints that emerged from this process are critical to understanding both the product market and organizational strategies chosen by firms.

In 1979, the auto sector was emerging from a decade and a half defined by conflict with the federal government, and it is against this background that the political response to LP must be understood. Beginning with the publication of Ralph Nader's *Unsafe at any Speed* in 1965, three waves of federal regulation broke over what had been a largely self-policing industry. The first involved an increasing number of safety regulations promoted by a new generation of consumer activists operating through the courts as well as state and federal legislatures.[77] The bureaucracy formed to implement these, the National Highway Transportation Safety Administration (NHTSA), was viewed by the industry as ignorant of their products and divorced from the realities of

[77] Between 1968 and 1979, at least 46 areas of automotive design were specified by law for safety purposes, ranging from obvious requirements such as seat belts to more obscure safety precautions such as reduced flammability materials being required for auto interiors.

designing and building cars.[78] This wave of safety regulations was followed in the 1970's by stringent environmental legislation that generated costs for auto makers in both design and manufacturing. Environmental standards such as reduced exhaust emissions required firms to make investments in unproven technologies like the catalytic converter. Finally, the first oil crisis in 1974 led to the creation of Corporate Average Fuel Economy (CAFE) standards. Beginning in 1978, these standards required that the average fuel efficiency of each manufacturer's vehicles meet incrementally higher standards over the following seven years, with potentially large "gas guzzler" fines for missing these targets.

The auto industry had fought most of these steps through lobbying, lawsuits, and public information campaigns. Aside from imposing costs on manufacturers that they wished to avoid,[79] these laws created poor publicity that was believed to have a powerful negative effect on consumer attitudes and hence sales. This secondary public relations effect highlighted the poor mileage of their vehicles, drew the public eye to periodic safety investigations or mandated recalls of unsafe vehicles, and tracked the damage done by automobiles to the environment. For firms in an industry where a positive brand image is critical, this was a real threat. Through the 1970's, intrusive regulation and poor market performance contributed to an anti-government attitude on the part of the Big 3 that bordered on the fanatic.[80] This attitude was in part a rational response to the costs

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[78] Some of the political developments that led to the creation of the NHTSA are described in Mashaw and Harfst (1990).

[79] It is difficult to estimate the costs imposed on manufacturers or consumers by safety, fuel efficiency, and environmental regulations. The Bush administration's Bureau of Labor Statistics estimated in 1992 that regulations enacted between 1971 and 1979 had increased the cost of the average automobile by more than $900 (in constant 1991 dollars). Unsurprisingly, the degree to which these costs were passed on to the consumer was emphasized by auto makers.

[80] In addition to the onward march of product-related regulations, the late 1960's and 1970's saw recurrent (though implausible) threats to break up the Big 3 on anti-trust grounds. These existential threats to the Big

associated with regulation, but there was also a psychological and cultural aspect to it that should not be minimized. Ever since the vilification of General Motors by Ralph Nader in the 1960's and the publicity disaster resulting from GM's response, the industry had developed a sense of being besieged and attacked by government and citizens' groups that led to furious resentment on the part of auto executives.

Attempts by the relatively industry-friendly Gerald Ford administration to obtain voluntary compliance with mileage guidelines foundered in 1974 on the industry's distrust of any further government regulation, leading to the imposition of formal CAFE standards by Congress the next year. Relations between government and industry worsened under the Carter administration despite its moderate approach to regulation.[81] In response to the oil crisis in 1979, Transportation Secretary Brock Adams proposed joint research programs between government and industry, challenging American firms to "do nothing less than re-invent the car" within a decade. Though this would have saved design costs, eliminated anti-trust concerns over sharing information among the Big 3, and emulated successful industry programs in Japan and France, American auto makers rejected it and publicly denounced Adams as a symbol of the hubris and ignorance of government regulators. When contrasted with the attitudes of European and Japanese competitors, the degree to which industry strategy was based on the assumption of an adversarial relationship with government is striking.

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3 appeared periodically in Congress and contributed to the implacable hostility felt by many industry executives against federal regulation and the Democratic Party specifically.

[81] The importance of rhetoric and symbolism in establishing poor relations between the Carter administration and the auto industry should not be underestimated. Though Carter's approach to regulation was relatively pragmatic, especially his pioneering deregulation push in the face of the 1979 economic crisis, the administration's early statements about corporate responsibility and embrace of the consumer movement alienated auto executives to a degree that can not be rationally explained.

Such an attitude made the auto industry a natural ally for the political movement that emerged from the tax revolts of the late 1970's. Denouncing the "Naderites" in the Carter administration, the Chairman of General Motors in 1978 suggested that the industry and its suppliers strongly support the taxpayers revolt emerging in western states. Specifically, he called for the industry to attempt to influence this movement to expand their political goals to oppose "wasteful government regulations and excessive government involvement" in the industry, suggesting that regulations were inflationary and unpatriotic.[82] This approach to politics – based on a tactical alliance with the most radical anti-government activists of the emerging Reagan revolution and blanket opposition to regulation – would characterize Ford and General Motors over the ensuing decade.

When the Iranian revolution sparked both a dramatic economic recession and the surge of Japanese imports, this adversarial attitude provided the lens through which executives in the auto industry viewed their problems that was difficult to discard. After arguing for fifteen years that the industry's problems were the product of unnecessary regulation, it was natural for auto executives to explain their competitive failure against the Japanese in the same terms. It is also interesting to note that this interpretation of the industry's problems was shared by many workers in the auto sector, contributing to the sectoral cleavage that split the Democratic Party in 1980 with the defection of the blue collar "Reagan Democrats." Though hardly the determining factor in Carter's defeat, the

[82] WAY 1978, p. 16

drop of almost 20% in union support for the Democratic candidate was important as part of a general electoral realignment and as a step in the political weakening of the UAW.[83]

This tendency to view competitive problems in terms of regulation cemented an alliance between the Reagan administration and the auto makers that would define automotive policy-making in the 1980's. Congress, dominated by the Democratic Party, was strongly influenced by an uneasy and easily fractured coalition of labor and groups that favored higher levels of environmental, fuel efficiency, and safety regulation. In responding to the auto industry's crisis in the early 1980's, Democrats focused on job losses and the threat to their allies in the UAW. The Reagan administration, in contrast, was faced with two sets of demands from auto makers: deregulation and import protection. Of these two general goals, Republican appointees supported demands for deregulation that would reduce auto makers' costs; ideology and interest aligned to make this a priority for the Reagan administration. Import protection, however, put ideology and pragmatism in contrast within the administration even as it split the auto makers. This made the Reagan administration a lukewarm supporter of protection even in the depths of the 1982 recession.

The nature of the problem posed by Japanese competition was therefore defined differently by the two political parties. For the Democrats in Congress, the loss of competitiveness in the auto sector was primarily a crisis of unemployment. This definition of the problem led them to propose certain types of solutions – most prominently a national industrial policy, import restrictions, and domestic content laws –

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[83] The divisions within the UAW brought out in the primary contest between Kennedy and Carter in 1980 were exacerbated in the general election by Reagan's claim that the auto industry's problems were attributable to government regulation. In the upper Midwest, this likely helped to sharpen the appeal Reagan made to non-economic values.

that were intended to increase domestic employment in the auto sector. For the Reagan administration, the profitability of domestic manufacturers was the best measure of their competitive strength. This understanding of the problem suggested other policy measures such as the relaxation of anti-trust regulations, tax cuts to encourage investment, and the elimination of costly environmental and safety standards.

This partisan split largely reflected the influence of labor and management, but it would be simplistic to view Democrats as no more than tools of the UAW and Republicans as advocates of the Big 3. Instead, two more subtle factors must be used to explain the divergence between the expected partisan alignments and the actual policies pursued. The first is disharmony within the interest groups representing management and labor. On the Republican side, divergent interests between Chrysler, Ford, and General Motors emerged on questions of import restrictions, industrial policy, and domestic content laws. Though these differences covered several issue areas and prevented coordinated lobbying in all but a few cases, the most consistent split involved Chrysler's intermittent support for proposals championed by Congressional Democrats.[84]

Perhaps more important in determining policy within the Reagan administration than the various differences of interest among auto makers was an ideological commitment to non-intervention in free markets. On the Democratic side, ideology of any kind was less important than the division between labor on the one hand and consumer or environmental groups on the other. Even within the UAW, divisions over

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[84] This counter-intuitive alliance arose largely from the personal views of Chrysler's mercurial CEO, the legacy of the 1980 bailout in making Chrysler's management forcefully aware of the positive aspects of government intervention, and Chrysler's initial competitive strategy of producing a more fuel efficient fleet of vehicles than required by CAFE standards and other federal requirements. This made support for the enforcement and expansion of these laws to the detriment of its competitors a useful market strategy for Chrysler.

personalities and policies hindered the formation of a unified stance on policies that affected the auto sector. The most significant of these included disagreements over the prospects for unionizing Japanese transplant assemblers and a bitter debate over cooperation with management in implementing LP. These disagreements, which had an ideological as well as a practical foundation, led to a lack of political direction on these questions within the UAW.[85] With the union divided over these issues, splits among Democrats in Congress arising from geography, ideology, and the specific makeup of their constituencies prevented concerted Congressional action on domestic content laws or the establishment of an industrial policy for the auto sector. This had the effect of ceding policy-making initiative to the executive.

More broadly, the importance of the auto sector to the overall economy and society made other constituent groups within each party relevant to shaping their policy positions. The most obvious such divisions appeared between environmental groups and labor on the Democratic side and the between free trade Republicans and the auto assemblers. In addition to these forces within each political coalition, other factors could overwhelm partisan alignment. For example, the geographical character of the American electoral system trumped partisanship in 1981 when Democratic and Republican representatives from Illinois, Michigan, and Missouri supported the program to bail out Chrysler and the danger of losing seats in the upper mid-west led to the Reagan administration's reluctant support for a program that violated many of their anti-regulation principles. The cross pressures on political actors in the two Republican

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[85] The "New Directions" movement manifested several fault lines within the UAW, most notably between younger and older workers, more and less confrontational approaches to negotiation with management, and political stance within the Democratic Party. For a summary of the confrontation that came into the open in the late 1980's, see WAW 6-89, pp. 44-45 and WAW 7-89, p. 103

administrations and Congress made both lobbying and policy-making a more complex process than a simply associating the parties with management and labor would suggest.

The partisan split was also an institutional split. While the two parties viewed the competitive crisis of the auto industry in the first two years of the Reagan presidency very differently, the kinds of policies they were *able* to pursue were defined by their institutional positions. Strategic choices emerged based on the levers of power available to each branch. The Democrats, controlling the House during this period and the Senate after 1986, were in a position to propose or threaten major legislative changes and to create or alter regulations. The Republicans, controlling the executive branch for twelve out of these fifteen years, were able to influence how regulations were implemented and operate a relatively autonomous foreign policy. The institutional powers available to each party were as important in determining their strategies as was the partisan split itself, with an overall advantage going to the executive.

The divisions arising from both institutional design and the character of the two coalitions produced political responses that were inconsistent and in some cases openly contradictory. Divided government created the institutional stalemate after 1980 that blocked any major initiatives proposed by either side.[86] Specifically, the Reagan administration's proposals to repeal CAFE standards, substantially weaken the Clean Air Act, and enact a series of investment tax credits were blocked by Democrats in Congress. Democratic plans for national bureaucracy to coordinate a Japanese-style industrial

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[86] This policy area provides a fascinating case study of the institutional gridlock examined by Sundquist (1988), though legislative initiative should be seen as less important in this case than bureaucratic oversight (c.f. McCubbins 1985) and Presidential prerogative in foreign policy (e.g. the negotiation of VRA's with Japan).

policy and annual proposals for automotive tariffs were blocked by Congressional Republicans and the threat of a presidential veto.

The only major activist policy in this entire period took place before Reagan entered office and was supported primarily by the UAW and Democrats sympathetic with European-style industrial policy. The legislation that created the Chrysler Labor Guarantee Board (CLGB) to rescue Chrysler from bankruptcy following losses of $1.31 billion passed congress in December of 1979. This program was the most direct attempt by the American government to influence how the auto industry responded to the Japanese challenge. Because it attempted to emulate aspects of the institutional environment that would facilitate LP, it is worth examining both how the program was constructed politically and how it influenced Chrysler's ultimate response to LP.[87] The bailout also provides an excellent example of the problems facing any attempt to use government policy – the direct application of regulatory power to industry – to create functional substitutes for the embedded institutions of resource governance.

Politically, the bailout encountered opposition from across the ideological spectrum.[88] This opposition was motivated by a variety of concerns, but the most important were ideational. Indirect aid had been given to Chrysler through defense contracts for several years, while three states, the city of Detroit, and the governments of

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[87] Because the resource governance needs of lean production were imperfectly understood when the CLGB was created (though better understood by the academics and bureaucrats influencing the policy than by auto executives), the general model used for the program was the German *Hausbank* and labor co-determination systems. Judged as a basis for creating the institutional preconditions for LP through contractual mechanisms and ad-hoc regulation, the German model must be considered flawed. Specifically, it failed to create any effective check on exit from supplier relationships and provided too much power over work conditions to the adversarial UAW (in contrast with Japan's more cooperative enterprise unions).

[88] A review of arguments over the proposed bailout from Ralph Nader on the left to George Romney on the right was published in a series of special features in WAW 12-79.

Canada and Ontario had provided loan guarantees in the past without raising principled opposition.[89] The practical reality of a disjointed industrial policy operated by the states, the Defense Department, and foreign governments had not threatened defenders of the free market ideal. The prospect of direct federal aid, however, and the creation of a bureaucratic apparatus to oversee its use, was considered unacceptable. Almost every aspect of the opposition to the bailout relied on invocations of the strength of the market and the danger of government "picking winners and losers," while supporters found it insufficient to rely only on pragmatic arguments involving unemployment and national competitiveness.[90]

Two factors were responsible for the passage of the Chrysler bailout in the face of this ideological opposition. First, the full lobbying power of the UAW was exerted by its President, Douglas Fraser, to save union jobs. Fraser's lobbying was more influential with President Carter than it might otherwise have been because of the timing of the bill. In late 1979, shortly before the first of the 1980 presidential primaries, the UAW's ability to turn out primary voters in the upper Midwest brought their influence to its height.[91]

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[89] Chrysler was the largest recipient of defense contracts in the auto sector in 1979 with $808.9 million (WAW 4-80). For the impact of defense contracts as a form of subsidy, see Harbour (1988), p. 150. Other sources of government money before the creation of the CLGB are listed in a review of Chrysler's finances in WAW 5-80. It is interesting to note that these state level loans created strong constituencies in Congress in support of the federal package as representatives tried to prevent Chrysler from defaults that would further burden their state budgets during an economic downturn. For a review of how these packages were created, see Moritz and Seaman (1981).

[90] Based on the rhetoric of some opposition groups, it seems likely that the "trigger point" that made ad-hoc policies by state governments and the Defense Department acceptable but a comprehensive national policy an ideological threat involved the creation of institutional capacity that the government would be able to use in the future. Comparisons to the Reconstruction Finance Corporation are especially illuminating in this regard. See Bardach (1984) and Graham (1992).

[91] See WAW 2-80, p. 9. The fact that Fraser personally endorsed Senator Kennedy over Carter a few days after the enabling legislation for the CLGB was signed is a major aspect of the split between the UAW and one wing of the Democratic Party mentioned above.

Second, the argument was made by Chrysler and its patrons that the primary reason for Chrysler's financial collapse was the burden imposed by government regulation. Specifically, American auto makers could not, for anti-trust reasons, collaborate to develop technologies and new designs that would meet government standards. Chrysler, it was argued, had to replicate the expensive research into smaller engines, catalytic converters, and lightweight body materials that General Motors and Ford (with larger research divisions) had already developed.

This argument meshed with the political rhetoric dominating the emerging 1980 presidential election: government had created Chrysler's problems, and if it would not allow the company to solve them through "market-based" mechanisms, then financial assistance was justified. The universal acceptance of arguing the issue based on anti-government rhetoric – ironically employed in favor of a massive government program – is shown by Democratic Senator Donald Riegele's argument that Chrysler had been the victim of "A unique conjunction of adverse events [including] massive engineering and retooling costs associated with federally mandated fuel-efficiency, emission and safety standards."[92]

The final formulation of the Chrysler bailout revealed the compromises necessary to pass any kind of an American industrial policy. There were three distinctive characteristics of the bailout that reflected concerns about interventionism in principle and strongly influenced Chrysler's competitive strategies. The first was the nature of the CLGB itself, the independent body intended to review Chrysler's investment decisions and disburse the more than $1.5 billion allocated by Congress. Because it was intended

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[92] WAW 10-79, p. 27.

to be insulated from political forces, the CLGB was overseen by a board made up of the Treasury Secretary, the Comptroller General, and the Federal Reserve Chairman and was designed to be transparent in its decision-making.[93] Despite the emphasis on transparency, the relationship between the CLGB and Chrysler was explicitly modeled on the role played by a German *Hausbank*. It was intended to provide oversight on investment decisions and protect the interests of the various private and public creditors involved in the bailout. The seldom-exercised oversight power of the CLGB was resented intensely by the management at Chrysler as an intrusion on their prerogatives and was the primary motivation for paying off the government loans several years ahead of schedule despite the opportunity costs of failing to use these guaranteed funds for other investments.[94]

The second involved the conditions imposed by the Chrysler Loan Guarantee Act. These required the corporation to meet certain financial and organizational requirements before the loans would be offered, but left the details of how to do so completely to the management of Chrysler. The most important requirement involved specifying several hundred million dollars in cost reductions that could only be met in cooperation with labor and suppliers. This aspect of the plan was influenced by European tripartite bargaining systems, but the legislation left all details of labor negotiations to those directly involved, refusing to allow any direct role for government. This gave enormous latitude to both management and the UAW, and the weak form of bilateral corporatism that they devised was an interesting adaptation to American institutions. Lacking any

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[93] See WAW 5-80, pp. 43-48, WAY 1981, p. 19, and Moritz and Seaman (1984).

[94] The intense dislike of oversight by the CLGB is made clear in a series of interviews with Lee Iacocca and Jeff Gerwald between 1979 and 1982. See WAW year end interview series 1979-1982.

legal mechanism for including labor in corporate decision-making, Chrysler chose to place UAW President Douglas Fraser on the company's board as part of an agreement to gain concessions on wages and work rules. This position served to increase trust during wage bargaining by making confidential elements of the firm's financial situation known to the UAW leadership. Other elements of this bargain involved salary cuts for management and a groundbreaking wage contract that included profit sharing, required in principle by the CLGB but left to negotiations between management and the UAW.[95] In addition to the cooperation with labor achieved through this system, the CLGB oversaw negotiations with upstream suppliers to create debt repayment programs that bound Chrysler to certain key suppliers in a way that emulated the ownership commitments of Japanese firms.

These elements of the bailout represented a conscious attempt to emulate the system of incentives that supports LP labor practices by offering workers a stronger financial incentive in the competitive success of the company.[96] Though the Chrysler program was successful on the margin in improving labor productivity and implementing LP-inspired team and shop-floor labor involvement programs, this success eroded over the subsequent years as Chrysler management eliminated the guarantees that supported them and returning prosperity caused the UAW to press for the elimination of the work

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[95] WAW 4-81, pp. 48-49

[96] The direct model for this system was not Japan but Germany, and it was not well understood at the time how union representation might relate to the higher productivity of Japanese firms. The general intention, however, was to align incentives between labor and management and increase worker participation. It is very interesting to note the historical origins of this plan. Profit sharing in the American auto sector was first implemented at American Motors (AMC) in 1960 as part of a plan to tie workers more closely to their employer and improve the quality of work. It was championed by UAW founder Walter Reuther based explicitly on European models and (unsuccessful) attempts had been made to emulate its provisions at other auto makers in the intervening years. For an account of the AMC bargain and the attitudes on both sides toward profit sharing, see Macdonald (1963), pp. 236-257

organization concessions it had granted. Though this attempt to construct a form of corporatism within an institutional environment generally considered hostile to it did not result in the full implementation of LP, it is worth noting that it was successful in a limited way for over a decade, with the corporate board membership held by Fraser and his successor Owen Bieber until 1991 and labor relations at Chrysler being more cooperative than at either of the other major auto makers. The Harbour Report estimates that the productivity increases in several specific Chrysler plants were related to the unique Modern Operating Agreements that were negotiated during this period.[97]

This erosion of the only real attempt to create functional substitutes for the resource governance mechanisms required by LP demonstrates how the institutional environment worked against this type of production strategy. Looking at the general pattern of labor relations over the ensuing decade, it is clear that only a few isolated plants were able to implement team-based programs that came close to Japanese practice. These occurred only where a combination of slack regional labor markets eliminated exit options for workers and conscious emulation of Japanese labor practices were undertaken by plant-level managers.[98]

The third aspect of the Chrysler bailout was the insistence that it be primarily organized and implemented by actors in the private sector. This was most obvious in the

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[97] Harbour Report (1993), p. 47. Even with the failure to implement truly LP-style labor relations due largely to the exit option possessed by workers, labor involvement in specific programs to increase participation and productivity was important in giving specific Ford and Chrysler plants a considerable advantage over General Motors. A fascinating (though overly optimistic) review of the issue from the perspective of the UAW is provided by Fraser himself in WAW 4-84, p. 5.

[98] See p. 222 below. Though Japanese transplant producers were more successful in general in achieving this combination of circumstances – they consciously sought out the two preconditions and worked to perpetuate them when achieved – the fact that the most successful single plant in achieving these goals was owned by Ford suggests that the environment rather than the firm's policies were determinative.

requirement that Chrysler executives raise more than $2 billion from other sources before the federal money would be disbursed. The compromise that allowed the bailout to pass through Congress demanded that the CLGB operate as though it were a private investor to the highest degree consistent with the requirement for unusual transparency and oversight, all of which were mediated through the legal system as though the Chrysler Loan Guarantee Act were a private contract. This unwillingness to set precedents or create new institutional mechanisms that might lead to further intervention was produced both by Republicans' fears about creating a new Reconstruction Finance Corporation and Democratic electoral concerns in the face of rising anti-government sentiment in the electorate. As a theoretical matter, this is important because it demonstrates the flexibility of the American institutional system and its ability to accommodate ad-hoc corporatism and complex, successful industrial intervention without modifying the institutions of what Hall and Soskice call market-based economic coordination.[99] The ability of the American economy to provide an approximation of cooperative labor bargaining and patient capital through well designed formal contracts supplemented by informal agreements and to implement them through non-market coordination systems is surprising. It suggests that many of the explanations of national political economy models that rely exclusively on structural factors and institutional complementarities should be re-examined.

Judged on its own terms, the Chrysler bailout was spectacularly successful. Chrysler not only regained profitability in 1982 after 4 years of unprecedented losses, it also offered a return on investment of roughly $250 million for the CLGB based on stock

[99] Hall and Soskice (2001), pp. 33-34

holdings that were part of the original program. The success of the bailout in such a short period was partly the result of import restrictions that protected all three American producers, but the bailout program was critical in providing the capital required for Chrysler's commercial response. Specifically, it allowed the otherwise cash-strapped Chrysler to make long-term investments in product innovation – most importantly the development of mini-vans to create a new market niche that the Japanese were unable to contest in the short run. In the most immediate sense, the bailout had given Chrysler the breathing room required to implement its commercial strategy despite the ongoing 1979-1982 recession. In addition to supporting the product market strategy that was eventually adopted by all three American producers, the CLGB also explicitly promoted a model for adaptation to the Japanese productivity advantage that relied on cooperation between labor and management that would affect the other major producers and the UAW. This had the effect of helping to solidify the intellectual consensus regarding exactly what LP was and how it could best be emulated by creating a model that could be examined, copied, and modified by Ford and General Motors. Some elements of the employee involvement programs implemented by the two larger auto makers were copied or adapted from the Chrysler experience.[100]

Despite the success of the Chrysler bailout, the window of opportunity for industrial policy shut decisively with the inauguration of Ronald Reagan in 1981. Though unable to repeal the Chrysler bailout, the Reagan administration approached the

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[100] One could also argue that the Chrysler bailout had legitimated opposition to the Reagan administration's attack on positive government, drawing united opposition from otherwise divided Democrats in Congress. Though the political debates that this produced will not be examined in detail, these debates played an important role in shaping the arguments over industrial policy that took place across the next decade. Specifically, debates over industrial policy in the 1984 and 1988 elections took place under the shadow of

problems of the auto sector from an ideological conviction that government regulation was responsible for its competitive disadvantage relative to the Japanese. This belief was strongly supported by the auto industry itself and grew out of their experiences in the 1970's. In 1981, it was not clear how the new administration's anti-regulation beliefs would be applied to the auto industry, though there was considerable doubt as to whether a regulatory rollback could be conducted so long as Democrats remained in control of the House and a blocking minority in the Senate.

One person was largely responsible for the administration's approach to the auto industry and translating an ideological hostility to regulation into a set of specific policies. David Stockman, a former representative from Michigan, had built his brief career in Congress on strident opposition to any form of government intervention in the auto industry. In the late 1970's, he had opposed safety regulations as interfering in the choices of consumers, denounced pollution standards, and called for the repeal of fuel economy requirements. In 1978, he had predicted that "By 1980 or '81, there will be a consumer uprising, a political explosion that will abort the whole thing [fuel efficiency standards]. The sad part is, it'll happen *after* the industry's spent hundreds of millions of dollars on downsizing, and consumers have paid the bill."[101] For him, Reagan's election was the fulfillment of this prophecy. When Stockman was appointed as budget director to the new administration, he announced his intention to use the leverage provided by formulating agency budgets to push the Environmental Protection Agency, the Federal

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Chrysler's success, as did the Bush administration's attempts to promote joint research programs discussed below.

[101] WAW 12-78, pp. 107-108 and WAW 2-81, p. 24. Stockman's complete set of proposals for regulatory rollback were set out in a 1980 White Paper that he continued to press on the executive agencies from his position as OMB Director.

Trade Commission, and the NHTSA to fulfill what he saw as the administration's anti-regulation mandate. "We're planning a clean sweep of the top floors of DOE, the Transportation and Labor Departments, EPA, and NHTSA. [...] Every Carter appointee will go. That means automakers will no longer have to deal with the arrogant environmentalists and Naderites."[102]

Stockman's dominance in setting automotive regulatory policy was cemented by the creation of the Office of Information and Regulatory Affairs (OIRA). This agency, made subordinate to Stockman's OMB, was given the power to review any regulation created by an executive branch agency and block those that failed to meet its standards of public benefits outweighing costs imposed on industry.[103] In the persons of David Stockman, Anne Gorsuch at the EPA, and Elizabeth Dole as Transportation Secretary, the auto industry's dominant interpretation of its own problems as resulting from regulation was transformed into the policy agenda of the executive branch.

It is worth highlighting that eliminating government regulation – in line with the cognitive point made earlier – served to address the symptom of competitive disadvantage perceived most directly by auto makers. Deregulation reduced direct costs and made American vehicles more price competitive in the short run, allowing for higher unit profit margins. As a prescription for restoring industry competitiveness, however, it was deeply flawed. Since imported cars were required to meet the exact same safety, emissions, and fuel efficiency standards, the regulations that were being targeted did not create an asymmetric disadvantage for American firms. Conceding this, advocates of

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[102] WAW 12-80, p. 31

[103] WAW 9-88, p. 116

deregulation argued that federal standards, especially fuel efficiency requirements, favored imported cars because Japanese producers had developed fuel-efficient designs for their home market over the course of many years while American firms had to replicate decades of costly design and testing. This more plausible argument was eroded over the course of the 1980's as Japanese auto makers successfully followed American producers into luxury and light truck segments of the market. Though American firms enjoyed first mover advantages in each of these segments, Toyota, Honda, and Nissan demonstrated that the productivity advantages of LP could be applied to types of vehicles with only limited appeal in their home market.[104] Eventually, the American subsidiaries of Honda and Toyota established design bureaus and testing facilities in the United States that considerably reduced the home market advantage enjoyed by American producers.

The regulatory rollback pushed by Reagan appointees was partly successful, but the institutional stalemate between Congress and the executive branch made it more effective at blocking new regulations than in eliminating existing ones. Due to the design of the Clean Air Act and the enabling legislation for the NHTSA, executive appointees had considerable power to modify existing regulations. In attempting to use this power, Reagan appointees encountered resistance from both the non-political employees within the agencies themselves and from Democrats in Congress opposed to weakening environmental and safety standards. The problem of a recalcitrant bureaucracy was encountered by both EPA director Anne Gorsuch and NHTSA chief Raymond Peck. In

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[104] Ironically, the elimination of safety regulations in one area benefited Japanese producers asymmetrically: meeting American bumper impact, rollover, and passive restraint standards imposed costs on Japanese firms that they did not have to meet for their home market (fuel efficiency standards in the U.S. were much less than those demanded by Japanese consumers). For a summary of Japanese regulatory concerns, see WAW 4-81, p. 86

the former case, Gorsuch's attempts to relax enforcement of air quality standards and her hostility toward the basic purpose of the EPA led to a guerrilla war between the director and her own agency. Ironically, this conflict within the EPA led to the failure of the administration's central environmental goal, weakening the Clean Air Act when it came up for renewal in 1981.[105] Mid-level EPA administrators leaked copies of administration plans and their likely effects on air quality to Democrats in Congress at strategic moments in the legislative debate, resulting in a scandal that led to Gorsuch's resignation and benefited Democrats politically by mobilizing even moderate environmentalists against the administration.[106] From 1982, the need to at least maintain a public image of protecting the environment hobbled the administration's plans for deregulation. More importantly for Reagan's broader regulatory program, the incident drew greater attention to questions of implementation by the executive agencies and demonstrated the potential political value to members of Congress and environmental groups of tracking otherwise obscure administrative decisions in this area.[107]

The NHTSA bureaucrats also proved difficult to contain. Though the number of required recalls for safety purposes declined, the threat of terrible publicity if a repressed safety failure were revealed in class action litigation made the agency's political leadership reluctant to block investigations. As with the EPA, mid-level administrators

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[105] The proposed 1981 changes to the Clean Air Act would have saved auto makers an estimated $80-$150 per vehicle (WAW 3-82, p. 28). It is interesting to note The Clean Air Act would remain largely unchanged until the more environmentally friendly Bush administration allowed a substantial revision in 1990.

[106] Some theoretical implications of the Gorsuch scandal for oversight and the operation of regulatory agencies is examined by Claveloux (1983).

[107] See Aberbach (1990) for a theoretical examination of the electoral incentives involved. See also WAW 10-81, p. 31 and WAY 1982, p. 15.

used leaks to the press and Congress to force the hand of NHTSA administrator Peck – a former lobbyist for the coal industry – in certain high-profile cases.[108] This demonstrates an important general point: professional bureaucrats in a regulatory agency are in some cases motivated by ideology or concern for their understanding of the public interest more than career incentives. Though Congress was able to prevent obvious revenge from being taken on the whistleblowers in each case, discovery would permanently damage their career in the executive branch. Over time, it is likely that a dedicated administration can remove these highly motivated bureaucrats and create an agency culture hostile to the recruitment of similar personnel, but this takes considerable time. In this sense, the speed with which Stockman, Gorsuch, and Peck pursued their agenda betrayed their ultimate goals by alerting Congress to their intention through high-profile decisions early in their tenure. As a result of this the executive order requiring new regulations to be reviewed by OIRA was more influential than high-profile attempts to roll back regulation. The rate at which new regulations were formulates slowed dramatically and roadblocks were put in the track of research that suggested that action was needed.[109]

The second main area where the relaxation of federal regulations was expected to help the auto industry was through allowing cooperation and joint ventures between auto makers. This issue had been raised in the 1970's in response to the cost advantage gained by Japanese firms from shared research organized by the Ministry of International Trade and Industry (MITI). The Reagan administration made relaxing anti-trust barriers to such

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[108] WAW 11-84, p. 33

[109] In addition to this, both of these cases suggest that it is easier for administrators to defy Congress when they are not interested in the typical bureaucratic goals of increasing agency budgets or competencies. Indeed, when a political appointee is intent on destroying the functional ability of their agency, the power

cooperation in the U.S. one of the four points in its auto sector program announced in April of 1981.[110] This strategy had been pushed for in the 1970's as a means of pooling resources devoted to basic research and development, reducing the costs for each manufacturer to meet federal fuel efficiency and emissions requirements. The arguments in favor of an anti-trust exemption were given additional weight in Congress based on the staggering losses suffered by the Big 3 and the more than 250,000 unemployed in the depths of the 1979-1982 recession. Under pressure from Republicans on competitiveness issues, Congress passed the National Cooperative Research Act in 1984, exempting a broad range of joint ventures in the auto sector from anti-trust prosecution.[111]

Two factors prevented this willingness to waive anti-trust laws from producing an American cooperative research program in the 1980's. First, the regulatory stalemate already described reduced the urgency of cooperative investment to meet federal guidelines. Simply put, without new regulatory requirements to meet, the Big 3 saw little potential benefits from joint research to balance the likely loss of proprietary engineering information. Similarly, diverging product and process strategies between the General Motors, Ford, and Chrysler reduced the number of common design or research problems they faced. This also reduced the obvious benefits of a joint research program during the 1980's. There remained a number of areas such as lightweight composites, experimental fuels, high-storage batteries, and improved impact resistance where long-term joint

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of Congressional oversight relies largely on criminal action, harassment, or negative publicity that reflects on the administration rather than the formal power of the purse.

[110] Ronald Reagan, April 6, 1981 speech.

[111] This represented a reversal on the question of anti-trust enforcement. As recently as 1974, Congress had considered legislation to break up General Motors as part of Senator Philip Hart's Industrial Reorganization Act.

research could have been pursued, but without the pressure of federal timetables for specific requirements, these research areas were relegated to a gauzy and undefined future. In a way, the success of one of the Reagan administration's de-regulation programs had made another unnecessary.

The increased competitive pressure between the American producers formed the second obstacle to a joint research program by sabotaging the incentives for joint research. Growing import sales were initially concentrated in the compact and sub-compact segments of the market, heightening competitive pressures between the Big 3 in the remaining market segments.[112] As competition between American firms heightened in a narrower range of the market, research came to be seen as a potential competitive strength rather than a common cost. General Motors, roughly five times larger than Chrysler, considered its ability to invest more in research than its smaller domestic competitors to be a powerful advantage. This combined with the increasing internationalization of production and design to create incentives for American firms to form joint ventures with foreign rather than domestic partners. Specifically, the rapidly expanding use of European and Japanese suppliers, joint management of pilot factories in the United States, cross ownership agreements that included technology transfer programs, and re-importation agreements under which American firms used their dealer networks to market imported cars gave domestic firms a stronger competitive interest in cooperation with non-American firms than in a national joint venture. This unintended

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[112] One of the remarkable elements of Japanese market penetration during the early 1980's was the brand loyalty displayed by consumers toward Japanese cars, especially Honda and Toyota. Of the American car buyers who purchased one of these brands, only roughly 10% purchased their next car from an American manufacturer. This produced the problem of "conquest sales" for the Big 3 and, lacking models that were fully competitive with imports, increased competition between domestic firms, occasionally even between

consequence of the Reagan administration's loose enforcement of anti-trust regulations enabled certain commercial strategies that would otherwise have been impossible.

With the exception of the purchase of American Motors by Chrysler,[113] the willingness of government regulators to waive anti-trust laws for auto makers was used primarily to facilitate these international joint ventures rather than to reduce duplication of research and design costs among domestic firms. Despite the decision by government lawyers at the FTC and Justice Departments not to question the legality of international joint ventures, the American legal system allowed challenges to emerge from within the industry itself. In another alliance with consumer activists, Chrysler in 1983 led public opposition to a joint venture between General Motors and Toyota to produce sub-compact cars in the U.S. Chrysler, having introduced two lines of cars in this segment, was attempting to use anti-trust regulations as a barrier to entry.[114] Though unsuccessful in preventing the joint program, Chrysler's combined strategy of lobbying and litigation should be seen as an example of the importance of venue selection and the application of political influence in areas where success is most likely. Under divided government, selection of lobbying venues became even more important, as policies that lacked coordination within one political party could be promoted or blocked more easily in a variety of forum. With the complexity of the American federal system exacerbated by a

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divisions of the same firm. For a general review of this phenomenon and the problems it posed for American producers, in the early 1980's, see Yates (1984) Ch. 3

[113] As will be detailed below, this acquisition was largely motivated by Chrysler's desire to establish themselves in the emerging Sport Utility Vehicle (SUV) market by gaining control of the Jeep name and trademark.

[114] WAW 11-83, pp. 58-59 and WAW 1-84, p. 33

partisan split, the separation of law making from implementation opened up gaps that corporate lobbyists were able to exploit through the courts.[115]

Lacking industry support for an entirely private joint venture, Congressional proposals for a government directed consortium became the only basis for public debate. Though the Reagan administration opposed these plans and Republicans campaigned against them through the 1980's, they were revived by the Bush administration as means of dealing with the effects of the1990-1992 recession.[116] Building on the 1984 National Cooperative Research Act, Bush produced bi-partisan legislation that created the United States Council for Automotive Research (later re-organized into the Motor Vehicle Manufacturer's Association or MVMA). This program consolidated several minor joint ventures in composites, battery technology, alternative fuels, vehicle recycling, and other long-range projects into one group and made available technology developed for military applications during the Cold War.[117]

The USCAR/MVMA program did not win stronger support in the auto industry for his 1992 campaign, but the same factors that had estranged Bush from the industry

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[115] One of the most prominent examples of this was a lawsuit against the NHTSA conducted by General Motors in 1984. This incident involved mid-level NHTSA appointees supported by Democrats in Congress undermining the power of their department's politically appointed head by attempting to force a safety recall of thousands of General Motors X-body vehicles. General Motors countered this move through a lawsuit against the recall filed in such a way as to appear before a Reagan-appointed judge, who upheld the lawsuit and admonished the NHTSA lawyers, weakening their ability to pursue safety violations in the future. See WAW 5-84, p. 21 and WAW 11-84, p. 33

[116] For a summary of the debate in the auto sector, see WAW 1-84, pp. 35-47. A useful review of the issues at the presidential level in the 1984 campaign can be found in WAW 9-84, p. 41.

[117] Even aside from this umbrella group, the weakening of anti-trust enforcement against domestic joint ventures encouraged a small number of private joint projects in manufacturing during the 1990-1992 recession (see WAY 1990, p. 16, see also WAW 7-91, pp. 34-36). This is interesting as another demonstration of the importance of the implementation gap that between the intentions of Congress in writing a law and the application of that law by the executive, in this case allowing the Bush administration to facilitate adjustment during an economic downturn.

contributed to the program's eventual success. Based on evidence of a backlash against Republicans among moderate voters bothered by the various environmental scandals of the Reagan administration, Bush had run in 1988 as a supporter of strengthening the Clean Air Act and closing loopholes that allowed corporate polluters to avoid paying for the cleanup of toxic waste sites. His push to follow up on these campaign pledges in 1989 and 1990 infuriated auto makers, but served to create new standards that they would have to meet. This overcame one of the key barriers to cooperation within the industry by giving auto makers common technical problems requiring research that would be wasteful to duplicate. This reversed the dynamic of the Reagan administration's deregulation program and fostered cooperative programs that had been unnecessary in the 1980's.[118]

The success of the Bush administration in breaking the Congressional deadlock that had defined auto and environmental regulation in the Reagan years was significant not only because it produced new legislation, but also because it served notice to auto makers that the regulatory holiday of the 1980's could not be continued indefinitely. Environmental problems that had been building up through the decade put regulation back on the agenda of mass politics, and even a business-friendly administration could not ignore them. The moderation of the Bush administration, the push for higher fuel efficiency standards following the oil price spike during the Gulf War, and a generational change in management at the Big 3 made the industry more receptive to cooperation with government by the time the Clinton administration entered in 1993. Indeed, the Big 3 were among the earliest and strongest supporters of the Clinton health care plan based on

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[118] These requirements included passive restraints, improved side impact standards, a phase out of CFC's

the crippling costs of the retirement and insurance programs extracted from them during the UAW's period of strength in the 1960's and 1970's.[119]

These issues aside, the auto sector's most important regulatory conflict during this period was tied to the product strategies of American firms. As will be discussed in the next section, one of the key strategies pursued by American manufacturers to evade the productivity advantage of LP involved creating and moving into market segments where the Japanese did not compete or suffered a product-related disadvantage. One of the elements of this strategy involved selling large vehicles that the Japanese – because of the character of their home market – had initial difficulty in designing and producing. Potentially standing in the way of this strategy, however, were federal fuel economy (CAFE) standards. For practical purposes, this meant that for each large car sold by the Big 3 that failed to meet the CAFE standard, a small car with considerably better fuel economy than the average had to be sold to balance it. The CAFE standards chained American producers to the small car market even though their products were inferior and their costs much higher, suffering losses in these divisions even during the period when they were protected by the VRA.[120]

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used in manufacturing processes, and more stringent tailpipe emissions controls (WAY 1992, p. 33)

[119] Though it is beyond the scope of this project, it is interesting to consider that the anti-government movement led by Congressional Republicans in 1994 had little support among the auto makers that had consciously tied themselves to the anti-tax revolt in the late 1970's. The role played by health care and pensions costs in the two later financial crises at General Motors in 1992 and 2005 suggest that this shift away from the anti-government stance of the 1970's was not entirely the result of a generational or ideological shift on the part of management, but had a powerful element of rational calculation of the costs of UAW pension and health care agreements as well.

[120] The primary solution to this regulatory problem involved evading the CAFE regulations by exploiting a loophole that allowed light trucks to meet different standards and not be counted as part of the car average. Led by Chrysler, this explains the rise of passenger pick-up trucks, Sport Utility Vehicles, and mini-vans. This strategy is discussed in section 3.6 below.

As oil prices remained low through the 1980's and American firms were proven completely unable to compete with Japanese producers in the compact car market, the pressure to focus on larger cars became overwhelming. General Motors and Ford, in tacit cooperation with Transportation Secretary Elizabeth Dole, began a campaign to roll back and ultimately eliminate CAFE standards, arguing that they had been imposed as a temporary measure to deal with a fuel crisis that was now over. The first step in this plan involved a request that CAFE standards be loosened between 1986 and 1989, raising them from the planned 27.5 miles per gallon to 26. This set the stage for a conflict between the political parties in which threats by Ford and General Motors to close factories that employed more than 75,000 workers split the Democratic coalition.[121] The counter-intuitive element of the fight against reduced fuel economy, however, was the position taken by Chrysler. Opposing Ford and General Motors, Chrysler organized lobbying in cooperation with environmental and consumer groups to maintain the 27.5 mpg standard. This was motivated by the fact that Chrysler had developed a product strategy specifically to avoid the fuel economy trap.[122] This product strategy had been made possible by the federal bailout in 1980, which had provided capital needed to accelerate product design of both an economy car that exceeded CAFE requirements and the first mini-van, which was not covered by them. Though the immediate goal of temporarily rolling back CAFE standards succeeded, the lack of unity among auto makers weakened the broader lobbying effort and fuel economy standards survived.

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[121] The critical Senate vote in July of 1985 upheld the administration's decision by a vote or 52-39. See WAW 9-85, p. 31. For a summary of the conflict, see WAY 1986, p. 21

[122] WAW 8-85, p. 63 and WAY 1986, p. 21

The stalemate over CAFE standards for passenger vehicles continued through this period. Though the original enabling legislation had called for incremental increases in the required average through the 1980's, the successful block of the 1986 increase signaled the end of this escalation. While the planned 1986 level of 27.5 mpg was finally implemented in 1990, a combination of low oil prices and the flat-out threats of plant closures by Ford and General Motors succeeded in blocking periodic attempts to continue the original plan of ratcheting the standards up. Two events seemed to open the possibility of CAFE increases in the early 1990's: the Gulf War and the election of William Clinton. In the former case, bi-partisan proposals to set higher CAFE standards faded as a result of the sudden drop in oil prices in 1991 and concern over job losses during the recession. With the election of Clinton in 1992 – strongly supported by environmentalists and facing a Congress controlled by his own party – the obstacles to CAFE increases seemed to have disappeared entirely. Clinton, however, prioritized health care reform over environmental legislation and attempted to build support in industry for his plan. Fuel economy standards were only one of the areas where a desire to gain business support prevented regulation from being passed. By the time the health care plan had failed, the anti-regulation agenda of the Congressional Republicans ahead of the 1994 election had come to dominate debate and CAFE standards were no longer part of the agenda.

While Reagan's program of regulatory relief reduced the costs facing American producers, it dealt with only one aspect of the political demands generated by LP. As has been emphasized above, it is important to understand that the responses to LP were always conditioned by how the problem was seen. Political actors did not undertake

programs to deal with the $1,500 cost advantage enjoyed by Japanese producers because this cost advantage was not the focus of lobbying undertaken by actors in the industry. Instead the Reagan administration perceived the problem primarily in terms of a financial crisis facing auto makers, [123] while Democrats in Congress, perceived the problem primarily as a crisis of employment and a threat to union jobs.

While it was the former definition of the problem that justified deregulation, it was the latter that motivated import quotas. Pressure for protection against Japanese imports began to build in the late 1970's based on questions of unequal access to the Japanese market and charges of "dumping" by Japanese firms. These technical concerns, pushed by niche producers in the U.S. and labor groups displaced by specific factory closings, failed to overcome the postwar American commitment to free trade in either the executive or legislative branches. It was only after the oil crisis and the onset of recession in 1979 that a strong protectionist lobby formed within the auto sector. Imported passenger car sales jumped from roughly 17.8% of the market in 1978 to 22.6% in 1979 and 28.2% in 1980.[124] In combination with the recession, this materially hurt both the major auto producers and labor. In 1980, nearly 250,000 workers had been laid off in the auto industry. Indirect unemployment added at least another 100,000 to this

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[123] It would be incorrect to claim that the Republican Party was indifferent to massive job losses in the upper Midwestern states. The frame that they applied to the problem, however, suggested that corporate profitability was causally prior to job losses. This allowed them to present deregulation and other measures that improved the financial situation of domestic firms as "jobs programs" that addressed unemployment. Since both the character of their electoral coalition and the anti-regulation ideology of the Reagan Republicans reinforced this frame, I will not attempt to disentangle or prioritize these two factors in motivating Republican policy proposals.

[124] Department of Commerce estimates reported by Standard and Poor's Industry Surveys 1984, p. A154. Exact figures depend on the classification of re-imported vehicles from American producers, vehicles partly assembled in the U.S., inclusion of some categories of light trucks, and the status of vehicles produced in Canada by American firms. Though this market share estimate includes all imports, the Japanese share of these was over 80% and consistently climbing during this period (Ibid. p. A148)

total, though estimates are very sensitive to job classifications.[125] Though the auto sector is highly cyclical and the drop in total sales resulting from the recession rather than displacement by imports was correctly blamed for much of the employment effect, the dramatic increase in market penetration by Japanese imports made trade protection an inevitable part of the political response.

Though auto makers dominated most elements of the political response to lean production, labor dominated the coalition pushing for import restraints. In lobbying for protection, the UAW leadership was not primarily attempting to protect aggregate domestic employment in the auto sector. In a classic insider/outsider divergence of interests, their goal was to protect very high paying union jobs concentrated in final vehicle assembly plants.[126] During the long postwar boom, the American auto industry was a comfortable oligopoly in which General Motors, Ford, and Chrysler all faced the same wage scale imposed during negotiations with the UAW. Given common labor costs, each firm could pass on increases in wage rates or benefits to consumers by price increases without fear of being undercut and losing market share. Lacking a strong incentive for wage moderation, this created a labor force that was among the highest paid in the industrialized world. With the advent of more serious Japanese competition in 1979, the UAW was placed in the position of attempting to preserve levels of wages and benefits that – given their relative productivity – priced them out of international competition. The most direct solution for labor involved preserving the oligopoly that

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[125] See WAY 1982, p. 9; WAR May 19, 1980, p. 156. Auto sector unemployment during this recession would peak in 1982, but the prospect of Chrysler's collapse (see above) and the job losses that this might involve (see WAW 10-79, p. 27) made the employment situation in 1980 seem more dire.

[126] Union membership was concentrated in the Big 3 and their wholly owned suppliers. Attempts to unionize extremely diverse upstream suppliers had not historically been successful.

allowed high wage levels to be maintained, holding their position as monopoly suppliers of labor to all car makers selling in the American market.

In contrast with the UAW, the major auto makers had a variety of possible responses to Japanese competition that did not require protection. Though preservation of oligopoly profits made import protection appealing, three factors made producers ambivalent about tariffs or direct import restrictions. First, American auto makers were multi-national corporations that viewed international joint ventures, overseas assembly, imported components, and re-importation of their own foreign-made vehicles as potential responses to Japanese competition. This meant that any protectionist legislation would have to be carefully crafted to preserve their own freedom to choose production and sales strategies. With Congress – and the Presidency in 1979 and 1980 – dominated by the Democratic Party, any form of import protection was seen as unlikely to take these concerns into account.[127] Second, competitive pressure provided auto makers with a powerful tool with which to extract concessions from the UAW. Any move that protected UAW jobs by reducing competition would reduce their leverage on issues such as job flexibility, wages, and benefits. As in questions of cooperation with government on regulation and industrial policy, it is likely that the cognitive frame built up over previous decades caused the Big 3 to define their interests narrowly, with the prospect of weakening the UAW weighted more heavily than an objective estimate might justify. Third, auto makers had internalized their conflict with the Federal government and formulated their problems largely in terms of reducing costs. By joining the Reagan

[127] The aspect of proposed legislation that was most feared as limiting the production decisions of auto makers involved domestic content requirements. By setting a percentage of the value of each car sold in the U.S. that had to be produced in the U.S., strategies involving international outsourcing or re-importation would be limited.

coalition and subscribing to its anti-government interpretation of their problems, auto makers had made it both intellectually and politically difficult to formulate demands that did not fit with this ideological framework.

This resulted in a division among auto makers over import protection. While the president of General Motors testified against protectionist legislation and Chrysler executives voiced approval in principle while undertaking little active lobbying, only Ford joined with the UAW in sponsoring the first serious attempt at restricting trade – a petition to the International Trade Commission (ITC) in 1980.[128] In addition to the lack of coordination among producers, the alliance between Congressional Democrats and the UAW gave labor the power to dictate the terms of the debate based on the same partisan and institutional division that drove policy in other areas. The refusal of the ITC to authorize the President to impose auto tariffs in November of 1980 meant that any formal restriction of imports would have to come from Congress, where a Democratic majority meant that they would be strongly influenced by the UAW.[129]

With the inauguration of Ronald Reagan in 1981, the same partisan and institutional factors that produced deadlock in other policy areas came into play on trade as well. Divisions among the Big 3 combined with increasing general support for some form of protectionism to create divisions within the Reagan administration that did not exist in areas of regulation or industrial policy. As the recession deepened in 1981, the likelihood of Democrats in Congress using American job losses as an election issue

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[128] For a more detailed review of the positions taken by American manufacturers, see WAY 1981, p. 24

[129] It is worth noting that the split between President Carter and the UAW early in 1980 played much the same role as the partisan division after 1981, pushing the UAW to focus their attention on Congress rather than the executive even before the ITC rejected the Ford/UAW petition. See WAR 3-24-80, pp. 91-92

combined with continuing financial losses among auto makers to press the administration toward protectionism. The incentives created by the institutional division of powers combined with the goals of Reagan's supporters among auto makers to create overwhelming pressure for some kind of trade restriction. If the administration took no action, Reagan would be faced with a trade bill that might be written in such a way as to limit auto makers' strategic choices or touch off a trade war. Given the popularity of such a bill, it would be politically dangerous to veto it or to provide a victory to Democrats by signing it.

The Reagan administration's solution, as with regulation, was to use the informal powers of the executive to achieve what would normally be a legislative goal. In this case, the objective was to offer just enough of a limitation on imports to mute demands by both management and labor for legislated protection. The tool used to accomplish this was an agreement with the Japanese government to unilaterally impose restrictions on auto exports. Under this Voluntary Restraint Agreement (VRA), Japan's Ministry of International Trade and Industry would restrict the total number of cars exported to the United States to 1.68 million for two years with an incremental increase in the third. Since this was theoretically a decision taken and enforced by the Japanese government, no legislation was required from Congress. For the Japanese, agreeing to this limit was a good policy for many of the same reasons that caused Reagan to propose it. Specifically, it was obvious to Japanese lobbyists in Washington by 1981 that public sentiment strongly supported protectionism and that any tariff or quota bill emerging from a Democratic Congress would impose more painful restrictions and conditions than the

proposal being offered by Reagan.[130] In addition, the informal agreement could be extended, modified, or discarded at any time by the choice of the Japanese government – a degree of flexibility that major protectionist legislation would not allow.

Though its immediate political advantage for the Reagan administration are clear, the political effectiveness – even brilliance – of this solution is only obvious when one examines its appeal to both auto makers and the UAW. The Big 3 immediately gained the ability to raise prices and restore profitability - after two years of losses, net industry profits were positive in 1982 despite the ongoing recession and continuing declines in overall sales.[131] From the perspective of management, this restored levels of working capital required for investment in new products and the capital improvements that were believed to be necessary to increase productivity. Because the agreement was negotiated during a recession and established a numerical target rather than a fraction of market share, any upturn in the economy and consequent increase in demand would exclusively benefit American producers. Being set to expire after three years, it also did little to erode the ability of management to extract concessions from the UAW as plants were closed and unemployment increased even after industry profits returned. Equally important from the point of view of management, the agreement accomplished this

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[130] Specifically, the Danforth-Bentsen bill offered the administration a "bad cop" in their negotiations with the Japanese, presenting in very graphic terms what the alternatives would be to an informal and voluntary restriction. See Dyer, Salter, and Webber (1987), pp. 224-225.

[131] Combined net income for GM, Ford, Chrysler, and AMC went from a loss of $1.34 billion in 1981 to a narrow profit of $321.8 million in 1982 (see *Standard and Poor's Industry Reports* Vol. 150, No. 14, Sec. 1, p. A181 and WAY 1984, p. 177) *despite* a net decline in car and truck sales of over 200,000 units. It is interesting to note that profits at GM and Chrysler drove this increase while Ford (which had lobbied for protectionism) continued into its third year of losses (see WAY 1983, p. 11, 171)

without imposing any restrictions on their own ability to re-import small vehicles or engage in international outsourcing of vehicle components.[132]

From the perspective of labor, the VRA represented the possibility of expanding union jobs and restoring the balance of power that existed between the UAW and the Big 3 prior to 1979. The stated goal of labor in supporting the VRA was to force Japanese firms to open factories in the U.S. and employ American workers.[133] If Japanese firms could be forced to locate production in the United States in unionized factories, it would be possible to re-establish the UAW's ability to impose a commonhigh wage on all producers selling in the American market. UAW President Owen Bieber called for government action that would allow "Fair and reasonable competition on American soil with American workers doing the full range of jobs."[134] If these jobs were located in the U.S. and could be unionized, the immense pressures imposed on the UAW by competition could be reduced and plummeting union membership – which dropped by more than 200,000 between 1979 and 1981 – could be restored. Though auto producers did not expect this to occur and hoped to use foreign competition to break the UAW, import restrictions that minimally affected their own international strategies and might impose higher American labor costs on their competitors were difficult to oppose.

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[132] The only significant exception was the General Motors plan to import Isuzu compact cars produced in Japan to be sold under the GM nameplate, a program that explains much of their opposition to the VRA.

[133] This argument was used in public statements by the UAW through the early 1980's. This strategy motivated the explicit threats of pushing trade restrictions or domestic content laws that were made by UAW President Fraser as early as 1980. See WAW 3-80, p. 9.

[134] See WAW 12-86, p. 35. It is clear that this was seen as a way of expanding UAW membership and revitalizing the union in the wake of the losses of membership and political setbacks it suffered during the 1979-1982 recession.

This plan to restore union power severely over-estimated the ability of the UAW to unionize Japanese factories in the U.S. It also assumed that the union would be much stronger both in organizing upstream suppliers and in pushing domestic content legislation than it proved to be. In the former case, the UAW could neither prevent the "hollowing out" of auto assembly as the assemblers tried to save money by outsourcing to lower wage, non-union suppliers; nor could they successfully unionize these diverse upstream suppliers and eliminate the cost incentive of outsourcing. In the latter, unions' attempts to push domestic content laws that would prevent auto makers from internationalizing both production and purchasing failed in the face of consistent opposition by Congressional Republicans attempting to save the administration from a politically damaging veto. As with new safety and environmental regulation, institutional stalemate favored the auto producers over their opponents.

The pattern established by the VRA in 1981 held for over a decade, as Japan extended the three year VRA in 1984 (though raising the voluntary quota to 2.3 million vehicles per year) and annually through the early 1990's.[135] Though the threat of formal restrictions remained, attempts to pass domestic content legislation failed in 1982, 1983, 1985, and 1986, while attempts to impose market share quotas failed in 1990.[136] In this sense, the VRA accomplished its political goal of weakening protectionist sentiment

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[135] The yearly extension of the VRA became primarily a symbolic concession to help the Reagan and Bush administrations contain protectionist sentiment; for example, the concessions made by MITI and Japanese auto makers ahead of the 1986 mid-term elections demonstrate that they fully understood the positions of the two parties on trade issues and wanted to support Republicans (see WAW 10-86, p. 59). By the late 1980's, Japanese production in the United States and gradual increases in the VRA itself had made the quota as meaningless as the numbers in nuclear arms control treaties – more targets that served a public relations function than real restrictions.

[136] In general, these bills passed the House but were blocked by Republicans in the Senate through low visibility procedural maneuvers. For an example, see WAY 1988, pp. 28-29

despite record trade deficits and massive economic dislocation in politically influential industries. A large part of this political success resulted from the fact that the VRA achieved its ostensible goal of forcing Japanese producers to build assembly plants in the U.S. The first transplant assembler was opened by Honda in Ohio in 1982. Others followed through the 1980's until production by these facilities constituted roughly 15% of domestic sales. In addition, Japanese component suppliers partly financed by their *Keiretsu* partners built production facilities in the U.S. Though these facilities began as exclusive suppliers for transplants, they were an important resource for the purchasing strategies of American firms.

The growth of transplants created constituencies that made attempts to pass formal protectionism in Congress more difficult. As American firms purchased more of their components from foreign suppliers – some located in the U.S. and others producing in lower cost foreign environments – the definition of an imported as opposed to a domestic car became blurred.[137] Domestic content legislation pushed in response to the 1990-1992 recession broke down on disagreements among manufacturers over what percentage of value would have to be produced domestically and how these totals would be computed. The traditional American solution to legislative complexity – granting the executive wide discretion in applying an ambiguously worded law – was made less acceptable by the partisan split between the executive and legislative branches. Based on the Reagan administration's record in administering environmental and safety regulation, many Congressional Democrats were unwilling to rely on the discretion of Republican appointees and grant them the power to apply a general domestic content law.

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[137] For a summary of sourcing and domestic/international content, see WAY 1992, p. 19

Despite the signal success of the VRA and the threat of domestic content legislation in drawing Japanese investment to the United States, its effects – both direct and indirect – further undermined the UAW and weakened the power of labor in the auto sector. As the next section will show, economic pressure on American firms resulted in the loss of union jobs throughout the 1979-1993 period. For a variety of reasons, the large numbers of new jobs that were created by Japanese assemblers were seldom unionized. Out of ten Japanese assembly plants opened in this period, only four were successfully unionized, and three of those four cases were joint ventures between Japanese and American companies that restricted the range of anti-union measures usable by management.[138] Even at these unionized plants, contracts did not represent an industry standard for wages or benefits. Under continual threat of plant closures, the UAW was reduced to bargaining over weak employment guarantees, compensation for laid-off workers, and the limits of cooperative schemes to try to enhance productivity.

By the late 1980's, it was obvious that the UAW's gamble in supporting the VRA and lobbying heavily for Japanese investment in the U.S. had failed. While transplant assemblers eroded union representation at the final assembly stage of production and further weakened the UAW's policy of setting industry standards for wages and benefits, the influx of investment by Japanese suppliers fostered outsourcing among American firms by increasing competition among suppliers that substantially lowered costs.[139]

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[138] See Singleton (1992), p. 23. Since Chrysler, Ford, and General Motors had to deal with the UAW at their other domestic plants, blatant anti-union measures at their joint ventures could be punished by strikes affecting other facilities. The independent Japanese transplants faced no such threat and employed a broad range of strategies to prevent the UAW from organizing their workers. These strategies and their importance will be discussed below.

[139] Roughly 170 Japanese suppliers built manufacturing facilities in the U.S. during this period, while many others opened sales offices to sell imported components (See WAW 7-89, p. 63 and Martin, Mitchell, and

Though the trend toward vertical de-integration as a means of cost reduction began before the Japanese suppliers arrived, their effect on the UAW's attempts to both unionize suppliers and gain some union control over outsourcing decisions was critical. It would not be possible to re-establish the bargaining environment of the 1970's, and the task of the UAW became one of managing decline. The most important issues the union faced in the early 1990's reflected a defensive orientation and a focus on the interests of an aging, diminishing membership.[140]

Overall, political responses to LP in the auto sector suggest four conclusions that are theoretically significant. First, the case makes clear that a rent-seeking model of industry lobbying is flatly inadequate even when the goals being sought are not explained by the need to facilitate the use of a new technology by creating or modifying governance mechanisms. Though many of the policies that auto makers relied upon can be thought of as rent seeking that is broadly compatible with the Stigler-Peltzman models, they were implemented through indirect forms of regulation that had to be defended on ideological and public policy grounds. The Chrysler bailout, for example, was a transfer of assets that superficially fits the rent-seeking model, but the importance of other factors in determining whether and how it would be implemented force an honest observer to recognize that this model is inadequate. The conditions imposed in the final

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Swaminathan, pp. 600-601). From an initial stance of primarily supplying a Japanese affiliate to which it had pre-existing links, most of these firms began to bid for contracts from American assemblers. For a brief analysis of the scope of these sales and the cost advantages enjoyed by transplant suppliers, see WAW 7-88, pp. 45-47 and WAY 1987, p. 39.

[140] The UAW's focus on health care, income protection for laid off workers, and job security are emphasized in interviews with Owen Bieber in WAW 12-89, pp. 69-72 and 12-90, pp. 55-59. In explaining the union's decline, he cites outsourcing, transplants, and a decline in the overall employment in the auto sector. A revolt by younger and more radical members against what were seen as policies of accommodation and drift in failed in 1989, and policies that catered to the aging and risk-averse core members of the union continued to dominate its overall strategy.

CLGB, the ideological arguments used to justify it, the explicit use of the German model as a basis for its oversight and semi-corporatist structures, and the cooperative manner in which the bailout was implemented can not be understood without considering the broader debate over the resource governance needs of LP and debates about how industry should be organized. Even in this instance where the policy most clearly involved creating or apportioning funds, concerns over how production would be organized had a real and important affect on policy and firm strategies.

Similarly, the lobbying strategies of American producers were based on how their competitive problems were interpreted and the kinds of partisan alliances they had made. This highlights the second lesson offered by the auto industry's political strategies: both ideas and partisan alliances constrain political action almost as strongly as does the institutional environment. The strategies pursued by the Big 3 and the Reagan administration demonstrate the importance of ideology and interpretive frameworks in determining what demands are made on government and what policy tools are considered appropriate to address them. When faced with a complex economic reality, both politicians and economic actors must define and interpret the problem before deciding what their self interest is and by what policies it would best be served. For example, the bipartisan but strongly business-oriented measures to allow joint ventures, share research and development costs, and set industry standards that the Bush administration championed during the 1990-1992 recession could easily have been pushed a decade earlier in Reagan's first term when the auto sector faced similar financial pressures. Aside from the weakening of labor and greater internationalization, the short-term circumstances during these two economic downturns were remarkably similar. But, like

the choice of political venue, the choice of political allies constrains the policies that can be advocated or even considered, often at the stage Lukes (1974) calls the "mobilization of bias."

Attitudes toward government more generally in the Reagan era and the role of free-market ideology strongly support this. The ironbound opposition to direct government involvement in the auto sector can only be explained by examining the anti-tax and anti-government ideology from which the Reagan campaign emerged and the decision of auto makers in the late 1970's to embrace it. The regulatory history of the 1960's and 1970's explains much of the attitude that auto makers brought to these questions of government coordination and industrial policy. Long exposure to an adversarial political environment and vilification by grassroots activists had accustomed auto executives to despise government involvement in an undifferentiated way, leading them to interpret the crisis of 1979-1982 in terms of government hindrance. The case of Chrysler after the 1980 bailout supports this; though the company was by far the least hostile to regulation and government coordination, its executives proved willing to forego the benefit of badly needed subsidized investment capital in order to eliminate even the comparatively undemanding oversight of the CLGB. In a more general example, the opposition to regulation even when it could be used as a form of non-tariff barrier against Japanese competition was not a rational, profit-maximizing choice. It was based on both the historical experience of the auto industry with "Naderite" regulators and the specific political alliance they had made with the rising anti-government movement in 1978-1979. The rhetoric used by auto executives had created the political reality in which they

operated, and the boundaries of that political reality had a real effect on their political strategies.

The decisions made by the Reagan administration are even more difficult to explain without examining their political and economic ideology. Though Stockman's approach to regulation provides the most striking example, the VRA offers an unambiguous case in which the administration's faith in markets to secure desirable outcomes without government interference shaped policy decisions. From the point of view of the Reagan administration, its purpose was to provide an infusion of capital to the Big 3 that would allow them to make the investments required to restore international competitiveness. The goal of restoring a strategically important industry, they felt, could be accomplished without government involvement if the American firms were simply free to choose their own strategies and given relief from the immediate financial crisis. When executives at Ford and General Motors increased retail prices of their cars and awarded themselves large bonuses immediately after negotiating concessions from the UAW, administration officials at both the Department of Commerce and the Stockman's Office of Management and Budget were furious. When arranging the VRA, "industry never came in and talked about price or profits. They never offered to strike a deal. But [the special trade representative] thought he had an agreement that they wouldn't kill the golden goose during the restraints."[141] This incident of profit taking was critical in the administration's decision not to request that the VRA be extended after 1985. To honestly expect no short-term profit maximization from the Big 3 suggests that it was

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[141] Interview with Stuart Keitz, Reagan administration Director of Automotive Affairs in the Department of Commerce in Dyer, Salter, and Webber, p. 225

neither obedience to the political demands of management nor a rational understanding of economic incentives that drove administration policy, but a kind of faith.

Third, the auto industry case emphasizes the linkage between firm strategies and regulation. While the CLGB demonstrated that production strategies are bound up with both the positive and negative effects of regulation in ways consistent with my argument, the product, organizational, and technological strategies of the American producers were all linked to safety, environmental, and CAFE regulations. Once auto makers had accepted that implementing LP in the American environment was impossible through either organizational changes or the political creation of more appropriate governance mechanisms, the details of regulation and policy choices became critical to determining both what alternatives existed to adopting a technology and how the costs and benefits of adjustment would be distributed. In this case, the exact character of both the Voluntary Restraint Agreement and the CAFE standards (discussed below) shaped the strategies employed by firms to deal with the effects of LP. General Motors' decision to oppose the initial VRA was a manifestation of this, as was Chrysler's stance *in favor* of tighter CAFE standards in 1985. In both cases, the firms were pursuing strategies that depended on a specific regulatory environment for their success. In the first case, General Motors was arranging joint projects with Japanese firms to re-import their products from Japan under GM brand names – a plan that would be restricted by the VRA. In the latter case, Chrysler's status as a first mover into mini-vans and out of large sedans had left their fleet average fuel economy lower than their competitors as an artifact of the particular way CAFE standards were calculated. Advocating tightened efficiency standards therefore became part of a competitive strategy to impose higher costs on Ford and GM.

An examination of the decline of the United Auto Worker's union illustrates the same linkage between strategy and regulation in another context. Based on the investment requirements of LP and the weak institutional mechanisms supporting labor in the U.S., the UAW was almost certain to become weaker relative to management as cost pressures increased and management's threat of exit grew more credible. The institutions of American capitalism, specifically a fluid and unregulated labor market, federalism, weak legal protection of workers' rights, and a lack of any formal role for labor consultation meant that the UAW was playing against a deck stacked strongly in favor of management. Despite this, specific policies were critical in determining what strategies labor would adopt to deal with the worsening environment during this period. The decision to support Japanese investment and attempt to unionize these new plants led to their decision to lobby for other specific policies – domestic content requirements – that would increase labor demand among transplants and suppliers and offer better prospects for unionization. Ironically, these policies eroded the union even as they had the intended broader effect of retaining a larger automotive labor force than analysts had expected in the early 1980's.

Finally, adaptation in the auto sector demonstrates importance of institutional divisions and political venues in determining policy outcomes. The partisan divide between the President and Congress that existed through most of this period created situations where each branch was forced to rely on its own policy tools to push the agendas of their constituents. In the American context, the relative weakness of Congress and the scope of executive discretion is striking, as is the character of the guerrilla war between Congress and executive appointees. The power of formal institutions to

structure political conflict should not be surprising, but the unusual alignment of partisan, constituent, and institutional divisions into a single fault line makes this a useful test case for examining its most extreme outcomes in regulation and industrial policy.

Labor again offers an illustration of this, emphasizing the degree to which the executive can create incentives for actors in the private economy. Using the discretion given them under the Chrysler Loan Guarantee Act, the Carter administration's negotiators arranged a situation that allowed the UAW to extract unprecedented concessions from the management of Chrysler as part of the 1980 bail-out package. These concessions included profit-sharing, a labor contract that formalized channels of consultation with management, and the appointment of UAW President Fraser to the Chrysler board of directors. This weak form of non-institutionalized corporatism could not capture all of the incentive effects enjoyed by Germany (explicitly taken as the model for the agreement), but it did provide labor with a stronger bargaining position that was used to prevent plant closures and pressure management to acquire a larger portion components from unionized sources.[142] Contrasting this with the decisions of the National Labor Relations Board (NLRB) under Reagan's appointees demonstrates that control of the executive branch grants enormous latitude in helping or hurting specific groups in the economy. The hostility of the NLRB was cited repeatedly by UAW president Owen Bieber in explaining the failure of the union to organize transplants and suppliers more successfully.[143]

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[142] WAW 7-89, p. 103

[143] See interviews with Owen Bieber in WAW 12-89, pp. 69-72 and WAW 12-90, pp. 55-59

3.6 Firm Strategies: Failure and Innovation

This section will examine three aspects of how firms responded organizationally to LP. First and most basically, it will show that the American institutional environment did not offer the forms of resource governance required to fully adopt LP. The fact that American assembly firms were largely unable to capture the benefits of LP even after 15 years supports my claim that both national and sector-specific resource governance mechanisms determine whether and how a new technology will be adopted. The importance of this failure despite repeated, costly attempts by auto makers to implement the production process should be emphasized: if neither the exact resource governance mechanisms needed by a technology nor usable substitutes can be created in a given environment, that technology simply can not be used.

Second, the ways in which each manufacturer changed their production organization to respond to the increased competitive pressure created by LP also reflected the incentives created by American institutions. Given the generic governance mechanisms that *were* available in the United States, reorganizations and process innovations that relied on markets to mobilize resources offered more flexibility (i.e. they can be pursued with the support of a deeper and more developed institutional infrastructure) and better prospects of success than those that relied on non-market coordination. The weakening of the UAW, internationalization of both purchasing and assembly, and the development of network technologies to reduce transaction costs in arms length supplier relations were all strategies that were optimized for an institutional environment dominated by market types of resource governance

This point is important both because it shows that firm adaptation strategies will be shaped by the opportunities and constraints of the local environment and because it

allows my argument to be extended. The importance of available governance mechanisms in shaping the organizational and technological innovations developed by the Big 3 to deal with lean production suggests that the logic of my argument can be run in reverse as well. Taking technology and its resource governance requirements as fixed, I argue that firms will attempt to use political action to create governance mechanisms that can be used with the new technology. In this case, the failure of attempts to find substitutes for the institutional infrastructure of lean production demonstrated by the Chrysler bailout's showed that this could not be done. Instead, auto makers faced with relatively fixed governance mechanisms attempted to innovate their way out of the technological trap lean production created by developing new technologies.

Manufacturing technology in the auto sector offers an unusually clear example of this point about the influence of resource governance on technology. The process of adapting *technologies* when governance mechanisms could not be changed occurred twice in the history of the LP. The first time, Taiichi Ohno and Eiji Toyoda found that Japan could not accommodate the scale economies, low-skilled mass labor market, and vertical integration that made the Ford River Rouge plant successful. Lean production was their attempt to adapt mass production to the resource governance constraints of Japan.[144] The second and less successful iteration of the same process occurred when GM, Chrysler, and Ford attempted to do the same thing by adapting LP back to the American resource governance environment. The trajectory of new technology in the first iteration included team labor organization, multi-purpose machine tools, and the *kanban* system, while the second iteration that I examine in detail included technological

[144] See section 3.3 above.

innovations in network technology and modular assembly as well as organizational innovations built around the use of global supplier networks and the creation of global upstream markets.

For my argument, one aspect of this pattern is especially important. In both cases, attempts were made first to alter the tools of resource governance to meet the needs of the technology. It was only after this failed that the path of technological innovation was chosen. Based on what follows in this section, the reasons for this are obvious. The task of technological entrepreneurship – of creating a production process built around new technologies – is costly, uncertain, and difficult. Rather than trying to adapt an existing model, this requires experimentation and risk. It also involves the likelihood of repeated failure. For the American auto industry, which was built around a mature production technology that had not been significantly changed in nearly fifty years, this was a more daunting prospect than it had been for Eiji Toyoda two decades before. This provides a basis to qualify my argument: it is risk aversion and cognitive simplification on the part of firms and specifically managers that causes them to prefer the tasks of organizational and political entrepreneurship.

Third, the success of American firms in developing new products to avoid competing directly with Japanese LP producers demonstrates that in differentiated markets, productivity advantages are often not the primary determinant of competitive success. In this case, the key strategy was to create and move into new product market niches where their particular experience with design, marketing, and testing in the American market could provide a structural advantage to offset their failure to adopt LP. By creating and mass marketing mini-vans and sport utility vehicles while expanding the

market for light trucks, the Big 3 pursued a strategy somewhat like climbing a ladder. For each new product they developed, their Japanese competitors would follow them into the new market after some time-lag. Once this happened, the enduring Japanese productivity advantage would erode their dominance of that market and encourage further product innovation. Only the fact that the Japanese producers chose to build most of their competing large vehicles in the United States – where their ability to use LP methods was limited – made this strategy as successful as it was.

This product strategy, like the other forms of adjustment pursued by American producers, was powerfully influenced by regulation and policy choice. In the most obvious sense, the classification of these larger vehicles as "light trucks" for purposes of the federal CAFE standards encouraged the Big 3 to move out of market segments such as large sedans and station wagons. These types of large vehicles had to either meet strict fuel efficiency standards or be offset by sales of compact or economy models in direct competition with the Japanese.[145] By contrast, light trucks were counted separately and required no offset. In addition to this regulatory support for light trucks, the federal government had subsidized the initial development of the min-van through the Chrysler bailout. The importance of this subsidy in overcoming the risk aversion that dominated product decisions in the auto industry is difficult to evaluate, but it is clear that competition with Chrysler's Caravan and Voyager drove product innovation for both Ford and General Motors until it was obvious that consumer demand for these types of vehicles could be generated.

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[145] See footnote 120 above.

Reflecting these theoretical points, the commercial responses of American auto makers can be divided into three general categories, some mixture of which were pursued by all of the domestic firms. First, each made extensive attempts to emulate the labor and supplier relations that define LP or to find functional substitutes for them. Second, each manufacturer implemented creative and diverse strategies to reduce their manufacturing costs. This involved large scale investments in new technologies, attempts at factory automation, domestic and international outsourcing, and pressure on the UAW to reduce labor costs. Third, each manufacturer attempted to escape Japanese competition through product diversification, introducing new products in segments of the market where Japanese firms faced disadvantages.

As with the political response examined above, it is important to understand that the challenge posed by lean production was not immediately or clearly understood by Chrysler, Ford, and General Motors. While the core problem these companies faced arose from an organizational technology, this was not the way in which they initially identified the competitive challenge. From the perspective of American car makers, their Japanese competitors in 1979 offered cars that fit better with consumer tastes, displayed higher quality than those produced domestically, and could be sold at a competitive price while realizing a higher profit margin on each vehicle.[146] Executives in the auto industry – where the organization of the production process has been relatively stagnant for a generation – were not trained to see competitive pressures in terms of organizational

[146] Japanese imports generally cost more than their American subcompact competitors even before the imposition of the VRA. American consumers were willing to pay a higher price for additional features, considerably better fuel economy, and higher perceived quality. For a comparison of base model prices and fuel efficiency, see Harbour (1990), pp. 171-172. For an analysis of dealer strategies and options that created these differences, see Yates (1984) pp. 60-74.

technology.[147] It was only over the following three years in answer to the question of why Japanese costs were lower that the nature of LP became obvious. Even then, the competitive task that American auto makers perceived was not defined solely in terms of matching the cost savings provided by LP, but instead dealing with the real manifestations of this Japanese advantage that appeared in profitability and market share.

As an intellectual consensus developed explaining the reasons for the Japanese manufacturing cost advantage, American assemblers attempted to copy their supplier and labor relations. Well before the term "lean production" was coined in 1987, the mechanisms by which Japanese employees were involved in the production process and the *kanban* system of cooperative inventory management had been identified and were being consciously copied. These attempts to directly copy LP techniques generally failed. Even as the LP system came to be better understood and attempts were made to implement it in a more consistent manner, American firms could not achieve plant level productivity comparable to Japan because of consistent failures in coordinating with both labor and contracting with suppliers.[148]

On the labor side, Ford's Employee Involvement and General Motors' Quality of Work Life programs were explicit attempts in the early 1980's to improve productivity by providing the trappings of LP-style labor involvement. While the institutional environment made these programs difficult to implement effectively, the fact that they

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[147] As a matter of organizational sociology, the postwar shift in the background of senior management at the Big 3 from product and design to accounting or sales contributed to the misinterpretation of LP. For a journalistic account of this process at Ford, see Halberstam (1986).

[148] For a general comparison of plant-level productivity between American and Japanese final assembly plants, see Fine et. al. (1996), p. 26; Harbour (1992), p. 203; Womack et. al. (1990), p. 92. For brief comments on the difficulty of productivity comparisons across individual plants, please see footnotes 25 and 29 above.

were imposed on workers during a period of massive layoffs and cost cutting reduced their effectiveness even more.[149] Employee involvement programs specific to individual assembly plants were used by all three major American auto makers during the 1980's. In some cases, work areas and assembly lines were altered to physically resemble those found in Japan, including fetishizing the cord over each employee's work station capable of stopping the line until a quality problem is addressed. Other elements of LP labor relations that were tried included quality circles, team organization on the assembly line, and formal systems of worker participation. In an attempt to reproduce the social environment of a LP factory, common dining areas or uniforms worn by labor and management alike were sometimes tried. These programs produced uneven, incremental improvements in quality, but seldom resulted in dramatic productivity increases.

Two more substantive attempts were made to find functional substitutes for the incentive system that governed labor relations in Japan. While these failed to produce the same effects as the Japanese system of company unions, guaranteed employment, and a lack of opportunities for lateral movement, they demonstrate how the substitution of governance mechanisms was attempted within the American institutional environment. The first of these involved profit sharing programs that were introduced in the early 1980's and began to produce material returns for workers by 1984.[150] This addressed part of the incentive problem facing workers by providing a material stake in the

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[149] For a summary of the elements of the General Motors plan, see WAW 10-81, pp. 75-78. The practical problems of building worker trust and participation in an environment of layoffs are addressed in an interview with Ford Chairman Philip Caldwell, see WAW 12-83, p. 29. Note that GM's Quality of Work Life program was originally modeled on European systems of employee involvement and was only restructured in the late 1970's to emulate Toyota's. See Cole and Yakushiji, pp. 180-181.

[150] See Harbour (1992), p. 249. For a brief account of the origins of the Chrysler profit sharing agreement as well as the "concession bargaining" of the early 1980's, see WAW 4-81, pp. 47-50

performance of their employer, reducing absenteeism and increasing participation in quality programs. It could not, however, guarantee the level of employee investment in skills and devotion to continuous improvement that characterize the LP system.

American firms and Japanese transplants came closest to emulating this aspect of LP by locating factories in depressed areas combined with the slackening of labor markets and the weakening of the UAW.[151] The loss of more than a quarter of a million jobs in the early 1980's and the closing of assembly and component plants by all three auto makers would have had an incentive effect on remaining workers in any case, but the long and exceptionally steep recession created regional unemployment that increased the search and movement costs faced by workers trying to find another job. By taking advantage of regionally depressed economies, the exit option provided by the fluid American labor market could be mitigated and labor made more willing to offer time, effort, and loyalty than could be achieved by any realistic system of positive rewards.

The location decisions of the Japanese transplant assemblers and General Motors' experimental Saturn division strongly support this interpretation. Despite the higher costs of shipping components to these locations, plants were built in economically underdeveloped rural areas of Ohio, Tennessee, Kentucky, and Illinois with the explicit goal of recruiting workers who were unlikely to unionize and would display a high level of company loyalty.[152] When recruiting labor in these areas, applications often outran the numbers of positions by more than five to one, allowing management to apply

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[151] The large numbers of factories in the United States implementing various programs in a wide range of local environments provides a natural experiment that allows some opportunity to evaluate what conditions and programs produced the greatest increases in labor productivity, flexibility, and skills investment. The data needed for this evaluation is drawn from a combination of the Harbour Report's labor productivity comparisons and studies of specific plants conducted by the industry press, especially WAW and Crain's.

psychological screening and select only workers likely to apply themselves at high levels.[153] In the few cases where transplant assemblers located in an urban or unionized area, similar selection procedures were put in place to come as near as possible to this ideal of loyalty.[154] The ability to select labor in this way and take advantage of geography to increase the costs of exit for workers probably contributed more than their greater familiarity with LP in explaining why transplant assemblers displayed productivity levels among the highest in North America.[155]

Further evidence that a workforce with no exit option provided the closest possible approach to LP in the U.S. is offered by the plant rated as the most productive in North America by both the MIT International Motor Vehicle Project and the 1992 Harbour Report. This plant, operated by Ford in Atlanta, displayed only a few of the formal organizational manifestations of LP. It featured relatively low levels of automation, retained a large number of distinct union-defined job classifications, and had been only partly re-organized to physically reflect just-in-time inventory management. Plant management attributed its productivity to an advanced vehicle design in the Ford Taurus (see below) and a labor force motivated by both the positive incentive of profit sharing and fear arising from a slack regional labor market and memories of massive layoffs in 1985. "After [the layoff of nearly half the factory's labor force]," a plant

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[152] Rubenstein (2001), p. 172.

[153] The additional effect of escaping the history of confrontational labor relations that had formed the UAW in the 1930's and 1940's is important as well. See Lichtenstein (1995) and MacDonald (1963).

[154] Notable are the GM-Toyota plant in Fremont, California and the Mazda-Ford plant in Flat Rock, Michigan. In both of these cases, a Big 3 plant that had been closed was re-opened and workers that had been unemployed, often for extended periods, were re-hired.

[155] Harbour (1992), pp. 50-52.

engineer stated, "workers appreciated their jobs more and came back with a good attitude."[156]

Based on the importance of company unions for Japanese auto makers and its unique power in the American labor market, one might expect that the UAW would be a key player in any attempt by American firms to achieve a pattern of labor relations consistent with LP. A combination of an adversarial history and the structure of American labor markets, however, insured that this would not occur. As defined above, lean production requires that broadly skilled labor be allocated to a variety of tasks within the plant – or even sent to upstream suppliers as needed – and that workers actively contribute to continuous improvement at the shop floor level. These requirements were undermined at the plant level by labor mobility, arbitrary demands by management that were reinforced by the threat of plant closures, and the lack of any mechanism to insure good faith responses to concessions made by workers. While management unable to bind itself to commitments to a core labor force was the most important aspect of this failure, the UAW had chosen a stance that increased the barriers to LP. At the macro level, the UAW's goal through the middle of the 1980's was to re-create the domestic oligopoly that existed prior to 1979 and oversee a fully unionized auto industry where wage increases could be extracted from domestic and transplant producers alike. This focused attention away from bargaining over loosened job definitions or other programs that could have theoretically accommodated Japanese-style labor governance. As the failure

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[156] WAW 11-91, p. 37. Even in factories with poor performance, differences in labor cooperation seem to follow trends in the external labor market - a striking example is the General Motors Lordstown, Ohio plant that went from labor militancy and abysmal productivity in the 1970's to a mediocre producer of J-series cars in 1983. Though ostensibly giving credit for the improvement to GM's system of hourly quality auditors and trust between management and labor, plant manager Charles Abernethy admitted that this

of this plan became obvious, the UAW shifted its focus to managing decline by focusing on job security and guaranteed earnings for its core workers.

Under pressure during the 1979-1982 recession, the UAW agreed to allow a high degree of plant-level autonomy under the general rubric of cooperative employee participation schemes[157] to implement experiments in LP labor relations while focusing its energies on industry-wide wage levels and the political fights over imports. This decision was partly responsible for the divergence of plant level productivity recorded by the Harbour Reports as some plant managers were more able to use the social environment of their plant to create work incentives. Plants of various ages, producing a range of different vehicles, operating in different geographic areas, displaying varying degrees of assembly line automation, and managed by executives with differing understandings of LP all attempted to "become lean" over more than a decade.[158] Their consistent failure to match Japanese labor productivity levels presents powerful evidence that the American labor market simply could not support this model of work.

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environment was created among laid off workers recalled after several months in a city with a 23% unemployment rate (WAW 8-85, p. 50).

[157] The Chrysler Product Quality Improvement Program, Ford's Employee Involvement Program, and General Motors' Quality of Work Life were company-wide programs that had existed prior to the recession. Lacking any formal structure of labor co-determination, these programs were adapted to try to organize labor participation to increase productivity in a variety of ways. In practice, the implementation of these programs relied on the personal relationships of managers and local UAW officials at each plant, producing uneven results.

[158] Harbour Report (1990), pp. 138-139. It is important to note that productivity comparisons attempting to isolate one aspect of a complex production process cannot be made precisely. When attempting to estimate labor productivity at the plant level, one encounters a variety of factors that cannot be held constant. For example, some plants perform more elements of the production process on site than others, making even sophisticated labor hours per vehicle comparisons such as those performed by Harbour questionable. Variation in ease of assembly across different types and models of vehicles, degree of plant capacity utilized during a given period (determined by consumer demand and completely out of the control of plant management), and level of plant automation also make labor productivity comparisons difficult. Given these difficulties, I accept only the broadest and most consistent conclusions regarding labor productivity corroborated by Harbour, Anderson, and what company data is available as accurate. For a partial

Consider the problems from the perspective of plant level labor leaders faced with attempts to improve productivity through more flexible use of labor and greater employee involvement. The rigid work definition clauses of union employment contracts that auto makers blamed for their difficulties in implementing LP[159] were developed in the 1930's for a reason. Taylorist time-motion analyses had pushed workers into uncomfortable or even harmful work conditions and exposed them to the demands of an arbitrarily increasing line speed. To relax the protections offered by these contracts without a strong mechanism for oversight and cooperation would amount to the surrender of hard won control over work practices. At the same time, the Taylorist model applied to mass production assumed that labor could be systematically rationalized and its integration into the assembly line made more efficient in a top-down process designed by industrial engineers and implemented by a centralized management.[160] The labor conflict that had created the UAW and the rigid job definition aspects of contracts had also discouraged and indeed punished any attempt by labor to contribute thought or creativity to the production process.[161]

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discussion of difficulties in measurement and comparison, see Krafcik (1988) and Harbour Report (1980, 1981)

[159] Harbour Report (1990), pp. 248-249.

[160] For the theoretical significance of this point, see footnote 56 above.

[161] For the origins of this system of coercive, centralized management, see Taylor (1911), especially pp. 77-85. Though Taylor's original work can be read as allowing for individual initiative and worker involvement, it was the emphasis on industrial engineering as a science and the role of time-motion experts that came to dominate the field in the 1920's. For a brief examination of the process of establishing this principle in the American auto industry, see Rubenstein (2001), ch. 5. The difficulties this system caused for implementing LP are summarized by an anonymous GM source in WAW 8-86, p. 26. In a fascinating development, further research in Japan has suggested that the task of identifying potential productivity improvements has become increasingly specialized and delegated upward to section managers and group or team leaders (Ishida, in Kochan et. al. ed., 1997), a step back toward Taylor's original allocation of this function to dedicated and highly trained specialists.

Reversing this historical legacy without some form of institutional support presented an enormous challenge. Implementing this aspect of LP required the establishment of a minimum level of trust and convincing labor to contribute voluntarily to improving productivity.[162] From a theoretical perspective, there are two barriers to this that are bound up with the nature of a labor market. First, investment in firm or position-specific assets is hindered by uncertainty regarding future returns to those investments. This is a commonplace point that should require no elaboration. It is clearly relevant to American auto makers in this period despite some level of unemployment protection provided by UAW contracts, as a result of both the reality of plant closures and the pervasive corporate dishonesty that surrounded them.[163] Second, productivity improvements resulting from employee suggestions at firms posed the threat of eliminating individual jobs, creating both rational and social pressures not to undermine fellow workers through labor-saving innovation. While the LP system in Japan dealt with this through a cooperative program to promote, reassign, or retrain employees made redundant by this mechanism – including cushion created by the transfer of workers between assemblers and suppliers – sufficient trust did not exist among traditional union workers in the United States to encourage this.

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[162] It is interesting to note the relative importance of this cultural or organizational aspect of labor relations. The managers of Japanese transplant assemblers consistently claimed that it was primarily the anti-management cultural bias of the UAW and *not* the high wages that it had extracted from the Big 3 that caused them to seek out locations that had no union tradition in states with strong right-to-work laws. This claim is given weight by the fact that most of the transplant facilities offered wages only slightly below UAW contract standards, even when this was considerably higher than regional averages.

[163] Seven final assembly plants were closed between 1980 and 1983, with several others shut down temporarily in response to slack demand, placing tens of thousands of additional workers on indefinite layoff. Even after the recovery, plant closings continued through this period.

These problems of fundamentally conflicting goals between labor and management could not be completely overcome without mutual commitment mechanisms more powerful than labor contracts, and the lack of such a mechanism doomed attempts to apply the labor aspect of LP in the United States, despite a near consensus among automotive engineers as to its importance.[164] The partial implementation of LP style labor organization achieved through experimentation by the Big 3 and transplants, however, presents sufficient variation to draw certain conclusions about what factors could act as partial functional substitutes for the Japanese forms of labor governance. The most obvious of these was the geographic isolation or lack of economic opportunity discussed above. This explains in part the relatively higher labor productivity of the Japanese transplants and the few American plants located in the south and rural Midwest. While the Japanese management of the transplants would suggest that different management or plant organization were contributed to this, the Big 3 plants in Atlanta, Spring Hill, and Kansas City were among the most productive in the United States.[165]

Though there was considerable variation between individual plants based on the regional labor markets and the decisions of individual managers, consistencies also emerged within each of the American firms that indicate the importance of history and corporate policies. By far the worst labor relations in the American industry – and the worst record for increasing labor productivity through LP-style management – could be found within General Motors. Based on comments by labor leaders and industry

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[164] WAW 3-82, p. 56

[165] For union organization at the three Japanese transplant facilities, see Rubenstein, p. 155. Labor productivity data for domestic plants in the south and Midwest from Harbour (1992), p. 138.

observers, this can be traced to GM's adaptation strategies during the 1980's, a history of confrontation between labor and management, and a culture of centralized management decision-making that undermined attempts to achieve cooperative relations on the factory floor at individual plants. The initial GM strategy of massive investment in automation, new plants, and robotics undertaken in the early 1980's (see below) was viewed as a means of weakening the UAW and allowing the company to eliminate union jobs. Further evidence of bad faith was seen in GM's opposition to the VRA in 1981 based on the company's agreement to expand imports from its Japanese affiliates Isuzu and Suzuki, as well as its opposition to domestic content legislation backed by the UAW.[166] The negative effects of this were exacerbated by the reversal of early GM pledges to deal with LP through a union-friendly policy of tighter vertical integration. Instead of creating more UAW jobs through greater vertical integration, GM systematically shed union jobs to outside suppliers.[167] Facing declining market share, the company continued closing factories through the recovery period between 1983 and 1990 despite historically high profits.

These trends focused negotiations between GM and the UAW even more so than in the industry overall on job security rather than wages or working conditions.[168] To

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[166] WAY 1981, p. 24; WAW 2-85, p. 63; and WAY 1992, p. 33. In each of these cases, the perceived goal of GM management was to preserve their ability to pursue potential cost-savings at the expense of UAW jobs.

[167] This strategy was seen as an extension of management proposals from the 1970's to move GM's components divisions to the American south for the same labor-related reasons that would later drive the transplants to assemble there. Though stopped by a series of paralyzing strikes at the time, the UAW of the 1980's was only able to extract vaguely worded agreements from General Motors executives that were often subverted or abandoned under cost pressure.

[168] WAW 5-82, pp. 44-45; WAW 8-84, p. 19; WAW interview series with UAW President Owen Bieber, 1988-1990; and former UAW President Fraser on contract talks with GM in WAW 6-87, p. 52. It is fascinating to note that, in addition to generous severance arrangements written into labor contracts in the

improve the bargaining position of management in these negotiations and motivate labor through fear of plant closures, GM implemented a program called "whipsawing." The objective of whipsawing was to force two or more relatively low-productivity plants to compete in meeting productivity goals under the threat of closing the facility that proved less efficient.[169] The fact that this was done under the aegis of the company's Quality of Work Life productivity improvement program further discredited it as a mechanism of labor-management partnership. Reversals of promises to keep two major assembly plants open in 1987 increased resentment and reinforced the impression of bad faith negotiation held by the UAW. These trends within the company made the task of plant-level managers attempting to develop LP style team participation extremely difficult.

By contrast, labor relations in the other two major auto makers were considerably better throughout this period, a fact reflected to some degree in higher labor productivity at the plant level.[170] Both Ford and Chrysler suffered very deep financial crises in the 1979-1982 period, leading to factory closings and layoffs. Chrysler's collapse and bailout led to a round of "concession bargaining" in which the UAW gave up a majority of the wage increases won in the previous round of negotiation in order gain improved

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1980's, the 1990 agreement set up specific restrictions on GM's sourcing decisions intended to counter purchases from non-UAW suppliers; see WAY 1991, p. 36 and WAW 8-91, pp. 20-21.

[169] Interview with GM President Roger Smith (WAW 12-83, p. 47). This blatant attempt to disrupt labor solidarity tended to harden UAW resistance to shop-floor productivity programs and increase the general atmosphere of distrust at GM plants.

[170] Ford had the highest performance by this measure, with nine plants among the 20 most productive. Chrysler fell only slightly below the transplant facilities, while the ten least productive were all GM facilities. See Harbour (1990), pp. 138-139. The more detailed plant survey in Harbour (1992, summary on p. 44) focusing on domestic producers supports this characterization, with average plant labor productivity highest for Ford, followed by Chrysler.

guarantees of job security and limited profit sharing.[171] The fact that initial job losses were concentrated rather than spread out over the decade helped to smooth labor relations at these firms, as did their support for import restrictions – the central political goal of the UAW in the early 1980's. Another important difference involves the approach to labor markets. Both Ford and Chrysler pursued policies of tying to use their existing labor force more flexibly to follow shifts in demand across plants, fostering an internal labor market rather than hiring and laying off outside workers according to cyclical demand as did GM. This should be seen as an attempt to find a functional substitute for the Japanese pattern of labor shifting within the *Keiretsu*, and it had a positive effect on the willingness of workers to cooperate with plant-level productivity programs. Though these policies created stress as workers were assigned periods of overtime work or invited to move to a new area when their local plant reduced shifts or output, this general policy encouraged higher levels of worker loyalty and created a better environment for plant level compromises to be negotiated.

Setting aside both these high-level differences and variation at the plant level owing to specific personalities and relationships, the relatively stronger labor cooperation at Chrysler and Ford can be largely explained by an institutional innovation at the former and a cultural difference at the latter. The Chrysler Loan Guarantee Act that placed a UAW representative on the company's board improved labor relations at Chrysler by sharing accurate financial information to justify management demands and providing a

[171] For a brief summary of the effects of the Chrysler concessions that broke the UAW's tradition of parity contracts between the Big 3, see WAW 3-81, p. 54. For a review of the comparable labor concessions made in the 1982 Ford-UAW pact, see WAR Feb. 22, 1982, p. 1.

forum for the union to voice concerns directly to the company's directors.[172] This attempt to replicate corporatist institutional structures was a partial success. It succeeded initially in fostering greater willingness among the UAW leadership to restrain wage demands and promoted what was perceived as a more fair distribution of job losses between white and blue collar workers during the recession. It was less successful, however, in building the trust required for plant level reorganization of job classifications. As a result of organizational disruptions and charges of violating worker protections written into contracts, UAW members threatened to block all plant level cooperative re-organization in 1987-1988. The key issues involved were job classifications and seniority, both issues relating to worker security that – in the absence of formal guarantees – required high levels of trust. Despite the attempt to use informal and contractual means to substitute for the institutions that LP labor practices possible, the management culture at Chrysler remained centralized and levels of labor cooperation varied among factories.[173]

Ford, though it lacked the quasi-institutionalized union representation arranged by Chrysler, fostered a different management culture that made plant-level cooperation easier. This was achieved despite tensions arising from outsourcing and wage concessions that were similar to those at General Motors. Specifically, Ford did not try to codify "lean" work practices into a single company-wide contract as was done at GM and Chrysler. Instead, Ford management supported individual plant managers in

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[172] It is interesting to note that while this arrangement was eliminated in the 1990's, it was revived after the merger of Chrysler with Daimler Benz in 1998 explicitly for these reasons. It is also worth noting that the close relationship between UAW leaders and Chrysler managers led to a rift between union members and the national leadership in 1987 that undermined support for the arrangement.

programs to arrange new work practices in cooperation with local UAW representatives. In the event of a strong disagreement, the rigid job classification protections of the old contracts could be used to protect workers' interests, providing a valuable form of insurance for workers.[174] In addition to this higher level of plant autonomy, Ford's Employee Involvement program was designed and implemented by managers trained at Ford's European assembly plants with the explicit goal of replicating the more cooperative style of labor relations that existed in Germany. The system of rotating managers and executives through the company's European subsidiaries was common in Ford throughout its history, but it became part of the standard executive career track in the early 1980's in order to familiarize senior managers with German-style labor co-determination. The intention was that managers familiar with European labor relations would be more effective in implementing cooperative programs in North American plants. This management culture helped to make Ford the most effective user of LP-style labor relations in the United States.[175]

The cultural element of Ford's relative success is difficult to quantify, but appears in most primary sources examining Ford's plant level success. Ford had been a major international producer since the 1920's and held a strong and well-embedded presence in

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[173] Harbour (1990) pp. 251-252. For the specifics of the job classification dispute at Chrysler, see WAW 8-86, p. 26

[174] This system began eroding with the late 1980's as the initial difficulties with contracts reducing the number of job categories were worked through at General Motors and Chrysler.

[175] Though Ford was by far the most successful user of lean practices in the United States, it is informative to compare the performance of their best plants with those in Japan. Taking Ford's most productive American plant as the best copy of LP that could be achieved in the American institutional environment, the labor productivity comparison used by Harbour (1992, p. 207) shows that it remained 20% less efficient than Toyota's plants in Japan. This figure, though not incorporating the considerations raised in footnote 158 regarding plant-level productivity comparisons, should be taken as the clearest measure of the effect of

European markets. During the 1980's, personnel decisions at Ford's American divisions were largely in the hands of a group of executives with substantial experience in Germany, with Ford President Harold Poling having served as President and Chairman of Ford of Europe before returning to the United States in 1980. It was Poling who promoted the system that rotated American executives through European plants and he credited this cultural exposure with some of the Ford Employee Involvement Program's success. The inability of Ford and the UAW to use labor contracts as a mechanism for codifying this system suggests that the possibilities for informal implementation of cooperative labor relations in a hostile institutional environment are real but limited. The Ford case suggests that the fate decreed by national institutions can be softened or mitigated, but it can not be avoided entirely.

The second aspect of LP that American firms attempted to implement shows a pattern of failure similar to that found in labor relations, but in the case of supplier relations there is another dimension to the story. As the importance of supplier relations in LP became clear in the early 1980's, all three American auto makers undertook programs that would establish longer-term relationships with them.[176] Though the theoretical justification for increased productivity based on co-specific investment along a supply chain was not novel (e.g. Alchian and Demstez 1972), LP provides three specific areas where such investment can be beneficial. Japanese firms were observed to

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the institutional barriers to implementing LP in the United States. That is, this represents the closest that substitutes for Japanese governance mechanisms could bring American producers to LP.

[176] Supplier relations in the auto industry were in a state of flux even before attempts to emulate LP were undertaken. Government regulations and the first oil crisis in the 1970's had resulted in a shift toward lightweight materials, smaller engines, and the development of front-wheel drive. According to an Arthur Anderson survey published in 1979, closer relations with suppliers were needed primarily to allow capital constrained suppliers to make investments in more advanced technologies, specifically synthetics and electronics. For a summary of this report, see WAR Nov. 19, 1979, p. 371

use these relationships to promote higher quality through improved oversight, "just in time" inventory reduction systems that require information exchange, and improvements in manufacturability and reduced costs based on the involvement of supplier engineers in the design process. By 1982, an overwhelming majority of automotive engineers at the Big 3 believed that closer relations between suppliers and assemblers had the potential to improve efficiency and quality.[177]

After the end of the recession and the return to profitability in 1983, all three major auto makers initiated plans to develop long-term relationships with suppliers that would allow for higher levels of co-specific and long term investment. The details of these programs varied, but they included many similar elements. In most cases, in-house engineers were assigned to benchmark individual suppliers' manufacturing processes. All three auto manufacturers increased their use of long-term contracts to encourage increased investment in highly specific tooling or human capital. In order to overcome the commitment problems inherent in such investments, Ford and Chrysler used contractual mechanisms such as "pre-sourcing" agreements in which some components would be guaranteed for a single supplier whose business would theoretically be secure for the life cycle of a given model of vehicle. Similarly, final assemblers attempted to convince suppliers to build new facilities in closer geographical proximity to assembly plants in order to facilitate "just in time" inventory systems by committing to longer term contracts.

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[177] WAW 1982 Engineering Survey, WAW 3-82, especially pp. 58-59. The need for financial support from final assemblers to support supplier investment programs is highlighted in the 1981 survey, where 91% of respondents predicted increasing investment commitments by their employers. See WAW3-81, p. 78

Despite some specific successes and variations in degree between the major auto makers, contracts proved to be an insufficient mechanism for overcoming commitment problems and fully capturing the benefits of LP supplier relations. As with labor, both the fear and reality of opportunistic behavior prevented the levels of trust required for supplier relations that were both flexible and secure. Investment in physical capital and "in-house" engineering departments by suppliers are the most important measures of both cooperative design and quality assurance, and by this standard American firms could not match LP standards. A survey of the level of co-investment in physical assets made by auto producers and their suppliers in 1994 showed a pattern similar to that found in labor relations, with Ford and its suppliers ranking highest, Chrysler ranking lower, and General Motors at the bottom.[178] As with labor productivity, however, levels of physical asset co-specificity were lower for *all* of the American survey respondents than for Japanese producers operating in Japan. Looking at human capital and engineering capacity, it appears that auto suppliers were more willing to make investments in these areas than in physical capital. These investments seem to have been triggered by market opportunities and new technologies, however, rather than the effective creation of long-term partnerships.

A similar pattern appears in decisions regarding physical location. In order to facilitate LP inventory control practices, it was generally considered necessary to purchase components from firms located in close physical proximity to the assembly

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[178] Dyer 1996, pp. 277, 279-280. Dyer uses an interesting proxy for co-specific investments in physical capital, asking survey respondents among auto suppliers what percentage of their physical investments would be useless to them if they were unable to work with their primary auto making customer. Problems with this method certainly include failure to account for levels of diversification within large suppliers, sales to multiple final assemblers by first tier suppliers (especially among raw materials suppliers), and

plant they served. In Japan, this distance was estimated to be roughly 50-60 miles, while industrial engineers predicted that the higher capacity American road and rail network could accommodate distances of up to 100 miles while maintaining the same schedule of component delivery and degree of oversight.[179] The demands of geography and industrial history had scattered American auto plants beyond the Detroit area that had been the industry's traditional geographic center, however. Attempts in the 1980's to consolidate purchasing from suppliers in closer physical proximity proved difficult for these plants. The scale of investment that is required to change a manufacturing firm's location is considerably larger than for specialized machinery, and generally only small suppliers with relatively low levels of investment would move closer to their customers.

In both of these areas, arm's length contracts were insufficient institutional substitutes for the combination of partial ownership and relational contracting that supported LP in Japan. The LP system requires a high level of relational security between suppliers and assemblers while retaining separate systems of administration and corporate governance. Attempts were made by American firms to emulate this relationship through both of the mechanisms that transaction cost economics would suggest – consolidated ownership and more complex contracts intended to structure long term relations. Neither of these mechanisms could be made to function in the American institutional environment well enough to gain the productivity benefits of LP.

In the early 1980's, General Motors attempted to institute cooperative manufacturing and design programs through consolidation of wholly owned subsidiaries.

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[179] Ohno (1988), p. 34 etc. See also Linge (1991, p. 326) notes that a majority of critical suppliers serving the original Toyota Koromo facility were located within 40 miles. For an example of early attempts to organize long-distance supplier relations in the U.S., see WAR July 6, 1981 (inset interview with David D. Campbell).

Since GM was by a wide margin the most vertically integrated of the three American auto makers, this decision had a large internal constituency.[180] Early experiments in implementing LP inventory control practices with outside suppliers led to an internal pilot program conducted in 1981 at two of the company's engine plants. The 1984 structural reorganization at General Motors was intended capture LP productivity gains by facilitating communications between component designers and those with specific manufacturing knowledge while facilitating reductions in component inventories.[181]

The reorganization was unsuccessful in both areas. It proved difficult to replace management at the various old divisions into the new integrated platform divisions, largely because the specialized knowledge of division managers could neither be dispensed with nor transferred to a new level of organization. Facing enormous organizational inertia and the potential for chaos in ongoing manufacturing if existing management were badly disrupted, GM executives created an additional level of management at the various divisions being combined rather than replacing them. This decision reinforced the problems of communication and bureaucratic inertia that the reorganization had been intended to overcome, and the coordination of design and delivery intended to imitate LP did not take place.[182] GM managers were so dissatisfied

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[180] Though the degree of vertical integration varied across this period, Chrysler was consistently the least vertically integrated (roughly 30%), with Ford the next (roughly 50%). Though General Motors was generally claimed to be 70% vertically integrated, a more accurate estimate of General Motors internal sourcing would be 57%, with members of the components group frequently outsourcing their own purchases to lower cost outside suppliers before passing on components to final assemblers. WAW 2-93, p. 33.

[181] WAY 1984, p. 12; WAW 9-89, pp. 74-75; Maynard (1995), pp. 42-44.

[182] Harbour and Associates (1990), pp. 268-269 and 234-237.

with the results of the 1984 reorganization that attempts to refine it were being made continuously until 1989.

Tellingly, internal supplier relations were eventually given to the same purchasing departments that managed purchases from outside suppliers. This represented a conscious attempt to capture market incentive structures by benchmarking internal components suppliers against potential outside sources of similar parts.[183] The conclusion that many of GM's internal component suppliers were more expensive while being no better integrated into the design and inventory control process than outside competitors demonstrated the decisive failure of GM's attempt to adapt LP techniques within a vertically integrated structure; of the choice between markets and hierarchies described by Williamson (1975, etc.), both had been tried and both had failed. Retreating from this costly experiment, the company undertook a program that attempted to impose market discipline on both internal and external suppliers by making contract decisions more contingent and *easier* to break off. Accepting the tradeoff between the benefits of long term contracting and market discipline in pricing, the latter was chosen.

A more decisive test case for GM's attempts to create LP style supplier relations within one management structure was provided at the level of a single assembly complex. The company's "Buick City" plant in Flint, Michigan was constructed by incorporating eight major and several minor subsidiary factories owned by General Motors into one organizational unit managed by a single team.[184] In theory, substituting vertical integration for the partial ownership represented by Japanese *keiretsu* networks should

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[183] Ibid. p. 234. This reform was also intended to take advantage of the organizational capacities of GM's purchasing department to consolidate control over supply chain organization.

[184] WAW 6-83, pp. 22-28

have allowed both the design and inventory coordination to be directed bureaucratically, though at the cost of price discipline imposed by market relationships. Despite marginal improvements, the experiment produced only marginal cost savings related to the close physical proximity between component producers and final assembly plants, which helped consolidate control over inventories. Geographical proximity also allowed for closer contact between assemblers and suppliers, increasing the flexibility with which the manufacturing process could deal with specific quality problems. Physical proximity could not overcome the organizational barriers to sharing design work, however, and the full range of expected benefits did not materialize. For those areas where improvement in cost structure or quality were noted, it is not possible to show that they resulted from organizational or ownership integration rather than the ability of managers to physically track problems within the facility.

Aside from vertical integration, attempts were made by all three of the major American auto makers to use long-term contracts to create cooperative relationships with suppliers. Complex contracting, however, proved to be an insufficient tool to match the levels of co-specific investment required by LP. The aggregate results shown by Dyer's surveys[185] demonstrate this for the industry overall, while Helper and Sako's survey data indicate that in 1993, only 29% of supplier relations with final assemblers met a minimum standard for close coordination or partnership.[186] These data are suggestive,

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[185] See above. Dyer's survey data estimates an average of 17% co-specific capital investment among suppliers to American assemblers in 1994, compared with 21.3% for Japanese suppliers. Since Dyer does not weight these results based on the size or relative importance of supplier firms, there is considerable justification to believe that these estimates are very conservative and understate the absolute levels of co-specific investment among Japanese suppliers. Dyer (1996), p. 277 and 280

[186] Helper and Sako (1995), p. 80. It is important to note that the same survey shows only a slightly higher level of cooperative relationships in Japan, but as with the Dyer survey this does not differentiate among

but in order to demonstrate the importance of the institutional mechanism of cross ownership and the failure of contracting, it is necessary to examine the reluctance of American suppliers to make co-specific investments more closely. The responses to yearly supplier and purchaser surveys, an examination of specific failures when cooperative relationships were attempted, and the trend across the recession-recovery-recession market environment reinforce the theoretical point that the uncertainty and transaction costs associated with American style contracts were simply unable to foster the levels of trust required for relational contracting to work in more than a few exceptional cases.

All three American final assemblers experimented with relational contracts after the initial financial crisis of 1979-1982 had passed. The degree of market power possessed by auto makers willing to make large scale purchases, however, allowed them to dictate terms to most suppliers. This kind of asymmetric market relationship is not conducive to high levels of trust, and contractual mechanisms that would have truly constrained the final assemblers were unacceptable to them. The example of just in time inventory control is instructive. Final assemblers attempting to reduce inventory costs by moving closer to LP style production flow generally imposed small batch delivery requirements on suppliers arbitrarily and without direct assistance in adjusting those suppliers' manufacturing procedures. This left suppliers to either reconfigure their manufacturing process on their own or, in most cases, simply carry additional inventory in their own facilities without compensation until it was called for by auto makers. This

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suppliers of different sizes or relative importance in the production process. It also does not differentiate between suppliers inside of the assembler's *keiretsu* network and those outside, calling the usefulness of this measure for Japan into question. The authors interpret contradictory data from Japanese respondents that suggest ongoing patterns of considerably tighter relationships than in the United States on p. 79.

process transferred inventory costs form the assembler to the supplier and improved the measured efficiency of assembly plants from the perspective of assemblers, but resulted in no real increase in the efficiency of the manufacturing process.[187]

Demands for continuing price reductions even as the assemblers returned to profitability in 1983, refusal to accept changes in price based on increases in materials costs, and requirements that suppliers pass on sensitive production information to their customers contributed to a perception among suppliers that they were bearing too much of the costs of competition. The psychology that this power asymmetry created was poisonous to information sharing or the establishment of long term cooperative investment. In 1988, a survey of suppliers and assemblers found that 57% of suppliers considered trust to be "extremely important" in their relations with assemblers, while only 19% of assemblers agreed.[188] A follow-up survey the next year found that 68% of suppliers believed that the organizational change in the industry that would achieve the greatest cost savings would be the development of more trusting relationships between suppliers and assemblers, while only 33% of respondents from assemblers agreed. Other survey results across this period demonstrate that a substantial fraction of suppliers felt that their experience justified a cynical view of long term partnership programs pushed

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[187] In the 1983 Arthur Anderson survey of automotive suppliers, 80% of supplier executives believed that just in time practices were primarily "a way for manufacturers to transfer inventory to them." Over the subsequent surveys in 1985 and 1987, this number declined to 61% (see WAR Aug 10, 1987 p. 200). Susan Helper (1994) reviews survey data from 1989 showing that 48% of automotive suppliers have achieved just in time delivery schedules for customers by stockpiling inventory in their own facilities, a 28% increase over 1984, p. 633. Illuminating comments by suppliers on this trend can be found as early as 1980, see Industry Week (April 5, 1982), p. 19; WAW 9-80, p. 18; and WAW 12-80, p. 81. It is clear from these comments that only the market power of assemblers allowed them to impose these costs on suppliers, and that suppliers understood and resented this.

[188] Arthur Anderson Delphi survey results published in WAW 7-88, p. 57

by assemblers and considered themselves subject to arbitrary and inconsistent demands despite the new language of partnership and long-term relations.

More important than problems of perception and corporate culture, suppliers had two strategic concerns that hindered the development of long term cooperative relationships with assemblers. The most basic of these involved the risk of being abandoned by their customer after making specific investments. This danger could arise as a result of either bad faith or poor apportionment of risk on the part of the assembler. In the former case, assemblers often continued to search for alternate outside sources for components even after entering a long-term relationship with one supplier. This pattern became more common as the assemblers increased their use of foreign suppliers in the late 1980's, which introduced currency fluctuations or other *ex ante* unknowable factors into sourcing decisions. High profile instances of such bad faith created a demonstration effect that prevented suppliers from considering future offers of long-term contracts to be credible. The most visible example of this occurred as a result of the series of corporate re-organizations undertaken by General Motors between 1984 and 1993. On three separate occasions, the entire purchasing organization of the company was altered. This disrupted personal relationships that had developed between suppliers and purchasing agents, established new and often arbitrary standards for all supplier contracts, and introduced a series of short-lived programs to monitor and improve quality. Even aside from the danger of losing business, suppliers facing the near certainty of having the terms

of their contracts altered in a future corporate re-organization were reluctant to invest in such agreements.[189]

Almost as important as concerns over bad faith or changing management were suppliers' fears that production information shared with customers could be used either to demand lower prices or to give a strategic advantage to a competing firm. By providing detailed cost and process information to customers, supplier firms would essentially give their customers the power to determine what profit margin they would realize on any given purchase. Assemblers possessing such information face an overwhelming temptation to cut their own short term costs by squeezing the profits of their suppliers to the point just short of driving them out of business.[190] Even aside from the perverse incentives that this behavior creates for suppliers to misrepresent their costs, this practice reduces the ability of small suppliers to finance exactly the kind of investment in engineering capability or quality improvement programs that are required by LP. The danger of an assembler passing on strategic information such as proprietary technologies or innovative production processes developed within the firm to a competitor (including the assembler's own internal parts divisions) also hindered the exchange of

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[189] See WAW 7-89, p. 38. The most dramatic instance of assembler betrayal of supplier trust certainly occurred in 1992, when General Motors brought in a purchasing expert from their European division to manage their completely re-organized North American operations. The new executive arbitrarily altered the terms on which GM would make all of its future purchases and issued a statement that he expected price reductions from all suppliers of 20%. This created enormous uncertainty about future work and infuriating suppliers that had developed long term sales relationships (see Maynard, 1995, ch. 5-6).

[190] The consistent fear of this behavior pattern is revealed in several annual Ward's Supplier Survey results. See especially WAW 7-89, pp. 35-41. Under lean production as it developed in Japan, a similar problem involving the strategic us of cost information exists. Though this problem is at no point fully overcome (see WAW 6-90, p. 54), in general it is alleviated by three factors. First, the partial cross-ownership of suppliers by assemblers reduces the incentive to drive down costs by squeezing supplier profits. Second, assemblers supply personnel and organizational support that reduces actual expenses, partly compensating "in kind" for low prices. Third, long-term relationships with assemblers reduce the risk faced by suppliers operating on lower margins.

information.[191] Though accusations of this were widespread, the most glaring example of such abuse also came from GM. The 1992 reorganization of the company's purchasing division was followed by the defection of the European executive responsible to Volkswagen under mysterious circumstances. Strong circumstantial evidence suggested that he had copied and removed tens of thousands of pages documenting proprietary information from General Motors' suppliers that could be passed on to Volkswagen or its suppliers.[192]

In theory, it should be possible to restrain these behaviors by means of contractual mechanisms. There is nothing in the American system of contract law that prevents a binding long-term contract from being written, and the very real gains that co-investment and sharing of design offer should provide an adequate incentive for both parties to allow their choices to be restricted by legal agreement. To use Hirschman's (1970) framework, increasing the cost of the exit option in such a relationship should provide sufficient basis for the trust required to make long-term investments, and this increase in exit cost should be achievable through contracts in the American legal system. In practice, however, contracting that imposed real limits on assemblers' future choices occurred only rarely and under unusual circumstances. Even among Japanese transplant assemblers consciously attempting to replicate LP supplier relations, there was a strong tendency to

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[191] Rubenstein (2001), p. 93. For an instance of these concerns disrupting the negotiation of purchasing contracts, see WAR Oct. 18, 1993, p. 1.

[192] See Maynard (1995), ch. 7 and WAW 5-93, pp. 16, 50. For a summary of the intellectual property allegations against Lopez, see *Der Spiegel*, May 31, 1993, pp. 120-121. See also Stephens in *ARMA Records Management Quarterly*, Oct 1997. After extended and costly litigation, a civil settlement was reached in 1997 that awarded $100 million to General Motors, though no compensation was awarded to suppliers.

use informal agreements and evolved, personalistic systems for dealing with suppliers rather than codifying such relationships in contracts.

Among the American producers, a variety of complex, contingent, and long-term contracts between suppliers and assemblers were experimented with during this period to accomplish this goal. These agreements seldom functioned effectively to guarantee a long term relationship and did not become common in the industry. This can best be explained as a curious type of risk aversion on the part of auto makers. The market advantages of being a near-monopsony purchaser are obvious and ongoing. The power to extract price concessions, impose arbitrary product standards, and transfer inventory costs to suppliers is clearly useful to assemblers. In addition, the ability to shift business to a lower cost supplier – or even retaining the threat of doing so –whenever some form of technical innovation pushes down marginal costs can be used to impose price discipline on suppliers, using market pressure as an ongoing source of cost savings. By contrast, the advantages of a long term partnership with a supplier even under the best of circumstances are uncertain, difficult to specify or quantify in advance, and require internal reorganization and the development of new bureaucratic competencies to transfer information and exercise oversight. When weighed against the costs, the productivity advantages that might be derived from Japanese style relational contracting were rejected in most purchasing decisions despite studies that showed their advantages in the LP model.[193]

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[193] According to the 1989 Arthur Anderson Delphi survey of auto industry purchasing managers, only 13% agreed that a long term relationship should be considered when making product sourcing decisions. (See WAW 7-89, p. 37). Based on the fact that this structural tendency to underestimate the benefits of relational contracting and retain the exit option allowed by more contingent market arrangements dominated even Japanese practices among the transplant producers, this seems to be another manifestation of Streeck's (1997*b*) beneficial constraints operating to facilitate LP in the Japanese system.

Once again, the varying practices of the three major American producers support this interpretation. The degree to which auto makers attempted to implement relational contracting was inversely related to their size, with Chrysler experimenting the most boldly, followed by Ford and then General Motors.[194] This suggests that the greater market power provided by higher volume purchasing is one of the factors that makes short term contracts more attractive. In addition, attempts at relational contracting seem to be more common between auto makers and very large, diversified suppliers. Since the costs of losing auto industry contracts for a large, diversified company are relatively smaller, the threat that can be wielded by purchasers is less effective in extracting concessions or transferring costs. Mutual vulnerability could also serve this by reducing the power asymmetry between supplier and assembler. Long-term contracts for the production life of a vehicle became common in the late 1980's for specialized components that could not easily be substituted. With both large, diversified suppliers and producers of critical components, assemblers possessed a less powerful 'stick' to use in these relationships, making the 'carrot' of long-term contracts more useful.

Even in cases where long term contracting has been used, its potential was often undermined by the transaction costs of creating and enforcing a contingent agreement and an obsessive concern over preserving escape clauses. The requirement for teams of skilled lawyers operating over a period of months to create a complex contract imposes both direct monetary costs and potentially more damaging delays on the development or manufacturing process. In addition, this process tends to formalize and legalize relations between suppliers and assemblers, reducing the flexibility and adaptability of the

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[194] See WAW 2-93, pp. 25-33.

relationship. For example, a typical pair of major contracts signed between General Motors and large outside suppliers in 1990 contained specific provisions for responsiveness, price quotations, delivery procedures, after-market service, and a requirement for an ongoing level of productivity improvement.[195] Writing an *ex ante* contractual requirement for 3% annual increases in productivity before the major design or production systems have been put in place indicates a flawed understanding of lean production: the productivity improvements that arise from LP supplier relations are dependent on tacit knowledge of workers, managers, and designers involved that emerges over time. This means that the exact level of productivity improvement or cost savings that this process will offer in a given case cannot be reliably predicted even by the engineers directly involved. Attempting to not merely predict but specify these improvements in an enforceable contract cannot guarantee that they will materialize.

The inability of formal contracts to serve as an adequate framework for LP supplier relations is also demonstrated by the experience of Japanese transplant facilities in the United States. These producers initially relied on a combination of components imported from their traditional suppliers in Japan, relatively simple parts purchased from established suppliers in the United States, and complex assemblies produced by Japanese firms that followed their customers to America. Under the threat of domestic content legislation, however, the transplants increased their purchases from American suppliers over the course of the late 1980's. In doing this, they worked to establish cooperative relationships with American firms that did not rely on the use of complex or long term contracts. This decision is partly attributable to a powerful cultural dislike for

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[195] WAY 1990, p. 34

adversarial, formal systems of dispute resolution, but is much more the product of an awareness that effective lean production requires forms of cooperation that cannot be formalized and enforced through legal means.

Their choice to rely on informal mechanisms to support supplier relationships was partly successful, resulting in improvements that made their vehicles the highest quality rated among those produced in North America. It did not, however, result in either the full cost savings achieved in Japan or the tightly coordinated daily operation that exists under successful LP. Interestingly, American suppliers working with Japanese transplants consistently rated them more difficult to deal with than domestic producers despite their long-term relationships and by a range of measures felt that they utilized their American suppliers much less effectively than either Ford or Chrysler.[196]

Finally, the failure of relational contracting in the United States was demonstrated by the reaction of American firms to the economic downturn in 1990. Facing record losses and forced to reduce short run costs, American auto makers abandoned many "relational" contracts they had built up in the late 1980's. The escape clauses in even the most binding long-term contracts had usually tied ongoing purchases to market demand or the continuation of a given product line, and the cyclical collapse of automotive demand in the 1990 recession triggered a brutalizing liquidation of contracts with suppliers that had made co-specific investments with auto makers.[197] Though most transplants used LP "production leveling" techniques to maintain a lower level of

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[196] Based on questions regarding both the overall efficiency of supplier relations, the difficulty of working with transplant as opposed to domestic producers, and the usefulness of each producer's quality programs/awards. These survey results are especially interesting as they demonstrate remarkable consistency across the 1983-1990 expansion, the 1990-1992 recession, and the beginning of the 1993 expansion. See WAW 7-90, p. 39; 7-91, p. 41; 7-92, p. 42; 4-93, p. 38; 7-93, pp. 59-60; etc.

purchasing during the 1990-1992 recession, American assemblers rationalized purchasing to eliminate nearly 20% of their direct suppliers and imposed draconian demands for lower prices on those remaining.[198]

Of the three domestic auto makers, Chrysler made the most sustained attempt to prop up its suppliers and hold on to the elements of LP contracting that it had constructed. These attempts included the distinctly Japanese step of taking up direct contact with banks that had loaned money to suppliers in order to provide assurances that these companies would be receiving future orders and deserved easier credit terms.[199] Chrysler also attempted to divide large purchases among suppliers to share revenue losses across its vendors. These steps were more logical for Chrysler than for its domestic competitors because the company's small size and low level of vertical integration made it more dependent on its suppliers and less able to exercise coercive power through its purchasing system. In addition, Chrysler's financial collapse in 1991 forced it to meet short term cash requirements by delaying payments to suppliers as it had done in 1980 prior to the federal bailout, making the company beholden for its financial existence to the willingness of major suppliers to delay demands for payment.

Chrysler's attempts to ease the burden on its suppliers as a way of building trust showed some success, especially with its largest suppliers. The engineering cooperation along the supply chain required to produce the partly modular (see below) LH series cars

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[197] Ibid. 6-92, p. 97.

[198] See Kawahara (1998) pp. 209-210; Rubenstein (2001) pp. 94-97. This difference should not be considered a sign that Japanese producers were operating in complete defiance of American trends; sales of Japanese cars produced at transplant facilities did not suffer as badly as those from the Big 3, making their task of supporting suppliers through the recession considerably easier.

[199] WAW 12-91, p. 62

in the early 1990's demonstrated this, but it was unable to avoid breaking many contracts that had been intended as long-term. As a result of its own financial crisis, the company's intervention with banks had not been backed by direct financing and produced few clear results.[200] Chrysler was forced to rationalize and reduce its purchases roughly to the same degree as were Ford and General Motors. By the end of the 1990-1992 recession, Chrysler had cut the number of suppliers it dealt with directly by nearly 50% compared to the mid 1980's. The attitudes of Chrysler's suppliers toward the company revealed in yearly surveys remained generally more positive than toward its competitors and its relations with a core group of key suppliers were much closer than those achieved by other American firms, but the clear patterns of co-investment and behavior across the economic cycle associated with LP were not achieved.[201]

While American institutions had a decisive influence on the failure of American attempts to adopt LP, they also had an effect on the kinds of organizational and technological innovations adopted to make American firms more competitive. The governance mechanisms that *were* available to American firms were almost as important in shaping their organizational response to LP as those that were not. Specifically, American firms pursued organizational strategies that were intended to take the greatest possible advantage of market mechanisms for governing resources and developed new technologies that could be used in price-mediated, market relations. American firms developed computer and network technologies that were intended to make supplier

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[200] Ibid.

[201] WAW 3-93, pp. 28-29. By Dyer's measure of co-investment (see footnote 185 above), the level of co-specific investment among Chrysler's suppliers remained at 17.5%, below both Ford and the Japanese average. This measure is useful in an aggregate sense but does not weight co-specific investment based on

relations more efficient without the need for long term contracts. As a result of this, design information could be shared through these systems without the physical interaction of personnel or close cooperation in early stages of product development. In addition, these network technologies allowed computers to coordinate inventory information and replicate some of the advantages of the LP system through a technical rather than an organizational means.

These advances in computer technology opened up a range of other ways in which American firms could use markets to further increased productivity and lower costs. Once the costs of communicating complex information with suppliers had been reduced, it became possible to create an international and eventually a global market for auto parts. This allowed American firms to take advantage of lower costs or clusters of highly skilled labor in regions and countries around the world. Where international sourcing had traditionally been considered high-risk and subject to serious problems of quality monitoring, production delays, and design incompatibility, American firms made this the centerpiece of their organizational response to LP in the late 1980's.

As with the other aspects of the American response, the development of new supplier markets was highly conditioned by perception and the specific way in which the problem was interpreted. Based on socialization and the incentives created by financial markets American auto executives were strongly inclined them to view the challenge of LP not in terms of manufacturing organization, but instead as a problem of reducing costs. Based on the organization of auto manufacturing, the most obvious categories where costs can be reduced were seen in labor and purchases from upstream suppliers.

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the relative size or importance of supplier partnerships, raising a measurement problem similar to that noted above for the Japanese estimates.

The kinds of cost reducing strategies that were used in both of these areas were mutually reinforcing and relied on a similar switch to market forms of resource governance.

The drive to increase outsourcing and foster greater competition among suppliers had its origins in attempts to reduce labor costs. The 1979-1982 recession marked the beginning of an offensive by all three major auto makers against the United Auto Workers union that ebbed during the recovery period but redoubled after 1990. Focusing on labor costs, auto executives initially explained much of the Japanese advantage arising from LP in terms of lower Japanese wage rates. After decades in which the UAW had exploited the American auto oligopoly to extract high levels of wages and benefits, this explanation had considerable plausibility. In 1979, the average nominal hourly wage of a UAW member working for one of the American producers was $13.43, compared with $7.00 in Japan at contemporary exchange rates.[202] This wage gap was thought to be a core element of the Japanese competitive advantage, and reducing it became the central goal of cost-cutting during the recession era.

The first step in extracting wage concessions from the UAW was taken by Chrysler during the financial crisis and bailout in 1980. Chrysler was in a paradoxically strong position to demand better terms from the union because it was able to literally threaten bankruptcy unless costs were reduced. Consistent, monopoly pricing of labor for all of the American Big 3 had been the core UAW strategy through the postwar era, but the threat of permanently losing over 100,000 union jobs if Chrysler failed outweighed

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[202] U.S. Bureau of Labor Statistics, September 1990. The use of this wage difference to justify demands for lower wages in the U.S. was most evident in the 1982 bargaining round, see WAW 9-81, pp. 29-30. Measured by Harbour, Anderson, J.D. Power, and other sources examining the plant level, the cost advantage enjoyed by Japanese producers still existed in 1991 when the wage disparity measured by the same standard was $24.21 in the United States compared with $18.15 in Japan.

this. Chrysler engaged in multiple rounds of "concession bargaining" that resulted in over $462 million in reduced wages and benefits between 1979 and 1983. Ford and General Motors, arguing that these concessions to Chrysler represented a cost advantage of roughly $600 per vehicle, demanded similar concessions in the 1982 bargaining round.[203] The UAW was forced to reduce its demands, accept greater plant level labor flexibility, and defer some pension and health care benefits. Attempts to extract further concessions, however, encountered effective resistance and two successful strikes. Targeting General Motors, the UAW was able to block a number of plant closings and to stop the practice of "whipsawing," winning important victories that prevented Ford and Chrysler from attempting similar strategies. Though losing members, suffering from internal dissent over surrendering too many shop floor prerogatives, and politically marginalized by the Reagan administration and internal Democratic politics, the attempt by American producers to break the UAW and establish market wages had failed.

Chrysler, Ford, and General Motors could not directly confront the union, but after the end of the recession they changed their tactics. Rather than reduce wages or benefits for the UAW, American producers decided to adopt a labor minimizing strategy that would reduce the number of high-wage union workers they employed. Though GM attempted to accomplish this through a massive program of automation, the primary manifestation of this involved reducing the number of components that were produced "in house" and purchasing more from upstream suppliers. This transition was undertaken

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[203] For a summary of the effect of creating a "2-tier" wage structure in the industry, see WAW 4-81, pp. 48-50 and WAR Feb 22, 1982. The original concessions made to Chrysler took place in a series of negotiations in 1979 and 1980 and involved other concessions such as profit-sharing and the opening of company financial information to UAW leadership as described above. See also WAW 3-81, p. 54. The individual motives for various concessions made by both sides and the influence of government on these bargains is discussed in Moritz and Seaman (1981), ch. 12-13.

in a piecemeal fashion during the 1980's in response to declining costs in the expanding components industry.

Despite its failure, the automation plan undertaken by GM to reduce labor costs and "leapfrog the [Japanese] competition" through robotics and computer technology is worth examining.[204] To accomplish this, General Motors undertook one of the largest programs of private capital investment in modern industrial history. This investment program would construct a series of entirely new manufacturing plants that would possess "fully flexible automation and complete computer integration."[205] These "factories of the future" were intended to incorporate extensive robotics to replace repetitive line work, increasing the capital component of assembly costs relative to labor.[206] In addition to substituting away from relatively expensive labor, these plants would increase productivity and allow for operation on a 3 shift, 24 hour per day schedule using the same numbers of workers traditionally required for 2 shifts.

Once again, this strategic choice reflected a decision to use markets as the primary mechanism for industrial adjustment. The problem of competitive adjustment was approached as an accounting decision based on the relative costs of labor and capital. Strikingly, it was expected that General Motors could purchase "off the shelf" robotic and network technologies developed outside of the industry and integrate them into their production process at low cost using primarily the skills of specialist contractors and

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[204] Roger Smith essay on GM investment plans, WAW 9-84, p. 16

[205] ibid.

[206] As of 1981, roughly one third of gross income at General Motors went to labor in some form, with the UAW's standardized industry contracts making this estimate acceptable as a generalization for the industry (see Baker, S&P Industry Analysis 1981, p. A 154). Smith's goal was to reduce this as far as possible,

outside consultants. Failing to understand LP as an organizational technology enabled by specific governance mechanisms, it was simply unimaginable to GM executives that any technological advantage the Japanese possessed could not be purchased and indeed surpassed by the world's largest manufacturing firm. The auto assemblers would operate as consumers of technology and processes, rationally maximizing their own productivity using tools that were available for purchase or hire. This attitude was reflected not only in the massive purchases of, but also in the decision to purchase entire companies in order to acquire their knowledge or supposed technological capacities. For GM, the largest of which were Hughes Aircraft for more than $5 billion and Electronic Data Systems (EDS) for $2.5 billion. The only area of the adjustment strategy in which reliance on markets was constrained involved labor, and the attempt to minimize its use can be seen as an attempt to shift more completely to market-mediated forms of production.

Smith's market led investment gamble failed; the early and under-planned implementation of immature robotic and computer technologies was a financial disaster for General Motors. Despite the $42 billion investment program and the large scale implementation of robotics on assembly lines, the productivity gap between GM and its rivals – domestic as well as foreign – remained constant or grew through most of this period. Comparing plant averages, GM remained by a wide margin the least productive of the Big 3. More compelling is the examination of GM's "factories of the future" in Flint and Hamtramck made by Harbour (1992). At these two highly automated factories, it required at least 30% *more* labor hours to assemble autos than at better organized and

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even if the capital investments required to do this appeared irrational in the short run (See WAW annual interviews, 1982-1983).

more effectively managed plants designed decades earlier.[207] The goal of reducing labor costs had failed on a staggering scale, with the immense capital investments made in these two facilities producing assembly lines that required more human supervision of maintenance intensive and accident prone robots than would be required for workers to accomplish the assembly tasks themselves.[208] Components factories built around high levels of automation during this period also failed, with GM's flagship Vanguard facility closing in 1991 after it proved impossible to match the manufacturing costs of outside suppliers for axle assemblies.

Though the explicit goal of this investment binge in automation was not met, the range of attempts to find a technical solution did foster some of the innovations that ultimately allowed a market-based approach to supplier relations to succeed. As described below, computer networks had by the late 1980's begun to provide the "magic bullet" that allowed assemblers and suppliers in the U.S. to coordinate more effectively with one another despite the lack of close organizational ties. Specifically, the ability to share design and specification data at no cost shortened design cycles and reduced the cost of designing components for manufacturability (which required sharing personnel and geographic proximity in Japanese LP firms) while facilitating competitive bidding processes that increased competition and imposed cost discipline on suppliers.[209] In

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[207] See Harbour 1992. As with previous references to Harbour's productivity rankings, (see footnotes 25 and 29), it is important to note that these should not be taken as a perfectly objective measures of relative productivity due to differences in vehicle manufacturability, variation in the degree of vertical integration of each assembly plant, and capital costs associated with varying degrees of automation.

[208] For brief contemporary reviews of the specific problems using automation technology at the Hamtramck facility, see *Wall Street Journal*, May 13, 1986 and *Manufacturing Week*, September 28, 1987. See also Ingrassia and White (1994), pp. 78-79.

[209] See WAW 3-89, pp. 42-48.

addition, the use of network technology to order, ship, and track components through the production chain allowed American firms to emulate the efficiency gains of "just in time" inventory control even in short term or contingent contractual relationships and despite much larger geographical distances than existed between LP firms. At the same time, computer tracking allowed assemblers to identify bottlenecks and inefficiencies in their purchasing, shipping, and storage procedures that led to organizational changes that reduced the cost of contracting with suppliers even further.

These contributions were critical to the most important American innovation: the increasing use of external suppliers to re-structure their production processes and use market mechanisms to force down costs. Vertical de-integration was the organizational manifestation of this innovation, and the initial outsourcing decisions were based on a desire to escape the high wages demanded by the UAW for parts produced internally. Chrysler had sold off many of its parts-making subsidiaries during the bail-out in 1981, but it continued to spin off subsidiaries on an opportunistic basis throughout the decade.[210] Ford pursued a similar though less radical strategy, while General Motors retained a higher degree of formal vertical integration despite the fact that its internal parts-making subsidiaries increased their own outsourcing, creating "hollow" components divisions that essentially became purchasing centers overseeing networks of external suppliers. The UAW reacted strongly against this, and included requirements for consultation on sourcing decisions in contracts written in the late 1980's.[211] These

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[210] See WAW 5-80, p. 44. Chrysler's Acustar components division was formally spun off in 1987 and attempts were made to sell it in 1987 and 1990. It was finally sold in 1994.

[211] See WAW 10-90, p. 77.

agreements succeeded in saving some specific high profile plants and job classifications, but the process was driven by cost pressures that continued through this period. As the process accelerated during the 1990-1992 recession, it was estimated that the auto industry supplier network would be essentially deunionized by 2000.[212]

The cost savings that came from outsourcing were not only the result of switching to non-union producers. More broadly, they were the product of the creation and expansion of competitive markets in the components industry. Though outsourcing and a greater emphasis on competitive bidding were adaptation strategies pursued by the American assemblers, the creation of markets that produced greater cost efficiency was a joint product of government policies and firm strategy. Specifically, three broad changes through this period made the American auto components industry into a somewhat competitive market and conferred a cost advantage on firms with access to it. First, entry by Japanese firms as both buyers and sellers increased the number of actors to the point where entry in niche component markets became a real threat. This led to increased competition that drove the diffusion of best practice techniques among competing suppliers and encouraged technical innovation. Second, the development of computer design and network technologies dramatically reduced the cost of information sharing, making it possible to provide detailed technical information and coordinate design even between firms with no institutionalized, long-term connection. This also facilitated competition by reducing the costs of bidding on new projects and reducing the tyranny of

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[212] WAW 8-90, pp. 20-21. For an examination of the contractual mechanisms by which the UAW attempted to influence sourcing decisions, see WAY 1991, pp. 36-37; WAW 7-90, pp. 58-61; and interview with UAW president Owen Bieber (WAW 12-90, pp. 55-59)

geography that had supported the oligopolistic regional clustering of suppliers.[213] The third development, facilitated by the first two, involved the internationalization of supplier networks. As Japanese and European suppliers opened offices in the United States to take advantage of new business opportunities, more purchasing was done from firms located outside of the United States. This provided access to the comparative advantages of other institutional environments at a relatively low shipping and monitoring cost. Speaking broadly, the components market moved closer to the competitive ideal as the number of buyers and sellers increased and network technologies reduced the barriers to entry and made information more widely available.

Prior to the mid 1980's, the upstream supplier industry had possessed few of the characteristics of a real market. Idiosyncratic purchasing policies and competition from the assemblers' internal parts suppliers combined with information asymmetries and often radical product differentiation to create serious barriers to entry and massive pricing inefficiencies. Reputation and personal contact were important in an environment where the risk associated with switching vendors could not always be hedged. The barriers created by the need to be familiar with the technical details of specific projects and the organizational characteristics of the assemblers made the auto components industry a closed community of technical specialists. Production or design engineers with experience at one of the major American producers were the most likely entrepreneurs in this field, and the requirements for access and specialized knowledge stifled innovation

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[213] Network technologies partly overcame the coordination problems that LP had solved only through a combination of organizational and geographic proximity (see below). Ohno's (1988 [1978]) description of shuttling Toyota engineers and managers between supplier firms and the assembly line in order to insure an even flow of parts and respond to crises could increasingly, if imperfectly, be replicated by low cost communication at any distance. Organizationally, the problems of specialization and co-investment under

by insuring that a common technical background and socialization dominated the industry. The few exceptions to this pattern were large, diversified firms that entered the supplier industry as only one element of their business based on some obvious competitive advantage, such as General Electric supplying electrical subsystems or large steel mills supplying specialized, pre-shaped metal parts.

This community of suppliers was too small and competition between its members too limited to be considered a market in the sense of classical economics. While the threat of entry or competition from an internal division of the assembler placed more price pressure on American vendors than faced by their counterparts in Europe or Japan, this did not result in the rationalization or efficiency gains that could be expected to arise from broader competition. Competition in the components industry only increased as the policy decision to force Japanese producers to build plants in the United States through the VRA came into effect. The transplant assemblers opening in the United States brought with them a constellation of Japanese component suppliers that set up first purchasing offices and later manufacturing facilities. This created pressure on both the supply and demand sides that resulted in an expansion and rationalization of the components industry. On the supply side, the Japanese supplier firms, once established, began to bid for contracts from the American producers as well as their original patrons. Despite the barriers discussed above, the superior reputation for quality that these Japanese firms brought with them combined with their supposed knowledge of LP techniques gave them a real advantage in winning orders from the Big 3. These firms would not have attempted to enter the American market without both the initial pressure

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arms-length contracts remained but they were reduced by the technology, creating a technical substitute for the organizational innovations of LP.

that forced Toyota, Honda, and Nissan to build facilities in the United States and the ongoing threat of domestic content legislation that the UAW and Democrats pressed for throughout the 1980's.[214] The Japanese assemblers partnered with suppliers through *keiretsu* networks provided a minimum guarantee of profitability in the new market they were entering served as Contributing to the collapse of the UAW among suppliers, these new entrants followed the strong anti-union policies of their Japanese parent firms, creating a cost-based race to the bottom that saw unionized American suppliers pressured to extract concessions from their workers or exit the market.

The pressure to increase the domestic content of their American assembled vehicles also led the Japanese transplants to purchase materials and parts from American firms even while their affiliated Japanese suppliers were expanding their presence in the U.S. This increase in demand fostered market entry as knowledge of Big 3 purchasing policies or preexisting connections became less important for successful participation in the market. Both market entry and the exclusion of the UAW were also facilitated by the fact that Japanese assemblers often located in southern states or rural areas. This combined with computer and network technologies to reduce the location-based cost advantages of existing suppliers in the upper Midwest and created opportunities for regional economies and agglomeration in these new areas.

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[214] For a discussion of domestic content legislation, see above. The specific effect that this had on location decisions is demonstrated in an interview series and analysis in WAW 7-85, pp. 65-69 and 75. Further evidence that the threat of domestic content legislation influenced purchasing and investment decisions by transplant assemblers is provided by interviews with Honda of America President Irimajiri (WAW 12-86, pp. 89-90) and Nissan Motor Mfg. Corp. President Runyon (ibid. pp. 93-94). The claims made by these interviews are supported by the increasing levels of Japanese supplier investment in the U.S. and increasing numbers of joint ventures between American and Japanese suppliers that peaked in 1987 (See Elm International Survey)

This outcome was uniquely suited to the American environment. The existence of a highly mobile labor force in the United States removed what would have been a major barrier to locating plants outside of traditional industrial districts.[215] In addition, the relative fluidity of entry and exit was facilitated by the ease of incorporating new firms or setting up partnerships under the American legal system. The existence of relatively efficient markets as mechanisms for coordinating complex production decisions cannot be assumed, and their existence in the United States made it possible to radically restructure the auto components industry over the course of roughly a decade. In other institutional environments, legal barriers to entry, stronger informal relationships between suppliers and assemblers, a relatively immobile skilled labor force, and resistance to rapid development by local governments or national bureaucracies would have hindered the creation of competition in what had been a structurally oligopolistic industry.[216]

The expansion of this market was also facilitated by the structure of government and the existence of local and state authorities focused on developmental goals.[217]

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[215] A study of labor recruitment for the Diamond-Star joint venture between Mitsubishi and Chrysler in Bloomington-Normal, Illinois illustrates the mechanisms that are required to set up a major industrial operation in a "greenfield" location (Chapman, Elhance, and Wenum (eds.) 1995) The importance of a geographically mobile population, the cultural expectation that skilled labor will change employers frequently, and the existence of facilitating informational mechanisms such as want ads and employment agencies are clear in this case study, but it is important to remember that those conditions and institutions are unusual in international comparison.

[216] Evidence to support this argument about the institutional advantage of the United States in this area can be found in a comparison with Europe. Despite the increasing nominal integration of European auto components markets as a result of the formation of the EU and the 1992 convergence deadline, international purchasing systems developed in the United States only spread to Europe through subsidiaries of American companies and the attempts made by American components companies to sell to European assemblers. See WAW 10-89, pp. 53-55 and the Lopez incident at GM (See Maynard, Ch. 7)

[217] The basic argument regarding the critical developmental role of state and local governments in the U.S. (see Peterson 1995) is borne out both by studying the incentives created to attract Japanese investment

Setting aside the tax subsidies and direct financial incentives used to attract investment, the important aspect of the American system is local control over environmental standards, zoning, and other aspects of regulation. Local governments dominated by business interests and engaged in a competition for investment are able to reduce the regulatory barriers to investment and facilitate a strategy that relies on markets to allocate resources. Though it reduces the friction of market transactions, this process of local regulatory flexibility is not simply efficiency enhancing. When environmental or land use regulations are modified to suit the needs of a new plant, the costs of these decisions are displaced away from industry but are not eliminated. Instead, they are transferred to politically weaker groups that are forced to adapt as best they can to factors such as industrial pollution, altered local labor markets, changes in real estate values, or other manifestations of rapid economic change. In part, this is the inevitable result of mediating social and economic changes through markets, but the role of local government makes the distribution of the costs of creative destruction very much a political question and distinguishes the American system for allocating these costs from those of other countries.[218]

The overall effect of these technological, political, and demand-led changes was to create the most nearly competitive market for auto components in the world, driving down costs and fostering both organizational and technical innovation. By 1989, more

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(Yanarella 1990) and an examination of the role of state and local governments in the 1980 Chrysler bailout agreement (WAW 05-80, pp. 43-48)

[218] The political choices involved in building Volvo's greenfield Uddevalla plant in the late 1980's provide an instructive comparison with the various new plants built in the United States during this period. The same general process was carried out in direct cooperation between the national government, the national Metall union, and Volvo largely using non-market coordinating mechanisms. Though focused primarily on the attempts to introduce new industrial practices at the plant, Bergren's (1992) examination of the building and operation of the plant provides a useful summary.

than 150 Japanese supplier firms were operating in the United States, of which less than half served only Japanese assemblers who were their original patrons. At the same time, the relatively open markets that were created in North America attracted significant numbers of entrants from West Germany, Britain, and Canada. By 1988, the director of international trade for the Motor and Equipment Manufacturer's Association argued that locating in the United States was perceived as an "economic imperative" for large suppliers.[219] Though comparisons across models and types of vehicles over time are difficult, this more competitive and internationalized components market seems to have reduced costs and increased the efficiency of the bidding process. Direct evidence for this comes from the numerical estimates from the 1992 Harbour Report, the success of the Big 3 in cutting supplier costs in response to the 1990-1992 recession relative to their performance at the same task in 1979-1982, and supplier benchmarking done by assemblers in the early 1990's. Indirect evidence appears in the responses to Ward's annual supplier and purchaser surveys and the fact that assemblers – international as well as domestic – tended to either increase their purchases from suppliers or benchmark their internal operations based on external standards – strategies that are only rational if the American supplier market had successfully created a new global best practice.

At the end of this period, the international aspect of increased competition came into sharper relief with the completion of the European Common Market in 1992 and the ratification of the NAFTA agreement in 1993. The success in reducing costs achieved by the competitive North American supplier market (the United States and Canada had

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[219] Numbers of Japanese transplant suppliers from Elm International Survey (reported in WAW 7-89, pp. 63-64). Numbers of European suppliers based on *Automotive Parts International* survey. Quote reported in WAW 1-88, p. 70.

eliminated auto component tariffs in the 1960's) created an additional incentive for non-American companies to locate production facilities or purchasing offices in the United States. This reinforced the political incentives created by the VRA and the threat of domestic content regulation that returned during the 1990-1992 recession. By the end of this period, the dawning globalization of the auto components market had become one of the dominant characteristics of auto production, hollowing out final assemblers and transforming the patterns of employment in the industry.

The trend toward outsourcing combined with the technical innovations in computers and network communications to produce a final set of organizational changes among American firms. By the early 1990's, the increasing use of modular subsystems was increasing the cost savings that could be obtained through outsourcing and allowing manufacturers to reduce the time required to develop new products. Among American producers, modular assembly was made possible only by the close coordination between assemblers and suppliers that network technologies allowed.[220] The key characteristic of these network technologies was their generic, adaptable character. Unlike the automation that was attempted in the early 1980's, the software systems that were used to connect assemblers and suppliers could be purchased "off the shelf" and tailored to a variety of new industrial applications without the need for a skilled and cooperative labor force to implement them. It was possible to hire technical specialists and even senior managers

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[220] LP producers were able to exploit close relations with traditional supplier firms to facilitate the cooperative design work demanded by modular assembly, but this method of organizing manufacturing requires that supplier firms possess specialized and diverse competencies. These competencies had to be built up by long-term investment by both parties among traditional LP suppliers, while American firms were able to contract with firms already possessing these investments (often from other sectors) in the expanding components market. The fact that many Japanese assemblers in the United States emulated this pattern in the 1990's suggests that the cost structure of modular assembly favored market based coordination over co-investment within relational or *Keiretsu* structures.

with roughly the appropriate skill set directly, taking advantage of the external labor markets that characterize the United States. Also unlike the automation of the early 1980's, the implementation of these computer and network technologies encountered no resistance from organized labor. Since most of the jobs directly affected by these reorganizations were in white collar management, office, or engineering, it was possible to liquidate labor through management reorganizations and downsizing of salaried personnel without obstruction.

The actual effect of modular assembly was to allow auto makers to outsource the production of increasingly complex and integrated components. Because the specifications for these components could be shared at minimal cost and computer aided design could insure that the subassemblies would be compatible, the number of tasks that had to be accomplished at a final assembly plant could be reduced and the nature of those tasks could be simplified. For example, rather than having unions workers install all of the wiring for a vehicle's electrical system on the line at the final assembly plant, it became possible to order subassemblies for the electrical system from outside suppliers that would only have to be plugged together on the assembly line. This reduced the complexity of the assembly task, eliminated union jobs, and produced gains from specialization as contractors or suppliers with specific competencies in electrical work replaced more general labor at the assembly plant. Modular assembly, in this sense, was a refinement of the division of labor that was only possible because of the two innovations described above: large and open supplier markets that could be entered by specialist firms and the transmission of complex engineering data through computer networks.

The last element of American adaptation involved product market strategies. Unlike the failed attempts to implement LP or the increased use of market mechanisms to drive down costs, product market strategies were not intended to make firms more competitive with Japanese imports, but to avoid that competition. With imported cars from Toyota, Honda, and Nissan initially concentrated in the compact and economy segments, the obvious solution was to simply cede those segments to the Japanese and concentrate on sales of larger cars the Japanese did not produce.

This strategy had been pursued during the 1970's when Japanese compact cars first began to take market share from American firms, but during the 1979-1982 recession it seemed impossible. Consumer tastes had shifted decisively toward more fuel efficient vehicles after the 1979 oil shock, and the inventories of large, V-8 powered cars that remained unsold from the 1980 and 1981 model years provided an object lesson in the dangers of ignoring the effect of rising fuel prices on the distribution of demand. After 1981, however, oil prices began to fall. The slow decline turned into a collapse in 1985, and prices remained at levels comparable to the early 1970's until the invasion of Kuwait in 1990. This decline in fuel prices did not immediately translate into increased sales of traditional large sedans, station wagons, and luxury cars. Levels of demand for small cars did not drop as quickly as they had after the first oil shock in 1973, but from 1985 on the potential existed for a renaissance in the American market for large vehicles.

Such a vehicle would have two advantages for American producers. First, it would allow auto makers to focus on a market segment that offered a higher profit margin per vehicle, reducing the numerical break-even point for sales of a given

model.[221] As importantly, it would allow American firms to market vehicles that had no Japanese competition. The Japanese consumer market demanded small, fuel efficient vehicles due to congested road conditions and high gasoline prices. Japanese firms had developed design and manufacturing expertise that placed a premium on minimizing weight and maximizing efficiency, giving their engineers little experience in designing larger vehicles. As a result of this, Japanese firms still had no presence in the more profitable mid-sized and luxury market segments by 1985.

With the increase in demand for such vehicles after oil prices began to fall in 1983, Ford's large luxury sedans sold strongly despite the fact that they had not been technically updated or more than superficially restyled since 1979. Planners at the Big 3 estimated that it would take Toyota, Honda, and Nissan several years to develop their own luxury sedans, imposing on Japanese producers the exact disadvantage in terms of development costs and internal expertise that had faced American firms trying to develop and market small cars after 1979.

Aside from the fear that another oil crisis could reproduce the dynamic of the 1979 collapse, the barrier to this strategy came from government regulation. As written in 1975, the federal fuel economy (CAFE) standards set a miles per gallon average for each manufacturer's fleet of domestically produced vehicles. Individual vehicles produced by the American Big 3 could be as wasteful of gasoline as their manufacturers and designers wished, but the average for each company had to meet standards that ratcheted up automatically over time. In practice, this meant that each large, low-mileage

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[221] Numerical cost efficiency is an important concept in mass production, representing the number of sales that must be made at a given price to recoup the investment in design and fixed capital required to organize a given production line. Though I do not examine this aspect of it in detail, the use of more flexible capital equipment in lean production had the effect of making smaller production runs profitable.

vehicle sold by Chrysler, Ford, and General Motors had to be balanced by a small, fuel efficient one. Because of this, no manufacturer could abandon the small car market to specialize in only luxury sedans or other large cars without facing massive fines. Even after the imposition of the VRA and the resulting price increases in Japanese cars, all three American firms were forced to produce large numbers of low quality, poorly designed small cars that were dumped on the market, often at a loss, in a bizarre act of regulatory cross-subsidization.

The auto makers experimented with several strategies to escape this regulatory trap and free themselves to increase their sales of inefficient but profitable large cars. General Motors attempted to have its captive import small cars classified as domestics to improve its CAFE balance and arranged joint ventures with Toyota to produce small cars in America that could be counted toward their small car totals. Two lobbying assaults were made on the fuel economy laws by executives at General Motors and Ford, but Democrats in Congress viewed the issue as an effective tool to highlight the Reagan administration's lack of concern for the environment, fighting off both attempts.[222]

The most effective way to escape the CAFE trap, however, emerged from a minor debate over family farms when the original legislation was passed in 1975. During the deliberations, Senators from rural states became concerned about the impact that fuel efficiency standards might have on American family farms. In the 1970's, pick-up trucks were heavy, uncomfortable, utility vehicles used primarily for the short-haul freight requirements of small businesses and farms rather than recreation or family travel. Their fuel efficiency was poor and they were sold primarily in midwestern and western states to

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[222] See the discussion of lobbying over the CAFE above.

contractors, farmers, and ranchers. In Congressional testimony, it was argued that applying fleet average fuel economy standards to these vehicles might force auto makers to exit these markets, hurting farmers and ranchers that the structure of state representation in the Senate gives disproportionate electoral influence. Since pick-up trucks represented a small and geographically limited segment of the market and occupied an ambiguous position between private and commercial vehicles, the CAFE legislation was written to exclude "light trucks" as a category. More generous and flexible limits were later set largely at the discretion of the NHTSA. Even those who were concerned about light trucks for environmental or conservation reasons were convinced that pressure from high fuel prices would limit the potential growth of this market niche in the wake of the first oil shock in 1973.

By the early 1980's, growth in sales of light trucks was proving this incorrect. Based partly on the popularity of small, fuel-efficient Toyota trucks through the 1979 oil crisis, American manufacturers began the process of re-designing pick-up trucks as passenger vehicles. Led more by expanding consumer demand than by a conscious decision to transform trucks from work vehicles to rugged passenger vehicles for consumers frustrated by the trend toward compact cars, Ford and General Motors led this process. The market evolution of the pick-up from work vehicle to family and personal transportation involved making them smaller and more fuel efficient in the early 1980's, then gradually making them more comfortable and stylish while changing the targets at which they were marketed.[223]

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[223] Unusually for the automotive industry, this trend seemed more driven by incremental shifts in demand than by a single, decisive change in manufacturers' market strategy. The steps in this chain can be seen in WAW 8-81, 31-35; 8-86, 33-39; and 10-87, pp. 59-61. Clouded by the inclusion of mini-vans and SUV's in the same category, the tectonic changes in the market for light pick-up trucks and the acknowledgment

Pick-up trucks, despite a growing consumer appeal, could not serve as true replacements for the large sedans and station wagons that were being eliminated or downsized by CAFE standards. In the early 1980's, with fuel prices still relatively high, the existence of this potential demand was not generally recognized. The market signal being sent by the growth of light truck sales was correctly interpreted in the 1970's by Harold Sperlich, an executive in charge of new vehicle design at Ford. He envisioned an entirely new kind of vehicle that would serve the baby boom generation of suburban parents as a replacement for the station wagons used by their parents in the 1960's. Targeted as much at women as men, this vehicle would be a small, light, fuel-efficient passenger van designed to feel and perform like a mid-sized car.[224] Ford's design team created plans for what would ultimately be called the "minivan," but the capital requirements for creating an entirely new platform for which there was no proven market represented an unacceptable risk.[225]

After the federal bail-out in 1980, the leadership of Chrysler (where Sperlich was employed after being fired by Ford) was uniquely willing and able to take a risk on the scale that the mini-van required. The company had secured its immediate future during the recession through the combination of federal assistance and being the first domestic auto maker to market its fuel efficient, front wheel drive car while fuel prices remained high. These small cars had little to recommend them except being available in the right

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that these vehicles were no longer being bought primarily by small businesses and sportsmen was only clearly identified toward the end of the decade. For a summary of this, see WAW 10-91, pp. 24-26 and 10-92, pp. 31-33.

[224] The shift in vehicle design and marketing to target women in the 1980's is a historic change in the industry, and many of the general market trends visible during this period such as easier steering, lower entryways, and greater emphasis on safety, are tied to it. The importance of gender in designing and marketing minivans is reviewed in WAW 10-91, p. 25

place at the right time, when high demand had bid up the prices and reduced the availability of compacts from Toyota and Honda but before the other American firms had introduced their small car lines. It was expected that the newer Ford Escort and General Motors K-platform cars would be superior in quality, price, and reliability to the Chrysler Omni/Horizon platform, leaving Chrysler's new management with no better option than to bet most of the federal bailout funds on Sperlich's minivan – a new product that would either save the company or bankrupt it. The decision was made in early 1980, immediately after the CLGB was created, and gained the support of the government oversight committee. It is unlikely that any American firm in a similar position could have raised the $700 million needed over the project's full three year design and manufacturing cycle from financial markets.[226] New platform investments in the American auto industry are always financed by retained earnings, and only the fact that Chrysler's investment was being underwritten by the "patient capital" of the federal government made this strategy possible.

The strategy was successful on a scale seldom seen in mature industries. Chrysler Caravan and Voyager minivans "blindsided the industry" and sold nearly 200,000 units in their first year.[227] The other American auto makers accelerated their plans to enter this new market niche, with the Ford engineers who had worked under Sperlich producing a new design while General Motors simply cut down its full sized vans until a new program could be launched. While the other domestic producers were

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[225] See Halberstam (1986) pp. 561-566 and WAW 3-83, p. 36.

[226] See WAW 3-83, pp. 36-43 and 98.

[227] WAW 3-85, pp. 64-65.

attempting to copy the Chrysler phenomenon, Toyota and Honda found themselves without the design or engineering capacity to even begin such a project. The Japanese domestic market had no parallel niche and the engineering capacity required to fill it had to built up from scratch – largely by investment in design and testing facilities in the United States. As a result of this, neither Toyota nor Honda was able to effectively penetrate this market until the early 1990's. This gave the American firms a source of oligopoly profits through the late 1980's that proved critical to their successful recovery. Forced out of the large and luxury sedan markets by the CAFE rules, American firms had responded with a new kind of vehicle in which they retained an engineering and manufacturing advantage.

This strategy was a product of both institutions and policy. In order to produce these vehicles, Chrysler and Ford had to dramatically retool existing plants and liquidate labor in a short time. Despite a 37 day strike at one critical Chrysler plant, this imposition on labor was easier in the American institutional environment than it would have been elsewhere. A similar advantage emerged in supplier relations, where the same system of arms-length, short term contracts that hindered the adoption of LP facilitated the rapid shift to minivans. New suppliers operating on yearly, contingent contracts were selected by Chrysler to supplement or replace existing suppliers lacking the capacity to produce the required components. These institutional factors combined with the CAFE standards and the federal bailout made the minivan an example of unintended but successful industrial policy, using government funding and the manipulation of perceived costs and benefits created by federal regulation in order to direct investments that took advantage of flexible labor and supplier markets.

The emergence of sport utility vehicles (SUV's) in the late 1980's followed a more evolutionary pattern, but represented exactly the same attempt to diversify out of markets where the cost advantage of LP was overwhelming and into areas not covered by CAFE regulation. In an important divergence from the minivan, however, the question of whether SUV's would be considered trucks or passenger cars was the explicit subject of industry lobbying. With the failure of the Reagan administration's attempt to loosen and ultimately eliminate CAFE standards in the mid-1980's, regulators in the Department of Transportation found it easier to modify the standards in subtle ways that would benefit the emerging product strategy of American firms than to push for formal changes in enabling legislation. In the nexus of policy making between executive and legislature, the low visibility of these decisions and the difficulty of passing legislation to target a specific regulatory policy gave the Reagan administration a decisive advantage in subverting the intent of the CAFE standards and allowing the average fuel efficiency of the American passenger vehicle fleet to stagnate through the last half of the decade.[228]

Overall, this product-based strategy on the part of American auto makers had an enormous influence on both their competitive success and the structure of the country's passenger vehicle fleet. The effect of this strategic re-orientation away from cars and toward the various types of light trucks was historic at the aggregate level. As a result of the CAFE standards designed to push the development of smaller, more fuel efficient vehicles, the total number of cars sold in the United States *declined* during the decade of

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[228] The relevant section of the Energy Policy Conservation Act that established CAFE standards instructed the NHTSA to set truck standards at the "maximum feasible level" for all years after 1979. Under the Reagan administration, this was interpreted to require taking into account four factors: technological feasibility, economic practicability, the effect of other standards on fuel economy; and the need of the nation to conserve energy. These factors allowed enormous administrative discretion. In practice,

the 1980's by roughly 2.21 million vehicles compared with the previous ten years while the total number of trucks increased by 8.37 million. More importantly from the perspective of the American industry, light trucks represented the only area in which their overall sales increased in the same period. During the 1970's, roughly 83.8 million cars were sold by American manufacturers, while 16.9 million were imported. During the 1980's, domestic sales declined to 71.7 million while imports increased to 26.8 million, the overwhelming majority of which were compact and sub-compact sedans that had grown to dominate 36.5% of the market. Overall sales of American light trucks, by contrast, increased by roughly 4 million in the same period, representing the only market segment in which American firms improved their sales during the decade.[229]

The Japanese response to the product strategies of their American competitors was shaped by the same political pressures that had led them to construct assembly plants in the United States. Facing the need to develop cars that met increasingly unique American demands, Toyota and Honda constructed design studios, testing grounds, and market research facilities in the United States. The impetus provided by the VRA to build vehicles in the United States was reinforced by the perceived need to design and test vehicles close to the American market or suffer an ongoing competitive disadvantage in their most important export market. The American divisions of Japanese firms became more independent from their domestic base in a parallel to what had occurred at Ford's

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standards for light trucks varied by weight and drive train characteristics, but were generally set between 19 and 21mpg in the late 1980's, compared with 26.5mpg for cars. See WAY 1986, p. 21.

[229] Sales estimates from WAR Oct. 3, 1988, p. 313 and p. 318; WAY 1993, p. 207; and WAW 10-91, pp. 24-25

European divisions in the early postwar era.[230] By the end of this period, Japanese firms were beginning production of both SUV's and minivans, but the market domination of American producers that was established in the 1980's and maintained through continuing refinement of SUV design was eroded only slowly.

In the overall pattern of adjustment, product differentiation can be seen as a temporary but highly effective strategy that exploited the institutional, policy, and knowledge-based advantages of American firms. While manufacturing strategies to deal with LP could not overcome the cost difference, product differentiation had the effect of making relative manufacturing efficiency irrelevant. Though an examination of the long-term effects of this strategy is beyond the scope of my argument, the absolute dependency of this strategy on historically low oil prices should be pointed out. The "light truck" strategy of product differentiation can be seen as an enormous bet on oil price trends; by their massive investment in producing large, inefficient vehicles, American producers developed design, manufacturing, and marketing capacities that were only useful in an environment of low fuel prices. In a broader historical context, however, this strategy exactly replicates the industry's stance prior to the 1979 oil crisis. When the next oil supply shock of comparable size and duration occurs, it is likely that the industry - abetted by government unwillingness to raise CAFE standards or close the light truck loophole over a period of twenty years – will be only slightly better positioned to cope with shifting demand than it was in 1980

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[230] See Ingrassia and White (1994), pp. 236-237 and Studer-Noguez (2002), pp. 22-29. Studer-Noguez emphasizes tariff barriers in shaping Ford's European "multi-domestic" strategy in the 1930's, while differing consumer tastes pushed Ford's European divisions to develop entirely different lines of vehicles in the 1960's.

3.7 Conclusion

The framework presented in Chapter 2 makes it possible to interpret the American response to lean production. This involves three steps that map out how American firms' response strategies were shaped by the external environment. First, LP can be defined as an organizational technology that is bound up with two specific forms of resource governance that are institutionally supported in Japan. This provides a clear explanation of why the organizational strategies pursued by American firms to implement LP in North America failed. Though these failures manifested themselves in a variety of ways, in each case it proved impossible to align incentives for labor and upstream suppliers in ways that produced the collaboration and mutual investment required by LP. Attempts to use complex contracts and informal negotiations with suppliers and the UAW represented attempts to find functional substitutes for the governance that made LP possible in Japan, but these failed as well.

Second, though there were scattered attempts to use government to provide needed forms of resource governance, the costs of such a strategy were considered too high by managers. The reason for this is quite revealing and suggests a weakness in my argument. Because the governance mechanisms required to replicate LP would have involved limiting the ability of firms to use markets to escape from commitments to suppliers or labor, American auto executives did not pursue them in a systematic way. The general socialization of American managers, the regulatory history of the auto industry in the 1960's and 1970's, and their choice to form a partisan alliance with the Reagan administration all undermined the ability of American firms to formulate an agenda of imposing "beneficial constraints" on their operations. Based on this, my general argument that firms will rationally pursue political strategies that facilitate the use

of a clearly superior technology should be amended to consider both the structural difficulty of creating new institutions and the importance of the cognitive limits of decision-makers within firms.

In this case, the only serious attempt to use the power of government to create the governance mechanisms necessary for LP came from outside of the industry as part of the Chrysler bailout. While this use of regulatory power and special legislation was surprisingly successful in improving coordination between Chrysler, the UAW, and suppliers, it was undermined by the resentment of managers who were frustrated by the ways in which it limited their ability to use outside markets. Where the option existed, the siren song of unfettered access to external markets could not be resisted by decision makers within any of the Big 3. This pattern can be seen not only in the eagerness of Chrysler executives to escape the constraints of the CLGB, but also in the failure of voluntary long-term supplier contracts and the abuse of employee participation programs.

This tendency to prefer the exit option offered by markets even where they were proven to be less efficient was the result not only of the ideology of managers, but also of their honest evaluation of their organizational capacities. Each of the Big 3 had well developed, institutionalized skills in organizing production through market mechanisms. Managers had developed systems to evaluate costs, insure compliance with contracts, and use the market power of being a large purchaser quite effectively, and these organizational capacities represented both an objective asset and a bureaucratic constituency within each company. To abandon the forms of resource governance preferred by these groups would have involved high risks and the need to engage in costly organizational learning even if the institutional preconditions could be achieved.

This resistance to entirely new ways of governing resources and the tendency to prefer adaptations that use existing capacities seems to be a general phenomenon, and a combination of extreme need and the undeniable failure of older forms of governance seem necessary to overcome it.

Again the parallel with the circumstances that led to the creation of LP in Japan is instructive. Ohno describes resistance by suppliers, workers, and managers to his attempts to change their behavior based on an adherence to traditional ways of solving problems and a cognitive model developed for mass production.[231] He also states that it required more than ten years to fully implement the LP system even with full support from senior managers – a period characterized by constant experimentation, redesign and rearrangement of equipment, and the development of new sets of skills among workers.[232] It is difficult to imagine any firm voluntarily engaging in a costly, long-term process of experimentation and organizational learning unless no alternative existed. In most industries, it is even more difficult to imagine that the organizational slack would exist to allow resources to be used in such experimentation.

Given this, the technical and organizational innovations undertaken by American firms in order to make markets more efficient as a means of competing with LP are also more comprehensible. When the creation of Japanese forms of resource governance in the United States was seen as flatly impossible, firms undertook the higher-risk strategy of technical entrepreneurship. The reasons why this should be considered an inferior strategy from the perspective of firms are demonstrated by this case. General Motors

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[231] See Ohno (1988 [1978]), p. 31

[232] Ibid. pp. 34-36

wasted several billion dollars and roughly five years on a program of technological change based on robotics and computer-controlled assembly lines that that proved unworkable. Similarly, early attempts to use network technologies to organize inventories or coordinate design work were not cost effective and demanded large investments not only in equipment, but also in restructuring internal processes and organizational learning. Again the most spectacular example is offered by General Motors: their attempt to develop network technologies by purchasing Hughes Aircraft for more than $5 billion and Electronic Data Systems (EDS) for $2.5 billion. Though these purchases were exceedingly wasteful and resulted in serious organizational problems within the company, they were important steps in developing the technologies that ultimately worked for all three of the American assemblers.[233] The billions wasted by General Motors produced techniques and organizational forms that were used more effectively by their domestic competitors to develop joint design and modular assembly programs that became industry standards.

Finally, even in areas where adaptation did not rely on the organizational and political mechanisms I identify, this case shows that a more nuanced model of business lobbying is needed. More importantly, it suggests some of the characteristics that such a model should offer. Contrary to rent-seeking models of redistribution in the tradition of Stigler and Peltzman, regulatory lobbying is seldom performed in isolation for the direct purpose of extracting rents. In this case, regulatory lobbying was generally part of a larger corporate strategy. For example, the strategic use of the CAFE standards to create

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[233] Despite the extremely costly conflict that this purchase created between EDS founder Ross Perot and GM Chairman Roger Smith (see Maynard 1995 and Keller 1989), EDS employees and organizational systems were critical to reorganization of GM's purchasing system and internal record keeping (see WAW 11-90, pp. 35-37).

temporary monopolies in minivans and SUV's can be seen as the creation of an opportunity for rent extraction, but this is hardly intuitive. The strategy required that massive investments be undertaken to develop an entirely new kind of vehicle for which no clear and distinct market existed. More tellingly, the opportunity for this kind of regulatory lobbying only existed because of the way the original CAFE law had been phrased and the fact that the Reagan administration's bureaucratic appointees were exceptionally accommodating to auto makers – especially when the strategy being pursued could be presented as reliant on competitive markets being blocked by intrusive regulation.

This shows that lobbying emerges from broader strategies and, when dealing with complex regulation, is based more around political targets of opportunity than simply the creation of rents. As firms are embedded in a complex regulatory environment, they will alternately treat regulation as a constant element of that environment or as something subject to manipulation, depending on the evolution of their own resources and the political opportunity structure they face. The alliance between auto makers and the UAW to support the VRA offers an example of this. Though auto makers had no interest in supporting the union's goal of preserving privileged jobs and their international sourcing strategies made them lukewarm to protectionism in general, Ford and Chrysler took the opportunity to force their Japanese competitors to produce in the higher cost American environment. In a similar fashion, support among the Big 3 for joint research programs in the early 1990's reflected their acknowledgement that the broader political environment was moving against them. Realizing that regulation in areas such as CFC's, particulate tailpipe emissions, and impact standards were inevitable, American auto

makers attempted to use exactly the means they had rejected a decade before to mitigate the costs that these regulations would impose.

By viewing industry lobbying as something that emerges from the interaction of firm strategies and the political environment, the politics of the auto industry during this period are made comprehensible. While my argument explains one regulatory goal that firms might pursue – creating the governance mechanisms they need to use a new technology – this case shows that that political action can be one aspect of a range of different competitive strategies. Product market strategies, specific attempts to increase competitors' production costs, or attempts to achieve technical innovation can all be facilitated by government action, and firms' strategies to gain these benefits must be understood in the context of their broader goals. A simple rent-seeking formula blinds one to all of this by focusing on the redistribution of resources in a static environment; so long as firms operate in a dynamic one, this will be misleading.

Chapter 4: Electronic Data Processing in the Commercial Banking Industry: 1960-1972

4.1 Introduction

In the 1960's, the American banking system faced a unique crisis. The country's commercial banks were no strangers to deep-rooted, structural problems that emerged as periodic waves of failures and financial contraction. Their history since the early 19th century had largely been a story of recurring local panics, regional cascades of bank failures, and system-wide liquidity crises. But in the 1960's American banks were facing an entirely new problem. Rather than dealing with the threat of insolvency from undiversified risk or a lack of confidence from depositors, banks faced a crisis of prosperity. Economic growth, increased use of banking services, and a change in the role played by credit in the economy had created a novel crisis of information management.

The information overload suffered by banks was a result of rapid, consumer-driven economic growth that placed new demands on banks as both deposit takers and lenders. The postwar economic expansion was the first in history based primarily on mass consumption. Boom periods in the 19th century had been driven by investment goods such as railroads and steel or by the unintended Keynesianism of government spending – usually in wartime. Expansions of this nature funneled more money through the banking system, but business investment required relatively little record keeping; large accounts with standardized, regular transactions such as monthly payroll could be handled by even the pen and paper systems used by banks. The increasing number of small personal accounts characterized by constant, irregular transactions produced different kinds of record-keeping demands. Individual or family deposit accounts

required more frequent updating, while an explosion in the volume of small consumer and real estate loans contributed to an overwhelming increase in record keeping requirements. This meant that not only was the volume of funds to be dealt with growing at an unprecedented rate, but more importantly, the number of transactions to be processed for any given amount of money was multiplying.

For banks, every transaction imposed a marginal cost. On the deposit side, the time and attention of a teller and clerk were required for every movement of funds. In addition, as more of these transactions involved transferring funds out of the immediate geographical area served by the bank, the use of correspondent relationships or the Federal Reserve's check clearing system added expense.[1] On the lending side, real estate, automobile, or consumer loans were more expensive for banks than traditional business lending, requiring relatively more time and oversight from a loan officer per dollar lent because of the small size of the loans and the diversity of borrowers. Where lending $1 million even to small businesses might involve only a half dozen individual loans, the same amount of money in the consumer era might finance hundreds of loans of a few thousand dollars each. As this trend continued, the need to track, record, and process small monthly payments from consumer customers threatened to overwhelm banks with paperwork. As important as the direct costs imposed by small depositors and borrowers, every transaction also represented a potential source of human error, which could result in the need for costly correction or even legal conflict. As both the numbers

[1] Throughout this period, banks were forbidden by law from offering interest on demand deposits and faced a regulated maximum interest rate on time deposits. This made competition for deposits on the basis of price impossible and forced banks to compete in offering services. The pressure of this competition among large, urban banks prevented service charges from simply increasing along with the volume of transactions.

of customers and the turnover of deposits increased, bank profits failed to rise as quickly as growth in deposits and lending.

Large banks in New York and other regional financial centers suffered from these trends first. Rising administrative costs, the difficulty of hiring qualified workers in a tight labor market, and pressure to speed up financial transactions pushed the largest and most innovative of these banks to experiment with the use of computer technology to manage information. In cooperation with the largest computer manufacturers, First National City Bank of New York, Wachovia, and Bank of America each developed electronic data processing (EDP) systems that increased the speed and reliability of demand deposit accounting while lowering the cost per transaction. When national standards for machine-readable checks were established by the American Bankers Association (A.B.A.) in cooperation with equipment manufacturers and the Federal Reserve, the potential savings from automation grew dramatically. The success of this system in using electronic equipment to reduce labor requirements created an obvious starting point for broader computerization programs – if the information on every check was being read by machine for sorting, it would be only a small additional step to transfer that data to computers that would track accounts and update balances automatically.[2]

After these check reading standards were adopted in 1960, EDP technology began to diffuse through the banking system. In the first half of the decade, large banks facing high transaction volumes were the primary users of EDP. The organizational, financial, and personnel barriers to implementing EDP were high, and small, independent banks in

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[2] For a brief summary of the network effects of the magnetic ink character recognition (MICR) system and the connections that check-reading equipment could have with other forms of EDP, see Reistad (1961). The importance of the MICR system in convincing banks to automate other areas of record keeping is examined by Yavitz (1967), pp. 27-30 and Aldom et. al. (1963), pp. 99-103.

rural areas were often able to deal with growing accounting problems without automation. As the decade progressed, the cost pressure from growing numbers of transactions increased while the lessons of early adopters made using computers a less daunting prospect for banks. At the same time, aggressive marketing by computer manufacturers and the A.B.A. allowed progressively smaller banks to adopt electronic systems, until by the early 1970's 62% of all commercial banks either had an EDP system in operation or were in the process of creating one.[3] By 1972, automation had been implemented through enough of the banking system to allow consistent patterns of coordinating labor, equipment, and organizational resources to emerge.

As the technology diffused, EDP imposed three problems of resource mobilization and coordination on banks. First, the large, complex computer systems themselves had to be purchased and integrated into the production process of an industry that had previously used almost no capital equipment. A high fixed capital cost and problems integrating EDP into existing information management systems required organizational change and costly investments that were challenging to banks of all sizes. Second, the new computer systems required a complete change in the personnel requirements of bank record keeping. In the early 1960's, basic clerical work in banks was generally done by poorly paid, largely female "pink-collar" workers. This clerical labor force was poorly organized, idiosyncratically trained, and displayed an annual turnover rate as high as 50%.[4] In order to adopt EDP, these clerical workers had to be eliminated and replaced by a smaller number of highly skilled systems operators,

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[3] A.B.A Automation Survey (1972).

programmers, and technicians. In most areas of the country, skilled programmers were simply not available through existing labor markets. This forced banks to adopt a range of strategies to train or attract the workers they needed to design, construct, and run their new automated systems.

Third and most importantly, the computer systems available through the 1960's had been designed to meet the data processing demands of some of the largest commercial banks in the world. These systems represented far more data processing capacity than was required by smaller banks. This created new and powerful economies of scale in an industry that was geographically diffused and made up of many small firms. Firms were faced with the necessity of either increasing their own transaction volume through mergers and acquisitions or finding some way to deal with a mismatch between the capacity of EDP equipment and their own data processing needs. To implement either of these strategies, banks were forced to change their regulatory environment, gaining from government the ability to consolidate or to enter new markets that had been expressly forbidden them since the 1930's.

In Section 4.2, I will begin by examining the banking sector as it existed prior to 1960. Bound within the New Deal regulatory structure, banking was among the most tightly and comprehensively regulated sectors of the American economy. With an emphasis on stability and the security of deposits, this regulatory regime governed how banks could be structured, the kinds of commercial and investment activities in which they could engage, and the kinds of services they could offer. This historical background is important for two reasons. First, it establishes the regulatory environment and political

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[4] Yavitz (1967). See also footnote 96 below.

opportunity structure facing commercial banks in the 1960's. Because commercial bank regulation was so complex and historically embedded – with four overlapping bodies claiming authority over bank conduct and organization – this history is vital to understanding how banks chose to lobby for the regulatory changes they required. Second, this historical context will help to isolate the effects of EDP from other forces that were both influencing bank lobbying and placing greater stress on the industry's regulatory structure. Even aside from changing technology, commercial bank regulators had to deal with the rise of non-bank financial institutions, the effects of postwar economic growth, and the development of new financial instruments. Faced with these challenges, the compromise regulatory system that had emerged from the New Deal seemed increasingly unsuited to the needs of bankers and bank customers, producing support for regulatory reform at the federal and state levels. By describing this regulatory system and the condition of banks generally in the period when automation was introduced, it will be possible to separate organizational and regulatory changes that were part of banks' strategies for dealing with EDP from those that emerged from other sources.

Limiting the scope of the case is especially important when evaluating adjustment in the banking sector. The period from 1960 to 1972 represents the end of an era in American finance. The late 1970's and 1980's saw widespread federal deregulation of banking and the spread of two other technologies – credit cards and automatic teller machines – that had transformative effects rivaling those of EDP. With the relatively unregulated entry of other firms into the business of supplying consumer credit and managing deposits, the definition of the banking sector blurs and an examination of how

technology is applied becomes more complex.[5] In a sense, the banking sector as it is defined in this chapter ceased to exist shortly after 1972, and many of the political forces that produced this radical deregulation were already mobilizing in the period I examine. In this twilight of the New Deal regulatory system, however, the task adapting to EDP technology was limited by law to commercial banks – a specific group of firms that possessed common functional and organizational characteristics. This narrows the range of factors that affected managers' decisions in how to use EDP and makes the case tractable. Where the auto sector features only three structurally similar firms whose decisions must be interpreted, the legally enforced homogeneity of the nearly 15,000 commercial banks that existed in the 1960's serves a similar simplifying purpose.

After setting out the regulatory environment and history that had defined commercial banking across the United States, section 4.3 will examine the coordination problems created by EDP technology in general terms. The required changes in capital investment, the character of the labor force, and the organization of the bank's data processing systems will be explained. This will involve a brief review of the cost structure of EDP systems, the ways in which banks were introduced to computer systems, and the degree to which EDP technology presented banks with unalterable constraints on how resources were mobilized and coordinated. This section is critical to the overall argument because it shows how a common interpretation of a new technology and the governance mechanisms required to use it can be generated and spread. In this case, a powerful industry association supported by a few large banks and the firms that built and

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[5] The *Depository Institutions Deregulation and Monetary Control Act* (1980) and the *Depository Institutions Act* (1982) at the federal level broke down most of the New Deal era restrictions on entry and eroded many of the safeguards on asset management by banks. For a summary of deregulation and the structural transformation of American banking in the 1980's, see Compton (1987), especially pp. 259-283.

supported EDP equipment imposed a specific construction of the technology on smaller banks that was then responded to as though it represented the objective characteristics of EPD.

The fourth section will examine the organizational changes banks had to introduce in order to meet the capital and labor governance requirements of EDP. This aspect of adjustment involved close cooperation with computer manufacturers and a surprisingly active role for the A.B.A. Unlike the auto sector, where assemblers responded to lean production by trying to create more fluid upstream markets among their suppliers to drive down costs, banks developed long-term relationships with suppliers to coordinate every aspect of their new data processing systems. Equipment manufacturers developed leasing programs that included comprehensive service contracts, created large-scale training programs to provide banks with programmers and equipment operators, and cooperated with banks to re-design their production processes to integrate EDP more efficiently. Though much of this coordination was nominally mediated through market relations, the long term cooperation, range of specialty services, and exchange of proprietary information developed between banks and equipment manufacturers are better characterized as relational.

In addition to the unusual and complex relationships developed between banks and computer firms, the A.B.A. played a powerful directive role in how EDP technology was developed. The importance of the Association in early standard setting was only the first step in its involvement. Growing out of the committee work that produced machine-readable checks in the late 1950's, the A.B.A. placed itself in the forefront of technological adjustment. This role was especially important to small and medium sized

banks that lacked any internal expertise in automation or systems design. Undertaking a broader role than is common for industry associations in the United States, the A.B.A. produced a series of publications and seminars on how to employ EDP in smaller banks, served as a clearinghouse of technical information supplied by computer manufacturers, and engaged in extensive lobbying at the state and federal level to loosen restrictions on commercial practices related to EDP.

Section 4.5 will demonstrate the importance of the regulatory environment in determining how banks developed and used EDP. The central conflict that had to be managed by banks adopting EDP was created by the economies of scale imposed by the technology. Designed explicitly to protect small unit banks from competition, bank regulation in many states had the effect of restricting bank size below the level at which EDP systems could efficiently operate. This led to two important strategies on the part of banks. On the one hand, bankers in many states pushed to relax restrictions on bank mergers and other forms of consolidation that would allow EDP to achieve its promised scale economies. This included not only direct attempts to change laws, but a creative search for legal loopholes, lobbying for reinterpretation of laws by friendly regulators, and sleight of hand attempts to play federal and state regulators against one another. While pressure to allow banking consolidation had existed through the postwar era, the important point made in this section is that the technological imperatives created by EDP shifted the balance of opinion within the A.B.A. and offered a powerful and effective additional argument to supporters of consolidation.

Where the prospect of changing the external regulatory environment so drastically as to allow consolidation seemed poor, banks experimented with a range of strategies that

could increase the scale of data processing without consolidation. These included pooling data processing with other banks, selling access to their excess EDP capacity to other banks, creating holding companies to market EDP services, and cooperating with equipment manufacturers or other banks to set up independent data processing centers. In other cases, banks attempted to expand the use of EDP to other areas of their own operations, developed programs to sell excess EDP capacity to bank customers in the form of services such as payroll accounting or to other banks through corespondent services, and experimented with new applications for EDP such as timeshare computing that could increase the profitable use of their new data processing capacities.

Without exception, these strategies required changes in regulation or regulatory interpretation as well as fundamental shifts in how banks were allowed to operate. This fact made both the choice of an adjustment strategy to and the implementation of that strategy into political processes. Though the transactions that bank managers wanted to undertake to achieve these new scale economies were nominally mediated by markets, in practice each step was determined by the interpretation of regulations. Attempts to consolidate through mergers required the approval of at least two regulatory bodies and could be challenged on anti-trust grounds by the justice department or competing banks. While the formation of a consortium to pool the EDP needs of several banks would be organized and mediated by contracts, the nature of the agreements and the details of how it would operate fell under the jurisdiction of bank regulators. With the exception of EDP services offered through a corespondent relationship, all of the major strategies pursued by banks to increase transaction volume required the permission or cooperation of regulators. Because regulation in this case was both more direct and more specific than

in the auto industry, banks' political strategies had to be more nuanced and carefully targeted. This made venue selection and public interest justifications for desired changes more important elements of these strategies. Banks lobbied for regulatory change through an increasingly divided but powerful interest group, exploited competition between state and federal regulators as well as divisions among four groups of federal regulators, and adopted new corporate forms in order to evade specific laws. As in the auto industry, they also used the legal system to challenge regulations and manipulate the range of strategies available to their competitors. The importance and complexity of regulation in this case provides an illustration of how the political opportunity structure can play a direct role in determining how the governance requirements of a new technology are met.

4.2 Commercial Banking in the United States

The American banking system in 1960 was made up of roughly 13,000 separate firms operating more than 26,000 offices. The largest and the most diffuse banking system in the world, it was also subject to an extraordinarily complex system of overlapping regulation. Though the purpose of this chapter is not to examine the history and evolution of the banking and finance industries, it would be impossible to understand the strategies pursued by bankers adopting EDP without considering their regulatory environment and history. In order to provide that context, this section is organized around three points. First, it will provide a clear definition of the business of commercial banking as regulation allowed it to exist in the years from 1960-1972. Second, the regulatory and organizational history of the industry will be examined. Emerging from a complex and crisis-prone history, the functions and types of business activities in which

banks could engage were carefully regulated. In order to understand this system of regulation and the ways in which it had coevolved with the industry, it is necessary to look at the accumulation of laws, informal agreements, and regulatory precedent that had been built up in a haphazard way since the introduction of free banking in the 1830's. In addition to explaining the idiosyncratic regulatory regime governing banks during the 1960's, this examination of history will introduce the political forces and interest groups that dominated policy making in the financial sector by explaining their origins and goals. Summarizing the product of this history, this section will provide a review of the industry and regulatory structures that faced banks when the adoption of EDP began.

For the purposes of this chapter, banks should be understood as private commercial entities that engage in two types of business activity: accepting deposits and making fractional reserve loans. The deposit-taking function of banks is divided into demand and time deposits based on the degree of liquidity possessed by those funds. Demand deposits, in this period primarily taking the form of checking accounts, were essentially liquid. A check drawn on a demand account could be used as a more convenient method of payment than cash and emerged in the postwar era as the core of the consumer payments system.[6] By law, commercial banks held a monopoly on the ability to offer demand deposit accounts to individuals and corporations. Time deposits, traditionally taking the form of savings accounts delivering a variable rate of interest, were the other form of deposit taken by commercial banks. Unlike demand accounts, other financial institutions such as savings and loan offices or credit unions could offer

[6] The development of a national check clearing system using Federal Reserve member banks was associated with the creation of a national mass market in the early 20th century, but again the affluence of the postwar era and the advent of deposit insurance caused an explosive increase in checking volume after 1945.

savings accounts to individuals or businesses. These interest bearing accounts have a lower volatility and turnover rate than demand deposits and are easier to use as a basis for estimating future reserves and planning loans. The interest rates banks were allowed to offer on these funds were limited by the Federal Reserve's "Regulation Q."

The ability to make fractional reserve loans is the other defining characteristic of commercial banking. Bank loans involve lending all but a fraction of the money the bank holds in deposits. This allows banks collectively to create money, as funds borrowed from one bank are deposited in another and lent again. This multiplies the amount of money in circulation, setting the money supply and therefore affecting the price level. Though control of the price level through manipulation of the ability of banks to create money was not its original purpose, the American Federal Reserve had by the 1960's undertaken this as one of its central goals. During the inflationary periods of the early 1970's, this function of the Federal Reserve become its dominating concern, allowing its role in bank regulation and the provision of liquidity to fade into the background.

Fractional reserve lending is the reason why banking is an inherently unstable business and provides the justification for government regulation. The amount and type of reserves a bank must hold is referred to as a reserve requirement, and during the period I examine this was tightly controlled by all three of the regulatory bodies introduced below. If depositors withdraw more assets from a bank than it holds in reserve, even a bank with very secure but non-liquid assets will be placed in a position where it is unable to meet the demands of its depositors for currency. This situation is described as a panic or a bank run, and cycles of such panics and accompanying bank failures were endemic

to the American financial system until the system of federal deposit insurance was created in 1933.

The system of regulation that existed in the 1960's – essentially unaltered since the reforms of 1935 – provided the most stability of any period in American financial history. The confidence created by this regulatory structure was important in securing a stable financial system during the Great Depression, the financial pressures of the Second World War, and the period of inflation and readjustment afterward, but it came at a price. The comprehensive regulation of the risks taken by banks in their lending policies and the fields of business in which they could operate slowed innovation in finance and acted as a damper on the rapid economic expansion in the postwar era. To guarantee that banks did not engage in high-risk lending practices with federally insured funds, their policies were restricted by a complex system of overlapping regulation that was created and enforced by three separate federal agencies. In combination with the fifty state-level regulatory bodies, these agencies defined the unique and byzantine "dual banking" system of regulation that banks faced when implementing EDP in the 1960's.

In order to understand the environment that faced bank managers when the EDP revolution began, it is necessary to explain how their regulatory environment had been created over the previous century. Over this time, patterns of regulation emerged from periodic legislative responses to major crises moderated and smoothed over by constant negotiation between banks and generally sympathetic regulators. New federal laws and the agencies required to enforce them were created in response to three specific crises: the budgetary and currency emergency facing the federal government during the Civil War, the lack of monetary flexibility that contributed to a series of financial collapses

around the turn of the 20th century, and the crisis of confidence that wiped out nearly one third of the nation's private banks and threatened the credit system with complete extinction in 1933 at the nadir of the Great Depression.

The solutions crafted to deal with each of these crises reflected the needs and attitudes of that historical moment, but the institutions that were created endured long after the immediate problems had been dealt with. Though the consolidation of regulatory power in one body would be preferable for efficiency reasons, each wave of reform legislation in the United States has added new regulators but failed to eliminate the old ones. Instead, the regulatory bodies created at each of these three historical moments reconfigured their work to deal with newly created rivals and negotiated new jurisdictional and functional boundaries among the agencies. By the postwar era, this had produced a geologic layering of regulatory authority that operated by a statutory division of labor supplemented by traditions and informal agreements among the regulators themselves. Though a comprehensive review of this history is not necessary, an understanding of the regulatory system in place in the 1960's requires a brief examination of the system's origins and the political forces that created and sustained it.

The first elements of this system were constructed in 1863 with the passage of the Currency Act and subsequent modification in the 1864 National Bank Act. The earlier history of American banking is fascinating and reveals a great deal about the politics of the pre-industrial era, but only a few aspects of this regulatory pre-history are relevant here.[7] Briefly, bank regulation in the early United States was seen as an aspect of more

[7] For a useful summary of banking in the early United States, see Hammond (1957). It is worth mentioning these early conflicts briefly because the political struggle over the establishment of the first Bank of the United States served as a proxy for regional, class, and distributional conflicts in ways that would be echoed throughout the 19th century. Beard (1965) presents a plausible argument that the conflict over the

basic questions about the economic development of the country and the proper role of government in shaping that economy. The Hamiltonian tradition saw a strong, well regulated national banking system as vital both to promote economic growth by mobilizing investment and to increase the efficiency of government finance.[8] The Jeffersonian tradition and its populist Jacksonian successor saw banks, and most specifically federally chartered banks beholden to the central government, as concentrations of economic power that would be centers of corruption at best and tools of tyranny at worst. The power of this anti-bank tradition and its centrality to one of the core political traditions of the United States is difficult to overstate. An official report to the Treasury Secretary in 1854 celebrating a law that prevented the Treasury from even holding deposits of public money in commercial banks captures the almost religious condemnation of the industry: "Having separated itself entirely from paper money banks, the United States government is no longer responsible for the evils they produce. For the correction of those evils, the people must look to the state governments [...] 'The less

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first Bank of the United States was critical to the formation of the first American party system, with opposition to Hamilton's plan causing the Democratic-Republican Party to coalesce around the issue. The Populists of 1896 echoed the vilification of wealth, industry, and concentrated economic power that were featured in these early bank struggles. Even after the permanent establishment of federal bank regulation and the Federal Reserve system, it is impossible to understand the endurance of America's inefficient patchwork of regulation for so long unless this cultural suspicion of concentrated wealth and federal power, reinforced by the weighted representation of rural states in the Senate, is kept in mind.

[8] Morgan (1956) presents a clear and well documented overview of Hamilton's role in the establishment of the first Bank of the United States. The ways in which Hamilton's vision of America's economic future was bound up with a powerful and concentrated financial sector are obvious both in the international examples he invokes as models for his proposed national bank (England, Holland, Genoa, etc.) and the specific virtues he ascribes to the proposal: the expansion of commerce, improvement of public and private credit, and an increase in general prosperity (see Cowen, 2000).

that government has to do with banks and the less banks have to do with government, the better for both.'"[9]

The failure of Congress to renew the charter of the Second Bank of the United States in 1836 was arguably the central political conflict of the Jacksonian era, but for the purposes of this chapter only the results of that failure are significant. With the federal government no longer directly chartering or regulating banks, each state became the sole authority that could grant bank charters within its borders. This period saw an enormous range of experimentation in banking regulation among the states. A series of scandals involving bribes and widespread fraud in the early 1830's largely discredited the most common system of allowing banks to be chartered only by special acts of the state legislature. Reacting against this, laws allowing any person or group to open a bank if they could meet a set of minimum standards were passed in Michigan (1837) and New York (1838). Laws modeled on these spread quickly through the union, and the era of "free banking" had begun.[10]

The free banking era is significant to an understanding of later bank regulation for two reasons. First, it established strong political support for state-chartered banking that the federal government was reluctant to overturn. From the 1830's through the era of EDP, states maintained a role in chartering – and hence regulating – banks within their

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[9] Cited in Hammond (1970), p. 21. The report is praising the Independent Treasury Act, which had to be eliminated immediately in order to finance government expenditures in the Civil War.

[10] Seventeen states passed Free Banking laws between 1837 and 1860 (Rockoff, 1975), while fifteen either retained special chartering laws or adopted hybrid systems. Despite the fact that this represents a bare majority of states in 1860, it is accurate to characterize this era as dominated by free banking because the states that did adopt this system held the overwhelming majority of the nation's free population, wealth, and economic activity. States failing to adopt free banking laws tended to be either new entrants to the union without sufficient economic activity or legislative sophistication to follow national trends (California, Oregon, and Texas) or underdeveloped agricultural states in the south where economic activity was concentrated and tightly controlled (Mississippi, Kentucky, and the Carolinas).

borders. The banks that chose state charters formed one pillar of the dual banking system. Second and more important, this era saw the founding of large numbers of small, independent banks. Since state-chartered banks were generally limited to a small geographic area and operated across state borders only at the sufferance of state regulators, free banking laws confined to individual states produced the least concentrated banking system in the world. While most European states were cultivating the concentration of capital through centrally regulated oligopolies or branch systems built around a powerful national bank, the United States unintentionally fostered a unique industry structure in which small banks rooted in small farming communities coexisted across regulatory boundaries with larger industrial or trading banks in the growing financial centers of Boston, Philadelphia, and New York.

This decentralization made the financial system inefficient in a variety of ways, but it is important for the structure of regulation because it produced large numbers of small but regionally important banks that had a strong interest in maintaining their regulatory environment. The political power of these local banks was reinforced by the geographic basis of congressional representation in the United States; while small by the standard of the national economy, these banks were often dominant within a specific congressional district or a state legislature. Bankers that were regionally powerful were able to dominate state legislatures and exert significant influence over the behavior of Senators throughout this period, and they used this power in part to block any program that would create federal interference in how their banks were run. By reinforcing the diffused, federal nature of the financial system, this distribution of political influence made federal regulation of banks even after 1863 tentative and indirect by modern

standards, captive to a rhetoric of states rights that was increasingly an excuse for local corruption and underdevelopment.

During the free banking period, bank failures were common and the deficiencies of the banking system were widely acknowledged. Capital could not flow easily from savers in one region to investors in another, reinforcing regional underdevelopment. The availability of credit fluctuated wildly, financial intermediation was retarded by savers' fears for the security of their deposits, and information problems relating to counterfeiting and the relative value of bank notes undermined economic activity, especially inter-state trade.[11] As the national economy grew and the transportation network of canals and railroads expanded, the problems of business payments across state lines became more acute. A common currency and a more stable system of payments were increasingly obvious necessities, but attempts by the federal government to establish national standards were blocked by the lobbying of state-chartered bankers who feared being forced to re-incorporate under less favorable terms and being subject to federal regulation.

The issue of currency stability was the core problem faced by Treasury Secretary Salmon P. Chase when he made his attempt to overcome the objections of state banks and establish a federal bank law in 1861. In the early 1860's, it is estimated that there were 7,000 different kinds of bank notes circulating in the United States backed by a range of

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[11] State banking authorities and private entities tried a variety of laws and regulations to deal with these problems. At the level of state authority, experiments included the chartering of state banks to establish uniform currencies, imposing audits on banks holding state funds, and promoting voluntary deposit insurance programs. These experiments involved impressive levels of policy innovation (see Rockoff, 1985) and represented a learning process that advanced the general understanding of bank regulation. Private solutions to the banking problems created by inadequate regulation included the formation of correspondent relationships, the generation of a service industry to verify bank note values, and the creation of voluntary deposit insurance schemes organized by regional bankers themselves. See Rolnick and Weber (1983) and Smith (1942).

assets acceptable to the various state banking authorities.[12] Even setting aside problems of counterfeiting, the information costs associated with trying to discount these notes at their proper value across regions were enormous.[13] Though Chase was a strong supporter of national banking and a unified national currency, the political situation he faced was still overwhelmingly hostile to federal authority over banks. Despite the clearing of most opposition in the Senate by the secession of the southern states and the acknowledged inefficiency of the system, two bills introduced in 1862 were defeated by supporters of state banks.

Two factors saved Chase's bank plan. The first and most important was the need to finance the war. Just as the prospect of military disaster had been used by his predecessor during the War of 1812 to secure the charter of the second Bank of the United States, Chase and his allies in Congress argued that a federal financial collapse would threaten the army and the Union. In late 1862, the value of the "greenback" currency issued by the government after the suspension of specie payments in 1861 declined sharply.[14] This decline combined with the difficulty of making war purchases using private bank notes to make it clear that the war could only be financed if the federal

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[12] Beckhart (1922), p. 7

[13] For a review of the measures that had to be taken outside of the relatively financially stable northeast, see Smith (1942).

[14] The federal government faced a poor fiscal situation at the start of the war largely as a result of the aforementioned Independent Treasury Act of 1846, which required that federal disbursements be made exclusively in gold or silver unless the receiver would accept fully backed Treasury notes. The scale of war expenditures forced the end of this system almost immediately in 1861, but during the years of its operation, the Treasury had failed to develop the bureaucratic tools or financial infrastructure required to organize war finance or force banks to accept greenbacks. This was the vice in which federal finances were caught early in the war, and the need to use federal regulation to prop up the greenback was the clearest argument in favor of a federal banking law. It was an argument that Secretary Chase used to the fullest, and it became more compelling as the war dragged on. For an overview of war finance and its effect on the debates prior to the Currency and Bank Acts, see Hammond (1970).

government were able to coordinate and control private capital through the banking system. If banks were subject to national regulation, they could also be required to manage bond issues and accept federal securities as reserves under any conditions set by the Treasury.[15]

The second strategy that was adopted to move the Currency and National Banking Acts through Congress was critical for the future of bank regulation. Faced with immovable opposition to any proposal to eliminate state chartering and concentrate all regulatory powers under the aegis of the federal government, Chase and his Congressional supporters attempted to achieve their aim through stealth. Rather than forcing state banks to obtain federal charters and explicitly eliminating the power of state regulators, the bill introduced by Senator Sherman in February of 1863 proposed a system under which banks could choose to incorporate under federal or state authority. This would offer banks the chance to choose their regulator based on whether they preferred the terms offered by Washington or their state banking authority.[16] The national banks chartered under these laws were placed under the regulatory authority of the newly created office of the Comptroller of the Currency, who had the authority to set regulations for their operation and to revoke charters for noncompliance.[17] Though this compromise secured the passage of the 1863 and 1864 bank bills, it was made in bad

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[15] For a review of the debate over the 1863 Act, see Million (1894). It is interesting to note that the ability to market bonds through national banks, though used rhetorically as a powerful argument in favor of the Sherman bill, turned out to be a very minor consideration, with less than 4% of war bonds issued being used by national banks to back their note issues by the time the war ended (Beckert, 1922; p. 8)

[16] See Robertson (1967), pp. 250-251.

[17] The office charged with bank regulation was referred to as the Comptroller of the Currency because of the intention that only national banks issue bank notes under the new system and the belief that the primary function of bank regulation would be controlling what would today be considered monetary policy. After

faith by the supporters of a national banking system. In 1865, Congress imposed a tax on the issuance of bank notes by state-chartered banks that was intended to make banking under state charters unprofitable and drive banks to re-incorporate under the federal authority.[18]

The failure of this plan created the enduring system of dual bank regulation. While the 1865 law did end the issuance of notes by state chartered banks and produced an initial surge of state banks re-chartering under federal authority, by the 1880's this tide had reversed and the dual regulatory system had been firmly established as the accepted model of bank regulation. In 1869, the national banking system reached its apex of regulatory coverage, holding 86.2% of the charters for all banks in the country. From there, it dropped rapidly through the late 19th century until it stabilized near 33% in 1910. The distribution of banks chartered under state and federal laws remained roughly stable at this ratio through the 1960's.[19] In this enduring pattern, state-chartered banks were more numerous, but national banks held the majority of deposits as federal regulation was viewed as a better guarantee of financial soundness.

The two reasons why state-chartered banks were able to escape the trap that Chase and Sherman had set for them are important not only because they help to understand the development of the regulatory environment, but also because they influenced how EDP was adopted. First, federal regulators set reserve requirements and

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bank notes issued by individual national banks ceased being the primary form of currency and the Comptroller's office focused on other aspects of regulation, this title became an anachronism.

[18] Redford (1966), p. 751, especially references to Secretary Chase's correspondence in footnote 11. For a summary of the Senate debate over whether the intent should be to eliminate the variety of bank notes in circulation or to eliminate the system of state banks entirely, see Million (1894), pp. 259-262.

[19] See Redford (1966), p. 755.

accounting standards relatively high. Many rural areas – primarily in the upper midwest and plains states – were insufficiently developed to support the levels of capital required for a federally chartered bank. This provided an incentive for state regulators to set lower standards for state chartered banks to facilitate banking in these communities. In addition to allowing more marginal banks to serve small communities, the less restrictive state regulations (usually manifest in lower capital requirements and less stringent reserve standards) gave state banks a competitive advantage over national banks.[20] This created a system of regulatory competition between federal and state authorities – a limited form of a "race to the bottom" in regulation that had the practical effect of setting an upper limit on the stringency of bank regulations. If either state or federal regulators imposed standards that were too burdensome, banks possessed an exit option that – if exercised on a large scale – would make the offending regulator irrelevant and fail to achieve the public purpose of the regulation.

The threat of this kind of regulatory competition led to considerable deference by the Comptroller toward existing state laws. States retained the power to tax nationally chartered banks on the same terms under which they taxed state-chartered banks. In a decision that had the greatest importance for the structure of the industry, the legality of branching by national banks was also left to the discretion of the states. One of the most important questions in banking at the time involved whether banks would be allowed to operate branches, that is, multiple offices of the same bank located in different areas. Branch banking is the most common and administratively efficient form of banking

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[20] By giving banks an exit option from their regulatory authority and the ability to play state and federal regulators against one another, this created a degree of regulatory competition that made bank regulation exceptionally solicitous of the interests of the banks they regulated. See Section 4.5 below.

concentration, and as such it had been outlawed or sharply limited in most states by the late 19th century based on the Jacksonian fear of concentrated financial power.

Conscious of this, some banks attempted to escape state-level restrictions on opening new branches or gaining a controlling interest in other independent banks in the years after the Civil War by changing to national charters. Since Congress had not specified whether national banks could own multiple branch offices, the decision was left to the Comptroller. The Comptroller, in turn, feared a backlash from the states if an unelected administrator changed such a basic aspect of the states' financial systems. This produced an administrative decision allowing branching for national banks under exactly the same terms that governed state-chartered banks in that state.[21] Had national banks been allowed to open branch offices, it is almost certain that the banking industry would have become more concentrated over the late 19th century and would have come to resemble the various national banking systems in Europe.

The second reason why state banks survived involved an innovation of organizational technology that made the tax on bank notes irrelevant within twenty years. Faced with a destructively high tax on issuing bank notes, state banks that were unable or unwilling to give up the privileges of their state charters searched for ways to continue their operations without issuing notes.[22] The solution they adopted transformed the banking industry and became one of the key reasons for the adoption of EDP nearly a century later. While deposit-based checking accounts had existed prior to the Civil War,

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[21] See Redford (1966), pp. 765-766. See also White (1982, p. 35) for an example of the political mobilization against even the threat of allowing branching by national banks that insured federal deference to state standards in the late 19th century. For a more general examination of this issue, see Chapman and Westerfield (1942). This deference to state regulators became so well-established that it was only in 1994 that the last branching restrictions were removed from nationally chartered banks.

they had not been an important part of the payments system because of the network externality involved. Checks are only useable for more than local purchases if they will be generally honored. In an impressive act of coordination among private businesses facilitated by the newly formed American Bankers Association (A.B.A.), banks in rural areas arranged to hold reserves with larger banks in regional financial centers and New York, which developed a centralized clearing house for checks that served these *de facto* reserve banks.[23] Reserve accounts could then be used to honor checks drawn on the original bank. The first step had been taken in turning money into information that could be manipulated virtually on corresponding balance sheets half a continent apart. The correspondent relationships that had been developed prior to the Civil War to facilitate the acceptance of notes and the handling of specie reserves required by growing inter-state commerce served as the model for the new check clearing system, but the improvement in efficiency and the use of specific banks in large financial centers as holders of the reserves required to clear checks were critical innovations.

The development of check-based banking is important for three reasons. First, it insured the survival of state regulation and the development of competing regulatory systems at the state and federal levels. By keeping state-level regulation as a viable choice for banks, this helped to preserve the uniquely diffused structure of the industry. In contrast to other developed countries, the United States developed neither a British

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[22] A brief summary of the development of checking in this period can be found in Hutchinson (1971), ch. 6.

[23] The check clearing function had been undertaken by a cooperative association of banks in New York even before the Civil War. The increased use of checks for inter-state commerce that accompanied the railroad-driven postwar increase in agricultural commerce caused this clearing house system to expand and was one cause of the "pyramiding of reserves" of banks in a very few large New York correspondent banks. For a review of the development of check clearing in New York, see Andrews (1942). For an examination of the effects of this system on financial stability, see Wicker (2000), ch. 1.

style national bank, nor a German style system consisting of a few banking chains with offices spread across the country. During the late 19th century, the existence and refinement of the check clearing system induced even nationally chartered banks to switch to a checking account model, and the issue of bank notes became progressively less important. Second, the check clearing system of banks with correspondent relationships in various financial centers shaped the strong interest group structure of the American banking system. The need to create and sustain financial connections with other banks facilitated the development of the A.B.A. and sustained a surprising degree of consensus on policy among bankers facing across the country.[24]

The national check clearing system and network of correspondent relationships it created was also important because it served as the model for the Federal Reserve system in 1913. A series of bank panics in the late 19th century had highlighted the instability of the national banking system, and eventually these problems became serious enough to overcome state resistance to a new federal banking law. Of the five serious financial crises between 1873 and 1907, four had clearly been the result of contagion from speculative panics in New York that affected confidence and liquidity across the country. The resentment of New York bankers that the Populists expressed in the 1896 election was more than a continuation of the Jacksonian anti-bank tradition; it had a foundation in the real belief that a small number of New York banks served as the lynchpins of an American monetary system that disadvantaged farmers and small businesses in the Midwest. The solution advocated by the populists – monetization of silver at an

[24] For a discussion of the early development of the A.B.A. and its role in establishing and supporting correspondent relationships, see Schneider (1957), Ch. 1-2.

inflationary rate – was rejected, but some more moderate plan to stabilize the banking system gained increasing support through the Progressive Era.

The Federal Reserve had three characteristics that are important for the discussion of EDP. First, it established a second layer of regulatory authority over banks. Both the coverage of this regulatory authority and the nature of the body that exercised it shaped the future of banking regulation. All nationally chartered banks were required to become members of the Federal Reserve System, placing them under the regulatory authority of the Federal Reserve Board as well as the Comptroller of the Currency. State-chartered banks could elect to become members of the system to take advantage of conversion and check clearing services.[25] By the 1920's, most states had passed laws exempting Federal Reserve member banks from state requirements for reserves and investment oversight. This created a new category of bank regulation: in addition to state banks operating under the authority of state regulators and national banks operating under the supervision of the Comptroller of the Currency, state-chartered "member banks" operated primarily under the regulation of the Federal Reserve. A compromise between the Comptroller and the Federal Reserve led the latter to agree informally to refrain from exercising its legal authority to regulate national banks outside of a few narrow areas. This was done largely to prevent national banks from mobilizing politically against the Federal Reserve or re-chartering under state laws to avoid the burden of a second level of oversight.[26]

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[25] State banks joined the Federal Reserve system in large numbers as a result of an appeal by President Wilson during the First World War (see Tippets, 1923; p. 404), but the requirement that all member banks must redeem valid checks at face value without imposing a service fee combined with interest losses imposed by the composition of Federal Reserve requirements led to a decline in membership after 1919.

[26] See Gidney (1922), p. 88

The second important aspect of the Federal Reserve system for bank regulation was the corporatist nature of the organization itself and the influence this had on interest group representation. Though the Federal Reserve is now more associated with monetary policy and academic interest is focused on the Board of Governors, its most important original function was to act as a regulator and standard-setting body, and in these areas it was not the politically appointed Board of Governors that set policy, but member banks. The twelve regional Federal Reserve Banks, to which the System's legally mandated regulatory powers were allowed to devolve, were established as public corporations. They were formally owned by the national and state member banks, with relative shares based on the size of the reserves those banks held in deposit. The regional Reserve Banks and the Board of Governors were financed by biannual assessments on member banks rather than an appropriation of Congress and were ruled in 1914 to be completely independent of the Treasury Department. By law, two thirds of the Directors of the regional Reserve Banks were elected by member banks. These Directors, in a strongly consociational framework, were legally required to be selected by and represent small and medium sized banks as well as regionally dominant ones.[27] This way of organizing representation formalized and reinforced the disaggregated structure of the American

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[27] General information concerning the organization of the Federal Reserve can be found in Beckhart (1972) and various issues of the Federal Reserve Bulletin. For a specific examination of the Federal Reserve Act and reasoning behind the legally mandated representative framework of the Reserve Banks, see Federal Reserve (1963) and Kemmerer (1922). The corporatist intentions of the authors of the Federal Reserve Act can be seen in the attempt to codify the place of a representative of farming interests to the Board in the 1920's. Though the Reserve Banks themselves were firmly corporatist in nature, this attempt to transfer this bargaining model to the Board of Governors at the apex of the Federal Reserve System was opposed by legislators and bankers based on a combination of suspicion of bank power and concern that the apex of the system represent only neutral, technical expertise (Ibid., p. 64). In the broader history of regulation it is interesting to note that the conflict between technocratic and corporatist visions of the Federal Reserve reveals important stages in the evolution of thought on regulation between the late 19th century and the New Deal.

banking system, reflecting the importance of the numerous small unit banks that defined the American system in the way regulatory power would be exercised.

This blending of public and private powers in the Federal Reserve encouraged a close relationship between it and the A.B.A. The collective action problems faced by bankers in the United States in forming a representative association that was considered broadly legitimate were immense. At the most basic level, the large number and regional diversity of independent banks made any kind of cooperation difficult. Banks chartered in states with differing laws had little interest in coordinating political advocacy or sharing information. Sectional differences between the Midwest, South, and Northeast based on divergent economic interests and advocacy of different monetary policies divided bankers as much as they divided the citizens who were their clients. The dual banking system created another fault line between national and state banks. In addition to these problems, the A.B.A. also had to overcome the Jacksonian fears of small bankers that their interests would be dominated by large, eastern banks with international interests. This reflection of the populist attitude toward concentrated financial power led the A.B.A. to adopt consociational rules that reassured small banks and weakened the influence of the association's largest members. Though in the adoption of EDP in the 1960's the association was dominated by its largest members, this historical legacy was borne out by the fact that influence was exercised more through asymmetric information and the investment of organizational resources than the exercise of formal power within the organization.

The Federal Reserve helped to both create a common interest among bankers and to coordinate their political activities. This counterbalanced the structural dispersion of

the industry and made the A.B.A. a more effective representative organization. Aside from common dependence on regional banks for liquidity in times of crisis and the ability to gain representation on monetary and regulatory questions,[28] the Federal Reserve did the most to bind together America's bankers by formalizing the check clearing system and enhancing correspondent bank relationships. Prior to the Federal Reserve system, the large numbers of banks that offered checking services held reserve accounts in financial centers that served to redeem checks drawn on their accounts. Checks from across the country were processed through clearing houses that were operated jointly by banks in the financial centers. The check clearing system fostered connections between banks through both the correspondent relationships that governed reserve accounts and participation in the clearing houses themselves. These made regional financial centers into "nodes" in the national banking network. What happened to large banks in these regional centers was of immediate concern to every bank that was part of the national check clearing system.[29]

This system, representing an impressive act of private economic coordination between banks without direct government intervention, was inefficient and idiosyncratic. Because correspondent relationships were bilateral and limited, checks might have to be passed between several banks or even multiple clearing houses to reach the bank on which they were drawn. This required additional time, which made checking less convenient for customers, and it added expense, as the cost of check processing increased

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[28] Schmitter (1979) has observed that one of the effects of corporatism generally is to concentrate and unify interest groups under the organization that has the privileged status in representation. While the A.B.A. did not gain a formal status with the Federal Reserve, their close cooperation made working with the A.B.A. a mechanism by which non-member state banks could promote their interests.

at each point where a clerk would stop to inspect, classify, and forward it. The Federal Reserve formalized the check clearing system through the regional Reserve Banks, required that member banks process checks without charging customers, and turned the A.B.A.'s recommended practices for check processing into an enforceable national standards.[30] This bound together the scattered banks in a strengthened and rationalized network of correspondence relationships. It also gave the A.B.A. a privileged status as the mechanism by which the banking industry solved coordination problems based on its influence with the Federal Reserve. Almost as important as reinforcing the relationship between the two organizations was the signal that this sent to non-member banks: influence within the A.B.A. could translate into influence with regulators at the Federal Reserve.

The final pillar of the regulatory system that existed in 1960 was created in response to the bank failures of the Great Depression. Because the American banking system was made up primarily of small, independent unit banks (banks operating only one office), the system tended to be extremely vulnerable to fluctuations in local economic conditions. Banks operating many geographically dispersed branches have a large pool of reserve assets and a diverse set of depositors and loan clients. This insulates them from local shocks and allows them to transfer reserves from economically healthy areas to those where depositor confidence is low, providing some protection against panics. Unit banks, especially those in rural areas, find it nearly impossible to diversify

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[29] For a review of the operation of the check clearing system both before the Federal Reserve and in its initial decade, see Jay (1922), pp. 82-85.

[30] See Scott (1978). It is worth noting that the bilateral correspondent relationships between specific banks remained even after the Federal Reserve took up the task of check clearing, since banks still needed to hold reserve accounts with their correspondents from which checks could be cleared.

the character of either their depositors or their loan clients. For these banks, a local economic shock or a loss of depositor confidence could more easily result in a run on the bank, loss of liquidity, and suspension of payments. Though the banking systems of Europe suffered serious failures in the 1920's and 1930's, these were largely the result of international payments shocks on such a scale as to dwarf any local loss of confidence. By contrast, the American system was insulated from international shocks but uniquely vulnerable to bank runs and failures due to its structure.[31]

During the 1920's, low agricultural prices led to a high rate of rural bank failures for exactly these reasons. Rural banks held portfolios of loans that were dependent on crop prices. The collapse of farm prices in 1921 destroyed the assets of entire communities, and banks were faced with depositors demanding their funds in a period when calling in loans to provide them would result in foreclosure. So long as the economic crisis was confined to agriculture, it was widely believed that bank failures could be dealt with through consolidation, with larger banks headquartered in financial centers serving rural communities. This would protect the banks themselves by allowing them to diversify their risk and would serve a broader economic purpose by transferring deposits from prosperous industrial regions to provide temporary liquidity to rural areas.[32] Bank concentration remained anathema in many states, however, and the

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[31] Crises in European banks seldom started with a localized loss of public confidence, making a direct comparison of vulnerability difficult. American banks were not heavily involved in investment outside of the United States prior to 1945 and faced little threat from currency risks or foreign economic shocks, while the ability to shift reserves across branches made European banks more resistant to liquidity crises and panics. The European crises therefore tended to be much less common but more severe and widespread when they occurred.

[32] Eight state-level deposit insurance schemes had been attempted prior to 1933, but all had failed or been voluntarily discontinued. Jones (1938) explains these failures as the result of insufficient diversification of risk, though the adverse selection problem of any voluntary insurance program was also a factor.

political power of small banks to block legislation that would allow branch banking was sufficient to produce gridlock.[33]

The general crisis of the early 1930's threatened to destroy the banking system entirely. A review of the financial aspects of the Great Depression is unnecessary, but it is important to understand the shadow cast over the subsequent generation by the bank failures, suspensions, and panics of early 1933.[34] When Franklin Roosevelt identified fear as the greatest threat to the country in his inaugural address, he was referring specifically to this unprecedented collapse of confidence in the financial system. By 1933, roughly 10,000 banks had failed in the United States, more than 1/3 of the total that had existed in 1920. The numbers of banks that were reorganized, consolidated, or otherwise went out of business without a complete loss to depositors was even higher. In sum, half of the independent banks in the United States had ceased to exist during the decade prior to 1933.[35] Much of the comprehensive nature of New Deal financial regulation and the conservatism of the generation of bankers and regulators that followed can only be understood if the magnitude of the banking crisis of 1933 is appreciated.

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[33] Consolidation of banks to increase capital reserves and diversify risk was the centerpiece of the Hoover Administration's response to bank failures during the early Depression, with Comptroller of the Currency Pole recommending to Congress the elimination of all restrictions on interstate branching by national banks in December 1930. Though bills to allow this were introduced in 1931 and 1932, both were blocked for familiar Jacksonian reasons – the second in a dramatic week-long filibuster by Sen. Huey Long. For an excellent account of the legislative debates over banking in the early Depression era, see Burns (1974). A more theoretical examination of the debate is provided by Golembe (1960), especially pp. 183-188.

[34] It is difficult to overstate the importance of the 1933 bank crisis in determining the laws, attitudes, and general outlook of bankers and regulators over the generation that followed. For a technical summary of the banking crisis, see Kennedy (1973) and Burns (1974). A more subjective but extremely powerful examination of the circumstances facing American banks in this period, as well as a personal account of the debate over the 1935 Banking Act, are presented by Eccles (1951).

[35] Department of Commerce statistics, cited in Burns (1974), p. 4.

In order to end the hoarding and contraction of credit that had reduced some areas of the country to the use of privately produced scrip in lieu of real currency, the solvency of the country's banks had to be restored. The first and arguably most important measure undertaken by Congress in the new session was to restore confidence in bank solvency by creating a federally guaranteed system of deposit insurance. As the centerpiece of the banking legislation of 1933, the Federal Deposit Insurance Corporation (FDIC) was created to guarantee bank deposits held by individuals with the credit of the federal government. Risk was pooled successfully by forcing all Federal Reserve and National banks to participate, and given the climate of economic uncertainty most state banks chose to join as well. In addition to this pooling of risk, losses were guaranteed by the FDIC's power to borrow directly from the Treasury to reimburse depositors.

Like the Federal Reserve Banks, the FDIC was created as a corporation chartered by the federal government. Though it holds a set of special legal privileges, it remains formally independent and self-financing from assessments on member banks. The FDIC was originally a temporary body formed to help end the "bank holiday" of 1933.[36] It was the intention of Congress and the Roosevelt administration that the FDIC charter expire after one year, when it would be replaced by a permanent, bureaucratic agency that would consolidate federal bank regulation and administer deposit insurance. Failure to produce a bill for the proposed consolidation and rationalization of banking regulation in 1934 led to the extension of the FDIC for another year. When the 1935 banking law was debated, however, the political climate had changed considerably. With the immediate crisis of

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[36] Willis (1935). Until it was made permanent in 1935 and its powers to regulate member banks to prevent the abuse of insured funds were expanded, the FDIC served primarily a psychological purpose in restoring the confidence of small depositors.

1933 passed, it was impossible to gain agreement on the composition of the proposed new federal regulatory body. The entrenched interest of the Comptroller, the Federal Reserve, and the state regulators blocked consolidation and led Congress to simply formalize the original stopgap system of 1933, making the FDIC permanent and retaining yet again the multiple divisions between bank regulators. Indeed, though their draft versions were modified by Congress, the FDIC Chair, the Federal Reserve Board, and the Comptroller's offices each wrote the sections of the Banking Act of 1935 dealing with their own competencies.[37] Rather than consolidate, simplify, and rationalize the regulation of banking, another layer of regulation had simply been added on top of what already existed.

While the banking reforms of 1933 and 1935 failed to simplify federal banking regulation, they did give considerably more power to the existing regulators. Of the various changes, the most important for the adoption of EDP in the 1960's were the power to restrict entry and consolidation in banking markets and the power to limit the lines of business in which banks could engage.[38] The reasons for granting regulators these powers were twofold. First, many legislators agreed with the popular perception that bankers' irresponsible practices had contributed to the Depression by financing speculation in securities, extending credit without adequate oversight, and misleading their depositors and investors. While the public perception associated these practices with simple greed and justified tighter regulation to insure more ethical behavior, most

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[37] See Senate and House Hearings cited by Kress (1935), p. 156. The legislative proposals considered and the role of various lobbying groups are reviewed by Burns (1974). For a contemporary account, see also Crowder (1936).

[38] For a complete review of the terms of the 1933 and 1935 laws, see Kress (1933), Willis (1935), Hannah (1936), and Crowder (1936).

legislators accepted a more structural explanation. As banks faced competition for deposits from speculative investors promising high returns, they were forced to offer higher interest rates to retain these deposits or risk being driven out of business. In order to support these higher interest rates, banks moved into more speculative investments of their own. Under this explanation, competition during a boom period would inevitably push banks into overextended, high risk behavior that would make the system vulnerable to cascading failure in a general recession.[39]

The regulatory prescription for this problem, in line with much of the early New Deal legislation, was to reduce competition through cartelization and exert regulatory control over competitive practices.[40] This strand of thought was responsible for the provisions that granted the FDIC and Federal Reserve the power to define types of deposits for all member banks and set a maximum interest rate on time deposits while disallowing interest on demand deposits altogether. This was intended to eliminate competition for deposits during fiscal expansions that might push banks to increase their risk tolerance in making loans. More importantly, the concern that competition that might force banks into high-risk lending led to restrictions on the chartering or expansion of banks into geographical areas considered to be "over-banked." The formal reasons for government control over entry and consolidation were a mixture of New Deal corporatism, traditional Jacksonian suspicion of financial consolidation, and federalism.

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[39] This conventional interpretation of the financial side of the Depression is reviewed by Galbraith (1954), and roughly parallels one explanation of the S&L crisis in the 1980's, when restrictions on the interest that could be paid on demand deposits (Regulation Q) was lifted.

[40] The general regulatory philosophy that motivated the restriction of competition is discussed by Schlessinger (1957), ch. 6.

Its political support came from small banks and the vested interest of the four regulatory bodies.

The second reason for increasing regulatory control over banking practices was the need to insure stability in the wake of the 1933 banking crisis. Deposits in federal, reserve, and state FDIC member banks would be insured, but the danger existed that insured deposits would create an incentive for bankers to engage in speculative investments. An investment system that allows one actor to capture gains while transferring losses to another distorts the weighing of risk and can result in an inefficient distribution of investment. This theoretical danger of deposit insurance was central to the 1933 and 1935 Banking Acts, an attitude that was reinforced as the misconduct of bankers in the 1920's was revealed by the Pecora Committee investigation taking place at the same time. Responding to these hearings, public sentiment was surprised and outraged by bankers' disregard for their responsibilities to their depositors and investors.[41] If the largest and most sound banks were willing to disregard the interests of their clients even under the threat of being punished by market forces, how much greater would the danger be under a regime where speculative loans could be guaranteed by the government?

But deposit insurance was considered necessary to save the system of small, unit banks, and any measures necessary to preserve that system could command

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[41] Though Pecora's methods and conclusions have been challenged, his own presentation of the findings of his investigation (1968 [1939]) offers an important insight into how bankers and their activities were viewed by the policy makers of the early New Deal. For suggestive though incomplete estimates of public opinion on banking in the 1930's, see Edwards (1937).

overwhelming political support.[42] The Hoover plan of encouraging risk pooling by allowing branching across regions had been decisively rejected by the Senators from agricultural states – a rejection that was reinforced in the mid-1930's by the perception that consolidation would amount to handing the entire financial system over to the criminals revealed by the Pecora investigations. If government was to guarantee savings through the FDIC, it would have to establish oversight to prevent that insurance from being misused. The best known element of this regulation was the provision separating investment from commercial banking, but the Federal Reserve and the Comptroller were given more specific authority. Commercial banks were restricted from engaging in any business aside from the narrow definition of banking formulated by these agencies. The only exception to this involved lines of business that were considered to be "incidental to the business of banking" that would allow some flexibility for banks to provide financial advising services and a limited number of other activities that had traditionally been bundled with deposit and loan services. The exact nature of these incidental lines of business was not specified in law, and in practice was left to the three federal regulators to determine.

This restriction was put in place for the same reasons that motivated the separation of investment from commercial banking. The 1933 legislation formalized the definition of banking as financial intermediation and attempted to isolate this function from other types of economic activity. Since banks had a near-monopoly on interest-free demand deposits that were in turn federally guaranteed, they could raise investment

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[42] Golembe's (1960) analysis of the political settlement underlying deposit insurance is compelling: "at one of those rare moments in history when almost anything is possible, deposit insurance was advanced and accepted as a method of controlling the economic consequences of bank failure without altering the basic structure of the banking system;" (p. 200).

capital at a lower cost than other units in the economy.[43] Applying this capital directly to other forms of economic activity could give banks an insurmountable competitive advantage in fields they chose to enter and would create conflicts of interest between their roles as financial intermediaries and their other business functions. The enforcement and interpretation of this restriction would be critical to banks' adaptation strategies to EDP.

This historical evolution over successive crises and responses produced the regulatory and industry structure that existed in the 1960's. Substantively, banks' activities were tightly regulated and their competitive strategies limited by law. Despite lip-service paid to the importance of competition, oversight by the FDIC combined with a near-monopoly position and a broad economic expansion to make banking a torpid, safe industry with a highly stable rate of return.[44] As a result of the legal and cultural legacy of the Depression, risk and structural innovation within the banking system were stifled through the 1940's and 1950's despite the opportunities offered by the postwar boom. The only major piece of bank legislation passed between 1945 and 1960 was the Bank Holding Company Act of 1956, which was a largely technical bill intended to prevent the

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[43] This near-monopoly could never be completely secure in the American system of dual banking, as state chartering of other financial institutions (savings and loans, credit unions, building and loan offices, and a range brokers of short-term obligations) became more common in the 1950's and 1960's. The pressure that this grassroots financial innovation eventually placed on federal regulators was a major cause of deregulation in the 1980's.

[44] The contradiction between an anti-trust concern for competitiveness and the regulatory focus on stability became sharper during the 1960's as restrictions on bank consolidation eroded, specifically in a series of conflicts between the Justice Department and the Office of the Comptroller. The emphasis of the FDIC on security and limiting competition is expressed by Randall (1966). Net profitability of American banks through this period ranged between roughly 7% and 10%, with average rates of FDIC insured bank failure at 3 per year. See Federal Reserve Bulletin and FDIC Annual Report (various years).

use of holding companies to escape from the line of business restrictions imposed in 1933.[45]

With the exception of large cities and a limited number of states, restrictions on branch banking kept the banking industry uniquely small in scale and community-based. Deposit levels were determined primarily by the size and wealth of the local population, which in this era was only beginning to discover other outlets for surplus capital. Large numbers of new customers opened accounts for the first time in the postwar era as prosperity, the convenience of checks in an increasingly complex national economy, and the federally-guaranteed safety of bank deposits turned average farmers and workers into savers and consumers. Since banks could not engage in price competition for deposits due to restrictions on interest payments, these new customers chose a savings or checking bank based primarily on location and convenience. The only price competition open to banks on the deposit side involved checking and account management fees, and there is some evidence that informal collusion among banks was common and accepted by regulators.[46]

Though the expansion of deposit customers partly concealed the fact, interest rate restrictions imposed by regulators to prevent competition for deposits had the unintended effect of fostering competition from non-bank financial institutions during this period. While the rapid growth area of checking accounts remained a banking monopoly, regulators in many states allowed credit unions, building and loan firms, or insurance companies to offer deposit services similar to savings accounts with interest rates above

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[45] Bank holding companies would come to be an important tool for evading and breaking down regulatory restrictions in the 1960-1975 period. Laws passed in 1960 and 1966, however, would be the dominant elements of that debate. For an analysis of the 1956 law, see Klebaner (1958).

those allowed by the Federal Reserve and the FDIC. Between 1950 and 1960, the share of total deposits held by banks dropped from 51 to 40 percent.[47] The inability of banks to compete for these additional deposits motivated a strong campaign against this element of federal regulation until its abolition in the 1970's.

As the American population became users of bank deposit and checking services, they were also being transformed into clients for consumer and real estate loans. Prior to the Second World War, most bank lending in the United States supplied working capital for business or seasonal loans for farms. Consumer lending during this period was supplied primarily by local credit unions, retailers, and banking affiliates of firms producing consumer durables.[48] Real estate lending by banks was more common and used contracts similar to agricultural loans, but still represented only a small fraction of the business of commercial banking. Despite a real estate and housing expansion in the 1920's that was largely mortgage financed, rates of home ownership were stable at roughly 46% between 1890 and 1940.[49] The inter-war period saw the creation of a consumer financing infrastructure, but it was limited to the professional class.

In the postwar years, demand for real estate and consumer loans expanded dramatically. Between the end of the war and 1960, home ownership expanded to 62% and levels of household mortgage debt increased by a factor of five. While this

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[46] See Crutchfield and Hald (1956), pp. 112-114.

[47] Nadler (1961), p. 229

[48] Commercial banks held only 20% of the outstanding consumer installment debt in 1941. A concise history of consumer lending prior to the Second World War can be found in Mors (1948).

[49] See Caplovitz (1968), p. 644. It is very likely that the increase in urban home ownership noted in the 1920's (see Housing and Home Finance Agency, *Housing Statistics Handbook*, 1948) was offset by attrition and consolidation of farm ownership during the agricultural recession of the same period,

expansion of home ownership and the related increases in consumer spending are often thought of as purely economic developments, it is worth noting that they were the results of federal policies undertaken by the Roosevelt and Truman administrations. The Federal Housing Administration and the Veterans Administration both provided loan guarantees for first time home buyers that transformed residential real estate loans from a small, high risk market serving a limited population into a form of credit used by a majority of American households.[50] This gave banks a new line of lending that offered a solid return with marginal risk; for banks that were restricted by the 1933 Banking Act from expanding into other lines of business or assuming equity positions in other areas of the economy, real estate loans became a central pillar of postwar expansion.

Consumer loans were the second area of postwar expansion for bank lending. During the period from 1945 to 1960, the monetary value of installment credit expanded at nearly twice the rate of personal income growth. Much of the growth in this area was exploited by lending affiliates of manufacturers such as the General Motors Acceptance Corporation, retailers, or small credit unions. Of these organizations, only credit unions were traditional competitors with commercial banks. Though banks were initially reluctant to provide small scale consumer credit based on the traditional belief that

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concealing a housing boom that established at least some of the financial instruments and methods that would be used in the postwar expansion.

[50] The GI loan program was part of a range of measures intended to counter the threat of a postwar return to Depression conditions by stimulating aggregate demand. It also contributed to the goals of the New Deal's Federal Housing Administration. These two programs in coordination with the regulatory encouragement of the Federal Reserve created the modern market for housing credit and transformed both the banking industry and the character of the postwar United States. See Schaaf (1958). McFarland (1966) provides an excellent technical overview of the FHA and the evolution of their lending policies over time. To understand the importance of federal insurance generally, it is worth noting that real estate mortgages had traditionally been considered a poor credit risk due to their association with fluctuations in farm prices. Prior to 1913, national banks had been prohibited from accepting a real estate mortgage as security for any kind of loan, and these attitudes persisted among bankers through the inter-war period. The persistence of

consumer credit was cyclical and high risk, high rates of growth in this area induced them to enter on a large scale in the 1950's. Not only did banks expand the volume of their consumer loans, they also introduced a variety of credit instruments that encouraged debt financing.[51] Revolving credit lines, credit checks, and credit cards came into widespread use during this period.

Prior to the introduction of EDP, consumer credit was the only aspect of the banking sector that could be considered innovative. Three forces tended to focus creativity here. First, the rapid growth of demand for consumer services and the potential returns on this relatively high interest, short term form of lending offered an incentive to shift resources to this area. Automobiles, furniture for private homes, and an expanded array of home appliances were generally too expensive to be paid for conveniently from savings, pushing up the demand for installment and short term credit. The second reason involved the relatively permissive regulatory climate in this area. While attempts to enter entirely new lines of business such as insurance, travel services, or retail brokerage for commercial bonds had been blocked by regulators, offering loans directly to consumers was one of the only avenues of expansion allowed by both federal and state regulators.

At the same time, banks were facing real competition in this area from retailers, manufacturers, and non-bank financial institutions. Entering these markets

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this attitude toward real estate loans is shown in a contemporary analysis of the McFadden Banking Act in Preston (1927), pp. 206-207.

[51] For a basic overview of the growth of consumer credit during this period, see Katona (1964). The postwar era saw a change in the perception of consumer debt, with installment financing becoming both socially acceptable and firmly associated with the middle class (see Lewis 1956, Shay 1956, 1966). Its expanded use was also critical in enabling rapid postwar economic growth. Aside from overcoming inter-temporal liquidity constraints, consumer credit also served an important role in flattening business cycle fluctuations. Purchases could be made by consumers regardless of their immediate liquidity, and installment payments placed a bottom limit on the contraction of demand and cash hoarding during economic downturns.

unencumbered by the restrictions imposed on banks by federal or state regulators and often leveraging positions near the point of sale, non-bank suppliers of consumer credit pioneered new forms of lending and captured a large segment of these market. While the regulatory regime guaranteed banks a comfortable geographic oligopoly within a narrowly defined field, consumer credit was a more competitive market. Faced with innovative forms of consumer credit, banks responded with new services that allowed them to use their advantage as holders of demand and time deposits to offer lower interest rates on these kinds of loans.[52] This contributed to a battle between the various institutions offering consumer credit – most of which engaged in some form of cross-subsidization from their other lines of business – that benefited consumers.

Overall, the American banking industry at the beginning of the 1960's remained a product of its history. This history was manifest most clearly in the large number of banks in the United States and the relative dispersion of ownership and control of those banks. Over 13,000 separate firms operated nearly 24,000 banking offices. By comparison, every other industrialized country had allowed or encouraged consolidation, creating a limited number of banks with regional branches and centralized pooling of assets and risk. Only seventeen American states allowed unrestricted branching of this

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[52] Mors (1948) examined installment loans and found that non-bank lenders dominated 80% of this market, but noted evidence that banks were entering this field and predicted that their market share would grow. Based on Federal Reserve data for auto loans from 1939-1964, Shay (1966; pp. 374-377) shows that financing by commercial banks increased during this period by roughly 30% at the expense of dealers and auto makers, largely based on price competition in the form of lower interest rates. Though credit unions and other non-bank institutions also increased their market share of these loans, this demonstrates that banks moved aggressively into this market. Smith (1962; p. 479) presents NBER data on the cost structures of banks and various consumer credit providers that demonstrate the cost advantage enjoyed by banks in making consumer loans, explaining the success of banks' gains in these markets. For an overview of these developments, see Dauten (1960).

type. While those states had more concentrated banking systems than the rest, [53] the overall character of the banking industry was community-based, small in scale, and conservative in outlook. Large banks existed in the traditional industrial and financial centers, but were locked out of national banking markets by restrictions on inter-state branching.

The diffusion and division of American banks had been partly overcome by correspondent relationships and a powerful industry association linked to a quasi-corporatist central bank. With the historical development of inter-state commerce in the 19th century, banks unable to establish their own branches in other areas had been forced to develop close correspondent relationships with partners in major financial centers. Correspondent banking served as a partial functional substitute for the consolidation through branch relationships that was common elsewhere. It allowed the transfer of funds across the country – albeit less efficiently than branch banks – through the clearing house system. It also allowed a limited pooling of risk by allowing banks to hold deposits with other banks that faced different economic environments. The network of correspondent relationships that developed in the late 19th century had created a community of bankers with a greater range of common interests than would be expected from the diversity of their economic and regulatory environments. These correspondent relationships, developed initially on an ad hoc basis to meet specific needs of business

[53] For a summary of bank concentration in the early 1960's, see Federal Reserve Bulletin, April 1963, p. 1195.

customers, formed the organizational infrastructure of both the Federal Reserve System and the A.B.A.[54]

In cooperation, the A.B.A. and Federal Reserve worked to counter the centrifugal forces of the banking system by establishing standards, consolidating services, and providing an institutionally privileged forum for the expression of policy preferences. This began in the early 20th century with the Federal Reserve taking on the task of standardizing the collection and clearance of checks across the country. It was proven successful when the Federal Reserve adopted the A.B.A. guidelines for this check clearing system as official policy and applied penalties to banks that violated these standards.[55] As the banking industry became more tightly regulated under the 1933 and 1935 reforms, the importance of the political element of the A.B.A. and Federal Reserve increased. This made the A.B.A. one of the most coordinated and effective industry associations in the country despite the size and diversity of its membership.

From a regulatory standpoint, the banking sector was even more complex. Authority to regulate banks was divided based on the authority that had granted the bank's charter, creating parallel systems of state and national banks. Overlaid on this, the Federal Reserve held extensive regulatory authority over all nationally chartered banks and those state-chartered banks choosing to be members.[56] This created a system of

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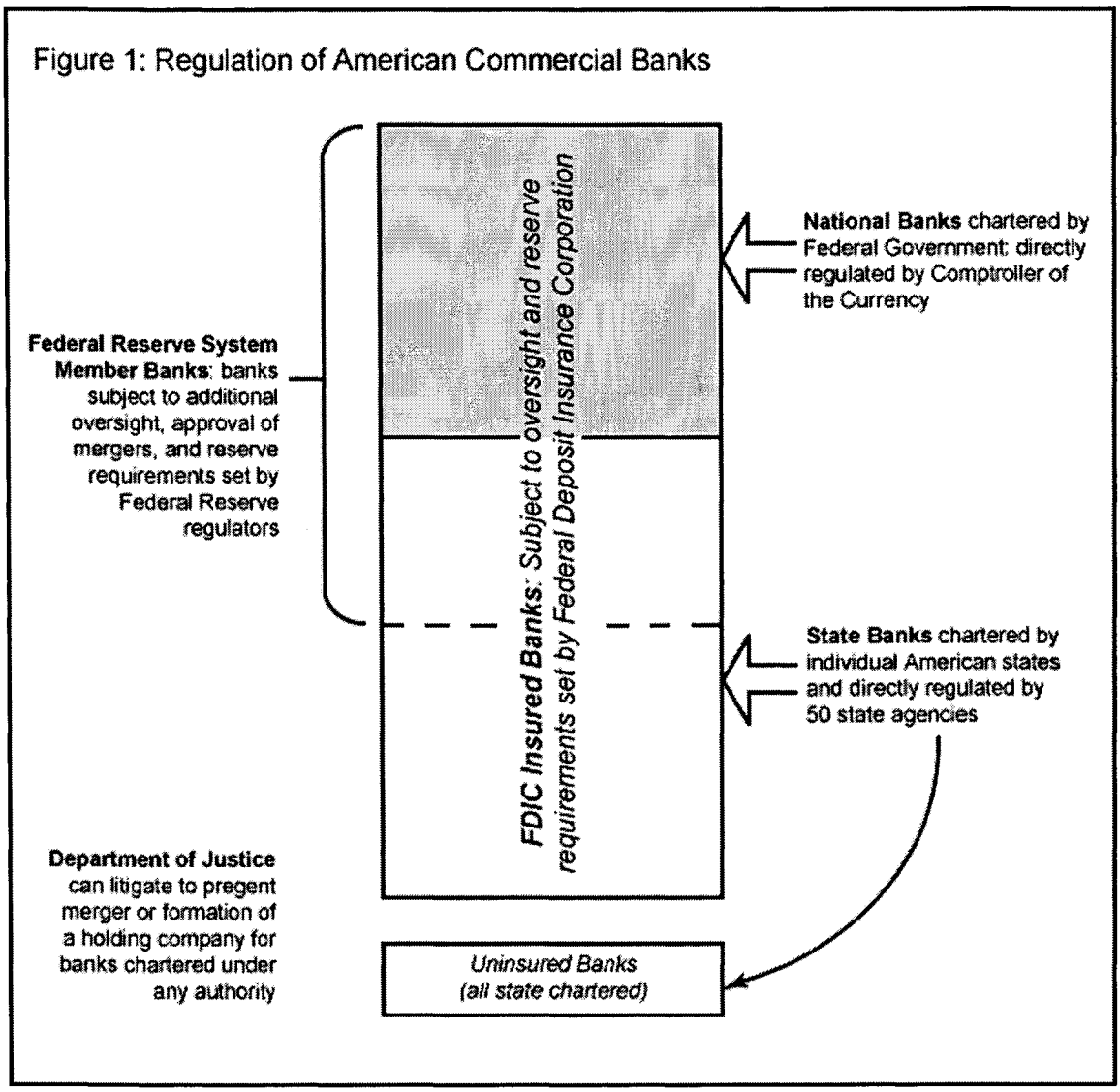
[54] The importance of correspondent relationships to the formation of the A.B.A is highlighted by Schneider (1956). A common response to the bank crisis of 1873, the desire to exchange information among correspondents, and the usefulness of establishing contacts among bankers across the country are cited as motives given by the founders. In an interestingly Tocquevillian note, the two initial founders of the organization claimed to have been inspired to create the association by a women's suffrage meeting in St. Louis.

[55] Auerbach (1965) reviews the transition to Federal Reserve check clearing. See also footnote 29 above.

[56] Debates over the advantages of Federal Reserve membership by state banks are a constant feature of the literature on banking. Each significant regulatory or policy change in this area has produced some change

national banks, state member banks, and state non-member banks. Finally, the FDIC held regulatory authority over all banks using its deposit insurance program, a group that included all national banks, all Federal Reserve member banks, and an overwhelming majority of state non-member banks. Formally, this created a system of overlapping regulation that can be thought of visually:

Figure 1: Regulation of American Commercial Banks



in membership which has been examined and dissected by researchers for its implications. For significant examples of this genre, see Tippetts (1923, 1928), Klein (1975), Prestopino (1976). The key point to draw from this research is that the Board's regulatory choices are clearly constrained by regulatory competition.

Table 1: Numbers and Assets of Commercial Banks by Regulatory Authority: 1960

	Number of Banks	Assets (millions)
Regulator:		
Comptroller of the Currency	4,537	$139,996
Federal Reserve and State	1,637	$76,740
FDIC and State	6,952	$39,587
State only	304	$1,820
Total	13,430	$258,143

Note: All National banks are also nominally overseen by the Federal Reserve and the FDIC. All state chartered Federal Reserve Banks are also subject to FDIC regulation.

The system was made more complex by the ways in which regulatory authority was informally divided between the three federal and various state regulators. By agreement, the Federal Reserve deferred to the Comptroller of the Currency on the regulation of national banks (required by law to be Federal Reserve members) so long as their regulatory decisions were coordinated. The Comptroller, in turn, imposed on national banks the same standards for branching and other requirements as each state in which they operated. This policy, initially a statutory interpretation by the Comptroller based on ambiguous wording of the 1864 Bank Law, was intended to prevent the states from losing control over the basic industry structure of banks within their territory. As with other aspects of bank regulation favorable to state unit banks, this interpretation quickly became entrenched by support from regional bank interests wishing to preserve local monopolies.[57] In its turn, the FDIC deferred to the two federal agencies on most

[57] The 1890's, 1910's, and 1930's, and 1960's all witnessed attempts to increase the efficiency of the banking system by allowing in-state branching by national banks, breaking the geographic monopolies enjoyed by banks in small communities. In each case, lobbying by independent bankers able to influence senators from rural states blocked the attempt. The political battle surrounding the first attempt to allow national bank branching in the 1890's is described by White (1982), pp. 35-36.

regulatory questions and confined itself to imposing on federally insured banks a set of reserve standards and risk criteria roughly based on those composed by the Federal Reserve Board.

This system of mutual deference and ambiguous authority contained many potential conflicts of jurisdiction and interpretation, but these did not surface as serious problems until the early 1960's. Prior to this, the urgency of the national crises of Depression and war combined with a general agreement as to the goals of banking regulation had allowed this subtle division of authority to function. The Federal Reserve Board, supported by the A.B.A., took a leading role in revising regulation or recommending new legislation to Congress. Under the pressure of Depression, war, and global stabilization after 1945, the Federal Reserve's two functions had become more separated from one another. The base of the federal reserve pyramid – the twelve regional Reserve Banks and the check clearing system – retained a close relationship with the A.B.A. and fulfilled their original role as service providers for member banks. As the apex of the pyramid at the Federal Reserve Board focused increasingly on monetary policy and macroeconomic stabilization, its members became less concerned with micro-level regulation and these areas of policy were devolved to committees of regional members and professional bureaucrats. This produced regulatory decisions that were cautious and endorsed innovation only when a consensus could be created within the banking community and specifically within the A.B.A.

In the period after 1945, the banking industry came under increasing pressure from the scale and scope of economic expansion. The growth in deposits and lending required the expansion of existing banks, while rapid urban and suburban growth opened

market opportunities for new bank locations. The system of bank chartering and the merger criteria created bottlenecks as state regulators blocked applications or existing unit banks worked through the courts to prevent entry that would increase competition within their communities.[58]

Insufficient numbers of commercial banks to meet rising demand for deposit and loan services contributed to the information management pressure that mounted through the 1950's. Banks expanded office space and increased employment during this era to keep up with demand for deposit and loan services. This involved the increased use of low-skilled, predominantly female workers handling the growing volume of physical record keeping. Banks were not only servicing a larger number of individual and business customers in this period, they were also dealing with a higher turnover rate of deposits. Deposit turnover describes the rate at which funds deposited in a demand (checking) account are put in and taken out again by customers. While this statistic is usually cited at the macro level to determine the velocity of money, it is important for the purposes of bank record keeping because each deposit or withdrawal imposes a record keeping task on the bank. Currency or a check must be handled, account records updated and confirmed, and – if the transaction does not take place with cash carried by the customer – funds must be transferred through a correspondent bank and a clearing house to wherever the money has been spent. From 1945 to 1960, the turnover rate at banks across the country roughly doubled; banks were not only processing a larger number of

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[58] For testimony relating to the growing need for banking facilities related to economic growth, see *Hearings on Conflict of State and Federal Banking Laws Before the House Committee on Banking and Currency*, 88th Congress, 1st Session. 276 (1963). The ability of state banks to challenge federal regulators in court on decisions involving mergers that could harm their market position was established in 1958 with the *Roseville v. Gidney* case (See Bell, 1961). The threat of such lawsuits slowed the merger approval process even where they were not carried through.

deposit customers, but from their point of view each customer now required twice the data processing effort.[59]

The most important area in which this increase in business affected bank record keeping was in check processing. The volume of checks in circulation increased from 3.5 billion on the eve of the Second World War to 6.5 billion in 1950 and over 13 billion in 1960. Each check had to be handled an average of 3 times by a clerk while being cleared through bank offices and the Federal Reserve clearing houses. The increased demand for labor imposed a financial and organizational strain on banks, many of which faced tightening labor markets even for the low-skilled, female employees that were hired for this purpose. Between 1946 and 1960, employment by commercial banks increased by 65%, primarily consisting of clerical and record-keeping personnel.[60] In addition to the problem of increasing payroll, many large banks faced considerable diseconomies of scale in handling, sorting, filing, and storing the volume of financial data now being generated by their customers. Problems of security, transportation, and storage for their records grew for urban banks with constraints on office space. The delays involved in accessing records stored at remote locations caused delays for customers and absorbed further labor. Taken together, these problems of record keeping were slowly paralyzing the ability of banks to expand their customer base or lines of service. In some cases, they were even preventing banks from keeping up with existing accounts and transactions in a timely manner.

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[59] Deposit turnover estimated by Board of Governors, Federal Reserve System cited in A.B.A (1962), p. 71

[60] Federal Reserve Bank of Philadelphia, "How Banking Tames its Paper Tiger." *Business Review* (May, 1960), pp. 5-6. For a review of the composition of this employment change, see Vaughn (1969), pp. 13-16.

This was the situation faced by banks in the late 1950's. The industry occupied a partly protected market niche that offered a stable return and relatively low risk. With sympathetic regulation and demand for its services growing at the fastest rate in history, banking seemed ideally positioned to benefit further from the continuing postwar expansion. Though the industry was expanding rapidly, a combination of restrictions on entry, the inefficiencies of the check clearing system, and the labor requirements of processing a growing number of transactions limited its ability to respond to increasing demand. Despite the increases in assets, transaction volume, and income, average bank profits stagnated in the 1950's due to the dramatic increase in labor costs required to meet the demands of check handling and deposit accounting.[61]

On the regulatory side, a consensus existed in the late 1950's that banking regulation was not adequately facilitating economic growth, but the entrenched interests of small, regional banks continued to play their historical role of blocking reform when a set of initiatives were debated in the Senate in 1958. Individual states again served as innovators by licensing non-bank financial institutions to assume some of the depository and credit allocation functions of banks, but these efforts presented only a minor competitive challenge to commercial banks. State-licensed credit unions, industrial banks, insurance agents, or building and loan cooperatives were too small in scale and were not part of the national check-clearing network that made demand deposit accounts at commercial banks useful as a payment mechanism. In addition, these small competitors lacked the benefit of federal deposit insurance that was necessary to attract a significant share of small depositors.

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[61] See O'Brien (1968), p. 4.

4.3 Electronic Data Processing and Resource Governance

The overwhelming data processing task facing banks drove the introduction of electronic data processing (EDP). Unlike lean production in the auto industry, EDP is a technical as opposed to an organizational innovation.[62] Specifically, it should be understood as the transfer of a bank's written account records onto electronically stored digital media. Information stored electronically required less physical space, could be manipulated, accessed, and altered more easily, and reduced the personnel requirements that had caused labor costs in banking to increase so dramatically in the 1950's. In this section, I will describe the introduction of EDP and outline the ways in which it could be used by banks. This will set up the problems of resource mobilization and coordination that banks using the technology were forced to overcome.

Electronic data processing came to the banking industry through a combination of three initiatives. First, two large banks experimented with electronic sorting of checks and computerized record-keeping for deposit accounts. These experiments were critical because they defined the characteristics of EDP in banking and served as a model for later adopters of the technology. Second, a cooperative initiative between the A.B.A. and the Federal Reserve system led to the introduction of standardized, machine-readable checks. Machine-readable checks were largely intended to facilitate the work of clearing houses and the Federal Reserve in processing and expediting the movement of checks

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[62] Thinking about technology in the terms described in Chapter 2, this is a subtle distinction. A technical change will almost always have organizational implications – changes in how a production process must be organized in order to effectively use new machinery or techniques. The latter step is often more clearly a product of social construction through the kinds of institutions I discuss than the former. In this case, the distinction is important because the obvious organizational implication of EDP technology – forming branch bank systems with one central record-keeping office – was specifically forbidden by regulation. This forced banks to "fit" EDP equipment into their production processes in a variety of other ways.

from where they were cashed back to the banks on which they were drawn. Once standards were adopted for machine-readable checks, the potential benefits of automating check handling *within* individual banks increased, leading to the automation of all deposit accounts that proved to be the primary application of early bank automation. Third, the A.B.A. cooperated with large equipment manufacturers to design computer systems that could be used in conjunction with check reading devices to accomplish the automation of bank record keeping. This involved programs to facilitate contact between EDP equipment manufacturers and bankers, the provision of information on automation to bankers through a series of publications and conferences, and lobbying to change federal and state regulations that hampered the adoption of EDP.

The first experiments with EDP in banking were undertaken by the First National City Bank of New York and California's Bank of America. The research programs conducted by these two banks were important for two reasons. First, they contributed to the development of the magnetic ink character recognition (MICR) system that the A.B.A. created and adopted to allow checks to be read and sorted by machine. Because checks had to be processed at multiple locations for the payments system to work, the internal automation of the largest banks could not go forward unless their systems were interoperable with the Federal Reserve and all other banks in the country. Establishing a standard for EDP would therefore require the creation of a political coalition to support a check-reading standard and impose this standard across the country. As had been proven by the standardization of check clearing procedures undertaken in 1916, the A.B.A. and the Federal Reserve were the bodies most suited to building such a coalition and mobilizing the power of government to enforce it.

The second result of this initial research by First National City Bank (which later became CITIBANK and eventually CITIGROUP) and Bank of America was to define the characteristics of the EDP systems that would be developed. Both companies actively solicited bids from computer and office equipment manufacturers to design and build a banking EDP system that would establish a bridge between check processing and deposit accounting. No equipment maker was willing to undertake the investment and bear the risk of developing data processing equipment and attempting to market it to the banks, and this affected the character of the EDP systems developed. Specifically, the equipment and procedures that were designed by City Bank and Bank of America for their internal use reflected the data processing needs of the largest banks in the country. In the early 1950's, when it began to investigate the potential of EDP to supplement or replace its punch-card check sorting and manual deposit accounting systems, Bank of America was the largest single bank in the United States, operating over 700 branch offices throughout California that managed more than 4.6 million accounts. It faced all of the specific data processing bottlenecks described above and its managers decided to solve these through a centralized system capable of processing extremely high volumes of checks and deposit account adjustments.[63] City Bank in New York had fewer branches and individual customers, but processed an enormous number of checks as a result of its position as a correspondent for regional banks throughout the country.

This meant that the systems designed and produced for automation in banking were structured around extremely high volumes and were intended to be part of a

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[63] For a brief history of the automation program at Bank of America, see McKenney et. al. (1997). California was the largest state to allow unlimited branch banking, a system that allowed much larger banks to form than were common in the rest of the country. This trend toward bank concentration and the early

centralized bookkeeping system for a large and geographically distributed system of branch banks. In a banking system uniquely defined by small, unit banking, this would inevitably create a basic conflict. Even as successive waves of new equipment manufacturers entered the market in the 1960's and actively marketed their systems to smaller banks, the gigantism that had been part of the original definition of EDP in banking would not be eliminated. Some of this bias toward a large scale was intrinsic to early computer technology and the need of manufacturers to recover high product development and production costs by selling only expensive, high volume systems, but the legacy of the early cooperation between equipment makers and largest banks influenced both the perception of EDP as a high volume investment and the technological trajectory that these systems actually followed.[64]

Spurred by these and other experiments in automatic data processing in the early 1950's, a group of large banks led by Wachovia proposed the formation of a commission within the A.B.A. to study means of automatic check reading and processing. When the committee first met in January of 1954, the first of its four stated goals was "to obtain the endorsement [for a national technical standard] from key operating men in banks throughout the country."[65] The A.B.A. project was conceived, funded, organized, and

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manifestation of the problems outlined in Section 4.2 were both products of California's rapid economic growth after the Second World War.

[64] Some indication of the importance of the two banks' experimental programs in defining bank automation can be seen in the fact that Bank of America was initially unable – despite active solicitation – to interest electronics manufacturers such as IBM, NCR, and Burroughs in developing an EDP system for their use. Ignorance of the potential market for such a system, risk aversion, and the novelty of the kind of integrated data management system being proposed made this program unattractive for these firms. Instead, the first computer system developed by Bank of America was designed in cooperation with the independent Stanford Research Institute (See McKenney, et. al. 1997: pp. 323-325). The involvement of large manufacturers only came once a prototype of the system had been constructed and work by the A.B.A had made the potential market for such systems clear.

[65] Reistad (1961), p. 9.

dominated by a narrow group of managers at the nation's largest banks, but the diffused nature of banking in the United States and the unique form of corporatism reflected in the A.B.A. required that any standards adopted had to be acceptable to a large majority of bankers. To reflect this, five of seven committee members represented the largest banks in the country, but the chair was appointed from a mid-sized bank and input was periodically sought from representatives of smaller banks to insure that the final product would reflect a national consensus.[66]

The need to involve smaller banks imposed constraints on the type of machine-readable system that could be adopted. While most large banks favored a punch card system that would be easier to implement for large corporate customers, small banks successfully opposed this on the basis that individual account holders would reject such a radical change in the basic design of their checks. After several months of meetings, small bankers had established that any machine readable system would have to leave the "look and feel" of checks fundamentally unaltered.[67]

The standard adopted after four years of research, negotiation among banks, and collaboration with printers and EDP equipment manufacturers was magnetic ink character recognition (MICR). This involved printing the account and routing information on the check using ink in which an iron oxide solution was suspended. When the iron oxide in this ink was given a magnetic charge, numerals printed with it could be read by a sensitive magnetic head that would translate the information into impulses that could be interpreted by computers. Due to the experimental nature of the

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[66] Aldom et. al. (1963) p. 28.

technology and the need for perfect accuracy, a more highly differentiated font was developed (E-13 B) that made arabic numerals easier for the magnetic reader to recognize.[68] The use of magnetic ink had been pioneered by Bank of America in cooperation with the Stanford Research Institute, but their system had involved magnetized bar codes that were readable with simpler machines. Though using these bar codes would have required less expensive development, the requirements of small banks again trumped the interest of larger ones. Banks unable to afford the expense of an MICR reader demanded that the information printed on checks be readable by a human being as well as a machine, precluding bar codes or the other machine-readable alternatives that were initially considered.[69]

Once these standards had been approved by the A.B.A., they were taken up by the Federal Reserve and spread across the country in a remarkably short period. The regional Federal Reserve banks began conversion to MICR readers in 1960, and by the end of 1962, nearly 70% of the checks they processed were MICR-encoded. By 1965, 90% of all checks written in the United States were MICR-encoded.[70] Large banks began to install MICR reader systems as IBM and General Electric developed more reliable and

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[67] Ibid., p. 30. Large banks had been using an experimental punch card check system with government and large corporate customers since roughly 1950. These punch cards simplified payroll and simple transfers from high-volume clients but remained unseen by the general public.

[68] The details of the MICR system and information on the A.B.A process that resulted in its adoption can be found in Reistad (1961), Aldom et. al. (1963; ch. 3), Hattery (1957), and A.B.A (1959).

[69] The obvious contrast can be made with European countries, which adopted the CMC-7 magnetic coding system without regard for human back-up (see Corbiere in National Automation Conference (hereafter NAC) (1964), pp. 31-32). With highly concentrated, branch banking systems featuring a limited number of firms that conducted data processing from a central location, the need to accommodate small banks without the technical capacity to operate MICR readers did not exist. Even where such small banks did exist, their political power relative to the convenience of large national chains was negligible.

[70] O'Brien (1968), p. 5 and Zipf in NAC (1969), p. 3.

lower-cost equipment in coordination with the A.B.A. over the ensuing five years. By the end of the decade, non-MICR checks had essentially disappeared entirely from circulation.[71]

Aside from highlighting the importance of interest group structure and the resolution of a common standards problem, MICR is important because it served as the impetus for most banks to use EDP. Using an MICR reader/sorter itself represented a major labor saving advance that helped to reduce the bookkeeping pressures outlined above. The rapidly increasing volume of checks in use could be dealt with through automation at a lower cost, but it did not by itself save the labor involved in paper record keeping. MICR readers, however, could be connected directly to computers that stored and manipulated numerical data. If information on all transactions by check was already being collected by a bank's MICR reader for the purpose of sorting and processing checks, it was a comparatively small step to store this information rather than discarding it and to use this as the basis for electronic record keeping of accounts. This electronic record keeping rather than the use of automatic sorting equipment was the truly revolutionary change in technology, and MICR systems provided an incentive to adopt it.

The third initiative that pushed EDP into the banking industry was a program sponsored by the A.B.A., equipment manufacturers, and federal regulators to promote the

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[71] An interesting coda to the story of bank automation becomes obvious when comparing EDP programs cross-nationally. Early adoption of EDP in the United States, the impressive effectiveness of the A.B.A. in coordinating the MICR system for automated check clearing, and the implementation of this system by the Federal Reserve had the perverse effect of creating large sunk investments in the use of paper checks. When other countries automated giro-type accounts and allowed electronic funds transfers within unified national bank systems, they achieved enormous cost savings by no longer clearing and physically moving checks at all. The United States, facing enormous barriers to the coordination of electronic funds transfers created by state boundaries and locked into the electronic check clearing system that was the wonder of the world in 1961, found itself trapped on an expensive and outdated technological path that it only started to escape in the late 1990's with full computer networking and optical scanning that can replace physical movement of checks.

new technology and provide active assistance to banks implementing it. Promotion of EDP and the provision of assistance to bankers in managing the purchase, installation, and use of computer systems was an attractive activity for the A.B.A. because a majority of its members were small banks lacking the expertise, resources, or contacts to evaluate the new technology and organize a plan to deal with it on their own. The primary constraint on the ability of bankers to initiate an EDP program involved financial and personnel resources. Profits at most small and medium sized banks, while stable, were not large enough to finance the kind of experimental program undertaken by Bank of America in the 1950's. Before equipment manufacturers recognized the potential market and began organizing sales and support staff to market their products to bankers, it was difficult to gain even basic information on the capabilities of EDP systems.[72]

More constraining even than the enormous expense of early computer equipment was a lack of knowledge or relevant skills among executives and managers. Banking was an extremely low-technology industry in this era. Record keeping techniques had not changed significantly in most small and medium-sized banks since the late 19th century. Customer account information was filed alphabetically in an on-site record room and double sets of transaction records were made by hand each evening after closing time at "bankers hours" of two or three in the afternoon.[73] Despite the introduction of elementary sorting machines and other office equipment in the 1950's, only the largest

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[72] The development of sales and support infrastructure by equipment manufacturers helped fill this gap over the course of the 1960's, but initially bankers wishing to study EDP had few resources to draw on. See Zipf in NAC (1969), p. 4 and Noel in NAC (1969), pp. 21-22.

[73] The extent of this traditionalism is illustrated by the difficulty faced by many small banks in introducing the seemingly trivial innovation of account numbers – necessary for the use of MICR technology. Bank record keeping systems had to be re-designed around numeric organization and in some cases banks were concerned that their customers would close out accounts rather than deal with the dehumanization of a numeric code. For a brief history of account numbering, see Reistad (1961), Ch. 2.

banks employed any specialists in office automation, and the level of knowledge among bank executives of the entirely new field of computers was extremely low. This problem of ignorance of the new technology was compounded by the fact that there existed no skilled labor force that could be hired to fill this gap. The type of equipment and systems being designed for banks were entirely new. As will be shown in Section 4.4, creating a workforce with the minimum qualification to operate these systems required a new investment program. Even for larger banks, finding people who were qualified to design and integrate such a system into the daily operations of the bank was an almost insurmountable barrier.[74]

The third factor that made the A.B.A. a vital element of an EDP strategy for many banks was a management and corporate culture that was defined by conservatism, parochialism, and risk-aversion. The protected, tightly regulated, geographically isolated character of the industry had not rewarded experimentation or innovation in the 1940's or 1950's. Slow management turnover, a geographically limited hiring pool for executive talent, and the memory of bank failures of the Great Depression tended to make senior executives unwilling to make large speculative investments in new systems or lines of business. While banking became a more dynamic industry during the 1960's as a result of generational turnover and a combination of technological and economic pressures, the initial resistance to new technology was strong. To overcome this, the provision of organizational templates for adopting EDP, the examples provided by sharing

[74] The importance of the regional availability of labor can be inferred from the locations of the banks that pursued EDP programs before the A.B.A's promotion. Boston, New York, and San Jose (near Bank of America's San Francisco headquarters) were all cities where specialized labor adaptable to bank automation was available due to the presence of academic or military-industrial infrastructure.

information about successful experiments, and social reinforcement through industry association "peer pressure" mediated through the A.B.A. were significant.

These were the main avenues through which EDP entered the banking industry. They were important because they helped to define the way in which the new technology was perceived and the kinds of resource governance strategies that would be needed to deal with it. These challenges can be divided into three general categories. The first two are relatively straightforward problems that can be inferred from the technology itself. First, banks had to integrate the actual electronic equipment into their record-keeping operations and alter their internal organization around electronics rather than paper files. This involved gaining access to the physical equipment and reorganizing the 'flow' of information around it. Though only a fraction of banks actually created on-site EDP systems that required the investment in physical systems, their organization and the relationships they developed with equipment manufacturers are worth examining because they required forms of governance through long-term relationships with suppliers that had to be mediated through relational contracts.

The second requirement imposed by EDP involved the organization and education of labor. The labor dimension of EDP is significant because it created two coordination problems. On the one hand, the workforce engaged in bookkeeping, filing, and processing paper documents had to be reduced as their tasks were taken over by electronic systems. On the other, new types of workers were required by the EDP systems that were being introduced. In the early 1960's, no labor market existed that would allow banks to hire EDP designers, operators, or programmers. Even as computer related skills became more common over the course of the decade, the geographically

limited labor pools from which most banks hired were unable to meet these needs. This created a problem of training that forced banks to develop new mechanisms to manage skills acquisition and personnel recruitment.

The third coordination problem imposed by EDP was more complex and theoretically interesting. Electronic data processing equipment as it was developed in the early 1960's and made available through the avenues I have described was designed to deal with the data processing needs of extremely large banks. Both First National City Bank and Bank of America managed millions of individual and corporate accounts that involved tens of millions of transactions each month. Equipment and systems designed to process information and automatically sort documents on this scale were created in cooperation with manufacturers and mated with high-volume MICR equipment designed to deal with the check processing needs of the Federal Reserve banks and clearing houses, some of which processed more than 500,000 documents each day.

The balance of the American banking system, by contrast, was made up of small and medium sized firms dispersed across the country and focused on serving small communities. While these firms faced an information management crisis for the same reasons that applied to larger banks, the smallest EDP systems available were too large to operate economically at the volumes they required. In 1961, Dale Reistad of the A.B.A. – one of the most enthusiastic evangelists of the EDP revolution – estimated that a bank would have to have data processing needs of over 10,000 documents per day to even consider using an electronic system.[75] In reality, data processing volume would have to

[75] Reistad (1961), p. 84. Based on later statements by bankers attempting to use EDP systems, Reistad underestimated the minimum scale that existing systems would support at a net cost savings. See estimates in NAC (1966).

be considerably higher to justify not only the capital costs involved (on which Reistad's estimate was based) but also the costs of reorganization, training, and secondary equipment. This mismatch between the scale of bank organizations in the United States and the scale for efficient use of EDP systems created a new reality in banking. Prior to the development of EDP, the strongest argument for large banks with multiple branches had been based on dispersion of risk across a larger number of depositors and multiple regional economies. In terms of the manual data processing tasks they faced, there is some evidence that the industry had displayed either a flat cost curve for increases in size or that minor diseconomies of scale had existed.[76]

With the introduction of EDP systems, the cost structure of deposit banking – where costs were dominated by data processing and the product was essentially undifferentiated due to federal regulation of interest rates – had been altered at its core. Using data from a 1967 Federal Reserve study that *did* break down bank costs by line of

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[76] Cost studies of banks are problematic for several reasons. First, banks in different jurisdictions face different procedural operating requirements depending on their regulator (state or national), affecting their ability to adopt a 'most efficient' practice. Second, banks in different geographic areas face different cost structures based on the local labor market and land values. Related to this, the character of the local economy in which banks are locked determines the mix of loans and types of deposits as well as the turnover rate of those deposits, all factors that are overwhelmingly important in determining cost structure. In addition, banks pursue different balances of the lines of business in which they are allowed to engage and target different types of customers. The results of statistical studies that compare large numbers of banks such as Greenbaum (1967) are highly sensitive to the assumptions used to define dummy variables for these factors or rely on the use of proxies to measure costs or output that are difficult to support. In addition, data on bank costs is not easily disaggregated to isolate accounting costs. Looking at aggregates, Alhadeff's (1954) classic study of California banks shows an ambiguous relationship between structure and costs, but a slight economy of scale based on size at very low and very high levels. My claim regarding diseconomies of scale in the specific area of accounting and data management is therefore based on statements made by bank managers of large banks at the A.B.A.'s National Automation Conferences that emphasize the savings achieved through EDP relative to previous systems. While these reports might be biased to overstate the costs of the accounting systems replaced by EDP, the consistency of testimony among large bankers is compelling. Compared with the ambivalence or even disappointment expressed by representatives of smaller banks about the relative benefits of EDP used only for deposit accounting. A more useful basis for evaluating economies of scale comes from Yavitz (1969) and O'Brien (1968: pp. 80-81, especially tables 2 and 3) who show that the labor cost savings to large banks after conversion to MICR and EDP deposit accounting are extremely high, while cost reduction is less consistent for smaller banks.

business, Daniel et. al. (1973) estimated the cost curves associated with deposit account management for banks using EDP systems and those using manual or punch-card data management systems. The estimates for non-EDP systems were consistently upward-sloping at volumes up to 20,000 accounts. The cost curve for banks using EDP systems, by contrast, was estimated as downward-sloping across the range of account volume up to 100,000. Roughly consistent with Reistad's estimate, this study found that the cost curves crossed between 10,000 and 20,000 accounts.[77] The existence of these new economies of scale are also supported by Yavitz (1969) and O'Brien (1968; pp. 79-82, especially tables 2 and 3), who show large labor cost savings after conversion to MICR and EDP based on surveys comparing the same set of banks over time. Though O'Brien shows labor cost savings across a range of bank sizes, the numbers of workers eliminated in large banks were greater and the savings much larger in absolute terms. Put simply, EDP transformed commercial banking from an industry with significant diseconomies of scale to one with scale economies so sharp as to make banks with small numbers of accounts practically uncompetitive.

With the cost curve for accounting inverted from an upward to a downward slope by the introduction of EDP, many banks were placed in a position where the regulatory structure that defined their industry was directly at odds with demands of new technology. Large unit banks in urban centers were capable of reaching the desirable

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[77] Though this study used the best available cost data, the under-representation of small banks that were most likely to use conventional accounting in the Federal Reserve data set and the fact that nearly all participants in the study with high account volume had adopted EDP systems both create problems. It is also worth noting that the numbers of transactions per account and the bank's role as a correspondent and clearing house affiliate for other banks affect the accounting task facing banks. For example, a bank with a limited number of large corporate customers for which it handles payroll and purchasing accounts could easily have a much higher *transaction* volume and hence need for EDP than a bank in an economically depressed area with large numbers of small, fairly inactive deposit accounts.

area of this cost curve without structural change, but the average bank in the United States was a unit bank serving a sub-optimal number of deposit customers. Based on the geographic distribution of population and the need to be located near customers, these banking offices could not achieve the numbers of depositors required to benefit from EDP.

For the smallest banks in protected local markets facing no threat of entry, the efficiency gain from EDP could be ignored without serious consequences. The 'carrot' of potential cost savings and higher profit levels existed, but the 'stick' of competition did not. For these banks, solving the economies of scale problem posed by EDP was initially not urgent. Even for banks facing competition or a substantial threat of entry, the threat was blunt. Federal regulation of interest rates on deposits meant that direct price competition was impossible. Competitors using EDP could offer faster processing of transactions and an array of incentives to switch, but this was more likely to deprive a bank of growth opportunities and condemn it to low-profit stagnation than to drive it out of business. Measured by numbers rather than by share of funds, a substantial fraction of America's banks adopted exactly this strategy and suffered exactly this fate.[78]

The economies of scale created by EDP, however, provided an incentive to experiment with ways to increase transaction volume. Banks in rapidly growing areas found that their ability to compete for new business increased with their size, and they tried a range of strategies to create precisely the large, consolidated banks that the regulatory systems in many states were designed to prevent. Being products of the

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[78] These small banks formed the core of support for the campaigns by the Independent Bankers Association (I.B.A.) to prevent branching, block mergers, and tightly restrict the growth of large holding companies. Both in this role and in their position as the group within the A.B.A. that fought against growing industry

regulatory system, all of these strategies involved the use of non-market mechanisms to implement an organizational strategy that could capture the benefits of the new technology. The most obviously political manifestation of this was a series of attempts to alter state and federal regulations to allow branching – the establishment of multiple bank offices controlled by the same corporation. Where regulations could not be changed, they were subverted. Bank holding companies were formed to bring multiple banks under the control of one entity in order to use common data processing facilities.[79] In addition, banks undertook extensive lobbying that targeted the judiciary and the executive branch agencies to alter the law's implementation or interpretation. This was done either as an adjunct or backup to legislative strategies or as an alternative when formally changing laws was seen as too difficult or time consuming. These strategies were exceptionally attractive in the banking industry due to the wide range of bureaucratic discretion and jurisdictional ambiguity that existed in regulatory system and the capture of these agencies by banks.[80] A wave of lawsuits related to mergers and the activities of

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sentiment in favor of federal branch banking reform, they are important players in the process of technological adjustment despite their own decision not to use EDP.

[79] Bank holding companies had existed since at least the 1920's, but had been uncommon through most of the country until the postwar era. Their primary use in the prewar era had been to allow banks in small rural communities to develop non-bank services such as insurance or mortgage services that the community could not otherwise support. Rapid economic growth after the Second World War had led to increases in the numbers of chain systems and bank holding companies and resulted in federal legislation to bring them under the regulatory aegis of the federal government in 1956. For a brief history of these two forms of bank concentration, see Lamb (1961), Ch. 4. For the purposes of this chapter, chain banking, group banking, and holding company banking can be treated as variants of the same organizational form that are differentiated only to reflect what can be achieved under existing regulations.

[80] In a practical sense, the regulatory side of the Federal Reserve was captured by design through its association with the A.B.A. and the system of corporatist representation at the regional banks. Of the other agencies, the Comptroller of the Currency in the early 1960's saw his mandate as allowing modernization and expansion of the national banking system, making him a strong ally of industry lobbying (see below). Only the FDIC and to a lesser extent the anti-trust lawyers at the Justice Department retained a more traditional and conservative approach to enforcing bank regulations.

the Comptroller of the Currency in the early 1960's were the most obvious attempts to do this, but many others occurred at the state level.

When banks were unable to alter their regulatory environment to allow them to increase in size, they developed relationships with other banks that allowed them to pool their data processing or with service bureaus that would allow them to contract with outside firms to deal with their data processing. Even in this market-oriented solution, regulations had to be altered and long-term relations with outside firms developed. Since processing account information was central to a bank's daily operation, it was difficult to coordinate external contractors through arms-length relationships, leading banks to seek ownership of their data processing affiliates. Under the 1933 Banking Act, however, banks were forbidden from engaging in any line of business not directly related to their core functions of taking deposits and making loans. For banks to form cooperatives and set up a shared data processing center, it was necessary to either alter this law or to convince regulators to classify data processing as an activity incidental to banking. In addition, legal liability for any checks processed incorrectly could not be transferred to an external service bureau, meaning that banks would assume unlimited liability for mistakes made by their data processing contractors. Once again, banks found it necessary to either change the law or internalize this risk through ownership. Finally, even with pooling or EDP services agreements, banks often found that the capacity of their EPD systems outstripped their internal data management needs. One solution to recover the costs of EDP equipment was to sell data processing services to their business clients. Once again, regulatory restrictions had to be dealt with. Though more subtle than repealing restrictions on branch banking, even the most market-oriented responses to

EDP could only be implemented by using the power of the state to facilitate the use of governance mechanisms – partial ownership of EDP service providers, cooperatives formed with other banks, or relational contracts with a large bank – that were new to the industry and imperfectly supported by existing institutions.

4.4 Governing Labor and EDP Equipment

When EDP was introduced through the three channels described above, banks were forced to mobilize two resources that had literally not existed prior to the creation of the technology. Information processing and storage equipment designed to manage deposit accounting was only developed after the A.B.A. finalized standards for machine-readable checks in early 1960.[81] A number of electronic equipment firms had been involved in the association's deliberations and had prototypes ready soon after the MICR standards had been finalized. They learned in the course of preparing to market this equipment that only the largest banks had any interest in purchasing an EDP system "off the shelf" for deposit account management. This discovery, made in cooperation with the A.B.A.'s Automation and Marketing Research Staff, made banks a new kind of client for these firms. In the past, automation projects had been performed primarily for government or large manufacturing corporations. These clients tended to possess internal specialists capable of designing a detailed automation program and presenting its parameters to the equipment makers as part of the bidding process. The equipment

[81] These standards forced large bank pioneers to replace or modify the internal systems that they had developed in the late 1950's at considerable cost. As importantly, the equipment manufacturers that had co-developed those banks' proprietary systems – the two largest of these were IBM and Burroughs – were forced to abandon the specific investments made in them and produce equipment compatible with the new standards. This had the effect of creating an uncommonly level playing field for competition among the large manufacturers and prevented the first movers from becoming completely dominant in the emerging market.

manufacturers might offer suggestions to their clients based on their own experience, but for the most part their role was to respond to specific and well-articulated customer needs.

The task of automation in banking was considerably different. While a handful of banks facing the most extreme pressure from their data processing requirements had already conducted internal reviews, hired experts from other industries or academic institutions, and were prepared to take bids on a system built to their specifications, these firms were a vanishingly small minority.[82] Most banks did not possess the base of knowledge among managers to design an automation program and were unable to recruit executives who had relevant experience. This was true even among the large banks that were being forced by cost pressure and network externalities to implement MICR programs immediately. Facing a potentially profitable market in which clients lacked the basic information required to make purchasing decisions, equipment manufacturers responded by changing the nature of the product they were offering. Rather than stand-alone equipment packages or building custom systems to specifications provided by the customer, firms such as IBM developed automation packages that included standardized equipment, providing consulting services on how to incorporate the equipment into banking operations, rental of the equipment for a specified period, training existing bank

[82] According to the 1972 A.B.A. National Automation Survey, only 9% of respondent banks used automation systems operated entirely "on premises." Of these, only a small fraction (representing 19% of total expenditures by banks with internal systems) had purchased their entire computer system outright rather than through a rental, lease, or third party operation agreement. While this small fraction of banks included every bank with over $500 million in deposits, many of the most important large banks in regional markets, and a range of smaller banks facing specific data processing challenges, this remained a small portion of the total number of banks that used some form of EDP. See Cross and Tippett in NAC (1972), pp. 9-11.

employees to operate the system, and providing maintenance services on an ongoing basis.[83]

This shift from equipment sales to a mix of consultant services and equipment rental demanded that EDP manufacturers develop multiple lines of new competencies and products. The investments in organization and personnel that this called for were speculative and required a specialized knowledge of the needs of the banking industry. This was a key area for the A.B.A., which recognized the range of problems that would be faced by banks attempting to automate deposit accounting and set up a series of committees for the specific purpose of providing manufacturers with the information required to market full spectrum services to banks.[84] Based on surveys of bank managers and direct experience with early adopters, these committees reported that leasing programs and the provision of high levels of manufacturer support were strongly preferred by bankers considering investment in an EDP system. The A.B.A. also established an educational program for managers and opened a school for bank computer operators. It commissioned a series of studies by academic institutions and its own internal research staff that resulted in two books, a series of articles, and an automation newsletter subscribed to by both banks and equipment manufacturers.[85]

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[83] Bankers' needs and expectations from firms can be inferred from the advice given by consultants to help banks choose an EDP supplier. The lists of criteria that banks should look for in an equipment supplier provided by Reistad (1961; p. 91), Jordan in NAC (1964; pp. 136-139), Aldom, et. al. (1963; pp. 62-64) and various other sources establish the kinds of services expected by banks.

[84] The A.B.A. had established relationships with manufacturers during the course of its research for the MICR project and used these contacts to express the needs of small and medium sized banks for services as well as equipment. For a brief summary of the Association's goals in these relationships with manufacturers, see Kelley in NAC (1963), pp. 36-38.

[85] See Wilmouth, Corey, Kolb, and Shipley in NAC (1964), pp. 424-431.

The annual A.B.A. Automation Conferences that began in 1963 also served to cement the relationship between the Association and equipment manufacturers. Representatives of Burroughs and IBM were invited to address both technical committees and the problem-oriented panels held for bankers at these meetings. In 1965, the Chairman of the Board of IBM gave the keynote speech at this conference and addressed "The Man-Machine Relationship, " while the President of Burroughs addressed the 1968 conference on his firm's plans for the provision of new and expanded services for banks. In addition, these conferences served as trade shows with exhibits and demonstrations by manufacturers that were arranged with the A.B.A. to meet specific needs.[86] While much of the rhetoric of partnership between bankers and equipment manufacturers that emerges from these conferences is overblown, the real cooperation represented by committee work in setting equipment standards and the development of specific recommendations that were then carried through demonstrate that real problems faced by banks were being addressed.

Computer and electronic equipment manufacturers that were either unwilling to make investments in developing specialized skills in bank automation services or that lacked access to the information sharing available through the A.B.A. were disadvantaged in selling to small and medium sized banks. Over the course of the 1960's, these firms were generally pushed out of the market. Despite the fact that some equipment manufacturers in this category were selected by large banks for internally developed automation projects or to provide peripheral equipment, they should be thought of as participants in the broader market for generic office automation products

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[86] See NAC programs and exhibition lists, 1963-1972.

that began to develop in the late 1960's rather than important participants in the implementation of bank EDP.[87] The successful firms generally created entirely new multi-product divisions to market packages of products and services to banks. IBM, for example, re-organized their Data Processing Division during the 1960's to meet this need. Their program involved developing a library of new software packages designed around deposit account management, developing service, maintenance, and customer assistance offices to trouble-shoot problems encountered by banks, and establishing from scratch a training and credentialing program through which existing bank employees could become certified in using IBM equipment. Many of these programs were developed in cooperation with the A.B.A. and were based around the kinds of services that their research showed were desired by potential customers.[88]

It is useful to think about these investments and the intermediary role of the A.B.A. as governance mechanisms used to create and control new resources. While it would be possible to claim that the A.B.A. served simply to reduce transactions costs between equipment manufacturers and banks, this market-based model would obscure the importance of what actually occurred. Due to the work of the A.B.A., the nature of both the resources being mobilized and the ways in which those resources would be governed were altered. The physical EDP equipment was no longer the productive resource being

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[87] Of the major manufacturers that had participated in the MICR program and solicited early orders for EDP systems from pioneering banks in the late 1950's, the majority were unwilling to make the investments required to service smaller banks. According to the 1968 A.B.A. Automation Survey, three firms – IBM, Burroughs, and NCR – held more than 90% of the EDP market. As computer skills spread through the labor force in the 1970's, banks became less dependent on their suppliers and began to purchase peripherals and eventually core equipment from firms selling generic office automation equipment to other industries. During the pioneering era in banking, however, the high cost of developing specific packages of services for banks combined with the importance of relationships with the A.B.A. served as powerful barriers to entry.

[88] See Wilmouth, Corey, Kolb, and Shipley in op. cit. pp. 424-431

coordinated by the bank. Instead, the A.B.A. defined for the manufacturers a package of knowledge and functions that could be produced and sold to banks through the intermediary forum of the A.B.A. The cooperative programs organized by the Association did more than simply connect buyers and sellers, they defined what was being bought and sold. This simplified the coordination task of bank managers by allowing them to save the cognitive and organizational costs of learning enough about EDP to intelligently evaluate alternatives and choose one that fit their needs. When this system of establishing templates worked smoothly, it turned simple applications such as deposit accounting into a functional module that could be plugged into a bank's internal operating system, replacing a large portion of their physical record-keeping department. EDP manufacturers were transformed from makers of physical products into sellers of a complex and highly specified new service, and this transformation was not conducted through markets but by the planning and coordination tasks of the A.B.A.

Even setting aside both product definition and the creation of a forum to mediate between manufacturers and banks, governance through market mechanisms was insufficient to structure relations between banks and equipment manufacturers. Though these relationships were formally mediated through contracts, many aspects of the relationships that were developed between manufacturers, banks, and the A.B.A. were not formalized in enforceable legal terms. To supplement governance through long-term contracting, the relational trust built up by mutual association with the A.B.A. was necessary. Because sales opportunities for manufacturers were dependent on the cooperation of the A.B.A., their incentive for opportunistic behavior within the bounds of incomplete contracts was limited by reputational concerns. If bank customers were

unsatisfied with the partnership they had with an equipment manufacturer, the A.B.A. provided both an informal network through which information could be shared and the threat of formal action that would exclude a manufacturer from future cooperation with the Association.[89] More important than the potential for formal sanctions was the reputation and centrality of the Association itself. The A.B.A. possessed a high level of legitimacy and authority as the administrator and overseer of transactions between banks and manufacturers because of its internal composition, the record it had built by establishing and propagating industry standards, and its informal affiliation with government regulators.[90] It had gained credibility in technical issues from the success of the MICR program, which by 1965 allowed 95% of checks in circulation to be machine processed at enormous savings, and was perceived as being able to act as a proxy for banks in their dealings with manufacturers. For the same reasons, EDP equipment makers found it useful to coordinate their marketing, product development, and long-range plans with the various standing A.B.A. technical committees because they were confident that products and services developed in cooperation with these committees would find buyers.[91] Though the Association's role diminished over time as

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[89] Given the role of the Association in standard-setting, checking compliance, and providing information to banks, exclusion would have been tantamount to exclusion from the market. Though the relevant committees within the A.B.A. did transmit warnings to manufacturers, this most extreme step was never taken.

[90] The informally privileged position of the A.B.A. with regulators in the Federal Reserve gave banks an added incentive to participate in its governance and contribute resources to projects like the EDP advisory committees. By locking banks in and maintaining their participation, the A.B.A. increased its credibility with equipment manufacturers in a virtuous cycle that benefited both groups. Though the ability of any organization to accomplish this in the American institutional environment has been questioned, the unique and quasi-corporatist structure of the Federal Reserve seems to have been the key factor in coordinating banks and convincing them to participate.

[91] Vaughn (1969) found that 16 of the 18 banks in his detailed survey chose to lease equipment through programs such as this rather than purchase outright despite potential cost savings from depreciation

manufacturers developed their service programs and computer technology improved, its importance in creating a set of coordination mechanisms for small and medium sized banks that overcame the structural flaws of formal contracts was critical.

The obvious comparison in supplier relations between the banking and auto industries is instructive. In the latter case, auto assemblers had an overwhelming incentive not to commit to long-term relationships with suppliers that would limit their ability to use market power as monopsony purchasers to force down prices. This retarded cooperative investment and prevented the exchange of design and inventory information required by lean production. By contrast, the A.B.A. provided a forum for exchanging information, mediated between buyers and sellers, and had sufficient power to limit opportunistic behavior that would otherwise have emerged in incomplete contracts. This represents a form of governance through a generic mechanism (contracts enforced and interpreted by courts) supplemented by a formal structure. In the framework developed in Chapter 2, this could be thought of as banks using an industry association to generate productive resources and fit them into an organizational strategy.[92]

The mobilization of labor resources also followed this pattern of coordination through equipment manufacturers and the A.B.A. In 1963, the President of the A.B.A. claimed that one of the "greatest problems in the era of is to assure an adequate source of

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allowances. The 1972 A.B.A. Automation survey, the most comprehensive data source available on patterns of computer use, found that 72% of banks with on site EDP programs rented equipment.

[92] An interesting contrast exists between commercial banking and other industries with heavy record keeping demands and low levels of technical knowledge such as credit bureaus or insurers. Lacking an organization such as the A.B.A. to facilitate the development of system templates, exchange information, or limit opportunism, the former began to computerize only in the 1980's when generic office computers became common. The latter – which along with large commercial banks pioneered EDP in the late 1950's – was only able to use EDP because the industry was sufficiently concentrated to allow large individual firms to invest in systems design and bargain with equipment manufacturers on an equal basis (Swart and Baldwin 1971).

competent personnel with the technical skills needed to work with this equipment."[93] This impression is supported by survey data of banks implementing on-site EDP programs, which show that the largest and most consistent problem identified by bank managers was "finding and retaining qualified personnel."[94] In addition to being the most intractable problem for managers, labor costs also accounted for nearly as large a fraction of the cost of EDP conversions as did the capital equipment. Though computer record keeping did indeed live up to its promise of reducing net labor costs by eliminating clerical jobs in medium and large banks and breaking the linear relationship between increasing transaction volume and increasing clerical staff, labor costs were the largest single expenditure of most EDP programs.[95]

There were three general problems involved in mobilizing and coordinating labor resources. The first was the requirement that one entire classification of employees possessing skills in filing and paper record keeping be eliminated. This reduction of the clerical labor force was made easier by two factors not directly related to EDP; both the character of the largest group affected and the circumstances under which it had been created made their elimination relatively easy. Clerical employment had increased by more than 60% during the 1950's in response to the rising volume of checks being processed and the growing numbers of deposit accounts described in Section 4.2 above. To meet this labor demand, banks had predominantly hired young, single women with a high school education whose disadvantaged position in the broader labor market translated into lower wage demands. This group was not unionized and could not

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[93] Kelley in NAC (1963), p. 34.

[94] 1969 A.B.A. Automation Survey in NAC (1969), p. 126

effectively protest dismissal as a result of automation. These workers also displayed a high turnover rate, which in many cases made it possible to shift labor away from paper-based record keeping through attrition rather than mass firings.[96] The rapid growth of banking overall also helped to cushion career bank employees from the effects of EDP. Unlike the clerical staff that had been hired at low wages during the 1950's, banks were usually able to avoid firing the professional workers in their accounting departments. This was done either by moving them laterally within the bank's organization or by re-training them to use the new accounting systems being installed.[97] Though not possible in all cases, the fact that bank employment and salaries continued to increase throughout the 1960's in lockstep with general economic growth allowed most banks the luxury of not firing members of their core labor force, avoiding the community disapproval, labor protest, and poor internal morale associated with firing large numbers of workers.[98]

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[95] See Cafiero (1975), p. 114 and 120 and Doyle in NAC (1967), p. 84.

[96] Yavitz (1967) estimates that the turnover rate for female clerical workers in banking was between thirty and fifty percent (p. 15), though this obviously varied based on the character of the local labor market. Aldom et al. (1963) also highlights the high turnover rate of this group to justify the claim that attrition can prevent the need for disruptive firings. Synnott's (NAC, 1964; p. 181) small bank case study suggests that a strategy of allowing attrition to operate for a few months prior to EDP conversion can eliminate the need for reduction of the clerical labor force at all.

[97] There is a fascinating aspect of gender sociology in the conversion of banks to EDP. Women that had entered the clerical labor force were generally considered transient employees and were the least likely to be retained after EDP technology was introduced. Given the diversity of local labor market conditions, however, many banks that attempted to organize internal training programs or use those offered by manufacturers were forced to promote women into EDP-related positions. For a contemporary case study, see Wallace in NAC (1965), pp. 47-52. For a more general examination of the effect of EDP on women, see Hunt and Hunt (1968).

[98] See Aldom et al. (1963), pp. 67-68. It is interesting in general to note that bank managers – especially those running small banks with strong ties to their local communities – were extremely reluctant to simply fire employees and would go to considerable lengths to avoid terminating even workers in marginal positions. Based on statements made at National Automation Conference panel meetings and case studies from the Federal Reserve and A.B.A., this seems to be related to two factors. First, banks enjoyed a relatively secure business position based on geographical monopolies and regulatory barriers to entry. This reduced the force of competition in enforcing profit-maximization and allowed more slack resources for labor. Second, bank managers and owners consistently expressed a sense of responsibility as a community

While eliminating jobs made redundant by EDP was easier in banks than in other industries due to the marginal nature of the affected workforce, mobilizing workers possessing the skill set required to use computerized accounting systems was extremely difficult. When introducing a technology that requires radically new skills, firms accustomed to acquiring labor through market mechanisms generally attempt to hire the needed skills externally. Initially, commercial banks implementing EDP attempted to do this. Market mechanisms, however, could not provide the skilled labor demanded by the new technology. Though the largest banks operating in metropolitan centers such as New York and San Francisco were able to hire outside specialists at high cost, the market-based strategy for mobilizing labor was handicapped for most banks by three factors. First, EDP was an entirely new field for which literally no specialized labor existed. Programmers, computer operators, technicians, and managers could be found in other industries with skill sets that could be adapted to the systems being designed for banks, but these specialists would require additional training to integrate their skills with banks' actual needs. Second, the structure of banking in the United States locked most banks into restrictive local or regional labor markets. The labor pools from which these banks could draw seldom included either industries from which lateral recruitment was possible or educational institutions that provided comparable skills. Finally, banks initially did not respond to price signals and offered wages below the (extremely high) market value of computer specialists in the early 1960's. This is in some ways difficult to explain, since large banks quickly recognized that EDP specialists would have to be competed for against a range of high-paying, challenging industries that were desperate for

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leader and major part of the local economy. This may have been related to a desire to maintain a positive reputation in the community, but it appears consistently even in conversations among bankers and seems to

programmers, systems specialists, and even computer operators with relatively little training.[99] Part of the explanation lies in the fact that banks traditionally paid relatively poorly for clerical and record-keeping positions, a trend made worse by the hiring practices of the 1950's. Since EDP personnel were entering this area of the bank's operations, bank managers unfamiliar with the broader labor market balked at paying these new workers salaries dramatically higher than the workers they were replacing. Until banks offered higher wages and established more effective strategies to compete for labor that was in extremely high demand by other industries, external recruitment could not fill the needs of most banks.[100]

Faced with these barriers to mobilizing labor through external markets, most banks chose to train their own clerical and accounting workers to meet the needs of the new technology. All but the largest banks, however, lacked the personnel, knowledge, and other resources required to design and implement an internal EDP training program. The same forces that made hiring outside specialists to run EDP programs difficult also worked against organizing effective training programs. In addition, banks pushing forward to automate in the first wave after the introduction of MICR systems found that it would take too much time to set up a program, implement it, and benefit from the knowledge gained by the participants. Their failure to solve this problem forced them to

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be part of the social norms of the community.

[99] See Kelley in NAC (1963) and Kessler in NAC (1966; pp. 109-110)

[100] At some level, there existed an irrational resistance by management at smaller banks to paying higher salaries and creating more attractive career paths for EDP personnel. In some cases, this was based on concern about the anger of existing bank employees upon learning that their new colleagues started at a much higher base salary and fear that this comparison would increase wage demands among the entire bank workforce. This attitude is condemned repeatedly in sessions on management attitudes toward information technology at several of the A.B.A. Automation Conferences. See especially Kaye in NAC (1964; p. 46), Dean in NAC (1965; pp. 20-21), Kessler in NAC (1966; p. 110), and Laeri (1966).

rely on expensive, inefficient short-term solutions as they either learned to use their new EDP systems through trial and error or paid equipment providers to provide training personnel at a high cost. According to one survey examining banks implementing both on and off site automation without formal training programs, more than 60% reported problems related to operator mistakes.[101] Self-taught managers, sales representatives from equipment manufacturers, and a limited number of outside consultants were brought together in crash programs that generally allowed the bank to complete conversion, though at much higher cost than anticipated and without initially meeting goals for productivity improvement. The results of this were often chaotic and inefficient processes that initially had to be backed up by duplicated manual accounting to insure that no errors had been made in account records as a result of misuse of the equipment. While these problems were worked out by early adopters at a high cost, other banks learned from their experience that trained labor was an absolute necessity.

To deal with this problem, banks again turned to the A.B.A. and equipment manufacturers. Mechanisms similar to those that had helped to solve the coordination problems of computer equipment and systems design were used to provide the labor input demanded by EDP on at least a temporary basis. The equipment manufacturers gained information about banks' specific needs through the forum of the A.B.A. committees and created training programs tailored to their own systems. At the same time, the A.B.A. set up its own general courses and credentialing programs that dealt with various aspects of EDP, raising money from member banks to research the personnel requirements imposed by various types of computer systems and construct courses to meet these needs. The

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[101] Vaughn (1969), pp. 54-55 and Synnott in NAC (1964), pp. 179-180

Association also co-sponsored classes with colleges and universities to provide programs on the management of information processing and a range of technical skills.[102]

For equipment manufacturers, training programs served two economic purposes that made them worthwhile investments despite their inexperience as providers of educational services. First, large firms saw education as a potential profit center in their expanded role as service providers to banks. Just as manufacturers packaged software with the equipment they sold and worked to prevent outside agents from competing in this area by writing program packages in proprietary formats, they also sought to convince customers that manufacturers' courses were the best option for educating operators and managers. The second function served by manufacturers' training programs was to tie customers to their products across successive generations of new equipment. These education programs emphasized the value of existing employee skills and the specificity of those skills to the products of a given manufacturer. This investment in employee skills would be lost or reduced in value if a bank upgrading their EDP system switched to a different supplier. In cases where banks were satisfied with the skill levels produced by these educational programs, this strategy helped to reinforce long term relationships between manufacturers and their customers. Many small and medium sized banks found that the costs of entering a more dependent relationship with a manufacturer by using their educational program were much lower than the start-up costs

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[102] In some cases these cooperative programs became the nucleus of junior or state college degree programs or specialties in office data management that expanded far beyond banking. The unintended externalities produced by cooperative programs such as this were important in creating the exact thing that had been missing for early adopters – a large enough pool of EDP-trained workers to allow later adopters of the technology to use market mechanisms to find the workers they needed. This dynamic suggests that much of what economists assume is the operation of markets in generating needed labor or "spontaneously adjusting" to new needs is actually the aggregation of processes that are socially planned and embedded in the interaction of firms with non-economic institutions.

of an internal training program, even with the educational templates provided by the A.B.A.

Other banks, however, were either unwilling to rely on training programs created by manufacturers or found these programs insufficient for their EDP systems. In many cases, banks wished to avoid or supplement manufacturers' training regime because these programs were too limited in scope, tied to a specific equipment package, or incompatible with the bank's internal processes. For banks wishing to use EDP systems more flexibly or expand their EDP program beyond what could be supported by one manufacturer, alternate systems for worker training were unavoidable. Where the need existed, the largest banks simply hired outside consultants and created training programs *de novo*. Such internal training programs often involved great expense and required that the bank organize a new department to manage technical training and skills. To minimize this, banks' internal programs were often organized with the assistance of the A.B.A. and specific input from manufacturers. Once established, most of these internal programs were sufficient to meet minimum personnel needs – though at a premium cost – until the general set of computer skills required by EDP became more common in the workforce.

Banks lacking the internal resources or confidence to construct an EDP education program from scratch relied even more heavily on A.B.A. The Association served banks in this area in three ways that are worth examining, because each of them involved non-market coordination of knowledge and people to help implement EDP. First, the A.B.A. constructed generic curricula for bank EDP training programs that could be used as templates for educational programs by its members. These packaged educational

programs were targeted at the needs of small and medium sized banks wishing to organize an internal training program but unable to engage in the research and lacking the skills to create one on their own. Managers or other employees with a general technical education would be sent to an A.B.A. training course that would qualify them to run the standard training program for their bank. These training programs included books, films, testing materials, and lists of references that tied the general principles being taught with equipment made by different manufacturers, creating something like a generic curriculum.[103]

The Association also took a direct role in educating bank employees, focusing primarily on management and programmers – the two segments requiring the most extensive training. Rather than purchase and implement a pre-packaged or correspondence course for employees, banks could send them to extended courses created and run by the A.B.A. Some of these courses were entirely internal to the Association and run through its long-standing educational subsidiary, the American Banking Institute. Others were conducted cooperatively with universities, research institutes, or equipment manufacturers. The New Jersey Bankers Association chartered an automation school in 1963, and the A.B.A. followed the next year with a series of joint programs organized in cooperation with regional colleges and universities. In 1965, the A.B.A. opened an automation school that applied its educational research and ran courses for specific member banks.[104] These courses were more expensive than many of the manufacturers'

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[103] See Brown in NAC (1964), pp. 374-375. It is worth noting that the A.B.A.'s ongoing cooperation with manufacturers in developing equipment was vital in allowing it to construct these generic curricula.

[104] See Feldman in NAC (1964), p. 376.

educational programs, but their breadth and the opportunity to avoid dependence on one manufacturer induced some smaller banks to support them and pay for their services.

The A.B.A. had a long history of providing educational services to its members both independently and in cooperation with educational institutions that served as a basis for these new programs. The Association had been instrumental in founding the Whatron School of Business in Pennsylvania in the late 19th century and had pushed for accounting and financial education to be included among the course offerings of other schools. In 1901, the A.B.A. had created an educational committee and set up the American Banking Institute to administer the programs it recommended,[105] but this educational system had become less important during the 1950's, as high turnover of low-skilled clerical labor, the feminization of non-management employees, and the growing necessity for a college degree to enter bank management had bifurcated the banking workforce between professional, college-educated management and low-paid clerks and tellers having only a high school education. Computer-related education breathed new life into the American Banking Institute and resulted in an enormous expansion of its activities. This expansion required structural and personnel changes, since the Institute had previously been entirely focused on accounting and bank organization. The creation of courses and certifications in scientific and technical areas

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[105] See Schneider (1954), pp. 54-59. The conflict over training as a legitimate role of the A.B.A. lasted over 20 years. Bankers in the late 19th century often had not completed a college education and felt that the skills required for success were best learned in long apprenticeships as bank clerks rather than through formal training. Frustration among some bankers with this parochial attitude resulted in the independent founding or expansion of a number of business and finance programs in prestigious universities as A.B.A. members wishing to promote finance education were blocked from doing so through their trade association. Donations and support for economics education in major universities were also pushed by A.B.A. members during this period – an infusion of resources and patronage that helped to shape the academic discipline in the United States. Ultimately, the increasing complexity of American business and finance that led to the managerial revolution in industry also forced bankers to support formal professional education.

required new investment and new leadership, and it was not until the mid 1960's that its internally developed courses could take their place next to joint programs with business schools as full-service options for EDP training.[106]

The most significant problems noted by analysts of these programs involved selecting the bank employees best suited to computer work and the danger of defection once employees had received EDP training. To deal with the problem of employee selection, banks most often used psychological and logic-based aptitude tests developed by equipment manufacturers or research institutes. Some research in this area was done by the A.B.A. while developing their own training programs, but this failed to produce better systems for evaluating employee aptitude. A decade of workforce instability and reliance on poorly paid female clerical labor had left banks in a difficult position even for internal EDP recruitment. With the general labor market tight in the 1960's and the structure of employment separating management-track workers from tellers and clerks, banks had some difficulty in finding workers to fill the new intermediate class of skilled non-management workers that EDP created. The problems of a disproportionately female clerical labor force – high turnover, concern that female workers would leave for marriage or child care after undergoing expensive training, and a general belief that

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[106] The internal details of this reorganization are not clear from A.B.A. records. Statements by Reistad suggest that pressure from the Automation Committee was important in developing these programs, but this can not be seen as a neutral evaluation. The fact that state-level associations created EDP education programs before their national counterpart and the emphasis placed on joint courses involving colleges and equipment manufacturers suggest that the American Banking Institute was slow to respond to these demands. After 1965, the Institute appears to have taken a more active stance, with the number of its regional chapters and affiliates nearly doubling between 1968 and 1972. (See Labor Statistics Bureau 1968, p. 783 and Labor Statistics Bureau 1973, p. 806). Based on some evidence from conference proceedings, equipment manufacturers might have played a role in sabotaging these programs in order to preserve their role in providing technical education that would lock customers into their equipment.

women were less capable at technical tasks – emerged as banks selected employees for EDP training.[107]

Bankers also used loyalty and employment history as a basis for selecting workers to receive EDP training in an attempt to minimize defection. The problem of workers defecting to take higher paying computer-related jobs with firms outside of the banking industry was endemic to bank educational programs in the early years of EDP. In an era of rapidly growing demand for labor trained to use office automation, banks found that their position as pioneers of EDP combined with an ongoing management bias against high salaries for EDP workers resulted in wasted training and ongoing staffing problems. The same problems banks had in hiring outside computer specialists hampered their ability to retain employees as well. By promoting internally and selecting computer training candidates partly on the basis of their loyalty to the firm, some banks were successful in beating the market incentives and holding down wage costs for their automation staff.[108] These were exceptions to the general trend. In most cases, banks were forced to create incentive-based contracts with monetary bonuses to retain skilled workers or suffer chronic high turnover in EDP departments and associated losses of productivity.[109]

Overall, the importance of education as a component of EPD systems and the fact that banks were flatly unable to use existing market mechanisms to meet these needs

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[107] See Wallace in NAC (1965), pp. 47-52 and footnote 97 above.

[108] See Langenbach in NAC (1964), pp. 49-50.

[109] Managers of bank training programs estimated that salaries for bank EDP staff were still below the market value of their skills through the mid-1960's (see Kaye in NAC (1964), p. 45). Urbatsch in NAC (1966), pp. 424-428 emphasizes bonuses tied to job tenure in combination with careful selection of employees as key elements of achieving low turnover in EDP departments, suggesting that overall salary levels might be lower so long as incentives for longer tenure are created.

demonstrates the importance of resource governance strategies based on embeddedness in social institutions (e.g. cooperative programs with local colleges or technical schools), negotiated cooperation with equipment manufacturers, and the provision of collective goods through the A.B.A. As early adopters of EDP, even banks in favorable geographic and demographic environments found that no labor market existed for the kinds of skills that would be required. The irony of these non-market solutions to the labor problem created by EDP was that all of the non-market mechanisms constructed to coordinate training had the unintended effect of creating something like a labor market in the medium and long term. Banks proved unable to retain more than a fraction of the workers they trained internally. The cooperatively organized programs set up by the A.B.A and various colleges served as a base of knowledge and resources for offering courses in office automation to the general public where such programs might otherwise have required a prohibitively high initial investment. Similarly, the work by manufacturers to develop specific EDP education was eventually translated into generic certification programs for employees of other businesses. All of this created the nucleus of a real labor market in skilled EDP personnel. As other businesses with data processing needs came to use electronic equipment, they benefited from the externalities created by the coordination performed by banks, equipment manufacturers, and the A.B.A. Non-market coordination mechanisms created at the micro and meso-levels in response to a specific technological challenge had the macro-level effect of creating a new labor market and lowering the costs of automation in other sectors of the economy.

4.5 Political Strategies and Economies of Scale

Early electronic data processing systems were designed in cooperation between the largest American banks and equipment manufacturers to deal with the staggering transaction growth that came with postwar prosperity. Built to deal with this problem, the systems created were large, expensive, and designed to process extremely high volumes of data continuously. This characteristic of the new technology was incompatible at a fundamental level with the structure of the American banking system and the regulatory system that supported it. As described above, the American commercial banking industry was uniquely oriented around small, unit banks. No other country, including federal systems such as Germany and Canada, had an industry structure so unsuited to the centralization of record keeping and data processing that EDP technology demanded. The computer equipment being introduced in the 1960's represented a large investment that involved reorganizing bank structures that had remained unchanged since the 19th century, educating an entirely new workforce, and imposing changes such as account numbering and new check formats on customers. Few banks could afford to make investments on this scale to then use the new computer equipment at only a fraction of its capacity. Unless the new technology could be fully utilized by processing large numbers of transactions, EDP would simply mean a transition from high labor expenses for a huge clerical workforce to a high capital expense for equipment and large sunk costs for training, re-organizing account management, and an expensive internal reorganization.

If computer record keeping was to result in net savings for more than the Federal Reserve banks and a few dozen of the largest commercial banks in major financial centers, some way would have to be found for smaller banks to utilize more of the data

processing capacity these machines possessed.[110] This need to increase the profitable use of high-capacity computers was met with an impressive range of strategies. Some of these strategies, like branching or diversification to provide non-banking computer services, required fundamental changes to the legal and regulatory structure. Others, such as outsourcing EDP to service bureaus or pooling data processing through correspondent banks, required only minor changes in the interpretation or application of regulations. None of these strategies could be implemented without political action that allowed or facilitated them.

Though indirect, these strategies can usefully be thought of through the lens of resource governance. The need to increase transaction volume in order to make the technology cost effective is similar to the division of labor ascribed to Smith's pin-maker or the scale economies associated with mass production. For example, it is unquestionably less expensive to produce ten cars on an assembly line than to craft each part and assemble them into a vehicle and then repeat the process ten times. Constructing the assembly line and arranging for all of the components to be subcontracted just to produce ten vehicles, however, would be more expensive than the wasteful, lower technology craft production. The technology dictates not only the *upstream* resources that must be mobilized and controlled, but also the character of the *downstream* market on which the final product must be sold. And just as Ford's creation of a mass market for cars to justify their mass production was a necessary strategy to adjust to a new technology, commercial banks were forced to find some way to increase the number of transactions being processed in order to take advantage of EDP.

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[110] For a brief examination of he economies of scale created by EDP, see Daniel et. al. (1973) and above, especially footnotes 76 and 77.

The relationship between a machine or technique on the one hand and a specific division of labor on the other is complex and depends on the environment in which the technology is applied.[111] In a historical perspective, it might appear that mass production could only be applied to serve a preexisting mass consumer markets, but this perspective is undermined by the case of EDP. Like Ford's assembly line, the equipment operates efficiently only at high transaction volumes, and this suggests that banks would have to increase the size of their customer base to implement it. But faced with a system of banking regulations that were designed specifically to prevent banking consolidation, the obvious strategy of using the political system to allow mergers was only one avenue taken by banks.

To continue the comparison with lean production in the auto industry, EDP was developed by large banks in California and New York, both states where regulation already allowed mass markets in commercial banking and could support the optimal use of the technology. Transplanting that technology into other states where branch banking was forbidden was comparable to bringing Fordism to Japan, where the mass consumer markets did not exist to support the levels of production that were possible in the United States. This created a puzzle for bankers in these states. Because the constraint that prevented them from adopting the optimal organizational form was regulatory rather than structural, they were better positioned than Toyota to create the environment they needed – to engage in political entrepreneurship rather than organizational or technical entrepreneurship. The other option, however, was to emulate Ohno and Toyoda and

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[111] See footnote 62 above.

attempt to adapt the technology – or in this case the organizational form (branching) that was compatible with EDP – to what their environment would allow. Though American banks responding to this challenge did not produce a breakthrough on the order of lean production, they did devise three alternative organizational strategies that would allow them to use EDP where only minimal regulatory changes could be achieved.

This section will examine the four main strategies used to overcome structural and regulatory barriers to achieving the scale economies made possible by EDP. Two of these strategies were direct – consolidating banks to pool their data processing needs through branching or holding companies. Since these strategies openly conflicted with the defining characteristic of the American banking system, they involved the most obvious political struggles. These conflicts played out in all three branches of government at both the federal and state levels, with banks searching for legislative, administrative, or legal pathways to achieve consolidation. The other two strategies were indirect. Banks that were unable or unwilling to consolidate found ways to pool their data processing work while remaining legally and operationally separate. Though these solutions were primarily implemented through contracts and the creative use of organizational forms that were already allowed by law, they also had a political dimension. Existing regulations apportioning legal liability for errors, Glass-Steagall restrictions on the kinds of services that banks could sell, and anti-trust concerns about banks pooling their operations had to be dealt with through the same political channels that were used to assault branching and holding company restrictions.

Some of these strategies were more successful than others, and by the early 1970's two solutions – the use of bank holding companies to achieve consolidation

indirectly and the purchase of off-site EDP services from correspondents by small banks – had become dominant ways of dealing with the problem of scale economies among banks that were unable to gain the regulatory goal of unlimited branching. True to the regulatory complexity of the American system, no single pattern of adaptation became universal, but one effect of the multi-front push for regulatory change did affect the entire dual banking structure. By dividing the state level political coalitions of small unit banks that had blocked regulatory change since the 1930's, the conflicts over EDP provided an opening for the comprehensive deregulation that occurred later. The technical problems posed by computer record keeping created new cleavages within the A.B.A. and weakened what had been a solid and effective veto by small banks in each of the forums where banking regulation was decided. Banks in rural states were divided on the need for consolidation as they had never been before, breaking the century-long Senate logjam on legislative action.

The numerically dominant unit banks in the A.B.A. lost their cohesive opposition to changing the regulations on consolidation as some decided that they could benefit from purchasing competitors to achieve EDP scale economies. This encouraged the A.B.A. and the Federal Reserve to reconsider regulatory decisions that had held since the Depression on deregulating financial services. The Comptroller of the Currency in the early 1960's, a former General Counsel to the A.B.A., used the need to respond to EDP as a pretext for subverting regulations on branch banks, bank holding companies, and mergers. Though an examination of the regulatory changes that followed in the late 1970's and early 1980's is beyond the scope of this chapter, it should be obvious from what follows that the stable system of unchanging, interlocking regulations that had been

inherited from the New Deal was broadly destabilized and delegitimized by the struggle to allow banks to pursue the scale economies of EDP.

The most obvious solution to the new problem of scale economies was to consolidate the data processing of several bank offices in one location by branching. For a bank organized into branches, EDP equipment could be kept at a central location to process and store account information from a large number of remote locations. Rather than have each bank office built around its own accounting and record-keeping, one central location could hold the account records for dozens or even hundreds of branch offices. These branch offices would communicate transaction information and update accounts electronically over telephone lines.[112]

This "hub and spokes" model of banking has two great advantages that made it the preferred model for implementing EDP. First, it allowed banks with low transaction volume such as those in rural areas to gain the efficiency of EDP by pooling the numbers of transactions from many locations. This was by far the most direct organizational form employed to take advantage of the scale economies created by EDP.[113] Second, branch offices could dispense with most on-site record keeping and account processing functions. Organizationally, this meant that branch offices could avoid duplicating

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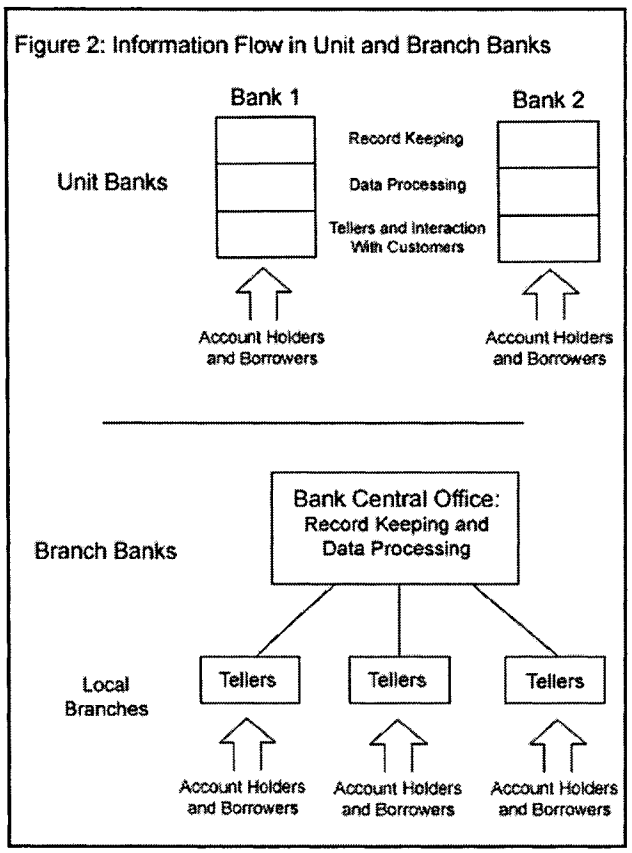
[112] The development of telecommunications equipment to allow reliable remote processing of this nature lagged behind the computer systems themselves. Though large branch banks in California had developed online systems that used telephone data transmission between branch office and a central data center as early as 1961, this was not widespread until the mid 1960's (see Bez and Scheld in NAC, 1966; pp. 241-246). As a result of this, for a few years in the early 1960's, remote data processing was limited to centralized check clearing for all offices in a branch system. Despite this lag, it was clearly recognized by bank managers, equipment manufacturers, and communications firms that a central processing model for large numbers of remote offices was the best use of EDP technology. See Mead in NAC (1964), pp. 100-111.

[113] O'Brien (1968; pp. 125-126) compares the organization of branch banks before and after EDP, noting primarily the increase in centralization made possible by computers and the reduced emphasis on branch management autonomy.

record keeping infrastructure and personnel at each office, retaining only those employees on site required to deal with customers.[114] This form of organization had been established as the ideal way of using EDP by Bank of America, which successfully centralized its data processing in San Francisco in the early 1960's. For risk-averse banks considering how best to use an EDP system, the success of these branch banks and the perception that they represented the future of banking was an important cognitive guide.

The contrast between branch and unit banking and its importance for the use of EDP are clear when their organizational structures are compared:

Figure 2: Information Flow in Unit and Branch Banks



[114] Branch banking also created indirect benefits for EDP users. For example, banks with a central office located in a large city were able to recruit EDP workers and technical support from a larger and more educated labor pool. In addition, manufacturer support and service for equipment was in many cases easier to arrange and the physical structure of the EDP department easier to organize and oversee.

If branch banking was the best way to take advantage of the scale economies created by EDP, it was a solution available to only a fraction of the commercial banks in the United States. The reasons for this are bound up with the structure of banking regulation. First, only 16 states in 1960 allowed unlimited branch banking within their borders, while inter-state branching was forbidden by both state and federal regulators. While an additional 16 states allowed some limited form of branching, this was often subject to bizarre and arbitrary restrictions on the number, location, and exact lines of business that could be conducted at remote offices.[115] States with the most restrictive branching laws tended to be rural and to have regulatory politics dominated by coalitions of regional banks that used the Jacksonian rhetoric of federalism and distrust of large, impersonal finance to protect their positions against competition from expanding urban banks.

As described in Section 2.2, federal regulators were required to apply the same standards for branching to nationally chartered banks as were imposed on those chartered by each state. This meant that a national bank in Michigan would be restricted in its ability to establish branches by the same standards as would a state chartered bank. By placing the political power to decide branching policy in state legislatures that were more responsive to locally powerful interest groups, the principle of federal deference gave small unit banks disproportionate power to shape their own regulatory environment. As pressure to allow branch banking became more powerful as a way of pooling lending

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[115] Federal Reserve Board data, cited in Commission on Money and Credit (1962), p, 48. Laws governing branching in the states where it was partly restricted were often based on historical cases and supported by the interest of local banks in retaining specific regional monopolies.

risks across local economies to deal with the bank crises of the 1920's and 1930's, federal deference was elevated to the status of a political principle and defended by the newly formed Independent Bankers Association as a core American ideal.[116] While the initial political advantage of placing their regulatory fate in the most favorable venue had come to state banks almost by chance, it would not be given up easily.

In states with restrictions on branching, banks wishing to follow the Bank of America model and achieve EDP's scale economies through consolidation faced a political task. To legalize the organizational form best suited to the new technology, the political environment afforded them three obvious options. First, banks sought to change state laws to allow branching. If this could be achieved through direct legislative action, the principle of federal deference would clear the field for branching by banks chartered by both state and national authorities. Though this was the most obvious approach to allowing branch banking or removing idiosyncratic restrictions on it, lobbying state legislatures often represented the path of greatest resistance. This resistance was generated by the fact that small banks opposed to any change or non-bank financial institutions eager to keep their bank competitors at a disadvantage were often able to block legislative changes by controlling at least one veto point in what was generally a multi-stage process. Second, large banks provided critical support for a former A.B.A. General Counsel appointed to the office of Comptroller of the Currency in 1961. James Saxon lobbied relentlessly to lift restrictions on branching by national banks and, when this failed, used his administrative discretion to allow branching by national banks in every instance where doubts could be raised about the application of the McFadden

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[116] See IBA (1976), pp. 14-15. See also IBA (1975).

Act.[117] Though Saxon's most blatant policy changes were blocked by Congress and the courts, he succeeded in broadening the branching powers of national banks and framing an agenda of less restrictive branching laws that pushed action in several state legislatures. Third, banks challenged state branching laws in court to exploit a range of loopholes or ambiguities. This strategy was often combined with lobbying state legislatures, since an attempt to revise branching laws to close loopholes or clarify intent in response to a court challenge would open up the possibility of inserting new provisions or promoting a broader deregulation. With the political opposition to bank consolidation uniquely divided by the desire of many small banks to take advantage of EDP technology, this resulted in a some cases of successful consolidation in states where branching was nominally restricted.

Attempts to pass laws allowing branch banking where it was either forbidden or restricted to certain conditions were undertaken in most states. At the aggregate level, these attempts met with only moderate success. In 1960, 18 states prohibited branching entirely, while a further 16 imposed restrictions of various kinds. By the early 1970's, only 13 states had retained complete prohibitions on branching.[118] While only four states

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[117] Examples of Saxon's broad interpretation of his authority include ruling that any exception to state anti-branching laws could be expanded by his office to allow universal branching in 1963 and rulings in both Texas and Georgia applying more liberal standards to mergers for nationally chartered banks (see American Banker 10 May, 1963).

[118] For the aggregate numbers of states with different levels of branching restrictions, I have relied on interpretations of researchers affiliated with the A.B.A. in both cases. See Commission on Money and Credit (1962; p. 48) and Golembe and Hengren (1975). Given the diversity of state laws and the importance of interpretation by state banking regulators, the proper classification of some states in both periods could be disputed. This is usually the result of complex state legislation passed on an ad hoc basis at the behest of a single bank seeking to implement a specific type of service or remote location. For example, Colorado is classified as a state that completely prohibited branching in both periods despite the passage of a law in 1969 allowing banks to open a single remote deposit center not more than 2000 feet from their central office. Similarly, exemptions for limited numbers of drive-through offices, branches on federal military bases, and other idiosyncrasies have to be evaluated. For a review of specific branch restrictions in various states, see Gup (1971), pp. 681-682.

had completely eliminated branching restrictions during this period, these overall numbers conceal a clear trend toward loosening restrictions. As late as 1960, some states were still debating bills to restrict branching or close loopholes of various kinds, but by the middle of the decade, the agenda had been completely shifted and restrictive laws were under serious attack in most states. During the entire period from 1960-1972, no state moved from allowing branching to prohibiting it, and the only significant new restrictions or conditions came as limited loopholes in larger liberalizing bills.

It is important to recognize that the political pressure to allow branch banking during this period came from many sources. The potential cost advantages of branch organization opened up by EDP was only one possible suspect to explain this broad-based pressure for liberalization. The general economic expansion, increased competition form non-bank financial institutions, and a generational change in bank management all played some part in creating support for new banking laws. Given the fact that branch structures and high levels of concentration are nearly universal among industrialized nations, it would be plausible to argue that the loosening of restrictions on branching to allow a greater degree of consolidation was actually a correction of the significant and longstanding anomaly of America's diffuse and inefficient bank structure. But powerful interests, their positions reinforced by the geographic nature of political representation in the United States, had sustained that anomalous bank structure for over a century. Appeals to rationality and efficiency had been insufficient to reform the system of dual bank regulation and the restrictions on inter-state branching even in the face of the 1933 crisis.

To explain what changed in this period that caused so many states to liberalize branching laws, the role of EDP in dividing the lobbying power of small unit banks must be examined. This change can only be understood in the context of how the politics of branch banking evolved within the A.B.A. prior to the 1960's. Though most of its organizing and decision-making power devolved to activists recruited from large, east-coast banks, the A.B.A. always contained a clear numerical majority of small unit banks. To legitimate its quasi-public role, the A.B.A. relied strongly on consensus decision making and avoided controversy.

In its early years prior to the establishment of the Federal Reserve, the need to gain universal cooperation from banks on issues of check clearing standards had provided a powerful incentive for the A.B.A. to avoid controversy. The deliberate silence on branch banking during this era was part of the policy adopted by A.B.A. leaders of addressing only political questions on which there existed clear agreement among bankers.[119] With the wave of progressive reform in the early 20th century, the A.B.A. assumed a more corporatist role in policy-making based on its prestige and its close association with the new Federal Reserve system. As its influence increased, the Association became in some ways even more careful to avoid internal conflict, and during the early part of the 20th century it focused largely on technical issues, public education, and the establishment of national legal standards governing various bank transactions.

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[119] See Schneider (1956), pp. 14-21. The A.B.A. initially focused on issues where a nearly complete consensus existed, such as the removal of Civil War era taxes on bank operations and the retirement of the devalued greenback and a return to specie payments. He only significant exception to this occurred when a strong majority pushed the A.B.A. to support for the gold standard during the currency debates of the 1890's despite the objections of banks from western silver mining states, but this geographic minority was

Despite the wishes of A.B.A. leaders, the question of a common position on branch banking could not be avoided indefinitely, and in the wave of political activism among bankers that followed the passage of the Federal Reserve Act, this came to a head. In response to a vaguely worded recommendation issued by the A.B.A.'s Committee on Federal Legislation suggesting that nationally chartered banks be allowed to branch within cities, the small unit banks that formed a majority in the A.B.A. staged a revolt. Surprising the A.B.A.'s officers and the representatives that usually formulated its policies with little oversight from member banks, a group of bankers from the upper Midwest began a campaign to clarify the Association's position and affirm its opposition to branch banking. Letters were sent, advertisements taken out in banking publications, and personal lobbying conducted. Their success in mobilizing A.B.A. members was overwhelming. Attendance at the 1916 A.B.A. convention in Kansas City was double what the organizers had expected, and these representatives of member banks – the silent majority that usually did not vote on Association business or express strong opinions on its lobbying positions – were determined to oppose branching.[120]

The super-majority of unit bankers forced a resolution to the floor over the objections of Association President James Lynch that opposed branch banking in any form and then another that recommended new federal legislation to reinforce existing restrictions. A similar groundswell of political action by small unit banks in 1922 contributed to the restrictions on branching that were written into the McFadden Act and passed a resolution requiring the formation of a committee to insure that these various

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so small within the banking community that a stand against bimetalism can hardly be considered controversial.

[120] Ibid.

resolutions were acted on in the Association's federal lobbying.[121] Even the A.B.A. support for the provisions of the McFadden Act that allowed national banks to branch under the same restrictions imposed by state laws produced a serious split within the Association that led to accusations of bad faith and corruption that contributed to the formation of the Independent Bankers Association in 1930 as a lobbying group dedicated exclusively to opposing bank consolidation.

Large bank members of the A.B.A., as well as the Association's officers and staff economists, disagreed strongly with the position taken by the majority, and the general tide of opinion swung in their direction with the wave of bank failures in the early Depression. As the small, rural unit banks praised by the A.B.A.'s resolutions failed by the thousands, financial experts, economists, and members of the Hoover Administration argued that branch banking was the most effective way to save the banking system. Attempts were made to write branching provisions into law in 1930 and 1932, but opposition from unit banks was so strong as to block bank reform entirely. Branching was also debated as part of the New Deal bank bills of 1933 and 1935, but the political power of unit banks in the agricultural states formed too effective a blocking coalition. Rather than replace the American system of unit banks with European style national branching, America's small banks would be propped up by deposit insurance through the FDIC, protected from competition by state and federal authorities, and regulated to prevent serious risk to even the smallest, most vulnerable of their numbers.

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[121] See Ibid., pp. 209-214. The standing leadership of the A.B.A., strongly influenced by the interests of large banks and wishing above all to avoid further internal controversy, managed in both cases to prevent these resolutions from being acted on in a significant way.

The outcome of the branching debate in the 1930's produced a delicate stalemate within the A.B.A. that lasted through the postwar years. The supporters of small unit banks had won the legislative fight, but their victory was essentially defensive. They had succeeded in protecting the power of the states to preserve by law an essentially inefficient and anachronistic form of banking.[122] So long as unit banks retained power at the state level, they could protect themselves against competition. Within the A.B.A., neither side wished to split the Association by forcing a new debate, and the existing policy of federal deference to state law allowed both existing unit and branch bankers to operate under their preferred standards.

With the drift of public opinion and the passage of the New Deal banking laws, officers and committees of the A.B.A. shifted its official position from blanket condemnation of branch banking toward acceptance of the principle of federal deference manifest in the McFadden Act. Unit bank supporters, perceiving that their position was eroding in the broader public policy debate, struck a compromise with large banks in 1937. The A.B.A. passed a motion that expressed acceptance of federal deference and strongly supported the rights of state governments to regulate branching in ways that best reflected their needs. Large banks accepted this as a permanent solution to avoid further internal conflict in an advocacy group that otherwise served their interests effectively, while unit bankers accepted a compromise that would eliminate the threat of federal action and keep political conflict over branching at the state level where their resources

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[122] With the New Deal bank reforms and the FDIC, the two core problems of unit banking – the inability to diversify risk beyond a single community and the problem of making local savings and investment immobile – had both been mitigated. The correspondent system and the Federal Reserve that allowed national check clearing made community savings available for investment nationally and the FDIC insured against geographically concentrated risk. It would be difficult to argue, however, that either of these mitigating institutions functioned as efficiently as would a system that allowed national branching.

were greater. So long as the Association made no attempt to promote branch banking in states where it was not allowed, the compromise held.[123] Branching policy devolved completely to the states and the nominal position of the A.B.A. calcified into bland neutrality and generic praise for the principles of federalism.

This is why any change in the regulatory politics of unit bank states must be understood as a split among the locally powerful unit banks themselves. Despite the position papers produced by federal regulators or the academic arguments made about the efficiency of branching, a stable blocking coalition of unit banks had been effective for more than a half century in preventing federal branching. The combined effect of EDP and a growing economy, however, was to split this coalition. When population and business activity increased in a unit bank state, the same laws that protected existing banks from entry also rendered them unable to expand to serve these new customers. New banks faced relatively high costs to enter these markets based on capital requirements, the need for skilled personnel, and the problem of establishing a new customer base.[124] The scale economies of EDP gave established banks in these states an opportunity to lower their costs through expansion, while there was active business lobbying in some areas for streamlining chartering procedures to fill the need for new banks more quickly.

This created a larger potential advantage to deregulation for banks with the resources to establish new branches. When there had been no cost advantage to

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[123] Ibid., pp. 220-222.

[124] The difficulty that new banks have in attracting depositors and establishing connections with commercial customers is reviewed by Alhadeff (1974). These factors also explain why banks considering expansion through branching or multiple firms belonging to a single holding company generally prefer merging with and expanding existing banks in the target market rather than *de novo* entry.

branching and potential competition was viewed in a slow-growth economy as splitting a fixed number of customers among more banks, it was easy to maintain a political consensus to limit entry. In most states, a potential new bank had to demonstrate that a need existed in a given community for banking services, and state regulators could deny a charter on the basis that a new bank might unduly harm the business of an established one. Even if the need was demonstrated, a new entrant represented little real threat to an established bank with a solid base of customers.

The opportunities offered by this combination of EDP and rapid economic growth created a split between potential winners and losers from branching. Banks that had supported the hard-line position of the Independent Bankers Association based on fear during hard times found themselves opposing it based on confidence in their own competitive strength as the postwar expansion resumed after the 1958 recession. An example of this can be seen in Kansas, a traditionally strong unit bank state. In 1969, 24 established unit banks endorsed a bill to allow limited, splitting with the Independent Bankers Association and touching off a serious fight over the state's branching laws.[125] Though the stated reason for reversing their longstanding advocacy of unit banking was couched in terms of the pressing need to respond to regional economic growth by expanding the banking system as rapidly and efficiently as possible, the fact that the cost structure of banking had shifted certainly played a role.

Other state cases also indicate that a breakdown of the consensus against branching among existing unit banks was responsible for a reconsideration of existing laws. Examining even a few of the many cases of state legislative action in detail reveals

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[125] *American Banker*, 14 January, 1969.

both the split in this traditional coalition and the role of potential expansion by existing unit banks in driving it. Even the states with the strongest unit bank traditions in the farming areas of the Midwest found reform on the agenda. In 1969, economists and financial experts citing increased efficiency testified in Iowa in support of a bill to liberalize existing restrictions on branching and holding companies. This bill, introduced in one of the traditional bastions of independent banking, was formally opposed by the state Bankers Association, but a substantial minority broke with the association for the first time since the Depression.[126] In 1972, Florida's banking regulators responded to pressure from bankers within the state by recommending to a comprehensive liberalization bill to the legislature. One of the ten reasons cited in the recommendation was the need to capture the economies offered by EDP technology, which would allow existing banks to meet the needs of a rapidly growing population were they not blocked by obsolete legislation.[127] In both cases, as in several other reform programs undertaken at the state level through the 1960's and early 1970's, the key facts that motivate change involve a split in the existing coalition of state-chartered unit bankers based on the potential efficiencies to be gained by EDP.

While these conflicts were playing out at the state level, an attempt was being made to undermine the principle of federal deference in banking regulation and allow nationally chartered banks the power to branch even in unit bank states. This subversion of the McFadden Act was undertaken by the Comptroller of the Currency from 1961-1966, James Saxon. Saxon, despite being an active and partisan Democrat, had been

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[126] Ibid., 17 February, 1969.

[127] Ibid. September 28th, 1972. The wording of the recommendation makes it clear that the objective of liberalization involves creating opportunities for existing unit banks to consolidate.

General Counsel for the A.B.A. prior to his appointment as Comptroller and had been frustrated at the failure of a major bank reform bill in 1958. The 1958 bill had been one of a long series of reforms that were blocked in Congress by legislators from rural states and the influence of the Independent Bankers Association. It was important, however, in that it convinced Saxon that any real change in the banking system would have to come from the initiative of regulators rather than new legislation. Saxon, deciding that the unit bankers and local monopolists in banking held an unassailable veto in Congress, decided that he would flank their legislative strength and reinterpret the law to promote competition and consolidation, which he saw as keys to creating amore efficient, dynamic banking system.[128]

Saxon's tenure as Comptroller of the Currency was notable for jurisdictional conflicts with the FDIC, the Federal Reserve, the Justice Department, and a strong majority of state regulators.[129] More importantly, he also came into conflict with members of Congress through a blatant disregard for the content of the laws he was charged with executing. The regulatory conflict between the legislature and executive was expressed by the Chairman of the House Banking and Currency Committee, a staunch ally of the Independent Bankers Association who had been responsible for blocking the 1958 reform bill. Chairman Wright Patman, who had been in the House since 1929 and personified the New Deal attitude toward banking regulation that Saxon was attempting to reverse, diagnosed Saxon's attitude toward his office:

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[128] The best single source for information on Saxon's background and philosophy can be found in Brumfield (1978), chapters 1 and 2.

[129] See A.B.A. poll of state bank supervisors reported in *American Banker* 8 April, 1963.

"What disturbs me a lot, Mr. Saxon, in your case, is that you were an advocate of certain changes in our banking laws, many of them. They were quite revolutionary. Although they passed the Senate of the United States, they came to our Committee, Banking and Currency, and after weeks and months of study and consideration, [they were] defeated. And you were defeated, naturally, s representing that viewpoint.

Then you became Comptroller of the Currency, and in all the important cases, where you were defeated in that proposed legislation, you have done the same thing by regulation that you asked Congress to do by law, and the Congress refused to do it.

That disturbs me a lot – as to why you would be so presumptuous as to make laws yourself [...] merely by issuing a regulation, one man can make law.[130]

Though Saxon pursued a number of liberalizing initiatives, the aspect of his agenda that most directly affected bank consolidation and therefore the structural change required to use EDP in the Bank of America model was his support for branching by national banks. Saxon's primary strategy in this area was to approve as many mergers of national banks (which, when consummated, produced new branches without the need to build up a new customer base) as possible. He did this even in cases where deference to state laws would have prevented approval.[131] These mergers were challenged in a series of court cases that had the effect of aligning the Justice Department with the I.B.A.

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[130] U.S. House of Representatives, Committee on Banking and Currency, Subcommittee on Domestic Finance, Hearing on S. 1698. 89th Congress, 1st Session, 1965. Chairman Wright Patman was a fascinating figure in banking regulation during this period, carrying the torch of Jacksonian populism on banking issues into the 1970's and defending the ideal of local, autonomous community finance in an era when this was considered anachronistic at best. Throughout this chapter, the ability of small, unit banks to defend their local oligopolies by supporting federal deference to state laws has been described in abstract terms based on the strength of the Independent Bankers Association and the geographic structure of Congressional representation. But the tendency of a political system and the structural advantages that it gives to certain interest groups do not determine outcomes. Wright Patman was the manifestation of these abstractions, and his personal characteristics translated them into the survival of the dual banking system and the viability of unit banks long after an elite consensus of academics and policy-makers had condemned it as an expensive and inefficient subsidy of poorly managed local banks. For a summary of his career that captures the frustration of his adversaries in business and finance, see Weintraub (1977). For a fascinating examination of Wright Patman's legislative tactics, see Owens (1985).

against the Comptroller on anti-trust grounds. The critical precedent was set in the *United States v. Philadelphia National Bank* case, an novel decision that applied the Sherman and Clayton Anti-Trust Laws to banking. Prior to 1960, no bank merger had been successfully challenged on anti-trust grounds and the consensus legal position was that bank mergers could not be held to the same standards as other industries because they were subject to a specific alternative regulatory regime established by Congress. Saxon's alleged abuse of his discretion in granting merger applications for national banks, however, led to the involvement of the courts in what had previously been a completely administrative matter.[132]

The banks themselves played an important role in this conflict through their interest groups representatives. On the side of the unit banks seeking protection for their local monopolies, the Independent Bankers Association had supported lawsuits brought directly by banks that might be competitively damaged by mergers rather than relying on the Justice Department. This tactic brought a number of test cases to court and helped to slow the pace of bank mergers by requiring additional legal work to be done by the

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[131] Redford (1966) reviews the *First National Bank of Logan v. Walker Bank and Trust Co.* case that rejected the ability of the Comptroller to interpret state branching laws according to different standards than state authorities themselves would use.

[132] Bell (1961) establishes the consensus opinion prior to Saxon's appointment that the merger criteria on which the Comptroller may judge are clearly distinct from those established by the Clayton and Sherman Acts. Later statements by members of Congress involved in passing the 1956 Bank Merger Act suggest that it was their intent that bank mergers be subject to a set of criteria different from those used in the Clayton and Sherman Acts (see Klebaner, 1967). It is worth noting that Saxon's conservative predecessor, Ray M. Gidney, had also been attacked for licensing mergers that some state regulators would have denied. This suggests that the structural influence of large banks on the Comptroller's office would have produced the kinds of jurisdictional conflicts that occurred under Saxon even under a different appointee. As with Chairman Wright Patman, there is a valid question as to how the specific way the conflict between the champions of large and small banks played out was determined by Saxon's personality, his specific background working with large banks at the A.B.A., and managerial style. Certainly Saxon's strategies and character sharpened these conflicts and made the task of counter-mobilization by the Independent Bankers Association and state regulators easier.

Comptroller before granting approval.[133] On the other side, when serious opposition to Saxon's policies led to a Congressional investigation of his conduct and requests that he be removed from office by the Independent Bankers Association and state bank supervisors in 1963, Saxon's allies among large banks actively lobbied in his defense.[134] At one point, this conflict threatened to split the A.B.A. completely, as pro-Saxon national bankers explored the possibility of forming a National Bank Association to act as a counterweight to the I.B.A. The direct cause of this split was the A.B.A.'s position formally opposing Saxon's efforts to ease restrictions on branching.[135]

If the conflict over branching that manifest itself in Saxon's merger policy is viewed as a struggle between unit banks supporting and opposing consolidation as the best way to implement EDP, then the opponents seemed to have won another in their long line of victories. This victory, however, was an incomplete and Pyrrhic one. The use of federal courts to oppose mergers slowed the pace of consolidation in states where they were conditionally allowed by law. More importantly, given the growing political

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[133] The ability of any bank that might be competitively harmed by a merger to bring a lawsuit opened up enormous scope for nuisance litigation and forced the courts to develop economic criteria that would allow them to judge banks in the same terms as other monopolies. As providers of multiple financial services that are not easily analyzed using the proxies developed to measure competition or potential competition in other industries, this resulted in a complex and incoherent jurisprudence. For an analysis of these decisions in the larger context of anti-trust cases, see Wu and Connell (1973). The general strategy of using courts to attack unfavorable regulatory decisions was not restricted to mergers. In an unprecedented move, the Vice President of the National Association of Supervisors of State Banks (an organization representing state chartering authorities and regulators) recommended that state chartered banks block national chartering decisions through legal action as well (see *American Banker* 19 April, 1963)

[134] See Brumfeld (1978), pp. 39-40 and 42-44.

[135] This can be seen as a continuation of the 1920's conflict over the Association's position on branching, with national banks contemplating what would have been unthinkable at the time: weakening the A.B.A. by splitting its membership and risking an erosion of its influence with regulators. See reports on a special meeting of national bankers to debate this proposal in *American Banker* 23 April, 1963 and 19 April, 1963. It is worth noting that this threatened split should not be confused with the National Bankers Association, a small organization founded in 1927 to promote the interests of banks owned or operated by minorities and women.

split among unit banks, this was a tactic that did not require a united front among small banks to be used effectively. Saxon's office was forced to expand its legal staff to prepare detailed justifications for approvals of mergers and the pace of approval slowed.[136]

The very effectiveness of this strategy, however, proved to be its undoing. The restrictive standard for denying mergers was used to block mergers not only in states where a clear majority opposed branching, but also in states where large and politically powerful banks were consolidating new branches. The I.B.A. would doubtlessly have preferred to deploy the judicial weapon only in selected cases to protect their members in unit bank states, but the legal interpretation that allowed any bank affected by a merger to sue meant that large banks in New York, Pennsylvania, and Connecticut found their operations newly affected by lawsuits. This mobilized political support for both legislative reform in those states and a new federal merger law that would overrule the controversial precedent set by the Supreme Court and establish explicit merger guidelines. With the political momentum behind them, large banks succeeded in pushing the 1966 Amendment to the Bank Merger Act through Congress. This law reversed a trend toward more restrictive standards on bank mergers and exempted nearly 2000 mergers that had occurred in the early 1960's from anti-trust considerations entirely. The most damaging aspect of the 1966 legislation for small banks, however, was the degree to which it split the I.B.A. Since many I.B.A. members had conducted approved mergers in the early 1960's that could be challenged under the broad legal precedent of the *Philadelphia* case, large numbers supported the 1966 law, essentially ratifying the loose

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[136] Brumfield (1978), Tables A-3 and A-5 for years 1961-1964.

merger standards that Saxon had applied everywhere during that period.[137] Though the new administrative standards that should govern the Comptroller's approval of future bank mergers were nominally stricter than those that had applied before, this small victory for the I.B.A. was far less useful than the ability to block mergers through the courts that they lost. Saxon, whose controversial term as Comptroller expired in 1966, won his greatest victory for consolidation through branching unintentionally and indirectly after he had left office.[138]

In order to use EDP effectively, it was not necessary to formally organize banks in a branch system. Any organizational form that allowed multiple banks to combine their data processing functions at a single location could capture at least some of the benefits of EDP. Though branching was the most efficient form of organization to allow this, other options existed for banks embedded in the American regulatory system. Organizing data processing for several banks owned by one holding company imposed higher administrative costs than a branch system, but it also had critical advantages under the specific laws regulating branching in many states. From the point of view of data processing within the organization, holding company banking can be thought of structurally:

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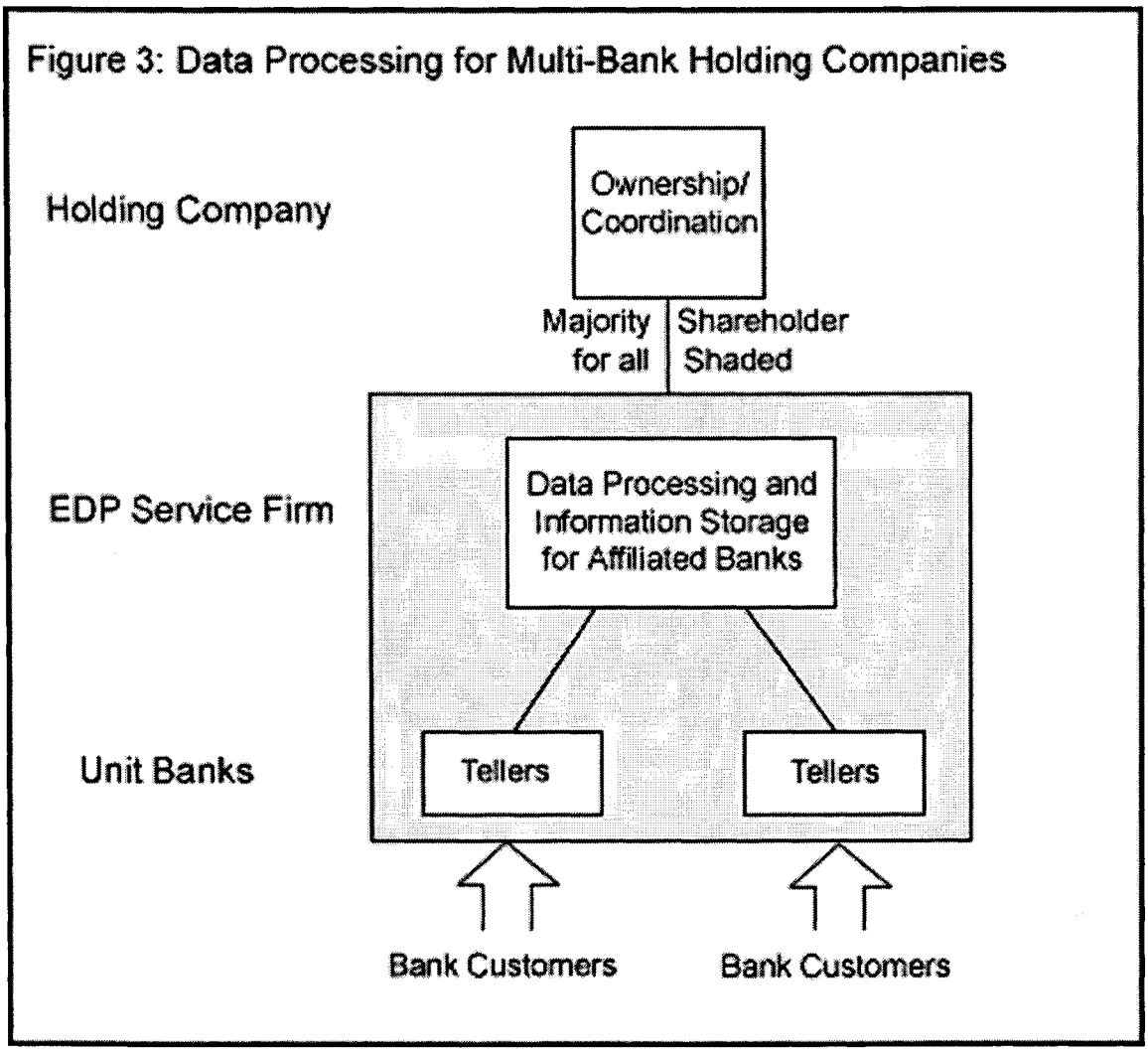
[137] See Columbia Law Review Staff (1966), pp. 775-777.

[138] This can also be thought of as an example of the perverse effects of choosing favorable venues for lobbying. In this case, the I.B.A. chose the courts as the best forum in which to achieve goals that they lacked the political resources to contest elsewhere. Unfortunately, the national jurisdiction of the federal court system meant that precedents established in cases brought in unit bank states would be used to restrict branching in branching states as well. This produced the unprecedented counter-mobilization required to actually push the national legislative machinery into motion on an issue that had been blocked for more than thirty years.



Aside from the obvious advantage of achieving the effect of branch banking on transaction volume at the cost of a slightly more unwieldy corporate form,[139] the key advantage of a bank holding company was the ability to escape the Glass-Steagall restrictions on what lines of business a bank could engage in. Based on the 1933 law, banks could neither own stock in other corporations nor engage in any line of business not directly related to banking. A bank holding company, however, had two options that

[139] Offices of separate banks owned by a single holding company remain nominally independent, but their operating policies can be coordinated easily by the intervention of their owner, the holding company.

would allow it to achieve the scale required to use EDP effectively. First, the holding company could own a firm that did nothing but sell EDP services to a set of unit banks also owned by the holding company. Functionally this arrangement approximated the hub-and-spokes model of a branch bank, allowing the holding company to pool data processing for the banks that it owned. Second, the holding company could – through its wholly owned data processing subsidiary – sell data processing services to other banks and the corporate customers of those banks. If this could be done successfully and profitably, banks could escape the problem of scale economies at its core; if the data processing equipment had far more capacity than was demanded by the bank's own data processing needs, that excess capacity could be marketed to other banks or businesses. Doing this would require additional investment in software and personnel to make the newly created EDP service company flexible enough to handle the data processing needs of non-bank customers, but the ability to use computer equipment at its full capacity might easily outweigh both this and the administrative costs incurred by having the EDP service firm formally separate from both the holding company and the subsidiary banks.

The opportunity to create an EDP subsidiary of a holding company enticed banks for one other reason related to the details of federal regulation. Under the wording of the 1956 Bank Holding Company Act, only holding companies that held more than a 25% interest in two or more banks were subject to federal regulation. A one-bank holding company could therefore operate any number of non-bank businesses without being subject to the Glass-Steagall restrictions. This loophole had been left open explicitly to benefit small banks in rural areas, and a chance to close it in a series of amendments in

1966 was rejected.[140] While banks taking advantage of this could not gain the benefit of increasing data processing volume by operating multiple offices in non-branching states, they were able to market their excess computer capacity to other banks and client businesses. According to reports given at the A.B.A.'s National Automation Conferences and the results of A.B.A. automation surveys, the strategy of cross marketing EDP services that this law allowed was difficult to implement. Only a relatively few banks were able to compete against the specialized data processing companies that were coming into existence by the late 1960's, and as a strategy to increase data processing volume and capture scale economies, it seems to have seldom accomplished more than partially offsetting costs.[141]

At first blush, this solution to the economies of scale problem created by EDP seems to exemplify the use of market mechanisms to arbitrage around the constraints of a new technology. In fact, however, this solution required a more complex exercise of political power than branching. In 1956, the regulations on bank holding companies had been tightened and their management subject to some of the Glass-Steagall restrictions. More importantly, the purchase of banks by holding companies had been subject to the approval of the Federal Reserve Board, making the expansion of holding companies

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[140] See *Michigan Law Review* (1973), p. 1176. Though this element of the law was written for the benefit of small unit banks, it also offered an opportunity to large branch banks. By forming a holding company controlling a large branch bank, it was possible to create a "virtual" universal bank. Though this does not seriously affect the adoption of EDP, it is worth noting that this loophole in the 1956 and 1966 laws – retained largely to help small banks attempting to market EDP services to their banking clients – was the first step in eroding and ultimately repealing the Glass-Steagall prohibition on combining commercial and investment banking.

[141] For a review of the prospects faced by EDP subsidiaries of holding companies throughout this period, see Lotz in NAC (1972), pp. 134-139. For more detail on the strategies of cross-marketing bank EDP services, see Perrett (1966).

subject to case-by-case approval, albeit by an extremely friendly regulator.[142] Between 1956 and 1960, the number of bank holding companies in the U.S. actually declined from 53 to 47, and the share of all banking assets controlled by these holding companies rose by less than 1%. Most analysts concluded that bank holding companies posed no real danger to independent banks and that existing regulation was, if anything, too strict.[143]

It was the advent of EDP that changed this situation. In 1960, banks in several unit bank states had begun to lobby their legislatures to permit the formation of holding companies that could charter EDP service firms.[144] At this point, many of the political factors already identified came into play. The I.B.A. membership was split on these bills, since the small banks that made up the I.B.A. were exactly the ones were most likely to need some organizational mechanism to achieve the scale economies required by EDP systems. Once these bills passed over the next year, the new state laws put nationally chartered banks at a disadvantage in those states, creating pressure for a federal law that would loosen restrictions on the ability of banks or bank holding companies to own equity in EDP service corporations. The logic of regulatory competition then expanded

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[142] The history of the 1956 bill is bound up with attempts by Bank of America to use a holding company structure to establish what amounted to inter-state branching, which does not need to be examined in detail. The I.B.A., considering the expansion of the largest bank in the United States across state lines to be an even greater threat than in-state branching laws, waged an all out struggle against this through the 1930's and 1940's that finally ended in an anti-trust settlement under the Clayton Act (see Stanford Law Review Staff, 1949). Prior to EDP, however, there were few strictly cost-related reasons to engage in holding company banking, and the Federal Reserve considered the 1956 bill to be largely precautionary. It is noteworthy that the I.B.A. succeeded in its primary goal for the 1956 law in the form of the Douglas Amendment, which specifically prohibited the purchase by a holding company of any bank outside of the state where the holding company was chartered unless such a purchase was explicitly authorized by the relevant state's laws (see Stanford Law Review Staff, 1957; pp. 338-340).

[143] Bank holding company data from *Federal Reserve Bulletin*, various years. For analyses of bank holding companies after 1956, see Hall (1965).

[144] The bellwether in this movement was Michigan, a state that allowed only restricted branching. The split within the Michigan Banker's Association on bank holding companies was the first open rift along the cleavage that had been papered over in the A.B.A. national organization during the 1930's.

again, with the prospect of a national law forcing more unit banking states to consider deregulation of holding companies.[145]

At the federal level, the result of this was the Bank Service Corporation Act of 1962. It was explicitly intended to allow for the ownership of data processing corporations. More important than the typically vaguely worded legislation was the conflict over its implementation between the Comptroller and the Federal Reserve Board. Under Saxon's administration, national banks were allowed to not only set up EDP firms under the aegis of a bank holding company, but to own stock directly in such firms or to market EDP services themselves directly. These were questionable rulings under existing laws, but during the time in which court challenges to these interpretations were working their way through the courts, national banks began to exercise these powers. State chartered banks, barred from matching this strategy by a different interpretation of the same laws made by the Federal Reserve Board, lobbied to gain equal rights. Though the Federal Reserve initially resisted, the conversion of two large state banks to national charters in order to set up EDP service corporations caused state regulators to demand that the Saxon interpretation be applied to state member banks as well. The Federal Reserve Board gave in, and the use of partial ownership in EDP service corporations as a mechanism for consolidating computer services and achieving economies of scale became an accepted practice.[146]

The same logic of competing state and federal regulation combined with the split in the political coalition of small unit banks to produce the two last pieces of federal

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[145] For a brief legislative history of this process, see Clarke (1962), pp. 776-777

[146] See Brumfield (1978), p. 109 and pp. 112-113.

legislation dealing with bank holding companies during this era. The first of these laws was a part of the 1966 Bank Merger Act Amendments that exempted bank mergers from the anti-trust standards used under the Sherman and Clayton Acts (see above). As in the case of the various state bills described above, the critical change that allowed this to pass was the split among small unit banks. Under the influence of several member banks that had engaged in mergers that were now being challenged in court, the I.B.A. reversed its position in 1966 and backed away from opposition to the Act.[147] By setting out the criteria that would allow federal regulators to permit a merger and by exempting from anti-trust review all banks that had merged prior to 1966, this law had the effect of leaving most bank merger decisions in the hands of federal regulators who were progressively less influenced by the divided I.B.A. This led to a doubling of bank holding companies between 1965 and 1970, as federal regulators who were either in sympathy with large banks or under competitive pressure from competing state or federal regulators applied liberal interpretations of what constituted an allowable merger.

A peculiar interaction between regulatory capture and the cycle of regulatory competition between federal and state authorities had begun to dominate the implementation of policy. Once this dynamic had started to work, the divided authority and legislative ambiguity of bank regulation insured that it would be difficult to stop. In bank mergers and bank holding companies, a kind of spontaneous deregulation had begun, with banks making more extreme requests of regulators and using the implicit threat of changing their charter status to pressure regulators to grant them. The first

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[147] See Columbia Law Review (1966), pp. 775-776.

mover in all of this had been James Saxon, who started the process by making regulatory decisions that forced states to respond.[148]

While the need to reorganize accounting around the scale economies of EDP was not the only factor that contributed to this process, it had served as the starting gun. Banks had attempted to avoid the Glass-Steagall restrictions since the 1930's, and the use of bank holding companies to evade restrictions on branching had been attempted with varying success since the late 19th century. Bank regulators had undergone a generational change from the New Deal zealots to a mix of pragmatists and advocates for the largest banks like Saxon. But the 1950's had seen the beginning of this shift among the regulatory personnel, and a business-friendly administration under Eisenhower that would have been unlikely to pose the anti-trust problems that Robert Kennedy's Justice Department did in 1963 in the *Philadelphia* case. By the same token, the rapid postwar expansion of the American economy in the 1950's had created enormous pressures for bank expansion that provided independent bankers in unit bank states with the temptation of branching.

These factors had all existed prior to 1960 – indeed the vulnerability of the system to regulatory competition had helped Chase and Sherman overcome bankers' objections to national regulation in 1863. So why did the regulatory pattern shift so dramatically in such a short period in the 1960's? The only plausible answer lies in the breaking of the

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[148] This dynamic was clearly recognized – and resented – by state regulators who realized that even having to pass laws that would limit or reverse Saxon's decisions would put regulatory reform on state legislative agendas and create openings for groups supporting more liberal merger standards. For example, Idaho Governor Smylie in 1963 accused Saxon of "indirectly pressuring" his state to repeal restrictions on branching by ruling that nationally chartered banks could meet less restrictive criteria. Though the decision was likely to be challenged successfully in the courts, Saxon's ruling threatened state regulators with the prospect of banks choosing to switch to national charters unless the state at least matched Saxon's decision. Saxon's style of regulation proved that it can take only one actor to start a race to the bottom even in a complex and overlapping regulatory environment (see *American Banker* 3 April, 1963).

coalition of rural unit bankers caused by EDP. Prior to the changes in cost structure caused by EDP, the system had been stabilized by the political power of small independent bankers used in concert to block regulatory change through all of the regulatory institutions. Put simply, so long as these banks were able to operate at the scale of their communities using technologies and organizational forms unchanged since the 19th century, the I.B.A. would be able to count on a powerful grassroots network to lobby members of Congress on banking issues. This lobbying coalition was only broken when its members perceived the prospect of not merely defending their existing markets, but capturing new ones. The economic growth of the 1950's had been insufficient to tempt these banks away from their traditional stance on mergers and expansion. It was only when the shift in cost structure brought about by EDP became obvious to them after the introduction of the MICR system in 1960 that the I.B.A. coalition of small unit bankers split and the century of regulatory stasis ended.[149]

By 1970, this pattern of regulatory competition had imposed a new constraint on Congress. The longer a new law was delayed, the larger the number of bank mergers and holding companies that might be affected by the new standards. The potential disruption of commerce and the public costs of divestiture applied to existing mergers forced Congress to include the anti-trust exemption for all previous mergers in the 1966 bill. At the same time, Congress could not stop the logic of regulatory competition without a

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[149] In addition to the cost-based explanation for the breakup of the political coalition of small banks, it is important to acknowledge a generational change among bank managers to match that of bank regulators. From their origin as agricultural banks in the late 19th century, the numerical majority of American banks in small towns across the south and Midwest had been more concerned with survival than expansion. Of the 10,763 banks that had failed between 1930 and 1933, over seventy percent had been small unit banks in towns too small to support more than one or at most two financial institutions. The banks, and more specifically the bankers, that had endured this collapse were not inclined to take risks and were quite willing to defend the regulations that protected them.

ground-up revision of banking regulation. Such a fundamental reorganization of banking regulation had not been possible since the Civil War. Even in the face of the 1933 banking crisis, Congress had found it easier to add another layer of regulation rather than rationalize and unify the administration of banking law. Such a revision of banking law, even if possible, would take considerably more time – a delay that would produce more mergers and holding companies that would have to be accepted through a grandfather clause or forced to divest assets.

The I.B.A. and their congressional allies who supported more restrictive federal regulation were trapped, ironically, by the very system of overlapping, ambiguous regulation that their earlier opposition to comprehensive reform had created. Bills to eliminate regulatory competition by consolidating federal regulatory authority in one office were introduced in 1965, 1967, and 1969 but never progressed beyond committee. In the mean time, regulatory competition continued to erode restrictions on branching or holding companies.[150] Unable to eliminate regulatory competition, Congress attempted to perform damage control by clarifying what had been vaguely worded laws governing the standards that should be used by regulators to approve mergers or the formation of holding companies.

The 1970 Amendments to the Bank Holding Company Act represented the last and most important step in the holding company movement during this period. The

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[150] Regulatory competition can operate in an unintended way, but there is overwhelming evidence that in this case it was being consciously used to achieve liberalization. In a number of specific instances, Saxon used regulatory competition deliberately in the service of bank consolidation. An example can be seen in the liberalization of Idaho's branch banking laws in 1963 (see footnote 148 above). In a letter to President Kennedy's Advisory Commission on Intergovernmental Affairs, Governor Smylie claimed that the liberalization was something that "the state did not want, the banks did not want, but was necessary in light of the Comptroller's administrative actions." (*American Banker*, April 3, 1963) Other cases in Utah and South Dakota support this general model of intentional subversion of state laws.

objective of the law was twofold. First, it was intended to close the one bank holding company loophole and apply federal standards to all bank holding companies. The *de facto* violations of the Glass-Steagall separation of commercial and investment banking by large banks alarmed many members of Congress who had not intended to overturn the entire New Deal system of regulation through the one bank holding company loophole. Second, the law was intended to establish clear standards for what types of non-banking entities could be owned or controlled by a bank holding company. The need for such standards was felt by many legislators because of the initiative taken by both the courts and the federal regulators over the previous decade in establishing generous interpretations of what businesses could legitimately be considered "incidental to the business of banking." The Supreme Court's decisions in various bank merger cases since 1963 had created a set of inconsistent standards for mergers that ignored the 1960 Bank Merger Act.[151] The decisions made by Saxon in the early 1960's as Comptroller had also been seen as disregarding the intent of Congress and taking advantage of ambiguity in the wording of laws to push an agenda of bank concentration.

While the law did establish the power of federal authorities to regulate one-bank holding companies, its effect was actually to stimulate the growth of holding companies and shift the debate from whether such holding companies should be allowed to what specific lines of business they should be permitted to enter. Though bank holding companies were being used for a range of businesses, it was the question of new

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[151] The dissatisfaction of many members of Congress with the legal interpretations of previous laws is examined by Via (1967). Reference is also made to disagreement with the intent of the legislature in Justice Harlan's dissent in *U.S. v. Philadelphia National Bank*, which applied the Clayton Act to bank mergers. Harlan argues that the court's decision nullifies the express intent of Congress and that in light of the majority decision the entire effort of Congress in passing the Bank Merger Act of 1960 "turns out to

technology that prevented Congress from imposing specific restrictions. Initial proposals for restrictions that would eliminate the discretion of federal regulators to allow or disallow specific activities were withdrawn based on the argument that rapidly changing technology would make any such list obsolete within a few years. The prospect of electronic teller machines (early versions of the technology that became ATM's), banking by phone, and new forms of consumer credit that all grew out of banks' initial experiences with EDP were cited as a justification for allowing federal regulators to retain a high level of discretion.[152]

By removing the threat of legal action and leaving bank regulators that supported consolidation, Congress eliminated the primary reasons for banks *not* to form a bank holding company. Within two years, the number of registered bank holding companies increased from 121 to 1,607. By 1972, 42.1% of all banks in the United States were part of holding companies, controlling 61.5% of all assets.[153] The law allowed states to establish more restrictive standards for bank holding companies, but only a limited number of states were willing to enact restrictive laws and risk imposing a competitive disadvantage on their banks that could result in defection to national charters. Though much of the debate over the law had dealt with general concerns over the expansion of banks into areas such as insurance, travel, and investment advising, a series of court cases restricted most of these and shored up the intent of Glass-Steagall. Only the provision of

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have been an exorbitant waste of congressional time and energy." The importance of the 1966 and 1970 laws on holding companies and mergers was largely seen as re-establishing Congressional authority.

[152] See William Camp Senate Testimony in Office of Comptroller of the Currency (1970), p. 256.

[153] Rose and Fraser (1972).

EDP services – the original motivation for forming one bank holding companies in the upper Midwest in the early 1960's – remained completely open.

The debate over bank holding companies and the question of whether banks could legally offer data processing services directly or through affiliates was important because banks offering these services for other banks proved to be the most common way for small banks to employ EDP. According to the 1972 A.B.A. Automation Survey, nearly half of all banks in the United States were using off-premise EDP. By contrast, only about 10% of the banks surveyed had EDP systems installed on-site.[154] Among banks using an outside EDP service, three main options existed. Some banks attempted to use the services of a specialized data processing firm. Others attempted to pool the transaction volume of a number of small banks and for a joint venture that would own and operate an EDP service provider for the group. By far the most common solution, however, was the use of the EDP services of a correspondent bank. The reasons for this demonstrate the importance of informal and relational mechanisms for coordinating the operations of banks that could not be substituted for through contracting.

The problems associated with using a non-bank EDP firm were both legal and practical. The legal problems include many aspects of the common law and various state commercial codes that govern specifically the business of banking and have developed in

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[154] Cross and Tippett in NAC (1972), p. 9 The evidence suggests that this 10% figure represents the segment of the industry that was sufficiently large to take advantage of an internal EDP system, highlighting the importance of the kinds of arrangements used by smaller banks. It is important to note in the results of the National Automation Survey that response rates varied by bank size (Ibid., p. 8). Large banks – measured by asset value – responded at a roughly 60% rate, while only roughly 30% of smaller banks queried offered a response. Though this represents the best available detailed data on patterns of automation and the implementation of EDP in various banks, it does underrepresent smaller banks. Since small size tends to correlate with rural environments and states with unit banking laws, this represents a systematic bias. Comments made by representatives of small banks in either *American Banker* interviews or in comments at A.B.A. conferences on each of the topics that follow have been considered to support the interpretations drawn from the general patterns of EDP use.

case law over a long period. The most obvious of these involved legal liability. In many states it was not legally possible to transfer the liability for errors in check processing from a bank to any non-bank entity through a contract. This meant that a bank using a non-bank EDP service might find itself having to settle lawsuits for errors made by the EDP firm.[155] In addition, banking laws require that information be made available in specific ways for bank examiners from the FDIC, Federal Reserve, and either the Comptroller for national banks or state regulators for state banks. Setting up a system that facilitates this is the responsibility of the bank being examined. As with direct payment errors, banks could be held responsible for errors or additional costs imposed by the external service bureau. More importantly, bank auditing was a specialized activity requiring considerable knowledge of bank law and the standards of each regulatory authority. The costs associated with building up this knowledge at a non-bank EDP service bureau or establishing a liaison between the bank and its service provider could be complex or costly.[156] Even in situations where auditing requirements could be met through effective contracting, the complexity of these issues and their interaction with a highly specialized area of state and federal law made bankers and EDP service providers reluctant to make the investments required to implement such systems.

In a more practical sense, the majority of small banks in the United States are located in rural areas where business populations were too small to support a local EDP service provider. Geography, so important in the development of the banking system overall, again imposed an additional cost on small, rural banks seeking an EDP service

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[155] Freed (1964), p. 757. Freed cites specific provisions of Pennsylvania's commercial code, but similar provisions existed in several states' laws.

[156] See Sullivan in NAC (1964), pp. 245-246.

provider. Even with the growing reliability of electronic data transmission throughout this period, physical proximity was important in oversight, auditing, and dealing with the minor problems that inevitably develop in a new business system.[157] While second-tier regional cities might support small EDP service firms, banks were reluctant to use them. For an application such as EDP services, banks tended toward conservatism in their selection of service bureaus, seeking a firm that was well established, had a record of providing similar services reliably for other customers in the past, and was sufficiently financially secure to relieve concerns that a service provider could fail on relatively short notice and leave a bank with no ability to process transactions.[158] Even if such concerns could be formally provided for through contracting, it would not be possible for a bank to sue for compensation for the damage that would be done by having to suspend operations as a result of a failure of its EDP service provider. While this conservatism gave an advantage to EDP service providers affiliated with large equipment manufacturers that had experience working with banks and developing bank-related automation systems, few such firms existed and those that did were located in large cities and major financial centers.

Cooperative data processing by a new entity owned by a number of regional small banks represented a solution to some of the problems that arose with service bureaus, but created new problems of cooperation, standardization, and personnel that made this a problematic approach to EDP for small banks. Once the bank holding company

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[157] See Wood in NAC (1966), pp. 222-224 and Sams in NAC (1966), pp. 235-240 for a review of electronic data transmission from the perspective of banks using external EDP services.

[158] For a brief review of the considerations that influenced small banks in this area, see Herriges in NAC (1963), pp. 181-182. See also Aldom, et. al. (1963), pp. 116-117. Vaughn's (1969) survey of small banks using EDP service also cites specific problems experienced by banks that support this.

movement and a series of administrative decisions had opened up the option of creating data processing subsidiaries for banks in many states, the idea of setting up cooperatives was seized upon quickly as a way of reducing administrative costs and capturing the benefits of large numbers of transactions in fully utilizing the power of EDP systems. This type of system has the advantage of being set up by a joint management that is familiar with the problems of banking and will be prepared for the problems of legal liability and auditing that are discussed above. It also provides a mechanism for more effective oversight and control than can be achieved through contacting.

Despite this, two disadvantages were associated with joint ventures that limited their use. First, the banks forming the cooperative were usually small and inexperienced in developing EDP systems. This meant that a large initial investment in hiring qualified personnel, purchasing and setting up equipment, and establishing a system to coordinate with each affiliated bank had to be made. Specifically, the level of specialized knowledge, organizational skill, and cooperation required to create an entirely new firm to perform a function that is unfamiliar using technologies that are not well established proved to be higher than expected.[159] Aside from the guaranteed customer base, all of the difficulties associated with starting a new company applied to these EDP joint ventures. In addition, all of the difficulties that small banks had in implementing EDP systems described in Section 4.4 applied to these service firms as well: difficulty in finding qualified personnel, a lack of knowledgeable management, and difficulties in selecting and properly setting up equipment. These disadvantages were compounded in practice by the fact that joint ventures had to satisfy two or more corporate overseers with

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[159] A case study highlighting this problem of organizational knowledge is presented by Synnott in NAC (1965), pp. 417-420.

conflicting goals or understandings of what the new service provider should be expected to accomplish. In some cases, these start-up costs were higher than anticipated and one or more of the banks in the venture withdrew. EDP joint ventures, even where successful, were often inefficient and operated at a loss, encouraging banks considering EDP systems to examine other options.

The second problem that was consistently associated with EDP joint ventures was one of privacy and competition. Banks creating a joint EDP center exposed detailed customer information to banks that were usually in their geographic area and therefore at least potential competitors. Some level of distrust and the need to arrange satisfactory guarantees of information security hindered cooperation, as did each bank's concern at placing a critical element of its internal operations in the hands of its rivals. In some cases, even success could create unexpected problems. If an EDP joint venture proved to be efficient and profitable, it might lead other banks in the region to bring an anti-trust action or other legal challenge based on coordination of policies among the involved banks.

In light of the problems associated with external EDP systems for small banks, an overwhelming majority of banks that chose to contract out their data processing did so through their correspondent relationships with large banks in major financial centers.[160] Generally, correspondent banks were able to offer adequate service and overcome the specific problems encountered through the service bureau or joint venture models for three reasons. First, the legal and organizational infrastructure existed to support close

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[160] The 1972 A.B.A. automation survey showed that 72% of banks using remote EDP services contracted with an established correspondent bank. Data from a 1967 FDIC survey with better coverage and response rates indicated that roughly 83% of banks that used an outside EDP service did so through another bank,

cooperation and sharing of data between banks and their correspondents. Extending that relationship to data processing therefore required few changes in existing law and administrative practices.

Since correspondent relationships in their modern form had existed since the rise of checking in the era after the civil war and had always involved joint processing of confidential information in the form of check clearing, state and federal law as well as auditing standards had co-evolved over along period to deal with them. Provisions for small banks to act as marketing agents for a large correspondent's international exchange or other services that could not be supported by locally existed in most state laws and provided a legal basis for managing EDP services. Any remaining legal problems that existed at the level of federal regulation were eliminated by the Bank Service Corporation Act even before the wave of bank holding company formation allowed these functions to be separated into a formal subsidiary. In addition, the existing legal background at the state and federal levels protected these relationships against charges of anti-competitive behavior or illegal concentration.

Second, correspondent relationships involved secure, long term cooperation between banks that developed trust between the parties and fostered mutual familiarity with operating procedures. As with most business relationships that involve a form of dependence and highly complex forms of cooperation, correspondent relationships tended to create a high level of trust that reduced the need for specific contingency contracting. Correspondent banks generally did not operate in overlapping markets – in most cases correspondent ties were with out of state banks in one of the Federal Reserve cities – and

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though based on the forms of service marketing allowed under the 1962 Bank Service Corporation Act (see above), some of these relationships might not have involved correspondents.

were therefore not competitors. An existing long-term, flexible relationship between banks and their correspondents did not have to be significantly altered or renegotiated to serve as the basis for selling EDP services.

In addition to a strict cost analysis of expanding an existing relationship to include EDP rather than initiating a new one, the cultural conservatism and risk-aversion of small banks was a serious barrier to most other types of external contracting for data processing services.[161] Case studies of joint ventures and the prevalence of the concerns cited above regarding EDP service bureaus strongly suggest that this played a role in management decisions regarding external EDP services. Comments by survey respondents, statements at A.B.A. panels on correspondent service, and the factors emphasized in advertising by large banks intended to attract new correspondents all highlight trust, cooperation, and reliability as factors in the decision to use correspondent EDP service.[162]

Third, most large banks were exceptionally well positioned to perform remote data processing for their clients. A majority of large correspondent banks in the 1960's were organized into some form of branch network, meaning that their own internal EDP

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[161] As with most business investment decisions, the factors that are usually formalized in the form of risk discounting are actually manifestations of industry and even firm culture. In a speculative investment area such as EDP in the 1960's, even an exceptionally well informed bank manager would have no strong basis to evaluate the risks associated with various strategies for using this new technology. If nothing else, the lack of accurate cost and risk information among bankers is demonstrated by the support given to the various EDP research programs and conferences organized by the A.B.A. and funded by its members. In the absence of accurate information, risk evaluations are bound to be highly subjective and will be based on the experience of the decision maker. Similarly, information on the risks associated with various options will also be discounted based on experience and biased weighing of different sources. It is most useful to understand this process in terms of the common cultural character of small bankers and the historical experiences that had created it.

[162] For survey results and reported comments by small banks, see Vaughn (1969; pp. 19-22). See also comments by Zahller in NAC (1963), especially p. 167 and Cooper in NAC (1970), especially p. 467. A detailed account of the decision-making process for switching correspondents based on EDP services is provided by Ellis in NAC (1965), pp. 160-164. The pattern of the appeals made in advertising in *The American Banker*, *Banker's Magazine*, and *Banking* is also clear. Price competition is seldom mentioned,

systems were organized in the hub and spokes pattern designed to receive input from remote locations and return account information reliably on a regular schedule. This allowed large banks to structure their sales of EDP services using the model developed for their own internal accounting. As importantly, large banks had created and developed the core technologies of EDP and been responsible for training the first generation of office automation specialists. This provided these banks with a base of knowledge and skilled personnel to organize the sale of EDP services that could not be matched by small banks or independent service bureaus. The only organizations that might possess equal technical qualifications to sell EDP services were the equipment manufacturers themselves, and in most cases these firms were unwilling to enter into competition in the sale of EDP services with their core, long-term customers.

In addition, even large banks could benefit from economies of scale in data processing using EDP equipment that existed in this period. Though the cost studies that establish economies of scale do not trace the slope of the cost curve reliably past a certain point,[163] it was a common perception among bankers that the fixed investments associated with a large EDP program – especially the high costs of training programmers and systems designers – could be diffused over larger data processing departments. Since investments of labor in programming and systems design had essentially no marginal cost for expansion, this calculation was probably correct for most large banks that had comprehensively integrated EDP. This perception led to the active marketing of

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but experience, trust, and reliability are consistently emphasized along with national and international credentials.

[163] See footnotes 76 and 77 above.

correspondent EDP services, often as a profit center for a newly formed holding company affiliate of the correspondent bank after 1966. This pattern was especially common among large banks that had over-invested in computer equipment in the enthusiasm of the early 1960's. These banks, while large enough to capture the minimum economies of scale required for an on-site EDP system, had purchased systems with higher capacity than their own needs justified and suffered from underemployment of expensive resource. Under these circumstances, even selling correspondent services at a loss could be justified.

It is important to keep in mind that all of the mechanisms that allowed banks to achieve the transaction volume required by the scale economies of EDP not only represent negotiated, socially embedded ways of reconciling the needs of technology with an idiosyncratic economic environment, they were also made necessary by legal and social restrictions on firm behavior. At the most basic level, both the problems of coordination and their solutions were products of a political history that goes back to the middle of the 19th century. The regulatory competition between national and state authorities exploited by Saxon to change state laws was the unintended consequence of the problems of financing the Civil War. The loophole in the Glass-Steagall Act that produced the artificial, faintly ridiculous spread of bank holding companies to market EDP services was originally a product of concern that small unit banks be able to provide a range of financial services in remote rural areas that could not support insurance agents or specialized mortgage firms. The conflict between administrators in fundamental sympathy with the groups that they regulate and a legislature concerned with other social goals was a product both of the American system of separation of powers and of the

uniquely corporatist structure of regulation that grew out of the check clearing mechanisms of the late 19th century and was formalized in the regional Federal Reserve system.

The kinds of tasks that bank managers had to undertake to implement EDP technology were generally did not manifest themselves as problems of hierarchies and markets to be solved purely on a rational, cost-minimizing basis. Instead, they were problems that grew out of a social, legal, and political environment that could only be dealt with through political action. Even the areas where markets were clearly used to coordinate resources, as in the buying and selling of off-site EDP services, the rational cost-benefit analyses that governed banks' strategies were powerfully influenced by the history of correspondent relationships and idiosyncrasies of state level regulation. For the numerical majority of small, unit banks that were forced to adopt EDP, strategies were determined by their place in a market structure that can only be explained in a political and historical context. These banks, being technology-takers forced to use EDP systems that required much larger transaction volumes than they could be generated internally, found that their only flexibility came in their ability to alter their institutional environment to make that technology usable. Through experimentation with strategies allowed by existing regulation, lobbying for changes in legal rules, and coordination with sympathetic regulators through a powerful but divided industry association, these banks found ways to adopt a technology whose central requirement for large scale of operations seemed incompatible with their very existence.

4.6 Conclusion

The adoption of electronic data processing in the banking industry demonstrates that the general argument developed in Chapter 2 can apply in a highly regulated service industry as well as the more traditional manufacturing sector. It also provides insight into how some parts of that argument can operate in unexpected ways. The most surprising elements in this case are the use of a private organization rather than the state to modify governance mechanisms and the overwhelming importance of political strategies to achieve the scale economies of EDP. In this section, I will briefly trace the steps of technological adaptation as they applied to commercial banks and highlight the points where the model must be supplemented to describe actual strategies and outcomes.

As expected, the first step in adopting the new technology involved an industry-wide learning process that defined the technology and set out the governance mechanisms that were best suited to employing it. In this case, the formal role of the A.B.A. and the informal power of large banks and equipment manufacturers made this a more structured process than it had been in the auto industry. While this followed the general expectations of my argument and paralleled in some ways the process of industry learning that characterized lean production, the way in which the process was structured raises an interesting question. In the auto industry, General Motors, Ford, and Chrysler each undertook the process of defining lean production internally based on the understandings of their own engineers and managers. All three firms sent delegations to observe Japanese factories, negotiated joint ventures with Japanese firms, and set up groups to study and copy lean production. Outside actors such as the National Research Council and Harbour Consulting played a role, but each firm had the organizational

capacity to avoid relying exclusively on any outside group's definition of the new technology.

This was not the case in the banking sector. While the large banks that developed EDP certainly defined the technology autonomously or in limited cooperation with researchers and equipment manufacturers, the majority of smaller banks had to rely on an understanding of both the technology and the governance mechanisms required to adopt it that came from the A.B.A. and the equipment manufacturers. This raises the question of whether the definition that emerged reflected the interests of those groups as well as an attempt to provide an objective understanding of what could be done with electronic record keeping. There are two reasons to think that this might be the case. Most obviously, the equipment manufacturers had a strong material interest in selling the most expensive products possible and in avoiding the risks of developing new products that were not guaranteed a base of customers. By marketing the large, high-capacity computer systems that had been developed for branch banks and organizing these sales through cooperation with the A.B.A., equipment manufacturers met both of these goals. Though there is no evidence that information or recommendations were manipulated, it is possible that the imperatives of creating a new market as well as their corporate backgrounds inclined firms like IBM, NCR, and Burroughs to emphasize the largest and highest-capacity electronic systems possible. This would reflect both their interest in maximizing profits per sale in an uncertain market and their background in developing computers for research and government applications, where cost was generally less important than high capacity and the flexibility to use a variety of software packages.

This is significant because it suggests two points about the process of defining and interpreting a new technology. The first is intuitive but often unacknowledged: the social construction of a new technology will depend on the groups that have a privileged role in defining it. Both the interests and the intellectual biases of equipment manufacturers seem to have reinforced the gigantism of design in the EDP systems developed by large branch banks. The critical point here is not that manufacturers were biased toward high-capacity systems. Rather, the way in which the A.B.A. dominated the process of defining the technology allowed these biases to become an industry standard that was accepted as simply the nature of things by later users of the technology. Even large banks that in theory possessed the organizational resources to experiment and investigate on their own tended to rely on the Association for an understanding of EDP and models of how to employ it. This indicates that the structures through which an industry deliberates on a new technology will have an effect on how the technology is ultimately defined. Had competing organizations attempted to define EDP through experimentation and contact with a wider range of groups in society at large, it is plausible that the computers would have been applied differently in banking.[164]

The second point is related to the first and has to do with how the resource governance mechanisms appropriate to a given technology are defined. The most surprising aspect of how banks chose to organize both their relations with equipment manufacturers and labor was the prominent role of the A.B.A. Not only did it provide a

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[164] The creation of the MICR check reading system required a central body to set standards and oversee its implementation. The A.B.A.'s association with the Federal Reserve Board and its history as a standard-setting body made it the only plausible actor to perform this function. In addition, the MICR process required extensive coordination between the A.B.A.'s technical committees and equipment manufacturers – contacts that forced these committees to think about the broader implication of EDP technology. The role

forum to connect buyers and sellers of EDP equipment, it also served to overcome problems of commitment and opportunism in the long-term relational contracts that were formed. Considering the importance of the Association in defining the technology, this prominence becomes more comprehensible. Since the A.B.A. had taken on the role of intermediary between manufacturers and banks in defining EDP and developing standards for its implementation, the decision to continue using its institutional capacities to help coordinate the subsequent transactions probably seemed an obvious strategy for both groups. This certainly served the organizational interest of the Association, as the increased prestige and resources involved in this task demonstrate.[165] For example, the revitalization of the stagnant and underdeveloped educational programs run by the Association in response to the need for EDP technicians, programmers, and data-entry personnel show how the permanent staff and committee members likely benefited from the increased flow of bank resources through their organization.

The next point involves the power of sociological factors in spreading new technology. In general, this project has assumed that the primary reason for firms to adopt new technology was provided by the external threat of competition. Since the process of implementing a new technology involves uncertainty, high levels of expense, and the overcoming of organizational inertia within the firm, there should be a strong bias against changing the firm's production process that can only be overcome by either the

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played by the Association was not inevitable, but it did emerge logically from the way automation technology developed.

[165] The fact that much of the information available about the implementation of EDP in the banking industry comes from the A.B.A. or its affiliates might bias my evaluation of this role and the degree to which it was uncontested within the industry. Secondary sources, surveys, and contemporary news items generally support the characterization of the Association's role that is presented here, but the conclusions drawn should still be considered tentative.

promise of increased profitability or the threat of losing business and ultimately being forced out of core markets. Of these, the latter should be stronger – an assumption that is borne out by the case of lean production in the auto industry. The reason for this is obvious. While the threat of lower cost competition and impending bankruptcy can end the existence of a firm, the "carrot" of reducing costs and increasing profits by using a new technology offers a weaker motivation. The promise of lower costs and improved efficiency must be weighed against both the expense of changing an existing production process and costs of organizational learning required to operate the new process efficiently. Weighing even more heavily against innovation is the uncertainty associated with change and the costs of disrupting existing forms of organization. While the gains from a new technology are in some sense speculative, the costs of firing workers, breaking ties with suppliers, and trying to mobilize and govern new resources are real and obvious to decision-makers.

The case of EDP in the United States shows some of the factors that can overcome this and induce firms to implement costly new technologies even when the competitive threat is relatively weak. Most banks in this period faced little competitive threat due to tight regulation and restrictions on entry imposed in the 1930's to prevent competition from forcing banks into higher risk lending. Even banks in larger cities generally enjoyed limited geographic monopolies and a stable customer base. In addition, general economic growth and the expansion of consumer loans made this period exceptionally stable and prosperous for bankers.[166] Only among large banks in urban

[166] In the ten years from 1951-1961, a total of 30 FDIC insured banks failed. Being driven out of commercial banking in the United States by market forces during this period required a combination of bad luck and poor lending decisions that was difficult to achieve (see Rose and Scott 1978, p. 91)

areas and major financial centers was there serious competition that made reducing costs a matter of existential concern.

But despite this lack of serious competitive threat, a majority of banks during this period undertook EDP programs of some kind. Three factors explain this. The first was the role played by equipment manufacturers and the A.B.A. in reducing uncertainty and eliminating much of the cognitive task facing managers considering new forms of record-keeping. By sharing information from early adopters, creating templates for EDP systems that could be applied with little modification, and making services such as worker training and management instruction readily available, the A.B.A. lowered the information cost associated with adopting EDP technology and reduced the risk perceived by managers in a major capital investment. The importance of this in convincing banks to adopt the technology suggests that some of the most important costs of technological change involve information and uncertainty – factors that are usually given only cursory examination in models of technology diffusion.

Second, EDP appeared during a period when two external changes were being imposed on banks, forcing them to change their internal processes and disrupting existing business patterns. Because organizational changes were being implemented to respond to these changes, organizational inertia had already been to some degree overcome and bank managers were more willing to consider computer systems. The first change involved the economic expansion and the change in patterns of both lending and deposit-taking. As discussed in Section 4.2, the growth in deposit customers after 1945 combined with the consumer revolution to change both aspects of banking. As banks were forced to deal

with the rapid growth and changing character of their accounting and record-keeping tasks, the need for a new solution impressed itself on banks across the country. This made the status quo less attractive to banks and forced them to search for some kind of solution to a commonly perceived problem. The marketing of EDP as this solution gave its adoption the character of a reaction to external pressure, even though this pressure was not imposed by the competition. The second change was the imposition of MICR check-reading technologies by the A.B.A. and the Federal Reserve. All but the smallest banks were forced by the new standards to use this technology in order to maintain their correspondent relationships and fulfill their responsibilities for check clearing. As this universal system for check sorting involved large-scale capital purchases that banks could not avoid, most bank managers in the period from 1960-1965 gained some familiarity with electronic equipment and dealt with sales representatives from manufacturers of MICR reading equipment. The success of MICR systems, the experience of installing and operating a complex piece of computer equipment, and the fact that this equipment could be 'mated' easily with computer systems made the adoption of EDP appear to be a natural progression based on decisions already made. This supports the conclusion that adopting new technology is easier when it is perceived as reactive and when uncertainty can be reduced.

The forms of resource governance used by banks implementing EDP were not simply the generic mechanisms available in the broader economy, but they were also not created or explicitly legitimated by the state. This points to another area where the general argument should be amended. The use of the A.B.A. as a forum for arranging and informally monitoring the relations between manufacturers and banks was done

within the existing legal and contractual system, but it represented a supplement to contracts that materially changed the incentives for opportunistic behavior – specifically by inducing equipment manufacturers to provide additional support for customers and to expand the range of services they offered as part of the purchase, rental, or lease of EDP equipment. This example shows that it is possible to create institutions that provide order in resource governance through entirely private, voluntary means. It could be argued that the relationship between the A.B.A. and the Federal Reserve represented some intrusion of state authority into this relationship and gave the oversight role taken by the A.B.A. some aura of governmental legitimacy, but there is no evidence that this influenced the behavior of equipment manufacturers. The functional role of the Association indicates that institutional support for resource governance can be more complex than my model allows.

If this is true, then firms trying to create or modify governance mechanisms to deal with a new technology have a broader range of options than strictly internal organizational strategies or the use of the political system. Based only on the EDP example, it seems most logical to think about the use of private or quasi-private groups like the A.B.A. to structure relationships between firms and groups that control needed resources as a variant of political action. If such private organizations have the power to enforce binding rules on economic and social actors even without the coercive power of the state, they should be thought of as sub-governments that are able to use specific kinds of power to control how actors relate to one another. Further research – possibly in corporatist or less market-oriented countries than the United States – might help to develop a more general theory of how these non-governmental organizations exercise

power under the state and the conditions under which they are likely to be useful tools for firms to organize resource governance.

Finally, the tight regulation of bank mergers, lines of business, and market behavior by government makes it difficult to separate political and organizational strategies. This does not contradict my argument, but it does suggest that the division between these two approaches can be unclear and that the strategies chosen by firms in one area might be entirely a product of forces that affect the other. For example, a unit bank choosing whether to attempt to merge with other regional banks to gain EDP's scale economies or create a subsidiary to sell data processing services made this organizational decision based entirely on the politics of regulation. This blurring of political and organizational strategies means that the adoption of new technologies will be shaped not by the most efficient way they can be used – subject to the point about how they are socially constructed above – but instead by the ways in which regulation can be modified.

The effect of this is to enhance the importance of the political opportunity structure and make organizational decisions subordinate to it. If it is easier to change restrictions on the lines of business in which banks can invest than to change the laws governing mergers, this will produce holding companies of the type shown in Figure 3 rather than a more efficient branch system. This may seem to make only an academic difference since in either case EDP is adopted in a parallel functional form, but its effects can be far-reaching. A holding company, though more costly to set up and more complex to manage, opens a range of business possibilities for banks that affect their behavior. In this case, the most important effect was to provide banks with an organizational mechanisms by which they could operate across state lines. Precisely because the

regulatory environment of the 1960's forced banks in these states to adopt a less efficient corporate form in order to use EDP, they developed the organizational and political resources to break down the dual banking system by purchasing unit banks in other states.

These unintended consequences of political action suggest another addition to my general argument. While it is certainly true that the political strategies of firms as they respond to new technologies alter governance mechanisms and economic institutions, they also create industry structures and generate organizational capacities in the private economy that create path dependencies within each industry. Just as the alliance with anti-government Republicans prevented auto makers from developing the kind of cooperative research relationships that characterized Japanese and European firms and forced them to develop both technologies and designs internally, the holding company strategy that was forced on many state banks by the political opportunity structure determined how the industry would develop over the next two decades. If this pattern is common, it could change how we explain cross-national differences in industry structure. Even aside from functional explanations based on how firms are able to govern resources, this indicates that such differences can be explained by the political strategies that firms used to deal with the defining technological changes in their history.

Chapter 5: Conclusion

This project has addressed two of the more puzzling issues in contemporary political economy by relating both to the question of how firms control productive resources. Starting with this distinctly micro-level question and placing firms at the center of my analysis, I have constructed a theory that can explain both institutional competitive advantage and the ways in which economic institutions – the systems that structure exchange relationships in a capitalist economy – change over time. In concluding my dissertation, I will review the basic elements of this theory, examine three areas where the case studies suggest that further work should be done, and trace a few of its implications for other areas of political economy.

All firms exist in a complex social environment that operates according to formal rules created and enforced by the state. In order to produce goods and services, these firms must extract resources from that environment and exert control over them, combining materials, knowledge nested groups of people, and manufactured goods produced by other firms according to a formula that is dictated by the state of existing technology. How effectively a firm can accomplish this task is determined by the ways in which government allows power to be exercised by independent actors. By defining property rights, enforcing contracts, regulating employment relations, and limiting corporate behavior, government provides firms with a set of tools that can be used to influence the behavior of people and groups. These tools allow the legitimacy of the law and the coercive power of government to be applied by private actors to enforce certain

kinds of agreements. I refer to the ways in which this power can be used by private actors as governance mechanisms.

When a firm attempts to follow the formulas set out by available technology to produce goods or services, it uses these governance mechanisms to do so. Because governance mechanisms define how resources can be used in a given environment, this means that firms are limited in their ability to execute a production process by the governance mechanisms available to them. This provides my answer to the first question: institutional competitive advantage exists when the resource governance needs of a production process can be better met by the resource governance mechanisms in one environment than another. Firms in the advantaged environment are able to produce using the most efficient production process implemented through the most apt set of governance mechanisms. This means that institutional competitive advantage is not a characteristic intrinsic to a given country, but instead is produced and destroyed by the interaction of two variables. Since different production processes call for bundles of resources mobilized and controlled in diverse ways, no institutional environment can offer a competitive advantage in all industries. Since production processes change over time as new technologies are introduced, no country's competitive advantage even in a specific industry is guaranteed to last forever.

This first step in the argument is useful, but it is the second step that addresses the question of how institutions change. When a firm finds itself in an environment where governance mechanisms and the needs of its production technology do not mesh, it faces a competitive disadvantage. But firms are not suspended in a political environment they are powerless to change. Like the men of France in Marx's *Eighteenth Brumaire*, firms

can act to create their own history, though they are constrained in doing so by circumstance and the legacies of history. Because governance mechanisms are created and sustained by the state, the state possesses at least the theoretical power to change them. If a firm can harness this power, it can be used to create the governance mechanisms that the firm requires and generate an institutional competitive advantage. In the developed world, attempts by a firm (or collective attempts by the firms in an industry with similar goals) to do this are mediated through a set of social and political institutions that can be thought of as a political opportunity structure.

Based on this, the key question is how firms go about the process of securing the regulatory changes required to govern resources as their production technology requires. This issue is more complex and will depend on how interest groups in the industry are organized, how the political system allows access and influence to be gained, and what other interest groups in society will mobilize against industry lobbying. While firms will try to use the political system for a variety of ends, my research design examines the response of two industries to specific and well-defined technological changes that imposed relatively fixed resource governance requirements on firms. This allowed me to at least partly isolate the kind of regulatory lobbying associated with changing governance mechanisms from other kinds of political action.

In applying this model, three results emerged that could not be neatly fit into the theory I had constructed and had to be considered separately. Though these problems do not seriously undermine the theory, they do suggest considerations that should inform future research. The most significant of these involves the ability of firms to substitute technological innovation for the political and organizational strategies that the theory

predicts. The example of this that appeared in my research occurred in the American auto industry. In this case, the proper governance mechanisms did not exist to implement lean production and – as predicted – American firms faced a disadvantage that could not be eliminated. These firms also faced a situation in which the political resistance to copying the Japanese resource governance mechanisms was essentially absolute.

Having exhausted the kinds of solutions predicted by the model, American firms undertook a massive program of research, investment, and experimentation. These programs, led by General Motors and carried on over the course of roughly a decade, were ruinously expensive and resulted for the most part in failed experiments such as Roger Smith's "factories of the future." Through a combination of the technologies that emerged from these investment programs and attempts to find functional substitutes for the governance mechanisms that facilitated lean production, however, some new techniques were created. Overall, the predictions of the theory were borne out, with American firms still losing market share and remaining roughly 20% less productive than their Japanese counterparts even after fifteen years. Despite this, the fact that American firms had been able to produce technical innovations that partly countered the cost advantage of lean production undermines the technological determinism that drives my argument.

In future research, it may be possible to improve the argument by specifying some of the factors that lead a firm to choose technical innovation rather than political or organizational change. The auto industry case should be thought of as an extreme example: the barriers to political change were exceptionally strong and the firms involved included some of the largest corporations in the world with enormous capital and slack

engineering resources that could be turned to new technologies. This combined with the management culture of the Big 3 and the political alliance they had made with anti-government Republicans to minimize the prospects for political action and produce a strong orientation toward technological solutions. To examine the general question, work by Dosi (1982, 1988) and Tushman and Anderson (1990) might be used to estimate whether decision-makers in the industry believe that a "technological opportunity structure" exists that influences how they divide their resources between technical and political or organizational strategies.

Related to this, both of the cases I examine offer some evidence that the way in which technology is constructed – and hence the resource governance requirements that it imposes on firms – is subject to some forms of manipulation. For the model to operate, it is necessary that the demands imposed by a technology be essentially fixed. Any ability of firms to "re-interpret" a technology would have the same effect on the theory as the ability to innovate out of resource governance requirements described above. Without binding constraints that must be met by altering their institutional environment, lobbying becomes just one of many available strategies and the advantages of using a resource governance perspective on production become less clear.

At some level, the degree to which this will pose a problem depends on the character of the technology being considered. Some technologies by their nature impose relatively unforgiving demands on users, while others are more easily reconfigured to be used with a range of different resource governance mechanisms. The functional approach to resource governance demands that I use in Chapter 2 is an important first step in dealing with this problem, but the difficulty of defining a real, applied technology

in terms of abstract functions makes this an unsatisfying answer. Human creativity applied to generic, flexible governance mechanisms such as contracts in the Anglo-American tradition, for example, can emulate a range of governance mechanisms that would otherwise be subject to serious incentive problems.[1] In further development of the theory, a typology of technological change based on Henderson and Clark (1990) might be used to provide better *ex ante* criteria upon which to judge how constrained firms will be in meeting a given technology's resource governance demands through different mechanisms.

The third unexpected empirical result challenges my theory from a different perspective and deserves more attention. In the banking industry, the ability of the American Bankers Association to oversee and impose meaningful constraints on transactions between equipment manufacturers and banks was surprising. Lacking the coercive power of the state, it should be exceptionally difficult for firms to find other organizations in society that have the power to create or alter governance mechanisms as the A.B.A. was able to do with long-term contracts. From the rationalist perspective of game theory, it is easy to see the kinds of sanctions that the A.B.A. could impose on equipment manufacturers – excluding them from the development of future standards and denying them access to member banks through the various A.B.A committees and organizations. This perspective, however, does not capture the positive role played by the Association in defining the products and providing a range of non-market services to banks implementing EDP programs. It also fails to account for the kinds of relational

[1] As described in Chapter 1, much of the flexibility of the transaction cost perspective (Williamson 1980 etc.) can be attributed to the fact that it analyzes a specific set of institutional mechanisms that are unusually flexible in allowing economic actors to adjust the specific character of a market transaction and impose costs on one another in a range of ways.

resources that the A.B.A. built up working with both banks and manufacturers to establish templates, define standard equipment and service packages, and reduce risk and uncertainty that would otherwise have prevented many small banks from undertaking large capital investments.

A more historical perspective is more enlightening, but its implications damage the parsimony of the model and suggest that resource governance should be understood in more sociological terms. The modern state with its Weberian monopoly on legitimate rule-making and coercive force is a recent innovation. Prior to the 19th century, most economic activity even in the most developed nations took place in dense social webs of obligation, context-dependent exercise of rights, and ambiguous jurisdiction. In some ways, the common law's reliance on precedent and the decentralized interpretation of evolving standards is a product of this pre-modern age before the concept of state sovereignty had made legislative acts the final arbiter of formal rules.

This suggests that we should not be surprised to find islands of informal rulemaking power in a modern society that operate based on sanctions that are less material than state coercion but are no less binding on social actors.[2] If this perspective were to be included in a model of resource governance and responses to technological change, it would offer a wider range of options to firms and would in some cases multiply the forums in which changes in resource governance could be secured. The concept of political opportunity structures would have to be expanded and made more diffuse, with firms being able to not only take advantage of existing rulemaking

[2] These organizations should be understood as conceptually distinct from the social groups that exist everywhere and informally structure human interaction through norms and non-binding expectations. The latter are important elements of the general economic environment and operate within my theory as interest groups and partners in firms' negotiations over resource control. The former, however, are distinguished

institutions, but possibly create or enhance weak social organizations that could serve as their proxy. Organizations that could be described in these terms might include the company unions that Japanese firms use to facilitate the involvement and contributions of workers (see Section 3.3) or the American Bankers Association mentioned above.

I would be reluctant to place too much weight on the power of these social organizations to create the kinds of binding rules that affect resource governance in a modern society. Two forces that work to undermine such non-state sources of authority make it likely that they will seldom play as powerful a role as the A.B.A. did in structuring resource governance. First, the state is a jealous source of formal authority and its power represents in most cases a trump card in conflicts with civil society. Since actors opposing such organizations will always retain the option of going over the head of the organization to the state to secure rules that disadvantage or weaken it, such organizations seem unreliable facilitators of resource governance. They might be used if convenient or if they serve the interests of the most powerful party (e.g. the Japanese company unions), but their ability to stand against the power of the state wielded on behalf of a determined interest group does not seem secure.

The second force that erodes these non-state sources of rule-making power is the market itself. The same history that show us the power of partial associations in structuring economic activity in the pre-modern era also provides object lessons in the fate of such organizations as national markets were established. Viewed as impediments to free trade and restricting the economic freedom of citizens, organizations such as guilds and traditional feudal corporations were attacked and eliminated or drastically

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by their ability to impose sanctions and therefore enforce rules of behavior that can structure how resources are governed. The example of the A.B.A. from Section 4.4 should clarify this distinction.

weakened. While the spread of commodification and the establishment of markets are certainly not universal forces of history and there will be circumstances under which the reach of market relations retreat, it seems justified to expect that the general trend of modern economies is away from allowing markets to be restricted in this way.

In future research, this observation should be reconsidered based on cross-national studies that examine the role of non-governmental or quasi-governmental organizations in resource governance. The example offered by the banking industry implies that more corporatist forms of interest mediation (e.g. the threefold Chambers system in Austria) might counter these arguments by delegating elements of state authority to industry associations or other semi-public groups. The limited perspective that emerges from the American national case seems likely to exaggerate the role of markets and legal mechanisms to insure that they operate without restriction.

The implications of my overall argument apply to both the present and the past. The argument explicitly describes elements of institutional competitive advantage that can help to interpret contemporary politics. From a policy perspective, states should expect that technological change will produce demands for regulatory change that are based on the resource governance needs of various industries. It is easy to imagine that an effective industrial policy can be constructed by targeting certain industries to be favored by the state in political conflicts over regulatory change. Such an industrial policy demands that the state balance responsiveness to the needs of industry against the danger that industries will use deference from the state as an opportunity for rent extraction. In a way, this need for political responsiveness balanced by concern over

opportunistic behavior by industry parallels the argument for embedded autonomy made by Evans (1995) in analyzing how states can promote economic development.[3]

More provocative than the direct application of my argument to international competition are its implications for interpreting modernization in European history and for contemporary democracy. In the broadest sense, the theory I have developed can be seen as the micro-level building block of a theory of capitalist development. Such a theory would reverse Ron Coase's (1937) famous claim that firms are the product of market structure and argue that instead markets are largely a form of resource governance that was created by firms. Over time, as producers found that they needed access to a wider range of human and material resources in the process of industrialization, these producers chose commodification as a strategy that allowed them to extract those resources from deeply embedded social environments. The mechanisms of political lobbying in early industrialization were different, but privileged access to the state was certainly enjoyed by producers in the European countries that industrialized successfully.

More fundamentally, the attempts by firms to expand their own ability to govern resources can be seen as an important adjunct to early state-building. Though the process of establishing Weberian sovereignty seems inevitable in retrospect, this was only achieved through long-term conflict with powerful groups and associations that commanded resources and legitimacy comparable to the royal bureaucracies and representative bodies that defined the political authority. In these conflicts, the state and economic producers may often have been natural allies. As the proto-firms of the early

[3] Though my argument deals only with domestic economic actors, a similar argument to Evans negotiations with international capital can be made. A more direct comparison would be with the wise management described by Johnson (1982).

modern age reacted to technological change, their need to mobilize and control resources that were generated and embedded within traditional social relationships was tremendously disruptive.[4] In order to overcome resistance to their attempts to control productive resources, these firms required a powerful state allied with them and serving their goals.

It is not necessary to view the state in strictly Marxist terms to recognize the benefits of cooperation with the emerging entrepreneurial class. Rather than the state acting simply as the tool of growing industry, the expansion of markets and the weakening of traditional social groups served to increase the power, legitimacy, and social reach of the state. Consider the development of labor markets described by Gellner. The creation of a mass labor market – the ultimate mobilization of a previously embedded productive resource – was tied with the development of national institutions such as universal education, military training, and linguistic homogeneity. That this served the interests of both industrialists and the state can not be seriously questioned, but placing one or the other group at the helm of this process is more difficult.

While a reexamination of the history of industrialization through the lens provided by my theory can prove useful, its implications for contemporary democracy are more important. In an environment of global economic competition, state responsiveness to the regulatory demands of business can be seen as an important element of public policy. The rapid pace of technological change and the threat of competition from other states more adept at creating the governance mechanisms firms require must incline politicians to offer business a privileged place in public policy-making. If for no other

[4] Both Weber and Schumpeter considered this disruption as being one of the defining characteristics of entrepreneurial activity and noted it in the European context. For a comparison of their perspectives on

reason, the provision of basic information about what the resource governance needs of new technologies are should lead states to give greater weight to interest groups representing industries that it wants to promote. A world of politically responsive developmental states cooperating with business to produce a rapidly growing, high-employment economies is a plausible vision of the future, and the threat that states failing to keep up could lose investment in a world of highly mobile capital will exacerbate the temptation toward responsiveness.

But this is also a vision that adds a new dimension to the concerns outlined by Lindblom (1877, 1982) over the prospects for democracy. Lindblom identified the privileges enjoyed by business in contemporary politics based on the fact that government must always anticipate its reaction to policies and evaluate the risk of lower investment, output, and employment on the general welfare. These concerns did not make democracy impossible under a market-based economic system, but it did provide representatives of business with an indirect and very potent ability to set agendas and exercise an invisible veto over the choices of the electorate. If states must respond to regulatory demands by business in order to compete internationally and if these pressures are increasing as a result of globalization in capital and goods markets, then the ability of states to balance the interests of firms against those of other social actors to approximate the common good is by no means assured.

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this, see MacDonald (1965).

Bibliography

Aberbach, Joel D. 1990. *Keeping a Watchful Eye: The Politics of Congressional Oversight.* Washington, DC: Brookings Institution

Abernathy, William J. 1978. *The Productivity Dilemma: Roadblock to Innovation in the Automobile Industry.* Baltimore, MD: The Johns Hopkins University Press

Abernathy, William.J., and Utterback, James M. 1978. Patterns of Industrial Innovation. *Technology Review* 80: 40-56

Abernathy (National Research Council). 1982. *The Competitive Status of the U.S. Auto Industry.* Washington, D.C.: National Academy Press

Abernathy, William and Clark, Kim. 1985. Innovation: Mapping the Winds of Creative Destruction. *Research Policy* 14: 3-22

Abernethy, William. 1978. *The Productivity Dilemma.* Baltimore: Johns Hopkins Press

Abo, Tetsuo. 1998. Hybridization of the Japanese Production System in North America, Newly Industrializing Economies, Southeast Asia, and Europe: Contrasted Configurations. In *Between Imitation and Innovation: The Transfer and Hybridization of Productive Models in the International Automobile Industry*, ed. RC Boyer, Elsie; Jürgens, Ulrich; and Tolliday, Steven. Oxford: Oxford University Press

Adler, Paul; Kochan, Thomas; MacDuffie, John Paul; Pil, Frits; and Rubenstein, Saul. 1997. United States, Variations on a Theme. In *After Lean Production*, ed. TL Kochan, Russell; and MacDuffie, John. Ithaca, NY: Cornell University Press

Adolph, Christopher A. 2004. *The Dilemma of Discretion: Career Ambitions and the Politics of Central Banking.* (Unpublished PhD thesis.) Harvard University, Cambridge, MA

Ahmadjian, Christina L. and Lincoln, James R. 2001. Keiretsu, Governance, and Learning: Case Studies in Change from the Japanese Auto Industry. *Organization Science* 12: 683-701

Ahmadjian, Christina L. and Lincoln, James R. 2001. Keiretsu, Governance, and Learning: Case Studies in Change from the Japanese Auto Industry. *Organization Science* 12: 683-701

Alchian, Armen. 1950. Uncertainty, Evolution, and Economic Theory. *The Journal of Political Economy* 58: 211-21

Alchian, Armen and Demsetz, Harold. 1972. Production, Information Costs, and Economic Organization. *The American Economic Review* 62: 777-95

Aldom, Robert; Schneider, Robert; Purdy, Alan; and Wittingham, Harry. 1963. *Automation in Banking.* New Brunswick, NJ: Rutgers University Press

Alhadeff, David A. 1954. *Monopoly and Competition in Banking.* Berkeley, CA: University of California Press

Alhadeff, David A. 1974. Barriers to Bank Entry. *Southern Economic Journal* 40: 589-603

Allen, Paul R. and Wilhelm, William J. 1988. The Impact of the 1980 Depository Institutions Deregulation and Monetary Control Act on Market Value and Risk: Evidence from the Capital Markets. *Journal of Money, Credit and Banking* 20: 364-80

Althauser, Robert P. 1989. Internal Labor Markets. *Annual Review of Sociology* 15: 143-61

Altschuler, Alan; Anderson, Martin; Jones, Daniel; Roos, Daniel; and Womack, James. 1984. *The Future of the Automobile: Report of MIT's International Automobile Program.* Cambridge, MA: MIT Press

American Bankers Association. 1959. The Common Machine Language for Mechanized Check Handling; Final Specifications and Guides to Implement the Program, American Bankers Association: Bank Management Committee, New York

American Bankers Association. 1962. The Commercial Banking Industry; A Monograph Prepared for the Commission on Money and Credit. Englewood Cliffs, NJ: Prentice-Hall

American Bankers Association. 1963. *Proceedings: 1963 National Automation Conference.* Presented at American Bankers Association National Automation Conference

– 1964. *Proceedings: 1964 National Automation Conference.* Presented at American Bankers Association National Automation Conference
– 1965. *Proceedings: 1965 National Automation Conference.* Presented at American Bankers Association National Automation Conference
– 1966. *Proceedings: 1966 National Automation Conference.* Presented at American Bankers Association National Automation Conference
– 1967. *Proceedings: 1967 National Automation Conference.* Presented at American Bankers Association National Automation Conference
– 1968. *Proceedings: 1968 National Automation Conference.* Presented at American Bankers Association National Automation Conference
– 1969. *Proceedings: 1969 National Automation Conference.* Presented at American Bankers Association National Automation Conference
– 1970. *Proceedings: 1970 National Automation Conference.* Presented at American Bankers Association National Automation Conference
– 1971. *Proceedings: 1971 National Automation Conference.* Presented at American Bankers Association National Automation Conference
– 1972. *Proceedings: 1972 National Automation Conference.* Presented at American Bankers Association National Automation Conference
– 1973. *Proceedings: 1973 National Automation Conference.* Presented at American Bankers Association National Automation Conference
– 1974. *Proceedings: 1974 National Automation Conference.* Presented at American Bankers Association National Automation Conference
– 1975. *Proceedings: 1975 National Automation Conference.* Presented at American Bankers Association National Automation Conference

Anderson, Gordon B. 1916. Some Phases of the New Check Collection System. *Annals of the American Academy of Political and Social Science* 63: 122-31

Andrews, Fletcher R. 1942. The Operation of the City Clearing House. *The Yale Law Journal* 51: 582-607

Angel, David P. 1989. The Labor Market for Engineers in the U.S. Semiconductor Industry. *Economic Geography* 65: 99-112

Aoki, Masahiko. 1986. Horizontal vs. Vertical Information Structure in the Firm. *The American Economic Review* 76: 971-83

Aoki, Masahiko. 1991. Toward an Economic Model of the Japanese Firm. *Journal of Economic Literature* 28: 1-27

Aoki, Masahiko. 2001. *Toward a Comparative Institutional Analysis*. Cambridge, MA: MIT Press

Argyres, Nicholas S and Liebeskind, Julia Porter. 1999. Contractual Commitments, Bargaining Power, and Governance Inseparability: Incorporating History into Transaction Cost Theory. *The Academy of Management Journal* 24: 49-63

Atsushi, Nakamura. 1980. Intra-Firm Wage Differentials. In *The Labor Market in Japan*, ed. Nishikawa, Shunsaku (trans. Ross Mouer). Tokyo: University of Tokyo Press

Auerbach, Irving. 1965. Should Federal Reserve Float be Abolished and its Check Activities Curtailed. *The Journal of Finance* 20: 490-9

Australia, Productivity Commission of the Commonwealth of. 1996. *Automotive case study : micro reform - survey of impacts on firms*, Productivity Commission of the Commonwealth of Australia, Canberra, Australia

Automotive Industry Action Group. 1987. *Five Year Survey of the Automotive Industry*, Automotive Industry Action Group (AIAG), Southfield, MI

Automobile Industry: Report on investigation no. 332-188 under the Tariff act of 1930, United States International Trade Commission (USITC), Washington, D.C.

Ayres, Ian and Braithwaite, John. 1991. Tripartism: Regulatory Capture and Empowerment. *Law and Social Inquiry* 16: 435-96

Babson, Steve. 1998. Mazda and Ford at Flat Rock: Transfer and Hybridization of the Japanese Model. In *Between Imitation and Innovation: The Transfer and Hybridization of Productive Models in the INternational Automobile Industry*, ed. RC Boyer, Elsie; Jürgens, Ulrich; and Tolliday, Steven. Oxford, UK: Oxford University Press

Bachrach, Peter and Baratz, Morton. 1962. Two Faces of Power. *The American Political Science Review* 56: 947-52

Bachrach, Peter and Baratz, Morton. 1963. Decisions and Nondecisions. *The American Political Science Review* 57: 632-42

Bagby, Wesley S. 1957. Automation in Insurance. *The Journal of Insurance* 24: 158-67

Bain, Jennifer L. 1964. Branch Banking: The Current Controversy. *Stanford Law Review* 16: 983-95

Bardach, Eugene. 1984. Implementing Industrial Policy. In *The Industrial Policy Debate*, ed. C Johnson. San Francisco, CA: Institute for Contemporary Studies

Barenberg, Mark. 1994. Democracy and Domination in the Law of Workplace Cooperation: From Bureaucratic to Flexible Production. *Columbia Law Review* 94: 753-983

Barker, James R. 1993. Tightening the Iron Cage: Concertive Control in Self-Managing Teams. *Administrative Science Quarterly* 38: 408-37

Barley, Stephen R. and Kunda, Gideon. 2001. Bringing Work Back In. *Organization Science* 12: 76-95

Barnard, John. 1983. *Walter Reuther and the Rise of the Auto Workers*. Boston, MA: Little, Brown, and Company

Basiuk, Victor. 1983. Security Recedes. *Foreign Policy* 53: 49-73

Baumgartner, Frank R. and Jones, Bryan D. 1991. Agenda Dynamics and Policy Subsystems. *Journal of Politics* 53: 1044-74

Baxter, William; Coonter, Paul; and Scott, Kenneth. 1977. *Retail Banking in the Electronic Age*. Montclair, NJ: Allanheld, Osmun & Co

Beard, Charles Austin. 1965. *Economic Origins of Jeffersonian Democracy*. New York, NY: Free Press

Bechtel, Kenneth H. 1995. *State Police in the United States: A Socio-Political Analysis*. Westport, CT: Greenwood Press

Becker, Gary S. 1964. *Human Capital*. New York, NY: National Bureau of Economic Research

Becker, Craig. 1987. Individual Rights and Collective Action: The Legal History of Trade Unions in America. *Harvard Law Review* 100: 672-89

Becker, Gary S. and Murphy, Kevin M. 1992. The Division of Labor, Coordination Costs, and Knowledge. *The Quarterly Journal of Economics* 107: 1137-60

Beckhart, B.H. 1922. Outline of Banking History from the First Bank of the United States Through the Panic of 1907. *Annals of the American Academy of Political and Social Science* 99: 1-16

Beckhart, B.H. 1972. *The Federal Reserve System*. New York, NY: Columbia University Press

Bell, James F. 1961. Branches of National Banks - Recent Cases on Review of the Decisions of the Comptroller of the Currency. *The Banking Law Journal* 78: 221-4

Bellush, Bernard. 1975. *The Failure of the NRA*. New York: Norton

Bender, Mark. 1975. *EFTS: Electronic Funds Transfer Service*. Port Washington, NY: Kennikat Press

Benton, Caroline F.; Richter, Frank-Jürgen; and Takai, Toru. 2004. Meso-Organizations and the Creation of Knowledge: Yoshiya Teramoto and his work on organization and industry collaborations. Westport, CT: Praeger Publishers

Berggren, Christian. 1992. *Alternatives to Lean Production*. Ithaca, NY: ILR Press

Berry, Jeffrey. 1989. *The Interest Group Society*. New York, NY: Harper Collins

Best, Michael H. 2001. The New Competitive Advantage: The Renewal of American Industry. Oxford: Oxford University Press

Bhagwati, Jagdish N., ed. 1982. *Import Competition and Response*. Chicago, IL: University of Chicago Press

Bittlingmayer, George. 1988. Property Rights, Progress, and the Aircraft Patent Agreement. *Journal of Law and Economics* 31: 227-48

Borsch-Supan, Axel and Romer, Paul. 1999. Capital's Contribution to Productivity and the Nature of Competition. In *Brookings Paper on Economic Activity: Microeconomics*, ed. MNR Baily, Peter C.; and Winston, Clifford, pp. 205-48. Washington, DC: The Brookings Institution

Boudreaux, Donald J. and Holcombe, Randall G. 1989. The Coasian and Knightian Theories of the Firm. *Managerial and Decision Economics* 10: 147-54

Bowles, Samuel and Gintis, Herbert. 2000. Walrasian Economics in Retrospect. *The Quarterly Journal of Economics* 115: 1411-39

Boyer, Robert. 1998. Hybridization and Models of Production: Geography, History, and Theory. In *Between Imitation and Innovation: The Transfer and Hybridization of Productive Models in the International Automobile Industry*, ed. RC Boyer, Elsie; Jürgens, Ulrich; and Tolliday, Steven. Oxford, UK: Oxford University

Boyer, Robert and Saillard, Yves. 2001. A Summary of Regulation Theory. In *Regulation Theory: The State of the Art*, ed. R Boyer, pp. 36-44. Florence, KY: Routledge

Bradford, Fredrick. 1940. *The Legal Status of Branch Banking in the United States*, American Economists Council For The Study of Branch Banking, New York

Braverman, Harry. 1974. *Labor and Monopoly Capital*. New York, NY: Monthly Review Press

Bridges, William P. and Villemez, Wayne J. 1991. Employment Relations and Labor Market: Integrating Institutional and Market Perspectives. *American Sociological Review* 56: 748-64

Bright, James Rieser, ed. 1962. *Technological Planning on the Corporate Level: Proceedings of a Conference Sponsored by the Associates of the Harvard Business School, September 8 and 9, 1961*. Boston: Harvard University, Graduate School of Business Administration

Brumfield, Charles Thomas. 1978. *James J. Saxon's Influence on Commercial Banking in the United States*. (Unpublished Thesis) University of South Carolina. 322 pp.

Brusoni, Stefano; Prencipe, Andrea; and Pavitt, Keith. 2001. Knowledge Specialization, Organizational Coupling, and the Boundaries of the Firm: Why Do Firms Know More Than They Make? *Administrative Science Quarterly* 46: 597-621

Buchanan, James M.; Tollison, Robert D.; and Tullock, Gordon. 1981. *Toward a Theory of the Rent-Seeking Society*. College Station, TX: Texas A&M University Press

Bureau, Labor Statistics. 1973. *Occupational Outlook Handbook*, Department of Labor, Washington, D.C.

Burns, Helen M. 1974. *The American Banking Community and New Deal Banking Reforms 1933-1935*. Westport, CT: Greenwood Press

Butler, Henry N. 1985. Nineteenth-Century Competition in the Granting of Corporate Privileges. *The Journal of Legal Studies* 14: 129-66

Calomiris, Charles W. 1989. Deposit Insurance: Lessons from the Record. *Economic Perspectives (Federal Reserve Bank of Chicago)*: 10-30

Calomiris, Charles W. 1990. Is Deposit Insurance Necessary? A Historical Perspective. *The Journal of Economic History* 50: 283-95

Calomiris, Charles W. 2000. *U.S. Bank Deregulation in Historical Perspective.* Cambridge, UK: Cambridge University Press

Campbell, John L. and Lindberg, Leon N. 1990. Property Rights and the Organization of Economic Activity by the State. *American Sociological Review* 55: 634-47

Caplovitz, David. 1968. Consumer Credit in the Affluent Society. *Law and Contemporary Problems* 33: 641-55

Carlson, W. Bernard. 1988. Academic Entrepreneurship and Engineering Education: Dugald C. Jackson and the MIT-GE Cooperative Engineering Course, 1907-1932. *Technology and Culture* 29: 536-67

Caroll, Glen and Teece, David (eds.). 1999. *Firms, Markets, and Hierarchies: The Transaction Cost Economics Perspective.* New York: Oxford University Press

Carrillo, Jorge. 1995. Flexible Production in the Auto Sector: Industrial reorganization at Ford-Mexico. *World Development* 23: 87-101

Campbell, John L.; Hollingsworth, J. Rogers; and Lindberg, Leon N. Economic Governance and the Analysis of Structural Change in the American Economy. In *Governance of the American Economy.* Ed. Campbell, John L.; Hollingsworth, J. Rogers; and Lindberg, Leon N. pp. 35-75. New York, NY: Cambridge University Press

Casadesus-Masanell, Ramon and Spulber, Daniel F. 2000. The Fable of Fisher Body. *Journal of Law and Economics*, Vol. 43, No. 1. (Apr., 2000), pp. 67-104.

Casper, Steven. 2001. The Legal Framework for Corporate Governance: The Influence of Contract Law on Company Strategies in Germany and the United States. In *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage,* ed. Hall and Soskice, pp. 387-416. New York: Oxford University Press

Caves, Richard. 1964. American Industry: Structure, Conduct, Performance. New York: Prentice Hall

Caves, Richard E. and Williamson, Peter J. 1985. What is Product Differentiation, Really? *The Journal of Industrial Economics* 34: 113-32

Chandler, Alfred D. 1962. *Strategy and Structure: Chapters in the History of the American Industrial Enterprise.* Cambridge, MA: The MIT Press

Chandler, Alfred D. 1977. *The Visible Hand: The Managerial Revolution in American Business.* Cambridge, MA: Belknap Press

Chandler, Alfred D. (ed.). 1979. *Managerial Innovation at General Motors.* New Yor, NY: Arno Press

Chandler, Alfred D. 1990. *Scale and Scope: The Dynamics of Industrial Capitalism.* Cambridge, MA: Belknap Press

Chandym Rajesh K. and Tellis, Gerard J. 2000. The Incumbent's Curse? Incumbency, Size, and Radical Product Innovation. *Journal of Marketing* 64: 1-17

Chapman, John M. and Westerfield, Ray B. 1942. *Branch Banking: Its Historical and Theoretical Position in America and Abroad.* New York, NY: Harper

Chapman, Margaret; Elhance, Arun; and Wenum, John. 1995. *Mitsubishi Motors in Illinois: Global Strategies, Local Impacts*. Westport, CT: Quorum Books

Chesbrough, Henry W. 1998*a*. The Differing Impact of Technological Change Upon Incumbent Firms : A Comparative Theory of Organizational Constraints and National Institutional Factors. In *Working Paper / Division of Research, Harvard Business School ; 98-110*. Cambridge, MA

Chesbrough, Henry W. 1998*b*. The Role of the Institutional Environment on the Impact of Innovation : A Comparative Analysis of US and Japanese Firms in the Worldwide Hard Disk Drive Industry. In *Working Paper / Division of Research, Harvard Business School ; 99-037*. Cambridge, MA

Chesbrough, Henry W. 1999. The Organizational Impact of Technological Change: A Comparative Theory of National Institutional Factors. *Industrial and Corporate Change* 8: 447-85

Cheung, Steven N.S. 1983. The Contractual Nature of the Firm. *Journal of Law and Economics* 26: 1-21

Chorafas, Dimitris N. 1988. *Electronic Funds Transfer*. Stoneham, MA: Butterworth Legal Publishers

Churella, Albert. 1995. Corporate Culture and Marketing in the American Railway Locomotive Industry: American Locomotive and Electro-Motive Respond to Dieselization. *The Business History Review* 69: 191-229

Clark, Gregory. 1984. Authority and Efficiency: The Labor Market and the Managerial Revolution of the Late Nineteenth Century. *Journal of Economic History* 44: 1069-83

Clarke, John. 1962. Electronic Brains for Banks. *The Banking Law Journal* 79: 765-84

Claveloux, Ronald L. 1983. The Conflict between Executive Privilege and Congressional Oversight: The Gorsuch Controversy. *Duke Law Journal* 1983: 1333-58

Coase, R. H. 1937. The Nature of the Firm. *Economica* 15: 386-405

Coase, R. H. 1959. The Federal Communications Commission. *Journal of Law and Economics* 2: 1-40

Coase, R. H. 1960. The Problem of Social Cost. *Journal of Law and Economics* 3: 1-44

Coase, R. H. 1988. The Nature of the Firm: Origin. *Journal of Law, Economics, & Organization* 4: 3-17

Coase, R. H. 1998. The New Institutional Economics. *The American Economic Review* 88: 72-4

Cole, Robert and Yakushiji, Taizo. 1984. *The American and Japanese Auto Industries in Transition*. Ann Arbor: Univeersity of Michigan

Coleman, James S. 1988. Social Capital in the Creation of Human Capital. *The American Journal of Sociology* 94: S95-S120

Columbia Law Review Staff. 1962. Recent Developments: Bank Merger Approved by Federal Banking Agency under Bank Merger Act Held Not Exempt from Attack under Sherman Act. *Columbia Law Review* 62: 716-24

Columbia Law Review Staff. 1966. Comments: The 1966 Amendment to the Bank Merger Act. *Columbia Law Review* 66: 764-89

Commons, John R. 1931. Institutional Economics. *The American Economic Review* 21: 648-57

Commons, John R. 1934. *Institutional Economics*. Madison, WI: University of Wisconsin Press

Compton, Eric N. 1987. *The New World of Commercial Banking*. Lexington, MA: D.C. Heath and Company

Comptroller of the Currency, Office of. 1970. *Comptroller of the Currency: Annual Report 1970*, Office of Comptroller of the Currency, Washington, D.C.

Conner, Kathleen R. and Prahalad, C.K. 1996. A Resource-Based Theory of the Firm: Knowledge versus Opportunism. *Organization Science* 7: 477-501

Corcker, Keith and Masten, Scott. 1991. Pretia Ex Machina? Prices and Process in Long Term Contracting. *Journal of Law and Economics* 34: 69-99

Cowling, Keith (ed.). 1999. *Industrial Policy In Europe: Theoretical Perspectives and Practical Proposals.* New York: Routledge

Crain Communications, Inc. (various). Automotive News. Detroit, MI: Keith E. Crain/Crain Communications, Inc.

Credit, American Bankers Association Committee on Money and. 1962. *The Commercial Banking Industry; a Monograph Prepared for the Commission on Money and Credit.* Englewood Cliffs, NJ: Prentice-Hall

Crouch, Colin and Streeck, Wolfgang. 1997. Introduction: The Future of Capitalist Diversity. In *The Political Economy of Modern Capitalism : Mapping Convergence and Diversity*, ed. Crouch, Colin and Streeck, Wolfgang. London: Sage

Crowder, Walter F. 1936. Evolution and Analysis of the Banking Act of 1935. *The Journal of Business of the University of Chicago* 9: 28-51

Crutchfield, James A and Hald, Earl C. 1956. Economic Expansion and the American Banking System. *The Journal of Business* 29: 111-23

Culliton, James William. 1942. *Make or Buy; a Consideration of the Problems Fundamental to a Decision Whether to Manufacture or Buy Materials, Accessory Equipment, Fabricating Parts, and Supplies.* Boston, MA: Harvard University GSB

Cusumano, Michael. 1985. *The Japanese Automobile Industry: Technology and Management at Nissan and Toyota.* Cambridge, MA: Harvard University Press

Cyert, R.M. and March, J.G. 1963. *A Behavioral Theory of the Firm: Attempts to Develop a Theory of the Firm Which Is Based on Empirical Studies of Decision-Making Within the Firm.* Englewood Cliffs, NJ: Prentice Hall

Daniel, Donnie L., Longbrake, Williiam A., and Murphy, Neil B. 1973. The Effect of Technology on Bank Economies of Scale for Demand Deposits. *Journal of Finance* 28: 131-46

Darnell, Jerome C. 1966. Chain Banking. *The National Banking Journal* 3: 307-19

Darnell, Jerome C. 1967. The Determinants of Chain Banking. *The National Banking Review* 4: 459-68

Dauten, Carl A. 1960. Consumer Finance: Recent Developments in the Field of Consumer Credit. *The Journal of Finance* 15: 206-20

Demmery, Jopseph. 1924. Correspondent Banks and the Federal Reserve System. *The University Journal of Business* 2: 288-309

Demsetz, Harold. 1988. The Theory of the Firm Revisited. *Journal of Law, Economics, and Organization* 4: 141-61

Demsetz, Harold. 1992. *The Emerging Theory of the Firm*. Dublin: Datapage International

Dewey, John. 1926. The Historic Background of Corporate Legal Personality. *The Yale Law Journal* 35: 655-73

Dill, William R. 1958. Environments as an Influence on Managerial Autonomy. *Administrative Science Quarterly* 2: 409-43

Dill, William R. 1962. The Impact of Environment on Organizational Development. In *Concepts and Issues in Administrative Behavior*, ed. Mailick, Sidney and van Ness, Edward. Englewood Cliffs, NJ: Prentice Hall

Dohse, Jürgens, and Malsch. 1985. From "Fordism" to "Toyotism"? The Social Organization of the Labor Process in the Japanese Auto Industry. *Politics and Society* 14: 115-46

Dore, Ronald. 1973. *British Factory, Japanese Factory: The Origins of National Diversity in Industrial Relations*. Berkeley: University of California Press

Dore, Ronald. 1986. *Flexible Rigidities: Industrial Policy and the Restructuring of the Japanese Economy: 1970-1980*. Stanford: Stanford University Press

Dore, Ronald. 1987. *Taking Japan Seriously*. Stanford, CA: Stanford University Press

Dore, Ronald. 2000. *Stock Market Capitalism: Welfare Capitalism: Japan and Germany vs. the Anglo-Saxons*. Oxford: Oxford University Press

Dosi, Giovanni. 1982. Technological Paradigms and Technological Trajectories. *Research Policy* 11: 147-62

Dosi, Giovanni. 1988. Sources, Procedures, and Microeconomic Effects of Innovation. *Journal of Economic Literature* 26: 1120-71

Douty, H.M. 1937. The Problem of Trade Union Structure in the United States. *Southern Economic Journal* 3: 427-42

Drucker, Peter F. 1959. Work and Tools. *Technology and Culture* 1: 28-37

Duchene, Francois and Shepherd, Geoffrey (eds.). 1987. *Managing Industrial Change in Western Europe*. New York, NY: Frances Pinter

Dunbar, Charles F. 1891. *The Theory and History of Banking*. New York, NY: The Kinckerbocker Press

Dyer, Davis; Salter, Malcolm; and Webber, Alan. 1987. *Changing Alliances*. Boston, MA: Harvard Business School Press

Dyer, Jeffrey. 1996. Specialized Supplier Networks as a Source of Competitive Advantage: Evidence from the Auto Industry. *Strategic Management Journal* 17: 271-91

Dyer, Jeffrey. 1996. Does Governance Matter? Keiretsu Alliances and Asset Specificity as Sources of Japanese Competitive Advantage. *Organization Science* 7: 649-66

Dyer, Jeffrey H. and Chu, Wujin. 2000. The Determinants of Trust in Supplier-Automaker Relationships in the U.S., Japan, and Korea. *Journal of International Business Studies* 31: 259-85

Ebadi, Yar M. and Utterback, James M. 1984. The Effects of Communication on Technological Innovation. *Management Science* 30: 572-85

Edwards, Gurden. 1937. Banking and Public Opinion. *The Public Opinion Quarterly* 1: 5-26

Edwards, Richard. 1979. *Contested Terrain: The Transformation of the Workplace in the Twentieth Century.* New York: Basic Books

Emery, F. E. and Trist, E.L. 1965. The Causal Texture of Organizational Environments. *Human Relations* 18: 21-32

Employment, Committee For Scientific And Technological Policy On Technological Change and. 1982. *Micro-Electronics, Robotics, and Jobs. Rep. No. 7,* Organization for Economic Cooperation and Development (OECD), Paris

Estevez-Abe, Margarita; Iversen, Torben; and Soskice, David. 2001. Social Protection and the Formation of Skills: A Reinterpretation of the Welfare State. In *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*, ed. Hall, Peter and Soskice, David. New York, NY: Oxford University Press

Ettlinger, Nancy. 1994. The Localization of Development in Comparative Perspective. *Econmic Geography* 70: 144-66

Evans, George H. 1949. The Entrepreneur and Economic Theory: A Historical and Analytical Approach. *The American Economic Review* 39: 336-48

Evans, Peter. 1979. *Dependent Development: The Alliance of Multinational, State, and Local Capital in Brazil.* Princeton, NJ. Princeton University Press.

Evans, Peter. 1995. *Embedded Autonomy: States and Industrial Transformation.* Princeton, NJ. Princeton University Press.

Fabozzi, Frank (ed.). 1975. *The Impact of the Computer on Commercial Banking.* Hempstead, NY: Hofstra University

Fine, Charles et. al. 1996. Meeting the Challenge : U.S. Industry Faces the 21st Century : the U.S. Automobile Manufacturing Industry. Rep. (DGPO)97057756, United States Office of Technology Policy, Washington, D.C.

Fischer, Gerald. 1961. *Bank Holding Companies.* New York: Columbia University Press

Fischer, Gerald C. 1968. *American Banking Structure.* New York: Columbia University Press

Florida, Richard and Kenney, Martin. 1991. Transplanted Organizations: The Transfer of Japanese Industrial Organization to the U.S. *American Sociological Review* 56: 381-98

Florida, Richard and Kenney, Martin. 1993. *Beyond Mass Production: the Japanese System and its Transfer to the U.S.* New York, NY: Oxford University Press

Florida, Richard; Jenkins, Davis; and Smith, Donald. 1998. The Japanese Transplants in North America: Production Organization, Location, and Research and Development. In *Between Imitation and Innovation: The Transfer and Hybridization of Productive Models in the International Automobile Industry*, ed. RC Boyer, Elsie; Jürgens, Ulrich; and Tolliday, Steven. Oxford, UK: Oxford University Press

Freed, Roy. 1964. Some Legal Implications of the Use of Computers in the Banking Business. *The Banking Law Journal* 81: 753-76

Freeman, J. Lieper. 1965. *The Political Process*. New York, NY: Random House

Freeman, Christopher; Clark, John, and Soete, Luc. 1982. *Unemployment and Technical Innovation: A Study of Long Waves and Economic Development*. Westport, CT: Greenwood Press

Fuss, Melvyn A. and Waverman, Leonard. 1992. *Costs and Productivity in Automobile Production : the challenge of Japanese Efficiency*. New York, NY: Cambridge University Press

Galbraith, John Kenneth. 1952. *American Capitalism: The Concept of Countervailing Power*. Boston, MA: Houghton Mifflin

Galbraith, John Kenneth. 1954. *The Great Crash, 1929*. Boston: Houghton Mifflin

Galey, John. 1979. Industrialist in the Wilderness: Henry Ford's Amazon Venture. *Journal of Interamerican Studies and World Affairs* 21: 261-89

Gellner, Ernest. 1983. *Nations and Nationalism*. Oxford, UK: Blackwell

Gerlach, Michael L. 1992. *Alliance Capitalism: The Social Organization of Japanese Business*. Berkeley, CA: University of California Press

Gerschenkron, Alexander. 1962. *Economic Backwardness in Historical Perspective: A Book of Essays*. Cambridge, MA: Harvard University Press

Gerschenkron, Alexander. 1968. Continuity in History. In *Continuity in History and Other Essays*, pp. 11-39. See especially pp. 12-4

Gerschenkron, Alexander. 1970. *Europe in the Russian Mirror: Four Lectures in Economic History*. Cambridge, UK: Cambridge University Press

Gertler, Meric S. 1988. The Limits of Flexibility: Comments on the Post-Fordist Vision of Production and Its Geography. *Transactions of the Institute of British Geographers* 13: 419-32

Gidney, R.M. 1922. Operation of the System: Relations of Reserve Banks to Member Banks and Inter-Relations of Federal Reserve Banks. *Annals of the American Academy of Political and Social Science* 99: 87-95

Gilson, Ronald J. and Roe, Mark J. 1993. Understanding the Japanese Keiretsu: Overlaps between Corporate Governance and Industrial Organization. *The Yale Law Journal* 102: 871-906

Gilson, Ronald J. and Roe, Mark J. 1999. Lifetime Employment: Labor Peace and the Evolution of Japanese Corporate Governance. *Columbia Law Review* 99: 508-40

Gitelman, H.M. 1973. Perspectives on American Industrial Violence. *The Business History Review* 47: 1-23

Glaeser, Edward L. and Schleifer, Andrei. 2003. The Rise of the Regulatory State. *Journal of Economic Literature* 41: 401-25

Glocker, Theodore W. 1915. Amalgamation of Related Trades in American Unions. *The American Economic Review* 5: 554-75

Glynn, Mary Ann. 1996. Innovative Genius: A Framework for Relating Individual and Organizational Intelligences to Innovation. *The Academy of Management Review* 21: 1081-111

Goldner, Fred H. and Ritti, R.R. 1967. Professionalization as Career Immobility. *The American Journal of Sociology* 72: 489-502

Goldstein, Robert Justin. 1978. *Political Repression in Modern America.* Cambridge, MA: G.K. Hall

Goldstein, Judith. 1986. The Political Economy of Trade: Institutions of Protection. *The American Political Science Review* 80: 161-84

Golembe, Carter H. 1960. The Deposit Insurance Legislation of 1933: An Examination of Its Antecedents and its Purposes. *Political Science Quarterly* 75: 181-200

Golembe, Carter H. and Hengren, Raymond E. 1975. *Federal Regulation of Banking.* Washington, D.C.: Golembe Associates

Gorton, Gary. 1996. Reputation Formation in Early Bank Note Markets. *The Journal of Political Economy* 104: 346-97

Graham, Otis. 1992. *Losing Time, The Industrial Policy Debate.* Cambridge, MA: Harvard University Press

Granovetter, Mark. 1985. Economic Action and Social Structure: The Problem of Embeddedness. *The American Journal of Sociology* 91: 481-510

Grant, Robert M. 1996. Toward a Knowledge-Based Theory of the Firm. *Strategic Management Journal* 17: 109-22

Greenbaum, Stuart I. Competition and Efficiency in the Banking System--Empirical Research and Its Policy Implications. *The Journal of Political Economy*, Vol. 75, No. 4, Part 2: Issues in Monetary Research, 1966. (Aug., 1967), pp. 461-479.

Greenleaf, William. 1961. *Monopoly on Wheels: Henry Ford and the Selden Automobile Patent.* Detroit: Wayne State University Press

Grier, Kevin B.; Munger, Michael C.; and Roberts, Brian E. 1994. The Determinants of Industrial Political Activity, 1978-1986. *The American Political Science Review* 88: 911-26

Griffin, Larry J. ;Wallace, Michael E.; and Rubin, Beth A. 1986. Capitalist Resistance to the Organization of Labor Before the New Deal: Why? How? Success? *American Sociological Review* 51: 147-67

Grupp, Hariolf. 1998. *Foundations of the Economics of Innovation.* Northhampton, MA: Edward Elgar

Gup, Benton E. 1971. A Review of State Laws on Branch Banking. *The Banking Law Journal* 88: 675-82

Hackley, Howard H. 1966. Our Baffling Banking System. *Virginia Law Review* 52: 565-632

Hackley, Howard H. 1966. Our Baffling Banking System. Part II. *Virginia Law Review* 52: 771-830

Hackley, Howard H. 1969. Our Discriminatory Banking Structure. *Virginia Law Review* 55: 1421-82

Hagen, James M. and Choe, Soonkyoo. 1998. Trust in Interfirm Relations: Institutional Sanctions Matter. *The Academy of Management Review* 23: 59-600

Halberstam, David. 1986. *The Reckoning*. New York: William Morrow and Company

Hall, George R. 1965. Bank Holding Company Regulation. *Southern Economic Journal* 31: 342-55

Hall, David J. and Saias, Maurice. 1980. Strategy Follows Structure! *Strategic Management Journal* 1: 149-63

Hall, Peter (ed.) 1989. *The Political Power of Economic Ideas: Keynesianism Across Nations*. Princeton, NJ: Princeton University Press

Hall, Peter and Soskice, David. 2001. An Introduction to Varieties of Capitalism. In *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*. Ed. Hall, Peter and Soskice, David. New York, NY : Oxford University Press

Hall, Richard L. and Wayman, Frank W. 1990. Buying Time: Moneyed Interests and the Mobilization of Bias in Congressional Committees. *The American Political Science Review* 84: 797-820

Hammond, Bray. 1957. *Banks and Politics in America: From the Revolution to the Civil War*. Princeton, NJ: Princeton University Press

Hammond, Bray. 1970. *Sovereignty and an Empty Purse: Banks and Politics in the Civil War*. Princeton, NJ: Princeton University Press

Hancher, Leigh and Moran, Michael. 1989. Organizing Regulatory Space. In *Capitalism, Culture, and Regulation*, ed. Hancher, Leigh and Moran, Michael. Oxford, UK: Clarendon Press

Hanley, Thomas; Rosenberg, James; d'Arista, Carla; Mitchell, Neil. 1985. *Technology in Banking: A Path to Competitive Advantage*, Salomon Brothers, New York

Hannah, John. 1936. The Banking Act of 1935. *Virginia Law Review* 22: 617-41

Hanson, Susan and Pratt, Geraldine. 1992. Dynamic Dependencies: A Geographic Investigation of Local Labor Markets. *Economic Geography* 68: 373-405

Harbour and Associates. 1981. *The Harbour Report: Competitive Assessment of the Automobile Industry*, Harbour and Associates, Rochester, MI

Harris, S.E. 1931. The Federal Reserve Act and Federal Reserve Policies. *The Quarterly Journal of Economics* 45: 371-408

Hart, Jeffrey. 1992. *Rival Capitalists: International Competitiveness in the United States, Japan, and Western Europe*. Ithaca: Cornell University Press

Hattery, Lowell H. 1957. Automatic Character Reading for Data Processing Systems. *Public Administration Review* 17: 159-63

Hayden, Samuel L. 1980. Foreign Languages, International Studies, and Business (A Dubious Savior). *Annals of the American Academy of Political and Social Science* 449: 141-50

Hayek, Friedrich August. 1945. The Use of Knowledge in Society. *The American Economic Review* 35: 519-30

Hayes, Michael T. 1978. The Semi-Sovereign Pressure Groups: A Critique of Current Theory and an Alternative Typology. *The Journal of Politics* 40: 134-61

Hazlett, Thomas W. 1998. Assigning Property Rights to Radio Spectrum Users: Why Did FCC License Auctions Take 67 Years. *Journal of Law and Economics* 41: 529-75

Healy, Kieran. 2000. Embedded Altruism: Blood Collection Regimes and the European Union's Donor Population. *The American Journal of Sociology* 105: 1633-75

Heertje, Arnold (ed.). 1988. *Innovation, Technology, and Finance*. New York: Basil Blackwell, Inc.

Helfgott, Roy B. 1966. EDP and the Office Work Force. *Industrial and Labor Relations Review* 19: 503-16

Helper, Susan. 1991. How Much Has Really Changed Between U.S. Automakers and their Suppliers. *Sloan Management Review* 32: 15-28

Helper, Susan and Levine, David. 1992. Long-Term Supplier Relations and Product Market Structure. *Journal of Law, Economics, & Organization* 8: 561-81

Helper, Susan. 1994. Three Steps Forward, Two Steps Back In Automotive Supplier Relations. *Technovation* 14: 633-40

Helper, Susan and Sako, Mari. 1995. Supplier Relations in Japan and the United States: Are They Converging. *Sloan Management Review* 36: 77-84

Henderson, R. and Clark, K. 1990. Architectural Innovation: The Reconfiguration of Existing Product Technologies and the Failure of Established Firms. *Administrative Science Quarterly* 35: 9-30

Henderson, Rebecca. 1993. Underinvestment and Incompetence as Responses to Radical Innovation: Evidence from the Photolithographic Alignment Equipment Industry. *The RAND Journal of Economics* 24: 248-70

Hill, Charles W. 1995. National Institutional Structures, Transaction Cost Economizing, and Competitive Advantage. *Organization Science* 6: 119-31

Hillman, Arye L. 1982. Declining Industries and Political-Support Protectionist Motives. *The American Economic Review* 72: 1180-7

Holden, Constance. 1980. The Reagan Years: Environmentalists Tremble. In *Science*, pp. 988-91

Holdsworth, W. S. 1922. English Corporation Law in the 16th and 17th Centuries. *The Yale Law Journal* 31: 382-407

Holland, Chris; Lockett, Geoff; and Blackman, Ian. 1992. Planning for Electronic Data Interchange. *Strategic Management Journal* 13: 539-50

Hollingsworth, J. Rogers. 1991. The Logic of Coordinating American Manufacturing Sectors. In *Governance of the American Economy.* Ed. Campbell, John L.; Hollingsworth, J. Rogers; and Lindberg, Leon N. pp. 35-75. New York, NY: Cambridge University Press

Hollingsworth, J. Rogers; Schmitter, Philippe C.; and Streeck, Wolfgang, ed. 1994. *Governing Capitalist Economies: Performance and Control of Economic Sectors.* Oxford, UK: Oxford University Press

Hollingsworth, J. Rogers and Boyer, Robert. 1997. Coordination of Economic Actors and Social Systems of Production. In *Contemporary Capitalism: The Embeddedness of Institutions*, ed. Hollingsworth, J. Rogers and Boyer, Robert., pp. 1-47. New York: Cambridge University Press

Hollingsworth, J. Rogers. 1997. The Institutional Embeddedness of American Capitalism. In *The Political Economy of Modern Capitalism: Mapping Convergence and Diversity*, ed. CaS Crouch, Wolfgang. London: Sage

Holmstrom, Bengt and Milgrom, Paul. 1994. The Firm as an Incentive System. *The American Economic Review* 84: 972-991

Holyoke, Thomas. 2003. Choosing Battlegrounds: Interest Group Lobbying Across Multiple Venues. *Political Research Quarterly* 56: 325-36

Homan, Paul T. 1932. An Appraisal of Institutional Economics. *The American Economic Review* 22: 10-7

Hooks, Gregory. 1991. *Forging the Military-Industrial Complex: World War II's Battle of the Potomac.* Urbana, IL: University of Illinois Press

Horovitz, Paul M. 1965. Stimulating Bank Competition Through Regulatory Action. *The Journal of Finance* 20: 1-13

Hounshell, David A. 1984. *From the American System to Mass Production, 1800-1932: The Development of Manufacturing Technology in the United States*. Baltimore, MD: The Johns Hopkins University Press

Howcroft, J.B. and Lavis, J. 1986. *Retail Banking: The New Revolution in Structure and Strategy*. Oxford, UK: Basil Blackwell

Howells, J. and Wood, M. 1993. *The Globalization of Production and Technology*. London, UK: Bellhaven Press

Hudson, James J. 1982. The Role of the California National Guard in the San Francisco General Strike of 1934. *Military Affairs* 46

Humphrey, David B. (ed.). 1990. *The U.S. Payment System: Efficiency, Risk, and the Role of the Federal Reserve: Proceedings of a Symposium on the U.S. Payment System Sponsored by the Federal Reserve Bank of Richmond*. Boston: Kluwer Academic Publishers

Hunt, H. Allan and Hunt, Timothy L. *Clerical Employment and Technological Change*. Kalamazoo, MI: W.E. Upjohn Institute for Employment Research. 1986.

Hutchinson, Harry D. 1971. *Money, Banking, and the United States Economy*. New York, NY: Appleton-Century-Crofts

Hyman, Richard and Streeck, Wolfgang. 1988. *New Technology and Industrial Relations*. Oxford: Basil Blackwell, Ltd.

IFO Institute for Economic Research. 1997. *A Comparative Analysis of Japanese and German Economic Success*. New York: Springer

Independent Bankers Association. 1975. *Independent Banking: An American Ideal*, Independent Bankers Association, Sauk Centre, MN

Independent Bankers Association. 1976. *Independent Banking: Serves America*, Independent Bankers Association, Sauk Centre, MN

Ingrassia, Paul and White, Joseph. 1994. *Comeback: the Fall and Rise of the American Automobile Industry*. New York: Simon and Schuster

Iversen, Torben and Soskice, David. 2001. An Asset Theory of Social Policy Preferences. *The American Political Science Review* 95: 875-893

Jay, Pierre. 1922. Operation of the System: The Federal Reserve System, State Banks and Par Collections. *Annals of the American Academy of Political and Social Science* 99: 79-86

Jay, Pierre. 1933. The Structure of the Banking System. *Proceedings of the Academy of Political Science* 15: 11-21

Jessee, Michael A. and Seelig, Steven A. 1977. *Bank Holding Companies and the Public Interest: An Economic Analysis*. Lexington, AM: Lexington Books

Johnson, Harry M. 1951. Sociological Aspects of Change and the Entrepreneur. *The Journal of Economic History* 11: 50-4

Johnson, Bruce C. 1976. Taking Care of Labor: The Police in American Politics. *Theory and Society* 3: 89-117

Johnson, Chalmers. 1982. *MITI and the Japanese Miracle: The Growth of Industrial Policy, 1925-1975.* Stanford, CA: Stanford University Press

Johnson, Chalmers. 1995. *Japan: Who Governs? The Rise of the Developmental State.* London, UK: Norton

Jones, Homer. 1938. Insurance of Bank Deposits in the United States of America. *The Economic Journal* 48: 695-706

Joskow, Paul L. 1985. Vertical Integration and Long-Term Contracts: The Case of Coal-Burning Electric Generating Plants. *Journal of Law, Economics, & Organization* 1: 33-80

Jürgens, U. Malsch, T. and Dohse, T. 1989. *Moderne Zeiten in der Automobilfabrik : Strategien der Produktionsmodernisierung im Länder- und Konzernvergleich.* Berlin: Springer Verlag

Kahn, James A. 1985. Another Look at Free Banking in the United States. *The American Economic Review* 75: 881-5

Kamata, Satoshi (trans. Akimoto, Tatsuru). 1982 [1973]. *Japan in the Passing Lane: An Insider's Account of Life in a Japanese Auot Factory*. New York: Pantheon Books

Katona, George. 1964. *The Mass Consumption Society*. New York, NY: McGraw-Hill

Katzenstein, Peter. 1984. *Corporatism and Change: Austria, Switzerland, and the Politics of Industry.* Ithaca, NY: Cornell University Press

Katzenstein, Peter. 1985. *Small States in World Markets: Industrial Policy in Europe*. Ithaca, NY: Cornell University Press

Kawahara, Akira. 1998. *The Origin of Competitive Strength*. Tokyo: Springer Verlag

Keller, Maryann. 1989. *Rude Awakening : the Rise, Fall and Struggle for Recovery of General Motors.* New York: Morrow

Keller, Maryann. 1993. *Collision : GM, Toyota, Volkswagen and the Race to Own the 21st Century.* New York: Doubleday

Kemmerer, E.W. 1922. The Purposes of the Federal Reserve Act as Shown by Its Explicit Provisions. *Annals of the American Academy of Political and Social Science* 99: 62-9

Kennedy, Susan E. 1973. *The Banking Crisis of 1933.* Lexington, KY: University of Kentucky Press

Kenney, Martin and Florida, Richard. 1993. *Beyond Mass Production: The Japanese System and its Transfer to the U.S.* New York, NY: Oxford University Press

Kindleberger, Charles P. 1976. The Historical Background: Adam Smith and the Industrial Revolution. In *The Market and the State: Essays in Honour of Adam Smith*, ed. Wilson, Thomas and Skinner, Andrew. Oxford: Clarendon Press

Kitschelt, Herbert. 1986. Political Opportunity Structures and Political Protest: Anti-Nuclear Movements in Four Democracies. *British Journal of Political Science* 16: 57-85

Kitschelt, Herbert. 1991. Industrial Governance Structures, Innovation Strategies, and the Case of Japan: Sectoral or Cross-National Comparative Analysis? *International Organization* 45: 453-93

Kitschelt, Herbert; Lange, Peter; Marks, Gary; and Stephens, John (eds.), ed. 1999. *Continuity and Change in Contemporary Capitalism.* Cambridge, UK: Cambridge University Press

Klebaner, Benjamin J. 1967. The Bank Merger Act: Background of the 1966 Version. *Southern Economic Journal* 34: 250-8

Klebaner, Benjamin J. 1979. State-Chartered American Commercial Banks, 1781-1801. *The Business History Review* 53: 529-38

Klein, Benjamin. 1988. Vertical Integration and as Organizational ownership: The Fisher Body-General Motors Relationship Revisited. *Journal of Law, Economics, and Organization* 4: 199-213

Klein, Michael A. 1980. The Membership Problem of the Federal Reserve: An Alternative Proposal. *Journal of Money, Credit and Banking*, Vol. 12, No. 1. (Feb., 1980), pp. 17-29.

Klevorick, Alvin L.; Levin, Richard C.; Nelson, Richard R.; and Winter, Sidney G. 1995. On the Sources and Significance of Inter-industry Differences in Technological Opportunities. *Research Policy* 24: 185-205

Kline, Ronald and Pinch, Trevor. 1996. Users as Agents of Technological Change: The Social Construction of the Automobile in the Rural United States. *Technology and Culture* 37: 763-95

Klug, Thomas. 1989.Employers' Strategies in the Detroit Labor Market, 1900-1929. *On the Line: Essays in the History of Auto Work*, ed. Lichtenstein, Nelson and Meyer, Stephen. Urbana, Il: University of Illinois Press

Knight, Jack. 1992. *Institutions and Social Conflict.* Cambridge, UK: Cambridge University Press

Kogut, Bruce. 1988. Joint Ventures: Theoretical and Empirical Perspectives. *Strategic Management Journal* 9: 319-32

Kogut, Bruce. 1991. Country Capabilities and the Permeability of Borders. *Strategic Management Journal* 12: 33-47

Kogut, Bruce and Zander, Udo. 1992. Knowledge of the Firm, Combinative Capabilities, and the Replication of Technology. *Organization Science* 3: 383-97

Kogut, Bruce. 1993. *Country Competitiveness*. New York: Oxford University Press

Koike, Kazuo. 1988. *Understanding Industrial Relations in Modern Japan*. New York: St. Martin's Press

Kolle, Thor (ed.). 1964. *Federal Banking Laws*. Boston, MA: Warren, Gorham, and Lamont, Inc.

Koolman, G. 1971. Say's Conception of the Role of the Entrepreneur. *Economica* 38: 269-86

Krafcik, John. 1988. *Comparative Analysis of Performance Indicators at World Auto Assembly Plants.* (Unpublished M.S. thesis.) MIT, Cambridge

Kress, Harold James. 1935. The Banking Act of 1935. *Michigan Law Review* 34: 155-99

Krueger, Anne O. 1974. The Political Economy of the Rent-Seeking Society. *The American Economic Review* 64: 291-303

Kume, Ikuo. 1998. *Disparaged Success: Labor Politics in Postwar Japan*. Ithaca, New York: Cornell University Press.

Laeri, J. Howard. 1966. Managing Tomorrow's Bank. *Banker's Monthly Magazine.*

Laing, Scott and Rahn, Robert. 1983. *Foreign Outsourcing by U.S. Auto Manufacturers. Rep. Special Report No. 151*, The Economist Intelligence Unit, London

Lall, Sanjaya. 2001. *Competitiveness, Technology, and Skills*. Northampton, MA: Edward Elgar

Lamb, Ralph. 1961. *Group Banking: A Form of Banking Concentration and Control in the United States.* New Brunswick, NJ: Rutgers University Press

Lamoreaux, Naomi R.; Raff, Daniel M.G.; and Temin, Peter. 2004. Beyond Markets and Hierarchies: Toward a New Synthesis of American Business History. *The American Historical Review* 108

Landes, David. 1986. What Do Bosses Really Do? *The Journal of Economic History* 46: 585-623

Langlois, Richard and Robertson Paul. 1989. Explaining Vertical Integration: Lessons from the American Automobile Industry. *The Journal of Economic History* 49: 361-75

Lasswell, Harold D and Kaplan, Abraham. 1950. *Power and Society: A Framework for Political Inquiry.* New Haven, CT: Yale University Press

Lazonick, William H. 1981*a*. Competition, Specialization, and Industrial Decline. *Journal of Economic History* 41: 31-8

Lazonick, William H. 1981*b*. Production Relations, Labor Productivity, and Choice of Technique: British and U.S. Cotton Spinning. *The Journal of Economic History* 41: 491-516

Leamer, Edward E. and Storper, Michael. 2001. The Economic Geography of the Internet Age. *Journal of International Business Studies* 32: 641-65

Leblang, David A. 1996. Property Rights, Democracy, and Economic Growth. *Political Research Quarterly* 49: 5-26

Lecher, Wolfgang and Welsch, Johann. 1983. *Japan – Mythos und Wirklichkeit.* Köln: Bund-Verlag.

Lehmbruch, Gerhard. 1989. Institutional Linkages and Policy Networks in the Federal System of West Germany. *Publius* 19: 221-35

Leinsdorf, David and Etra, Donald. 1973. *Citibank; Ralph Nader's study group report on First National City Bank.* New York: Grossman Publishers

Lercher, Wolfgang and Welsch, Johann. 1983. *Japan: Mythos und Wirklichkeit.* Dusseldorf: Bund-Verlag GmbH

Lewchuk, Wayne. 1984. The Role of the British Government in the Spread of Scientific Management and Fordism in the Interwar Years. *The Journal of Economic History* 44: 355-61

Lewchuk, Wayne. 1987. *American Technology and the British Vehicle Industry.* Cambridge, UK: Cambridge University Press

Lewis, Robert E. 1956. Some Factors in the Growth of Consumer Credit. *The Journal of Finance* 11: 249-56

Lewis, Tracy R. and Sappington, David E. M. 1991. Technological Change and the Boundaries of the Firm. *The American Economic Review* 81: 887-900

Lichtenstein, Nelson. 1995. *The Most Dangerous Man in Detroit: Walter Reuther and the Fate of American Labor.* New York, NY: Basic Books

Lieberson, Stanley. 1991. Small N's and Big Conclusions: An Examination of the Reasoning in Comparative Studies Based on a Small Number of Cases. *Social Forces* 70: 307-20

Lifland, WIlliam T. 1967. The Supreme Court, Congress, and Bank Mergers. *Law and Contemporary Problems* 32: 15-39

Lincoln, James; Gerlach, Michael; and Takahashi, Peggy. 1992. Keiretsu Networks in the Japanese Economy: A Dyad Analysis of Intercorporate Ties. *American Sociological Review* 57: 56-585

Lincoln, James and Gerlach, Michael. 2004. *Japan's Network Economy.* New York, NY: Cambridge University Press

Lindblom, Charles E. 1977. *Politics and Markets: The World's Political-Economic Systems.* New York, NY: Basic Books

Lindblom, Charles E. 1982. The Market As Prison. *The Journal of Politics* 44: 324-36

Linge, G. J. R. 1991. Just in Time: More or Less Flexible. *Economic Geography* 67: 316-32

Litan, Robert E. 1987. *What Should Banks Do?* Washington D.C.: Brookings institution

Little, David. 1969. *Religion, Order, and Law.* New York: Harper and Row

London, Robert. 1970. The Sad State of Bank Computer Training. *Bankers Magazine*: 78-84

Lowi, Theodore J. 1964. American Business, Public Policy, Case Studies, and Political Theory. *World Politics* 16: 677-715

Löwenthal, Richard. 1984. *Political Legitimacy and Cultural Change in West and East.* New York, NY: Columbia University Press

Lukes, Steven. 1974. *Power: A Radical View.* Basingstoke, UK: Houndmills

Lyon, Leverett S. ; Homan, Paul T.; Terborgh, George; Lorwin, Lewis L.; Dearing, Charles L.; and Marshall, Leon C. 1935. *The National Recovery Administration; an Analysis and Appraisal,.* Washington, DC: The Brookings Institution

Macdonald, Robert M. 1963. *Collective Bargaining in the Automobile Industry; A Study of Wage Structure and Competitive Relations.* New Haven, CT: Yale University Press

MacDonald, Ronan. 1965. Schumpeter and Max Weber - Central Visions and Social Theories. *The Quarterly Journal of Economics* 79: 373-96

Macfarlane, Alan. 1978. *The Origins of English Individualism.* Oxford: Blackwell

Machen, Arthur W. 1911. Corporate Personality. *Harvard Law Review* 24: 253-67; 347-65

Machlup, Fritz. 1967. Theories of the Firm: Marginalist, Behavioral, Managerial. *The American Economic Review* 57: 1-33

MacKenzie, Donald and Wajcman, Judy. 1985. *The Social Shaping of Technology.* Philadelphia, PA: Open University Press

Magagna, Victor V. 1988. Representing Efficiency. *The Review of Politics* 50: 420-44

Mahoney, Joseph T. 1992. The Choice of Organizational Form: Vertical Financial Ownership Versus Other Methods of Vertical Integration. *Strategic Management Journal* 13: 559-84

Marchand, Roland. 1991. The Corporation Nobody Knew: Bruce Barton, Alfred Sloan, and the Founding of the General Motors "Family". *The Business History review* 65: 825-75

Mark, Gregory A. 1987. The Personification of the Business Corporation in American Law. *The University of Chicago Law Review* 54: 1441-83

Markey, Hon. Edward J. 1990. Congress to Administrative Agencies: Creator, Overseer, and Partner. *Duke Law Journal* 1990: 967-83

Martin, Xavier; Mitchell, Will; and Swaminathan, Anand. 1995. Recreating and Extending Japanese Automobile Buyer-Supplier Links in North America. *Strategic Management Journal* 16: 589-619

Marx, Karl. 1976 [1867]. *Capital.* London, UK: Penguin Books

Mashaw, Jerry L. and Harfst, David L. 1990. *The Struggle for Auto Safety.* Cambridge, MA: Harvard University Press

Mason, James Eliot. 1997. *The Transformation of Commercial Banking in the United States: 1956-1991.* New York, NY: Garland Publishing, Inc.

Maynard, Micheline. 1995. *Collision Course: Inside the Battle for General Motors.* New York, NY: Birch Lane Press

Maynard, Micheline. 2003. *The End of Detroit.* New York: Doubleday

McCall, Alan S. and Peterson, Manferd O. 1977. The Impact of De Novo Commercial Bank Entry. *The Journal of Finance* 32: 1587-604

McChesney, Fred S. 1991. Rent Extraction and Interest Group Organization in a Coasean Model of Regulation. *The Journal of Legal Studies* 20: 73-90

McChesney, Fred S. 1997. *Money for Nothing: Politicians, Rent Extraction, and Political Extortion.* Cambridge, MA: Harvard University Press

McCool, Daniel. 1990. Subgovernments as Determinants of Political Viability. *Political Science Quarterly* 105: 269-93

McCubbins, Mathew D. 1985. The Legislative Design of Regulatory Structure. *American Journal of Political Science* 29: 721-84

McFarland, M. Carter. 1966. Postwar Changes in Consumer Financial Markets: Major Developments in the Financing of Residential Construction Since World War II. *The Journal of Finance* 21: 382-94

McKenney, James L.; Mason, Richard O.; and Copeland, Duncan G. 1997. Bank of America: The Crest and Trough of Technological Leadership. *MIS Quarterly* 21: 321-53

Melnick, Shep R. 1985. The Politics of Partnership. *Public Administration Review* 45: 653-60

Mercer, Lloyd J. 1972. Taxpayers or Investors: Who Paid for the Land-Grant Railroads? *The Business History Review* 46: 279-94

Milbrath, Lester W. 1963. *The Washington Lobbyists.* Chicago, IL: Rand McNally

Milgrom, Paul and Roberts, John. 1988. Economic Theories of the Firm: Past, Present, and Future. *The Canadian Journal of Economics* 21: 444-458

Milgrom, Paul and Roberts, John. 1990. The Economics of Modern Manufacturing: Technology, Strategy, and Organization. *The American Economic Review* 80: 511-28

Milkman, Ruth. 1997. *Farewell to the Factory: Auto Workers in the Late 20th Century.* London: University of California Press

Million, John Wilson. The Debate on the National Bank Act of 1863. *The Journal of Political Economy*, Vol. 2, No. 2. (Mar., 1894), pp. 251-280.

Mishina, Kazuhiro. 1998. Making Toyota in America: Evidence from the Kentucky Transplant. In *Between Imitation and Innovation: The Transfer and Hybridization of Productive Models in the International Automobile Industry*, ed. RC Boyer, Elsie; Jürgens, Ulrich; and Tolliday, Steven. Oxford, UK: Oxford University Press

Mitchell, Will. 1989. Whether and When? Probability and Timing of Incumbents' Entry into Emerging Industrial Subfields. *Administrative Science Quarterly* 34: 208-30

Miwa, Yoshiro and Ramseyer, J. Mark. 2000. Rethinking Relationship-Specific Investments: Subcontracting in the Japanese Automobile Industry. *Michigan Law Review* 98: 2636-67

Mizruchi, Mark S. 1996. What Do Interlocks Do? An Analysis, Critique, and Assessment of Research on Interlocking Directorates. *Annual Review of Sociology* 22: 271-98

Moe, Terry. 1990. Political Institutions: The Neglected Side of the Story. *Journal of Law, Economics, & Organization* 6: 213-53

Monteverde, Kirk and Teece, David J. 1982. Supplier Switching Costs and Vertical Integration in the Automobile Industry. *The Bell Journal of Economics* 13: 206-13

Montgomery, David. 1979. *Workers' Control in America: Studies in the History of Work, Technology, and Labor Struggles.* New York: Cambridge University Press

Morgan, H. Wayne. 1956. The Origins and Establishment of the First Bank of the United States. *The Business History Review* 30: 472-92

Moritz, Michael and Seaman, Barrett. 1984 [1981]. *Going for Broke: The Chrysler Story.* New York, NY: Doubleday

Mors, Wallace P. 1948. Commercial Banks and Competitive Trends in Consumer Installment Financing. *The Journal of Business of the University of Chicago* 21: 133-67

Moskal, Brian. 1984. "Just in Time". In *Industry Week*, 9 July, 1984. pp. 59

Motor Vehicle Manufacturers of America. (various years). World Motor Vehicle Data. Detroit, MI: MVMA

Myers, Summer and Marquis, Donald. 1969. Successful Industrial Innovations: A Study of Factors Underlying Innovation in Selected Firms. Rep. NSF 69-17, National Science Foundation, Washington, D.C.

Nadler, Paul S. 1961. Commercial Banking in the Sixties. *The Journal of Finance* 16: 226-40

Nasbeth, L. and Ray, G.F. 1974. *The Diffusion of New Industrial Processes.* London: Cambridge University Press

National Research Council, Committee on Technology and International Economic and Trade Issues. 1982. *The Competitive Status of the U.S. Auto Industry. A Study of the Influences of Technology in Determining International Industrial Competitive Advantage.* Washington, D.C.: National Academy Press

Nauss, Robert M. and Markland, Robert E. 1985. Optimization of Bank Transit Check Clearing Operations. *Management Science* 31: 1072-83

Nelson, Richard R. and Winter, Sidney G. 1973. Toward an Evolutionary Theory of Economic Capabilities. *The American Economic Review* 63: 440-9

Nelson, Richard R.; Winter, Sidney G.; and Schuette, Herbert L. 1976. Technical Change in an Evolutionary Model. *The Quarterly Journal of Economics* 90: 90-118

Nelson, Richard R. and Winter, Sidney G. 1977. In Search of a Useful Theory of Innovation. *Research Policy* 6: 36-76

Nelson, Richard R. and Winter, Sidney G. 1982. The Schumpeterian Tradeoff Revisited. *The American Economic Review* 72: 114-32

Neuburger, Hugh. 1977. The Industrial Politics of the Kreditbanken. *The Business History Review* 51: 190-207

Newcomer, Mabel. 1955. Professionalization of Leadership in the Big Business Corporation. *The Business History Review* 29: 54-63

Newland, Chester A. 1983. A Mid-Term Appraisal-The Reagan Presidency: Limited Government and Political Administration. *Public Administration Review* 43: 1-21

Ng, Kenneth. 1988. Free Banking Laws and Barriers to Entry. *The Journal of Economic History* 48: 877-89

Noble, David. 1977. *America By Design: Science, Technology, and the Rise of Corporate Capitalism.* New York, NY: Alfred A. Knopf

Nonaka, Ikujiro. 1994. A Dynamic Theory of Organizational Knowledge Creation. *Organization Science* 5: 14-37

Normann, Richard. 1971. Organizational Innovativeness: Product Variation and Reorientation. *Administrative Science Quarterly* 16: 203-15

North, Douglass C. and Weingast, Barry R. 1989. Constitutions and Commitment: The Evolution of Institutional Governing Public Choice in Seventeenth-Century England. *The Journal of Economic History* 49: 803-32

Nye, Joseph. 1990. Soft Power. *Foreign Policy* 80: 153-71

O'Brien, James A. *The Impact of Computers on Commercial Banking.* Boston, MA: Bankers Publishing Company. 1968.

Odaka, Konosuke; Ono, Keinosuke; and Adachi, Fumihiko. 1988. *The Automobile Indistry in Japan: A Study of Ancillary Firm Development.* Tokyo: Kokusaibunken

Odom, Richard S. 1968. Alternatives to the Present Check-Collection System. *Stanford Law Review* 20: 571-93

Ohno, Taiichi. 1988 [Japaese ed. 1978]. *Toyota Production System: Beyond Large Scale Production.* Portland: Productivity Press

Olson, Mancur. 1965. *The Logic of Collective Action: Public Goods and the Theory of Groups.* Cambridge, MA: Harvard University Press

Olson, Mancur. 1982. *The Rise and Decline of Nations: Economic Growth, Stagflation, and Social Rigidities.* New Haven, CT: Yale University Press

Owens, John E. 1985. Extreme Advocacy Leadership in the Pre-Reform House: Wright Patman and the House Banking and Currency Committee. *British Journal of Political Science* 15: 187-206

Palmer, Donald A.; Jennings, Devereaux; and Zhou, Xueguang. 1993. Late Adoption of Multidivisional Form by Large U.S. Corporations: Institutional, Political, and Economic Accounts. *Administrative Science Quarterly* 38: 100-31

Parker, Mike and Slaughter, Jane. 1988. *Choosing Sides: Unions and the Team Concept.* Boston: South End Press

Peck, Jamie. 1992. Labor and Agglomeration: Control and Flexibility in Local Labor Markets. *Economic Geography* 68: 325-47

Pecora, Ferdinand. 1968 [1939]. *Wall Street Under Oath; the Story of Our Modern Money Changers.* New York: A.M. Kelley

Peltzman, Sam. 1965. Entry in Commercial Banking. *Journal of Law and Economics* 8: 11-50

Peltzman, Sam. 1976. Toward a More General Theory of Regulation. *Journal of Law and Economics* 19: 211-40

Peltzman, Sam. 1980. The Growth of Government. *Journal of Law and Economics* 23: 209-87

Penrose, Edith T. 1952. Biological Analogies in the Theory of the Firm. *The American Economic Review* 42: 804-819

Penrose, Edith. 1955. Limits to the Growth and Size of Firms. *The American Economic Review* 45: 531-43

Penrose, Edith. 1959. *The Theory of the Growth of the Firm.* New York, NY: Oxford University Press

Perret, Joseph A. 1966. *The Process of Creating and Marketing EDP Customer Services.* Rutgers University, New Brunswick. 124 pp.

Peterson, Paul E. 1995. *The Price of Federalism.* Washington, DC: Brookings Institution

Pfeffer, Jeffrey. 1972. Merger as a Response to Organizational Interdependence. *Administrative Science Quarterly* 17: 382-94

Pfeffer, Jeffrey and Salancik, G. 1978. *The External Control of Organizations: A Resource Dependence Perspective.* New York: Harper and Row Publishers

Phillips, Richard; Way, Arthur; Lowry, A.T.; and Liang, Scott. 1982. *Auto Industries of Europe, U.S., and Japan.* Cambridge, MA: Abt Books

Phillips, Ronnie J. 1994. An End to Private Banking: Early New Deal Proposals to Alter the Role of the Federal Government in Credit Allocation. *Journal of Money, Credit and Banking* 26: 552-68

Piore, Michael J. and Sabel, Charles F. 1983. Italian Small Business Development: Lessons for the U.S. In *American Industry in International Competition*, ed. Zysman, John and Tyson, Laura. Ithaca, NY: Cornell University Press

Piore, Michael J. and Sabel, Charles F. 1984. *The Second Industrial Divide.* New York, NY: Basic Books

Podolny, Joel M. and Stuart, Toby E. 1995. A Role-Based Ecology of Technological Change. *The American Journal of Sociology* 100: 1224-60

Polanyi, Karl. 1944. *The Great Transformation: The Political and Economic Origins of Our Time.* Boston, MA: Beacon Press

Polanyi, Michael. 1958. *Personal Knowledge.* Chicago: University of Chicago Press

Porter, Michael. 1979. The Structure within Industries and Companies' Performance. *The Review of Economics and Statistics* 61: 214-227

Porter, Michael; Takeuchi, Hirotaka; and Sakakibara, Mariko. 2000. *Can Japan Compete?* Hapshire and London: Macmillan Press Ltd.

Powell, Walter W. and DiMaggio, Paul J., ed. 1991. *The New Institutionalism in Organizational Analysis.* Chicago: University of Chicago Press

Prather, Charles Lee. 1969. *Money and Banking.* Homewood, IL: R.D. Irwin

Preston, H.H. 1927. The McFadden Banking Act. *The American Economic Review* 17: 201-18

Prestopino, Chris Joseph. 1976. Do Higher Reserve Requirements Discourage Federal Reserve Membership? *The Journal of Finance*, Vol. 31, No. 5. (Dec., 1976), pp. 1471-1480.

Quantius, Frances. 1959. Federal Loan Insurance: Its Relation to Federal Reserve Policy. *The Journal of Insurance* 25: 51-4

Quinn, Dennis Patrick Jr. 1988. *Restructuring the Automobile Industry: A Study of Firms and States in Modern Capitalism.* New York, NY: Columbia University Press

Quinn, Dennis Patrick Jr. 1989. *Dynamic Markets and Industrial Mutation: the Changing Organization of Production in Automotive Firms*, Berkeley Roundtable on the International Economy Research Paper #1, Berkeley, CA

Rae, John. 1984. *The American Automobile Industry.* Boston, MA: Twayne Publishers

Ragin, Charles C. 1987. *The Comparative Method: Moving Beyond Qualitiative and Quantitative Strategies. Berkeley*, Ca: University of California Press

Randall, K. A. 1966. The Federal Deposit Insurance Corporation: Regulatory Functions and Philosophy. *Law and Contemporary Problems* 31: 696-712

Redford, Emmette S. 1966. Dual Banking: A Case Study in Federalism. *Law and Contemporary Problems* 31: 749-73

Reich, Leonard S. 1992. Lighting the Path to Profit: GE's Control of the Electric Lamp Industry, 1892-1941. *The Business History Review* 66: 305-34

Reistad, Dale L. 1961. *Banking Automation and the Magnetic Ink Character Recognition Program.* Detroit, MI: Detroit Research Institute

Rinehart, James W; Huxley, Christopher; and Robertson, David. 1997. *Just Another Car Factory?* Ithaca, NY: Cornell University Press

Robertson, Paul L. and Alston, Lee J. 1992. Technological Choice and the Organization of Work in Capitalist Firms. *The Economic History Review* 45: 330-49

Rockoff, Hugh. 1975. *The Free Banking Era: A Reexamination.* New York, NY: Arno Press

Rockoff, Hugh. 1985. New Evidence on Free Banking in the United States. *The American Economic Review* 75: 886-9

Roe, Mark J. 1994. *Strong Managers, Weak Owners: The Political Roots of American Corporate Finance.* Princeton, NJ: Princeton University Press

Rogers, Henry Wade. 1902. Corporations. *The Yale Law Journal* 11: 223-45

Rolnick, Arthur J. and Weber, Warren E. 1983. New Evidence on the Free Banking Era. *The American Economic Review* 73: 1080-91

Rose, Peter S. and Scott, William L. 1978. Risk in Commercial Banking: Evidence from Postwar Failures. *Southern Economic Journal* 45: 90-106

Rose, Peter S. 1987. *The Changing Structure of American Banking*. New York: Columbia University Press

Rosen, Sherwin. 1988. Transaction Costs and Internal Labor Markets. *Journal of Law, Economics, and Organization* 4: 49-64

Rosenberg, Nathan. 1994. *Exploring the Black Box: Technology, Economics, and History*. New York, NY: Cammbridge University Press

Rosenbloom, Richard S. 1981. Technological Innovation in Firms and Industries: An Assessment of the State of the Art. In *Technological Innovation*, ed. Kelly, Patrick and Kranzberg, Melvin. San Francisco, CA: San Francisco Press

Rubenstein, James. 2001. *Making and Selling Cars: Innovation and Change in the U.S. Auto Industry.* Baltimore: Johns Hopkins University Press

Rumelt, R.P. 1974. *Strategy, Structure, and Economic Performance*. Boston, MA: Harvard Business School

Rutherford, Malcolm. 2001. Institutional Economics: Then and Now. *The Journal of Economic Perspectives* 15: 173-94

Ruttan, Vernon W. 1997. Induced Innovation, Evolutionary Theory and Path Dependence: Sources of Technical Change. *The Economic Journal* 107: 1520-9

Sadler, David. 1994. The Geographies of Just-in-Time: Japanese Investment Investment and the Automotive Industry in Western Europe. *Economic Geography* 70: 41-59

Sandholtz, Wayne; Borrus, Michael; Zysman, Johnl Conca, Ken, Stowsky, Jay; Vogel, Steven; and Weber, Steven. 1992. *The Highest Stakes: The Economic Foundations of the Next Security System*. New York, NY: Oxford University Press

Savolainen, Jukka. 1994. The Rationality of Drawing Big Conclusions Based on Small Samples: In Defense of Mill's Methods. *Social Forces* 72: 1217-24

Saxenian, AnnaLee. 1989. *Regional Networks and the Resurgence of Silicon Valley. Rep. 508*, Institute of Urban and Regional Development, University of California at Berkeley, Berkeley, CA

Saxenian, AnnaLee. 1994. *Regional Advantage: Culture and Competition in Silicon Valley and Route 128.* Cambridge, MA: Harvard University Press

Schaff, Albert H. 1958. Federal Mortgage Interest Rate Policy and the Supply of FHA-VA Credit. *The Review of Economics and Statistics* 40: 384-9

Schattschneider, E.E. 1935. *Politics, Pressures, and the Tariff*. New York, NY: Prentice-Hall

Scheiber, Harry N. 1981. Regulation, Property Rights, and Definition of "The Market": Law and the American Economy. *The Journal of Economic History* 41: 103-9

Scherer, Fredric M. 1980. *Industrial Market Structure and Economic Performance*. Chicago: Rand McNally College Publications

Schlesinger, Arthur. 1957. *The Crisis of the Old Order*. Boston: Houghton Mifflin

Schlesinger, Arthur. 1959. *The Coming of the New Deal.* Boston: Houghton Mifflin

Schmitter, Philippe C. 1974. Still the Century of Corporatism? In *The New Corporatism; Social-Political Structures in the Iberian World*, ed. FBaS Pike, Thomas. Notre Dame, IN: University of Notre Dame Press

Schmitter, Philippe C. and Lehmbruch, Gerhard. 1979. *Trends Toward Corporatist Intermediation.* London, UK: Sage

Schneider, Wilbert M. 1957. *The American Bankers Association, Its Past and Present.* Washington, DC: Public Affairs Press

Schneider, Ben Ross. 1993. The Career Connection: A Comparative Analysis of Bureaucratic Preferences and Insulation. *Comparative Politics* 25: 331-50

Schumpeter, Joseph Alois. 1934. *The Theory of Economic Development; An Inquiry Into Profits, Capital, Credit, Interest, and the Business Cycle.* Cambridge, MA: Harvard University Press

Schumpeter, Joseph A. 1939. *Business Cycles.* New York, NY: McGraw-Hill

Schur, Leon M. 1960. The Second Bank of the United States and the Inflation after the War of 1812. *The Journal of Political Economy* 62: 118-34

Scott, Austin W. 1922. The Trust as an Instrument of Law Reform. *The Yale Law Journal* 31: 457-68

Scott, William H. 1965. *Office Automation: Administrative and Human Problems.* Paris, France: Organization for Economic Cooperation and Development

Scott, Hal S. 1978. The Risk Fixers. *Harvard Law Review* 91: 737-92

Scott, Kenneth E. 1980. The Patchwork Quilt: State and Federal Roles in Bank Regulation. *Stanford Law Review* 32: 687-742

Scranton, Philip. 1988. None-Too-Porous Boundaries: Labor History and the History of Technology. *Technology and Culture* 29: 722-43

Seymour, Edmund Bayly Jr. 1903. The Historical Development of the Common-Law Conception of a Corporation. *The American Law Register* 51: 529-51

Shaw, Edward Stone. 1962. *Savings and Loan Market and Market Performance; A Study of California State-Licensed Savings and Loan Associations.* California Savings and Loan Commissioner, Los Angeles, CA

Shay, Robert P. 1956. Postwar Developments in the Market for Consumer Instalment Credit. *The Journal of Finance* 11: 229-48

Shay, Robert P. 1966. Postwar Changes in Consumer Financial Markets: Major Developments in the Market for Consumer Credit Since the End of World War II. *Journal of Finance* 21: 369-81

Shepherd, William G. 1982. The Banking Industry. In *The Structure of American Industry*, ed. W Adams. New York, NY: Macmillan Publishing Company

Shetty, Y.K. and Buehler, Vernon M. 1988. *Competing Through Productivity and Quality.* Cambridge, MA: Productivity Press

Shimokawa, Koichi. 1994. *The Japanese Automobile Industry*. Atlantic Highlands, NJ: Athlone Press

Shirai, Taishiro. 1983. *Contemporary Industrial Relations in Japan*. Madison, WI: University of Wisconsin Press

Shirai, Taishiro, ed. 1983. *Contemporary Industrial Relations in Japan*. Madison, WI: University of Wisconsin Press

Siebert, Horst. 1995 *Trends in Business Organization: Do Participation and Cooperation Increase Competitiveness?* Tubingen. J.C.B. Mohr

Siebert, Horst. 1997. Labor Market Rigidities: At the Root of Unemployment in Europe. *Journal of Economic Perspectives* 11: 37-54

Simon, Herbert A. 1952. Comments on the Theory of Organizations. *The American Political Science Review* 46: 1130-9

Singleton, Christopher. 1992. Auto Industry Jobs in the 1980's: A Decade of Transition. *Monthly Labor Review*: 18-26

Skeels, Jack W. 1964. Early Carriage and Auto Unions: The Impact of Industrialization and Rival Unionism. *Industrial and Labor Relations Review* 17: 566-83

Skocpol, Theda. 1979. *States and Social Revolutions: A Comparative Analysis of France, Russia, and China*. New York, NY: Cambridge University Press

Skocpol, Theda and Finegold, Kenneth. 1982. State Capacity and Economic Intervention in the Early New Deal. *Political Science Quarterly* 97: 255-78

Sloan, Alfred P. 1963. *My Years With General Motors*. New York, NY: Doubleday

Smith, Arthur. 1942. Bank Note Detecting in the Era of State Banks. *The Mississippi Valley Historical Review* 29: 371-86

Smith, Paul. 1962. Cost of Providing Consumer Credit: A Study of Four Major Types of Financial Institutions. *The Journal of Finance* 17: 476-96

Smith, Adam. 1979 [1776]. *The Wealth of Nations*. New York, NY: Penguin Books

Smitka, Michael J. 1991. *Competitive Ties: Subcontracting in the Japanese Automotive Industry*. New York, NY: Columbia University Press

Sorensen, Charles. 1956. *My Forty Years with Ford*. New York, NY: Norton

Soskice, David. 1999. Divergent Production Regimes: Coordinated and Uncoordinated Market Economies in the 1980's and 1990's. In *Continuity and Change in Contemporary Capitalism*, ed. HL Kitschelt, Peter; Marks, Gary; and Stephens, John. Cambridge, UK: Cambirdge University Press

Southworth, Shirley Donald. 1928. *Branch Banking in the United States*. New York, NY: McGraw-Hill Book Company, Inc.

Stanford Law Review Staff. 1949. Transamerica: The Bankholding Company Problem. *Stanford Law Review* 1: 658-75

Stanford Law Review Staff. 1957. The Bank Holding Company Act of 1956. *Stanford Law Review* 9: 333-50

Stauss, James H. 1944. The Entrepreneur: The Firm. *The Journal of Political Economy* 52: 112-27

Steiner, Thomas and Teixeria, Diogo. 1990. *Technology in Banking: Creating Value and Destroying Profits*. Homewood, Il: Dow Jones-Irwin

Stephens, David. 1997. Document Security and International Records Management. In *ARMA Records Management Quarterly*

Stigler, George J. 1971. The Theory of Economic Regulation. *The Bell Journal of Economics and Management Science* 2: 3-21

Stigler, George J. and Sherwin, Robert A. 1985. The Extent of the Market. *Journal of Law and Economics* 28: 555-85

Streeck, Wolfgang. 1992. *Social Institutions and Economic Performance: Studies of Industrial Relations in Advanced Capitalist Economies*. Newbury Park, CA: Sage

Streeck, Wolfgang. 1997*a*. German Capitalism: Does it Exist? Can It Survive? In *Political Economy of Modern Capitalism: Mapping Convergence and Diversity*, ed. Crouch, Colin and Streeck, Wolfgang, pp. 33-54. London: Sage

Streeck, Wolfgang. 1997*b*. Beneficial Constraints: On the Economic Limits of Rational Voluntarism. In *Contemporary Capitalism: The Embeddedness of Institutions*, ed. Boyer, R and Hollingsworth, J.R. Cambridge, UK: Cambridge University Press

Streeck, Wolfgang and Yamamura, Kozo, ed. 2001. *The Origins of Nonliberal Capitalism: Germany and Japan in Comparison*. Ithaca, NY: Cornell University Press

Streeck, Wolfgang and Yamamura, Kozo. 2003. *The End of Diversity? Prospects for German and Japanese Capitalism*. Ithaca, NY: Cornell University Press

Studer-Noguez, Isabel. 2002. *Ford and the Global Strategies of Multinationals*. New York, NY: Routeledge

Suchman, Mark C. 1995. Managing Legitimacy: Strategic and Institutional Approaches. *The Academy of Management Review* 20: 571-610

Sullivan, Jeremiah J. and Peterson, Richard B. 1991. A Test of Theories Underlying the Japanese Lifetime Employment System. *Journal of International Business Studies* 22: 79-97

Sundquist, James L. 1988. Needed: A Political Theory for the New Era of Coalition Government in the United States. *Political Science Quarterly* 103: pp. 613-35

Sutton, John R. and Dobbin, Frank. 1996. The Two Faces of Governance: Responses to Legal Uncertainty in U.S. Firms, 1955 to 1985. *American Sociological Review* 61: 794-811

Swart, J. Carroll and Baldwin, Richard A. 1971. EDP Effects on Clerical Workers. *The Academy of Management Journal* 14: 497-512

System, Board of Governors of the Federal Reserve. 1963. *The Federal Reserve System: Purposes and Functions*. Washington, D.C.

Taft, Philip. 1937. The Problem of Structure in American Labor. *The American Economic Review* 27: 4-16

Tarrow, Sidney. 1994. *Power in Movement: Social Movements, Collective Action and Politics.* New York, NY: Cambridge University Press

Taylor, Fredrick. 1919 [1919]. *The Principles of Scientific Management.* New York: Harpe and Brothers

Teece, David J. 1989. Inter-Organizational Requirements of the Innovation Process. *Managerial and Decision Economics* 10: 35-42

Thelen, Kathleen and Kume, Ikuo. 1999. The Rise of Nonmarket Training Regimes: Germany and Japan Compared. *The Journal of Japanese Studies* 25: 33-64

Thelen, Kathleen. 2004. *How Institutions Evolve.* Cambridge, UK: Cambridge University Press

Thomas, Woodlief. 1935. Use of Credit in the Security System. *The American Economic Review* 25: 21-30

Thompson, James and McEwen, William. 1958. Organizational Goals and Environment: Goal-Setting as an Interaction Process. *American Sociological Review* 23: 23-31

Tippetts, Charles Sanford. 1923. State Bank Withdraws from the Federal Reserve System. *The American Economic Review* 13: 401-10

Tippetts, Charles Sanford. 1928. The Decline of Membership in the Federal Reserve System. *The Journal of Political Economy*, Vol. 36, No. 2. (Apr., 1928), pp. 185-211.

Tolliday, Steven. 1998. The Diffusion and Transformation of Fordism. In *Between Imitation and Innovation: The Transfer and Hybridization of Productive Models in the International Automobile Industry*, ed. RC Boyer, Elsie; Jürgens, Ulrich; and Tolliday, Steven. Oxford, UK: Oxford University Press

Tomlins, Christopher L. 1985. *The State and the Unions: Labor Relations, Law, and the Organized Labor Movement in America, 1880-1960.* Cambridge, UK: Cambridge University Press

Tsuneo, Ono. 1980. Postwar Changes in the Japanese Wage System. In *The Labor Market in Japan*, ed. SM Nishikawa, Ross ed.). Tokyo: University of Tokyo Press

Tushman, Michael L. and Anderson, Philip. 1986. Technological Discontinuities and Organizational Environments. *Administrative Science Quarterly* 31: 439-65

Tushman, Michael L. and Anderson, Philip. 1990. Technological Discontinuities and Dominant Designs: A Cyclical Model of Technological Change. *Administrative Science Quarterly* 35: 604-33

Tushman, Michael L. and Nelson, Richard R. 1990. Introduction: Technology, Organizations, and Innovation. *Administrative Science Quarterly* 35: 1-8

Tussing, A. Dale. 1965. Stimulating Bank Competition: Comment. *The Journal of Finance* 20: 691-2

Tuttle, Charles A. 1927. The Function of the Entrepreneur. *The American Economic Review* 17: 13-25

United States International Trade Commission. 1985. *Internationalization of the Automobile Industry and its Effects on the U.S.* Washington, DC

Utterback, James M. 1971. The Process of Technological Innovation Within the Firm. *The Academy of Management Journal* 14: 75-88

Utterback, J.M., Abernathy, W.J. 1975. A Dynamic Model of Process and Product Innovation. *Omega, The International Journal of Management Science*. Vol. 3: 639-56

Vaughn, James and Porat, Avner. 1969. *Banking Computer Style: The Impact of Computers on Small and Medium-Sized Banks*. Englewood Cliffs, NJ: Prentice Hall, Inc.

Veblen, Thorstein. 1983 [1921]. *The Engineers and the Price System*. New Brunswick, NJ: Transaction Books

Vergragt, Philip J. 1988. The Social Shaping of Industrial Innovations. *Social Studies of Science* 18: 483-513

Vernon, Raymond. 1966. International Investment and International Trade in the Product Cycle. *The Quarterly Journal of Economics* 80: 190-207

Vernon, Raymond. 1948. Postwar Trends in International Business Organization. *The American Economic Review* 38: 94-108

Via, J. WIlliam, Jr. 1965. The Administration of the Bank Merger and Holding Company Acts: Confusion Compounded. *Virginia Law Review* 51: 1517-44

Via, J. WIlliam, Jr. 1967. Antitrust and the Amended Bank Merger and Holding Company Acts: The Search for Standards. *Virginia Law Review* 53: 1115-32

Vietor, Richard. 1990. Contrived Competition: AIrline Regulation and Deregulation 1925-1988. *The Business History Review* 64: 61-108

Viner, Jacob. 1917. Some Problems of Logical Method in Political Economy. *The Journal of Political Economy* 25: 236-60

Vogel, Steven K. 1996. *Freer Markets, More Rules: Regulatory Reform in Advanced Industrialized Countries*. Ithaca, NY: Cornell University Press

Vogel, Steven K. 1999. When Interests Are Not Preferences: The Cautionary Tale of Japanese Consumers. *Comparative Politics*. 31: 187-207

Vogel, Steven K. 2006. *Japan Remodeled: How Government and Industry Are Reforming Japanese Capitalism*. Ithaca, NY: Cornell University Press

Wade, Robert. 1990. *Governing the Market: Economic Theory and the Role of Government in East Asian Industrialization*. Princeton, NJ: Princeton University Press

Walker, Jack L. 1969. The Diffusion of Innovations Among the American States. *The American Political Science Review* 63: 880-99

Walker, Gordon and Weber, David. 1984. A Transaction Cost Approach to Make or Buy Decisions. *Administrative Science Quarterly* 29: 373-91

Walker, Gordon and Weber, David. 1987. Supplier Competition, Uncertainty, and Make-or-Buy Decisions. *The Academy of Management Journal* 30: 589-96

Walker, Gordon and Weber, David. 1987. Supplier Competition, Uncertainty, and Make or Buy Decisions. *The Academy of Management Journal* 30: 589-96

Walker, Gordon. 1994. Asset Choice and Supplier Performance in Two Organizations - US and Japanese. *Organization Science* 5: 583-93

Walters, Raymond. 1945. The Origins of the Second Bank of the United States. *The Journal of Political Economy* 53: 115-31

Warburg, Paul M. 1914. Defects and Needs of Our Present Banking System. *Proceedings of the Academy of Political Science* 4: 7-22

Ward's Communications, Inc. (various years). World Automotive Market. Des Plaines, IL: Auto and Truck International

Ward's Communications, Inc. (various years). Ward's Auto Yearbook. Detroit, MI: Ward's Reports, Inc.

Ward's Communications, Inc. (various years). Ward's Auto World. Detroit, MI: Ward's Communications, Inc.

Ward's Communications, Inc. (various years). Ward's Auto Reports. Detroit, MI: Ward's Communications, Inc.

Watanabe, Susumu (ed.). 1987. *Microelectronics, Automation, and Employment in the Automobile Industry.* New York: John Wiley and Sons

Waymark, Peter. 1983. *The Car Industry.* Bath: Ronald Sewell & Associates, Ltd.

Weakliem, David L. 1989. The Employment Contract: A Test of the Transaction Cost Theory. *Sociological Forum* 4: 203-26

Weintraub, Robert E. 1977. Some Neglected Monetary Contributions: Congressman Wright Patman (1893-1976). *Journal of Money, Credit and Banking* 9: 517-28

Weiss, Robert P. 1986. Private Detective Agencies and Labour Discipline in the United States, 1855-1946. *The Historical Journal* 29: 87-107

Wernerfelt, Birger. 1984. A Resource-based View of the Firm. *Strategic Management Journal* 5: 171-80

West, Penny. 2000. *Organizational Learning in the Automotive Sector.* New York: Routeledge

Wetherbe, Jim C. and Whitehead, Carlton J. 1977. A Contingency View of Managing the Data Processing Organization. *MIS Quarterly* 1: 19-25

White, Eugene Nelson. 1982. The Political Economy of Banking Regulation, 1864-1933. *The Journal of Economic History* 42: 33-40

Wicker, Elmus. 2000. *Banking Panics of the Gilded Age.* Cambridge, UK: Cambridge University Press

Wicker, Elmus. 2005. *The Great Debate on Banking Reform: Nelson Aldrich and the Origins of the Fed.* Colombus, OH: Ohio State University Press

Wilkins, Mira. 1974. The Role of Private Business in the International Diffusion of Technology. *The Journal of Economic History* 34: 166-88

Wille, Frank. 1966. State Banking: A Study in Dual Regulation. *Law and Contemporary Problems* 31: 733-48

Williamson, Oliver E. 1975. *Markets and Hierarchies*. New York, NY: Free Press

Williamson, Oliver. 1979. Transaction Cost Economics: The Governance of Contractual Relations. *Journal of Law and Economics* 73: 233-61

Williamson, Oliver E. 1985a. *The Economic Institutions of Capitalism: Firms, Markets, Relational Contracting*. New York: Free Press

Williamson, Oliver E. 1985*b*. Assessing Contract. *Journal of Law, Economics, and Organization* 1: 177-208

Williamson, Oliver E. 1991. Comparative Economic Organization: The Analysis of Discrete Structural Alternatives. *Administrative Science Quarterly* 36: 269-96

Williamson, Oliver E. 1993. Calculativeness, Trust, and Economic Organization. *Journal of Law and Economics* 36: 453-86

Williamson, Oliver E. 1996. *The Mechanisms of Governance*. New York, NY: Oxford University Press

Williamson, Oliver E. 1998. The Institutions of Governance. *The American Economic Review* 88: 75-9

Williamson, Oliver E. 2000. The New Institutional Economics: Taking Stock, Looking Ahead. *Journal of Economic Literature* 38: 595-613

Williamson, Oliver E. 2002*a*. The Lens of Contract: Private Ordering. *The American Economic Review* 92: 438-43

Williamson, Oliver E. 2002*b*. The Theory of the Firm as Governance Structure: From Choice to Contract. *The Journal of Economic Perspectives* 16: 171-95

Willis, H. Parker. 1916. *American Banking*. Chicago, IL: La Salle Extension University

Willis, H. Parker. 1922. Before the Reserve Act: The Federal Reserve Act in Congress. *Annals of the American Academy of Political and Social Science* 99: 36-49

Willis, H. Parker. 1935. The Banking Act of 1933 in Operation. *Columbia Law Review* 35: 697-724

Winner, Langdon. 1996. The Gloves Come Off: Shattered Alliances in Science and Technology Studies. *Social Text*: 81-91

Wipp, Richard and Clark, Peter. 1986. *Innovation and the Auto Industry*. New York: St Martin's Press

Womack, James; Jones, Daniel; and Roos, Daniel. 1990. *The Machine that Changed the World*. New York: Rawlinson Associates

Woolsey, John B. 1936. The Permanent Plan for the Insurance of Bank Deposits. *Southern Economic Journal* 2: 20-44

Wright, John R. 1990. Contributions, Lobbying, and Committee Voting in the U.S. House of Representatives. *The American Political Science Review* 84: 417-38

Wu, Hsiu-Kwang and Connell, Lawrence. 1973. Merger Myopia: An Economic View of Supreme Court Decisions on Bank Mergers. *Virginia Law Review* 59: 860-84

Yanarella, Ernest J. and Green, William C. (eds.). 1990. *Politics of Industrial Recruitment: Japanese Automobile Investment and Economic Development in the American States*. New York, NY: Greenwood Press

Yang, Xiaohua. 1995. *Globalization of the Automobile Industry*. Westport, CT: Praeger Press

Yates, Brock. 1984. *The Decline and Fall of the American Automobile Industry*. New York, NY: Random House

Yavitz, Boris. 1967. *Automation in Commercial Banking: Its Process and Impact; A Case Study and Conceptual Analysis*. New York: Graduate School of Business dissertations series, Columbia University and the Free Press

Zajac, Edward J. and Olsen, Cyrus P. 1993. From Transaction Cost to Transactional Value Analysis: Implications for the Study of Interorganizational Strategies. *Journal of Management Studies* 30: 131-46

Zucker, Lynn; Darby, Michael; and Brewer, Marilynn. 1998. Intellectual Human Capital and the Birth of U.S. Biotechnology Enterprises. *The American Economic Review* 88: 290-306.

Zysman, John. 1983. *Governments, Markets, and Growth: Financial Systems and the Politics of Industrial Change*. Ithaca, NY. Cornell University Press.

Zysman, John and Borrus, Michael. 1994. From Failure to Fortune? European Electronics in Changing World Economy. *Annals of the American Academy of Political and Social Science*, Vol. 531, The European Community: To Maastricht and beyond. (Jan., 1994), pp. 141-167.