

The Spatial Configuration of the Firm and the Management of Sunk Costs*

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Abstract: In this paper we explain why the modern corporation may persist with a decentralized system of plants differentiated by the vintage of capital and the style of management. Our goal is to show how and why firms are, at once, structured by the inherited configuration of capital and also reproduce differentiation within and outside the corporation. To do so, we use concepts and principles drawn from modern financial theory to show that a spatially differentiated configuration of production may have advantages for the firm in terms of the risk-adjusted flow of revenue, strategic options in relation to actual and potential competitors, and the management of sunk costs. Our argument focuses on the modern corporation, characterized by a separation between ownership and control as well as a dependence upon internal stakeholders for the realization of planned revenue and output targets. We argue that our framework can help theorists account for the persistence of inter-firm and interindustry differences in capital profiles, despite a common presumption in favor of convergence around a simple, efficient industry standard. While the paper is an exercise in theory, it is based upon our previously published studies of corporate restructuring in manufacturing and retail industries in the United States and the United Kingdom.

Key words: corporations, spatial configuration, functional value of capital.

This paper is about the spatial structure and management of the contemporary Anglo-American corporation. There is considerable debate in economic geogra-

phy about how and why firms are organized the way they are and how firm organization reflects upon, and contributes to, the structure of the economic landscape (see Walker 1989; Dicken and Thrift 1992). We are principally concerned here with the first part of this research agenda; we develop a model of the firm for the purpose of better understanding the logic behind corporations' desired spatial configuration of productive capacity.

Note that we are concerned primarily with firms in which there is a clear separation between ownership (shareholders) and control (management) in a world of financial markets rather than financial relationships, a crucial characteristic of the contemporary Anglo-American corporation.¹ If

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¹ See Allen and Gale (1994) on the institutional differences between the Anglo-American

we are to understand the structure and evolution of the economic landscape, it is important that we better understand the organizing principles that drive the geographic decentralization and centralization of production capacity in these types of firms.² This means linking microeconomic theory with more institutional aspects of firm structure and management behavior in the spatial context. In the interests of clarity and simplicity, we emphasize the revenue objectives of managers together with related concepts drawn from modern corporate finance, especially portfolio diversification, risk, and return. This model of the firm is used as a reference point for a detailed assessment of the internal tensions among the firm's various stakeholders and how those tensions, related to the management of sunk costs, can play an important role in determining the spatial configuration of the firm.

Before summarizing the structure of the paper, we must make two points about the overall logic of the paper. First, we do not refer directly to new empirical evidence to justify our claims. The paper is intended to

countries and Germany (and much of continental Europe) regarding the financial structure of their economies. Christopherson (1993) also deals with related issues, emphasizing the very different systems of the United States and Germany and Japan.

² It might be argued that our analytical perspective is limited because it fails to go beyond the modern Anglo-American corporation. Lazonick (1994), for example, makes the point that the United States has fallen behind in the global race for competitiveness (as Britain did earlier in this century) because of the inefficiencies of the internal organization of its firms compared to Japan. In this respect, Aoki (1988) argues that the common structure of Japanese firms is more conducive to sustaining competitiveness than is the case with most U.S. firms. It will become clear, however, that we are indeed concerned with this issue (see the penultimate section of this paper) but are unwilling to identify a priori a dominant successful ideal type of corporation for the late twentieth century.

be both speculative and theoretical; this is by no means an exceptional or unusual strategy in economics or in geography (see, respectively, Hart 1995; Massey 1995). At the same time, the paper draws its inspiration from our separate case studies of corporate restructuring in the United States and the United Kingdom published elsewhere (see, in particular, Clark 1989, 1993; Wrigley 1994, 1995). As such the paper has immediate relevance to related work in corporate geography; see Laulajainen and Stafford (1995) on strategies of restructuring. Second, we draw heavily on recent developments in economics to make sense of the geography of the firm. We hope, however, that the firm that emerges from our analysis is richer in scope, linking issues related to finance and capital structure, than some economists' recent treatments of economic geography.

In the next section, we deal in more detail with the competitive domain of our firm,³ its organization in relation to market imperatives, and the nature of sunk costs.⁴ This is followed by a formal model of the firm. We then explain why, in the first instance, the firm's management might desire a decentralized production strategy; why, in the second instance, firms may

³ By reference to the "domain of competition," we mean the relationship between market structure and corporate strategy (Clark and Wrigley 1995). Those writing about restructuring tend not to be explicit about the extent of market agents' discretion or scope of action relative to market imperatives. We are concerned with firms that function in the structure-limited domain, a world in which firms have considerable autonomy but are not able to control either economic events or their competition. See Clark (1994) for further discussion of this point, including reference to the structure-dependent domain (where market imperatives dominate strategy) and the structure-focused domain (where corporate strategy dominates market structure).

⁴ Mata (1991, 52) defines sunk costs as those costs of a firm "which are irrevocably committed to a particular use, and therefore not recov-

value a spatially differentiated (by age and market value) portfolio of capital stock (production capacity) for strategic purposes; and why, in the third instance, the management of the firm with respect to realizing the potential of the inherited configuration of production involves indeterminate tensions among different stakeholders within the firm. In particular, we argue that there are important reasons to suppose that a decentralized firm is a desirable configuration of production, notwithstanding possible higher transactions costs of such a configuration. In this respect, we hope to convince economic geographers to take up the empirical and theoretical challenge posed by the contemporary corporation.

Corporate Form and Market Structure

How can we account for the decentralized firm? What are the links to be made among corporate form, the economic landscape, and market structure? In geography, most explanations of the decentralized firm draw upon aspects of spatial structure and market structure to help "explain" the configuration of the firm. For instance, Clark (1981) argues that firms may decentralize in order to create and maintain separate employment contracts for different parts of the firm. By implication, a spatially centralized configuration encourages homogeneity rather than differentiation of employment contracts, thereby possibly compromising the cost competitiveness of the firm in relation to its competitors. This argument relies on

erable in the case of exit." Most studies of sunk costs focus upon the interaction between entry and exit strategies, arguing that sunk costs are a significant barrier to entry in some industries and hence a means of guarding against competition. There are few studies of the role of sunk costs in determining the patterns of restructuring (but see Wrigley 1996; Clark 1994).

the prior existence of spatial differentiation in labor market conditions and contracts to facilitate corporate decentralization, but then reproduces spatial differentiation as a consequence of corporate planning. It is also related to a more general concern about the role and status of labor organization, the map of labor relations, and the relationship between corporate form and labor productivity in the context of industry competition, issues we return to in the penultimate section of the paper.

There are, of course, other ways of dealing with the issue. We could take a transactions cost perspective along the lines suggested by Scott (1988) in geography and Williamson (1988) in economics. Here, the value of different corporate configurations—centralized, decentralized, or something in between—is evaluated according to their relative transactions costs; presumably firms choose the configuration that minimizes internal transactions costs given the landscape of firms and places (the agglomeration economies of Marshallian districts). Another way of proceeding would be to begin with the nature of market competition and derive the spatial structure of the firm from market imperatives. So, for example, we could use Salais and Storper's (1992) framework concerning the nature of product markets and the related determinants of profitability to create firm types (centralized, decentralized, and so forth) consistent with those implied overarching imperatives. The framework we suggest in this paper is sensitive to the issue of transactions costs and to the nature of market competition. But these issues are only part of an answer and are not complete answers (if that were possible) in themselves.

Compared to many other models of industrial organization, our approach to the issue of the spatial structure of the firm is distinctive on a number of counts. For a start, we assume that the firm operates in either the *structure-limited* or *structure-focused* domain of competition (see Clark 1994). In summary terms, for economists like Baumol, Panzar, and Willig (1988) this

means imperfect competition (at least) or (more likely) oligopolistic competition, wherein price competition is not the only determinant of market competitiveness between rival firms. In the context of arguments over the relative status of strategy and structure, it is presumed that in these two domains "corporate executives have scope for independent action not strictly or exclusively defined by (market) structure" (Clark 1994, 12). Whether because of structural indeterminacy, cognitive limits, or path dependence, we contend that firms cannot simply read off the most efficient organizational strategy (centralized or decentralized) from the structure of market competition.⁵ Indeed, in some cases, market structure may be the object rather than the determinant of strategy; this is the domain of structure-focused strategy. These points are developed in more detail in Clark (1994) and Clark and Wrigley (1995).

Another point of distinction is the significance we attribute to sunk costs. While a danger to many firms, especially small firms operating in the *structure-dependent* domain of what Baumol, Panzar, and Willig (1988) term perfectly contestable markets, in our world of corporations and structural indeterminacy sunk costs can have a number of virtues. The existence of significant start-up sunk costs can be used by incumbent firms to deter market entry by potential rivals.⁶ Sunk costs can be thought essential for developing firm-specific expertise,

and sunk costs may be inevitable in any accumulation strategy that relies upon sequential and incremental investment decisions. Thus, we presume that the inherited asset base of the firm is both an important factor contributing to its form and an aspect of the firm that must be managed so as to realize the value of that form. This does not mean that industry competition and market structure are irrelevant; quite the contrary. As will be shown below, these are important issues for strategic planning and the long-term evolution of the structure of the firm. But it is important to recognize that our approach places considerable emphasis upon the spatial configuration of the firm in relation to competition and market structure. In this respect we have a certain sympathy for Schoenberger's (1997) corporate geography.

Our approach to the issue of the spatial configuration of the firm also has parallels with Cyert and March (1992), who argue that managers are constrained, in effect, by the history and geography of the firm as well as by the imperatives of making informed and timely decisions regarding the optimal structure of the firm. In a nutshell, Cyert and March argue that managers "set targets and look for alternatives that satisfy those targets rather than try to find the best imaginable solution" (1992, 214). Furthermore, they acknowledge that the inherited structure of the firm is only imperfectly related to market imperatives. As we suggest below, Cyert and March recognize the advantages and disadvantages of the inherited configuration of production rather than assuming that it is always and everywhere uniquely determined by mar-

⁵ Liebowitz and Margolis (1995) usefully analyze the logic and types of lock-in and path dependence (see also Roe 1996). Their analysis concerns the significance of path dependence for the robustness of neoclassical economics. Here, we assume that the existence of path dependence implies inefficiency and disequilibrium. Whether path dependence is a profound threat to economic convention is left to another time.

⁶ Three types of sunk costs can usefully be identified. The first may be termed *start-up*

sunk costs (initial capital investment); the second, *accumulated* sunk costs; and the third, *exit* sunk costs. To illustrate the differences among these types, the training of labor for a new production facility could be thought to be a start-up sunk cost, the seniority of labor an accumulated sunk cost, and the pension entitlements of labor an exit sunk cost.

ket structure. And, most importantly, they suggest that the firm is riven by unresolved conflict among the various internal stakeholders of the firm about the proper and possible path of accumulation. In this paper, these are vital issues as they relate to the management of firms' sunk costs.

Model of the Firm

Let us begin our analysis by sketching out the basic parameters of the world in which our firm operates. We assume that the firm operates in the structure-limited competitive domain, although the model could easily be shown to be relevant to a firm operating in the structure-focused domain. Thus, strategy matters, and managers have discretionary power over a range of relevant resource allocation issues. Because of the indeterminate nature of market structure, and the apparent risks and uncertainty associated with competitive strategic decision making, it is presumed that it is more efficient to delegate (to managers) than to centralize (with shareholders) corporate decision making (Demski and Sappington 1987). We also assume that the firm is owned by a large number of unorganized shareholders whose response to the high costs of monitoring managers' behavior is to diversify their stock holdings (Jensen and Meckling 1976).⁷ For the moment, we ignore the role of workers (but see below). One way or another we presume that corporate decision making is not predetermined by the structure of competition or by the nature of ownership.

⁷ This is surely still the case in the Anglo-American world, notwithstanding the 1980s market for corporate control, economists' models of market efficiency, and recent trends toward relational investing. See Lowenstein (1993) for a particularly interesting assessment of current powerlessness of company shareholders.

In more detail, it is assumed that the firm (shorthand for its managers) aims to achieve certain revenue targets.⁸ This is for two reasons. First, those revenue targets may enable the firm to design and implement competitive strategies, such as raiding competitors' markets. Second, those revenue targets may enable managers to finance investment in new plant and equipment internally. This is presumably cheaper (for managers) than raising money outside the firm via the bond and equity markets. It also has the virtue of increasing managers' long-term strategic options while avoiding the scrutiny of external financial analysts and investors (Froot, Scharfstein, and Stein 1993).⁹ The firm's "objective function" should be understood, however, to be subject to the following constraints: (1) the maintenance of profit level sufficient to deter external corporate raiders and organized resistance from shareholders; and (2) the maintenance of internal control of the enterprise with respect to market standards of quality and efficiency. Successful managers are presumably paid bonuses tied to indicators of company performance like growth of market share. But this is not essential to our argument.

What does the firm produce? And how does it produce what it does? Here, in relation to these questions, our analysis relies on our previously published case studies. Our firm is assumed to produce a range of related manufactured goods (wire prod-

⁸ In this paper we deal with just the firm as a functioning entity. This implies, like it or not, that a firm is able to operate quarter-to-quarter (see Opler and Titman 1994).

⁹ Here, we treat the firm as an integrated financial unit, where decisions made at the local level must fit within the overall financial structure of the firm. In reality, it is more complicated than this simple model allows. See Chowdhry and Nanda (1994) for an extended theoretical treatment involving the multinational firm.

ucts, for instance) for sale in national and regional markets and, at the margin, in export markets. It does so at a number of plants (more than two) that produce similar and related products. For illustrative purposes, and throughout the paper, Plant a is assumed to be an older plant in terms of the vintage of its capital stock and is located in a core industrial region. Plant b is assumed to be a newer plant located in a distant region characterized by a relatively short history of industrialization. Comparatively speaking, Plant a is assumed to be less competitive than Plant b, in that Plant a generates a lower rate of return *relative* to the replacement cost of a new plant. In relation to market competition, it is assumed that there are significant start-up sunk costs for any firm that would want to invade our firm's markets. Likewise, potential competitors are also mindful of the unique experience and knowledge of our firm, both with respect to its markets and with respect to the production of its products.

Having sketched out the firm at this point, we wish to pose a set of questions that underpin the subsequent analysis. Why does the firm not switch production from its older plant to its newer plant, assuming that capacity is not a problem and that it does not matter (in terms of transportation costs) where production is located with respect to the final market? Why does the firm persist with a differentiated asset base, recognizing that there exists, at any point in time, an apparent industry-defined best practice? In other words, why does the firm not optimize (in a global sense) spatially and historically? Why does the firm persist in holding these two plants as operating units when it may be more efficient (for stockholders and, perhaps, the whole economy) to centralize operations around the best plant? In what follows we explain the spatial configuration of the firm in an additive fashion. That is, we begin with a configuration that relates revenue targets to risk and then move on to more complex issues such as the functional

value of capital and the management of sunk costs.

At this point, it might be argued that it is simpler and more analytically tractable to explain the spatial structure of the firm with respect to one variable or one overarching logic.¹⁰ But this would be misleading. We aim to show that the spatial structure of the firm is actually "derived" from a set of contemporaneous corporate decisions involving related considerations about the best (if not the most efficient) possible asset base and use of corporate resources. In the first instance such considerations relate to revenue planning, in the second instance to strategic options, and in the third instance to the management of sunk costs. In doing so, we mean to imply that these types of decisions are made by corporate executives time and time again, reflecting the nature of risk and uncertainty about market circumstances and the decisions of other firms. The particular order in which we deal with these decisions, beginning with revenue planning considerations and ending with management issues, reflects our belief that we are dealing with a hierarchy of decisions: the first is more clearly amenable to technical solution but nevertheless leads to the second and then the third consideration, both of which are more important because of their intimate connection with issues of internal corporate management power. Our explanatory approach is a means of representing a hierarchy of interlocking

¹⁰ Scherer et al.'s (1975) study attempts to do just that, focusing upon the interaction between plant-based scale economies of production, transportation costs, and the geographic density of demand to "explain" the supposed suboptimality of multiplant corporate systems. Their study is a remarkable combination of empirical sophistication and theoretical vigor informed by location theory. In our case, we recognize the importance of issues like scale economies and the spatial configuration of production, aspects recognized by Scherer et al. but not directly studied by their analysis.

ideas in a way that allows the reader to see how each leads to and contributes to the other.

A Portfolio of Plants

We begin with revenue planning considerations and the technical solution offered by modern portfolio theory (MPT) and the capital asset pricing model that derives from it (Sharpe 1964; Lintner 1965). MPT has made a number of important contributions to understanding how firms should manage their assets, most generally, the suggestion that the risk of any investment (a new investment or continuing to hold an existing investment like a plant) should be evaluated with respect to the risk profile of the firm's entire portfolio of assets. That is to say, a project- or plant-specific perspective (a common reference point of geographers' case studies) is too limited as it ignores the relative valuation of assets by corporate managers (but see Comley and Hanink 1985; Hanink 1984). In theory, risk and return are positively correlated. Thus, one implication from MPT is that a strategic firm would want to diversify its portfolio of assets (plants), thereby reducing the overall risk profile of the corporation. In this sense, it would be logical to hold a number of plants (the number is an empirical matter) each producing different products and/or serving different geographic markets, thereby generating revenue flows that have a low covariance of risk.¹¹ Another implication of MPT is that a riskless portfolio of assets would be inconsistent with a revenue growth strategy. If our firm aims to increase revenue, it must strategically accept some risk in relation to the actions

of its competitors or face declining *relative* returns and the prospect of being taken over from without or within.

The idea of risk used in MPT has two dimensions: *systematic* risk, defined as the sensitivity of returns to movements in the economy as a whole (the issue considered in this section), and *residual* risk, defined as the sensitivity of returns to the structure and organization of firms' particular assets (considered in subsequent sections). In theory, our firm could measure its systematic and residual risk profiles by measuring, quantitatively, the risks associated with each plant, and then establish an overall risk profile from the sum of these individual plants. This, of course, presumes that Plant a and Plant b produce different products and/or are located in different markets which have distinctively different and measurable sensitivities to the path of the national economy. Yet even if the firm was unable to assign specific risk values to Plants a and b, it is likely that management would nevertheless want to make judgments about the short- and long-term contribution of each plant to overall revenue. Just as the firm's managers make this assessment, so too do stock analysts and individual shareholders. But, of course, their knowledge base is less comprehensive than that of managers. Therefore, a higher-order risk judgment is made by shareholders: the risk of continuing to invest in the firm against the alternatives, including passive investment in a general diversified equity index product like the Standard and Poor 500.

Given our model of the firm, and the MPT strategic framework that informs the first part of our analysis, what can be said in answer to the questions posed above? What could account for the persistence of the firm's spatial configuration of production? If Plants a and b produce different products and/or serve different markets, the answer is surely obvious. Diversification reduces the firm's overall risk profile, whereas consolidation to one plant (product and market) may only increase its systematic risk exposure to movements in the

¹¹ This argument (and the whole logic of a diversified portfolio of assets) is only credible in the absence of adequate insurance or hedging mechanisms. Put slightly differently, there are "missing markets" or "inefficient markets" with respect to firms' abilities to cover the revenue risks of relying upon one market.

national economy. For management, whose ambition it is to protect and enhance its own strategic discretion, an overall increase in its risk profile may decrease its strategic options (any strategic action would have potentially greater consequences) and increase its vulnerability to external scrutiny. When coupled to a strategy of enhancing corporate revenue, management may benefit from retaining both Plants a and b, given its long-term objectives. While clearly important for manufacturing firms, we would argue that a diversified and spatially decentralized product-market strategy is also important to retail firms. Indeed, the recent expansion of U.K. retail firms to the United States can be thought to have been driven by these kinds of considerations (Wrigley 1997). For many firms, the risk of a stable or declining revenue flow is both an impediment to competitive strategy in the short run and a threat to the survival of incumbent managers over the long run.¹²

Yet why could not a consolidated or centralized production strategy be deployed if the newer plant had sufficient flexibility to produce a variety of products suitable for different markets? Put slightly differently, even if we recognize the virtues of an overall diversified risk profile with respect to the firm's revenue targets, why does the firm persist with a network of plants when it could, theoretically, use the technical sophistication of its newer plant to achieve the desired risk profile, while reducing

internal management costs through geographic centralization? The immediate implications of this question are twofold: first, consolidation to the newer plant could take advantage of the most recent generation of industry-specific technology, and thus, second, break away from the dominance of the original plant and its particular location at the spatial-economic core of the economy. There is considerable evidence in the United States, at least, that such a "greenfield" strategy was implemented by many manufacturing firms through the 1980s, partly in response to labor cost differentials and partly in response to the accumulated work practices of older, union-represented plants (Clark 1989). Another implication, however, is embedded in this question: there must be a reason for persisting with a decentralized multiplant strategy, a reason that goes beyond the virtues of a combined MPT-based risk minimization strategy and revenue-enhancement strategy. At this point, we need to extend our analysis to include consideration of the firm's asset base and strategic options.

Functional Value of Capital

In the previous section, we suggested that our firm could achieve its revenue goals and desired risk profile through either a centralized or decentralized plant location strategy. A centralized strategy would be consistent with the firm's second constraint on revenue planning, the need to minimize internal transactions costs (see, for example, Bartmess's (1994) case study of the hypothetical U.S.-based bicycle manufacturer EDC). At the same time, decentralization would be desirable if such a locational strategy diversified the firm's overall revenue-risk profile. Given the tensions inherent in these competing pressures, it seems that some other determinant may be required to help resolve the firm's plant location configuration. Urban agglomeration economies (and diseconomies) could be invoked to explain the current configuration of the firm (and

¹² The leading U.K. food retailer, Sainsbury, one of Britain's most successful growth-oriented firms in the previous 15 years, reported a sales decline of 2.2 percent in the half year to November 1995 and was branded by the U.K. financial press as a relative "loser" in the changed conditions of competition in British food retailing (Wrigley 1994), having been outmaneuvered by its chief rivals. At least one of the incumbent managers (the marketing director) did not survive the declining revenue flow announcement (*The Times* (London), 2 November 1995, 25).

industry). Presumably there are positive and negative attributes to the geographic configuration of the economy (regional, national, and international), and these attributes (for instance, backward and forward linkages) add to or subtract from firms' market competitiveness (see Krugman 1994).

Resolution of the centralization-decentralization tension can also be found internal to the firm.¹³ This can be done if we introduce a second factor: the possibility of a capital asset becoming a sunk cost. Most studies of firm strategy and plant location decision making tend to ignore or avoid sunk costs and are based on a set of unquestioned assumptions about the fungibility or plasticity of capital (compare with Harvey 1982). Some analysts suppose that capital is fungible over some relevant time horizon, in the sense that it is *exchangeable* either between and within markets or between uses and locations of the firm. As a consequence, it is assumed that capital can be deployed and redeployed without cost to the firm. For other analysts, the firm's capital stock is assumed to be of little significance compared to the firm's flow of revenue, the argument being that the latter is the origin of the former and hence there is an analytical and practical priority assigned to the revenue flow that allows us to leave capital stock for future analysis (which hardly ever transpires). We would also suggest that, in economics at least,

¹³ This issue—explaining the centralization or decentralization of the firm—is currently the focus of considerable work in economics. Christie, Joyce, and Watts (1993) deal with the topic through an analysis of the internal structure of firm decision making, what they term “the right to make decisions or a decision right.” For them, the question is the rate of information transfer in the context of corporate control. A rather different perspective, one based on the organization of production, is offered by Mehta (1992), who contends that the decision to decentralize is a (positive) function of firm size.

Modigliani and Miller's (1958) hypothesis of the irrelevance of the financial structure of the firm has been influential in encouraging analysts to gloss over issues related to the financial risk of firm-specific capital assets (but see Scherer et al. 1975).

By convention, the capital stock of a manufacturing company like our firm is normally thought to be its production equipment—that is, the machines which, separately and together, are used to create the final product. Of course, in reality capital is more than this simple conception would seem to allow.¹⁴ Capital is also a complex ensemble of machines, financial flows, and operating contexts, including infrastructure (physical and human) (see Gertler 1993). For the moment, and for the sake of simplicity, let us suppose that capital is a machine and that its functional value as an asset can be decomposed into a number of components in the linear manner set out in Figure 1.¹⁵ There we have identified, in *market-value* dollar terms, the functional value of a capital asset to our firm over the time horizon t_0 to $t + n$, essentially the life cycle of an asset. In this context, our treatment of capital is primarily heuristic and is based upon accounting convention in the context of corporate strategy; it would be inappropriate to match our terms and logic and Marxian notions of value and fixed capital (compare with Webber 1987). Notice that the linear temporal logic implied by Figure 1 is for simplicity; it is reasonable to suppose that, in practice, the shape of the line may vary

¹⁴ Note that we also assume that the firm owns its entire capital stock. Of course, the existence of secured creditors (another group of stakeholders) would greatly affect the capacity of firm managers to use the existing capital stock in the ways we describe. This we leave for another time.

¹⁵ After developing Figure 1, we became aware of Capozza and Li's (1994) paper in the *American Economic Review* which does much the same. There they sketch (Fig. 1) the “value

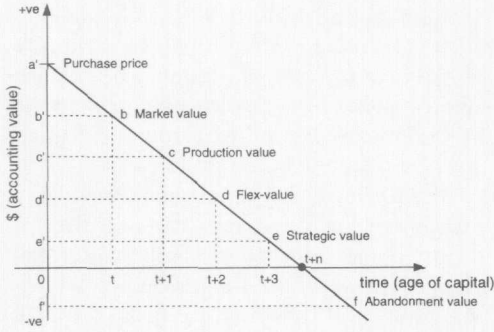


Figure 1. Functional value of capital.

considerably from industry to industry and from place to place.

With respect to Figure 1, at time t the value of the machine is its current purchase price, embodying its subsequent exchange value through to its abandonment value. Put slightly differently, we can imagine that an asset is worth its purchase price less depreciation and discounted by start-up sunk costs over the period t_0 to t . Over time, the market value of the asset declines as its initial component values are exhausted. For instance, the asset retains its discounted market value (its saleability to other firms) through to time $t + 1$ and retains its production value through to time $t + 2$. It may be used in a variety of ways (flex-value) and may even have value as an idle machine (strategic value). The point we wish to emphasize is that the functional value of capital is more than its purchase price; it has a number of significant components. In the end, once all these values have been exhausted and sunk costs accumulated, the abandonment value of the asset is negative. It costs the company money to disassemble, dismantle, and rehabilitate the space occupied by the machine. Indeed, given the expanding

legal significance of companies' environmental liability for site clean-up, the abandonment value of the asset may now loom large in firms' strategic decision making (Geltman 1992).

The valuation of capital is clearly then a strategic issue involving considerations related to the competitive strategy of the firm and the likely actions of its competitors. For instance, over the early stages of an asset's life cycle, maintenance of its market value may provide the firm with a range of strategic options (like resale, closure of the plant, and exit from the industry) not so easily available to the firm as the asset ages and loses its discounted market exchange value. This kind of option is global, in the sense that maintenance of the asset's exchange value allows the firm to switch investment between activities that promise higher returns and even switch out of the industry into unrelated activities. Indeed, the reference point for evaluating comparative returns may not be the industry norm; the reference point may be a financial product like a market index that is not a tangible commodity in any physical sense (Dixit and Pindyck 1994). The life of a productive asset as represented in Figure 1 can be understood as a process of increasing specificity, beginning as a nonspecific asset through to an entirely specific, non-tradable liability. This is another way of describing the process whereby an asset starts out as a commodity and over time becomes a sunk cost (Clark and Wrigley 1995).

One implication of Figure 1 is that the market value of an asset is not an exhaustive definition of value. In fact, and quite paradoxically, as an asset ages it may become more important to our firm for competitive strategy within the industry than when the asset was an entirely tradable commodity.¹⁶ Clearly, as an asset ages

of property," decomposing it into a number of components, one of which is an "irreversibility premium" as well as an "intensity premium." Capozza and Li focus upon the intensity of capital use.

¹⁶ Another way of expressing this argument is to say that as the asset's market value wastes to zero, its intrinsic value to the firm increases to a

it becomes both less sophisticated with respect to the most recent generation of machines in the industry and more company-specific in how it is used within the company as compared to its initial design specifications. But it is equally possible that as it ages it becomes more valuable to the firm; its specificity becomes a strategic competitive variable for the firm, since its specificity cannot be reproduced by potential competitors. In this respect, there is value in specificity because it represents in physical form nonreplicable plant-level knowledge about both the production process and the market. Thus, the production value of an asset can be maintained by virtue of accumulated and related investments in infrastructure and work practices that, in combination, determine the quantity and quality of output. In this context, even an idle machine has value in deterring new competitors from entering the market. Spare capacity in the hands of a determined incumbent firm could be used to so drive down the market price for common products that potential competitors judge the cost of entry to be too high.¹⁷

point where the value peaks and then also begins to waste to zero and beyond (a negative value). The actual temporal profile of an asset's value would vary with the firm. This is the language of financial investment and options (see generally Dixit and Pindyck 1994).

¹⁷ Dean Hanink (pers. comm.) wonders if the existence of idle capacity would be a threat to managers' independence—in effect, an opportunity for corporate raiders to gain control of the firm and sell excess assets. This is possible. Managers would have to balance the value of idle capacity against the potential risk of takeover. But we must also acknowledge that market agents are not always so efficient in either collecting relevant information or valuing it in the same way managers and their competitors value information. Managers can “hide” their strategies from stockholders and market analysts while using their knowledge to threaten potential competitors.

The implications of our argument regarding the value of specificity are important. For a start, it can help explain why firms may be highly competitive even with second-best capital equipment. Our argument is helpful as well in understanding why some firms choose not to embrace the notion of flexibility (in the post-Fordist sense) while other firms may do so but then rapidly exit the industry. Moreover, our argument helps to make sense of the persistence of incumbents, as well as their inability to refinance capital stock.

Just as the firm's configuration of production capacity can be understood as an element in its maximum revenue strategy, the configuration of its capacity can also be seen to be part of its portfolio of assets. Indeed, just as the firm can be thought to diversify its systematic risk through differentiation, having a differentiated set of productive assets can be shown to be similarly important in diversifying the risks inherent in its strategic relations with other firms. For instance, given the different ages of Plants a and b, Plant a can be understood as a capacity threat to any new competitor that is made credible by the much-reduced market value of the asset and the high abandonment costs of closing the plant. In essence, assuming competitors are aware of our firm's configuration of productive capacity, their decisions about market entry must be judged against the incumbent firm's strategic options. By contrast, Plant b could be understood as an exchangeable market asset and hence a fungible resource with respect to the corporation's overall industry strategy. Thus, a variety of plants differentiated by age and value could be understood to be a portfolio of strategic options managed by the firm to meet expected and unanticipated competitive circumstances. Hence, it may not be worthwhile to rationalize productive capacity to just one megaplant, nor may it be worthwhile to organize production around just one vintage of capital. In this sense, decentralization may be the result of competitive strategy.

Management of Sunk Costs

In the previous two sections, we sought to establish why our firm may persist with a decentralized configuration of production rather than a centralized configuration. Notwithstanding higher transactions costs which may be associated with decentralization, we suggested that our firm may utilize a decentralization strategy so as to manage its risk-adjusted flow of revenue. We also suggested that a decentralized plant strategy, essentially a portfolio of differentiated assets (by age and functional value), would be one way our incumbent firm could protect its market from actual and potential competitors. The first scenario is entirely internal to the firm. At issue are the balance of costs and benefits with respect to the overall flow of revenue associated with various plant location strategies. The second scenario is actually about the firm in relation to its competitors and includes, for instance, the credibility of the firm's threats of retaliation should a new competitor attempt to invade its markets. Here, the differentiated asset base of the firm was shown to be one determinant of the scope of the firm's strategic options. In this regard, the inherited configuration of production can play a vital role in corporate planning, recognizing the inevitable constraints upon strategy imposed by such a configuration.

While a differentiated (by age and value) asset base can provide the firm with scope for strategic action in response to competitors, the configuration of production is also a constraint in the scope of strategy. In this sense, it should be obvious that the firm could turn out to have the wrong configuration and hence insufficient and/or inefficient strategic options as technology and market circumstances change in unanticipated ways. Thus, on the one hand, our firm has a two-sided (revenue and competition) portfolio management problem embedded in its inherited configuration of production. On the other hand, the scope of strategic action implied by its asset base may not provide sufficient options in the

face of unanticipated changing circumstances. The firm may be forced into radically changing the inherited configuration of production or it may have to manage that configuration in ways that break with past practices (and thereby deal with the residual risk factor identified above).

So, in this world of constrained strategic behavior and uncertainty (not just risk), the management of sunk costs is a crucial determinant of the firm's viability. To illustrate this claim, let us now extend the model in the following ways. Recognizing that the firm is committed to managing its net revenue, let us pause for a moment to consider what this means. By *net revenue*, we mean total revenue less the costs of production. This revenue goal could be standardized against each factor of production, and each unit of production, and could be measured on a product-by-product, market-by-market, and plant-by-plant basis. This slight shift in emphasis has not changed the logic of the previous argument; rather, it only seems that the measurement of performance has been altered. If we assume, however, that each plant (a and b) produces the same product for related markets but varies in terms of its per unit contribution to net revenue, the firm has another management problem added to the two identified above—that is, a problem of managing the costs of production with respect to its desired flow of net revenue. Thus, it is easily understood how and why the firm may switch the volume of production between plants within a portfolio of plants; switching could accomplish a variety of management goals, including *the planned flow of risk-adjusted revenue*, broadening the scope of available *strategic responses to competition*, and *increasing total net revenue*.

With respect to the Marshallian firm, these management goals could be thought to be amenable to a simple technical solution. The entrepreneur-owner-manager would use an algorithm by which each plant's contribution to overall net revenue is measured and its allocated volume of production varied (or switched) accordingly,

assuming a simultaneous resolution of the firm's other two management problems. But in the modern corporation, the authority of corporate managers is by no means equal to that of Marshall's (or Adam Smith's) idealized owner-manager, a point recognized many years ago by Berle and Means (1932). Most obviously, it is apparent that the interests and goals of managers are rarely completely coincident with the modern corporation's shareholders; this is, of course, the classic principal-agent problem that looms large in the economics literature (see the seminal paper by Grossman and Hart 1982).¹⁵ It is also apparent that there are real problems in designing contracts for managers that are efficient in the sense of preserving the interests of shareholders (Baker 1992). In fact, given the inability of most shareholders to make informed judgments about the operating environment and proper competitive strategy of the firm, it would seem best that managers have wide discretion, even if this means higher costs of surveillance and recurrent tests of loyalty applied to managers by owners. There is also, of course, the issue of management's authority in relation to workers given the evolving regulatory framework of countries' industrial relations.¹⁹

Focusing just on the third management problem—increasing plant-by-plant net revenue—we would like to emphasize an aspect of the contested relationship between owners and managers. As a practical matter, we believe that the imagined algorithm for allocating production between the firm's plants fails to recognize

¹⁵ For a detailed assessment of the principal-agent problem with regard to owners and managers see Gordon (1994). He makes the point that there are a variety of ways of resolving the tension between the owners and managers of the modern corporation. He also notes that this issue may be less important in the 1990s than it was in the 1980s.

¹⁹ See the recent report by Millward (1994) on the British government's deliberate policy of increasing managers' "right to manage" through the changing structure of industrial relations law.

that managers' power to plan and implement those plans is dependent upon the resolution (even if momentarily) of three basic issues that are ever-present in the Anglo-American corporation. Managers' capacity to *realize* the apparent advantages of their portfolio of assets in relation to the actions of competitors is similarly dependent upon resolution of these issues. Furthermore, the management of sunk costs, managers' capacity to identify and use the functional value of the various assets that make up the firm, depends upon resolution of these issues. These components of the management problem are summarized in Table 1. The existence of these issues or components is a function of the historical and legal structure of the Anglo-American corporation (Roe 1994); they profoundly affect the bilateral relationships between managers and the firm's internal stakeholders (like workers). In one column of the table is the ideal or desired conception of the issue, and to the right is its obverse.

Each of these issues is, in one form or another, a variant on the other. For instance, resolution of the issues of cooperation and commitment presupposes resolution of the issue of information. At the same time, cooperation may be necessary to resolve the issue of information. How can agreement be reached without sharing information essential to managers' and stakeholders' assessment of their particular interests (Trebilcock 1993)? In another sense, these issues represent a hierarchical order of significance moving from the first to the third in order of institutional complexity and potential benefit to management. For instance, while stakeholders may, by accident or not, mislead management about their plant's potential labor productivity, recognition of the antagonistic interests of stakeholders in each particular plant may lead management to use different strategies between plants.²⁰

²⁰ To be efficient in its management of sunk costs, the firm's strategists would have to be

Table 1
Components of the Management Problem

	Ideal Conception	The Opposite Dimension
Problem 1	<i>Full information</i> about market conditions, on the one hand, and the circumstances of each plant, on the other hand, including their labor productivity, quality of output, operating capacity, capacity potential, and flexibility of use.	<i>Asymmetrically distributed information</i> , representing the specific locations of the firm's competitors and stakeholders being a problem that is costly to overcome and a problem that depends upon cooperation with others to resolve.
Problem 2	<i>The cooperation of others</i> (managers, workers, technicians, etc.) at the plant level in providing information for the effective planning of the firmwide configuration of production and in carrying out revenue plans conceived by corporate strategists.	<i>Bilateral terms of cooperation</i> , involving the implicit or explicit specification of contracted items of agreement between management and its internal stakeholders for the flow of information through the organization and the implementation of its tasks.
Problem 3	<i>The commitment of others</i> (including the managers) to the firm's goals and objectives, recognizing that at the plant level local stakeholders may have very different interests from the firm's strategists and external shareholders.	<i>The antagonist interests of others</i> , especially the firm's stakeholders, who may value continuity and certainty of employment (for example) higher than the firm's corporate strategists, who may value flexibility more than any other goal.

To illustrate, let us imagine that Plant a becomes important to the firm because of the threat of entry into the market by a new competitor. Let us also assume that the plant is used by the firm as a source of added capacity, in effect turned on and turned off according to market demand and the actions of rivals and potential rivals. To use the plant in these ways would require an intense and continuing flow of information, cooperation, and commitment. On the other hand, if Plant b is used to fill continuing demand based upon commodity prices assured by long-term con-

tracts, it may be less important to the firm to have such an intense flow of information, cooperation, and commitment. Indeed, in Plant b the interests of management and the firm's local stakeholders may coincide (overlap) rather than have to match exactly, whereas in Plant a management may have to deliberately organize local and firm interests in ways that match the level of commitment necessary for the firm to be competitive in the most hostile segments of the market. As a consequence, the firm may have to differentiate its institutional structure spatially and even differentiate (between plants) its contracts with stakeholders. In this sense, differentiation by plant may be essential to its overall management of fixed assets and hence to the flow of market revenue.

At one level, the framework sketched above may be thought to rely upon an implied notion of cooperative exchange—a liberal, voluntary vision of institutional management and design. In effect, the example above of managing plants with respect to market strategy seems to imply a

able to judge the flow of information from stakeholders against their known (or suspected) interests. Likewise, stakeholders would have to assess their level of cooperation with management in providing information about their plant in accordance with their own assessment of the firm's interests. As a consequence, a complex game of concealment and revelation may emerge, depending upon one another's imagined interests (see Clark 1993, Chap. 8).

world of benign difference. Each of the three issues is actually, however, a version of a more profound underlying problem: the power of management in the market (external) and in the firm (internal) to achieve its goals relative to the goals of shareholders and stakeholders. At issue is the capacity of management literally to control and direct the production processes of the firm in the interests of their revenue goals. Embedded in our summary statement of the three dimensions of this problem is an argument to the effect that just as managers are shareholders' agents so too does management rely upon others (stakeholders) within the firm for the implementation of their plans and realization of their goals and objectives. Our argument, then, is that the management of sunk costs is a social process that goes far beyond the utilitarian ethos of transactions cost economics (see Hodgson 1994). Thus, management and stakeholders need not always come to a cooperative and jointly resolved (pareto-optimal) set of objectives. Nor need bilateral agreements be efficient in the sense of being the best solution (as opposed to second or third best solutions). Conflict could be (and is, in some cases) endemic to larger multifunctional and multilocal firms.

Clearly, we have only suggested how and why the management of capital assets/sunk costs in the Anglo-American corporation is so important. There is a great deal more to be written about the realization of value in firms characterized by significant sunk costs. Elsewhere, though, Clark (1988) has suggested that one way U.S. steel corporations have attempted to realize the value of sunk costs in relation to heightened levels of intraindustry competition has been to implement new industrial relations contracts, differentiated within the firm on a plant-by-plant basis in accordance with the specific history of labor-management relations in each plant. As conceived, this kind of strategy sought both to improve the plant-by-plant performance of the particular corporation and to experiment with alternative and competing institutional

arrangements in the hope of identifying models of management that would be more reliable with respect to overall corporate competitiveness; hence, the relevance of the point made earlier in this paper about the value of decentralized labor relations with respect to maintaining the differentiation of labor contracts. While originally conceived as an issue of labor-management relations (Clark 1981), it is also an important aspect of the management of firms' capital assets.

Spatial strategies are important. But there are other kinds of strategies, some of which have obvious spatial analogues, though not all necessarily so. Here, we wish to briefly identify a set of institutional options that may be thought capable of resolving in the short term, or perhaps over the long term, the conflicting issues identified above. These institutional strategies have been tried by many firms in their attempts to stabilize the conflict between management and internal stakeholders with respect to the management of sunk costs. Our analysis here is purely illustrative, not definitive. Table 2 summarizes the potential value of four institutional options, beginning with an intrafirm focus upon "core" interests, moving to a system of worker and management stock options, through to literally selling ownership of the plant or firm to management (in a leveraged buy out) or to workers in some kind of ESOP (employee stock ownership plan) deal (see Huddart 1994).²¹

As we conceptualize each option, the potential of each with regard to resolving the three issues noted above varies from "low" to "high" potential. "Low" means either having only a short-term effect or having a small effect over the long run. Of

²¹ Note the close, but quite antagonistic, relationship between the ESOP option and the management leveraged buy out (LBO) option. ESOP places a premium upon the commitment of labor, while LBO places a premium on management's dominance of labor (Wrigley 1998).

Table 2
Potential Value of Institutional Options

Problem	Options			
	Core Focus ^a	Stock Options ^b	Management LBO ^c	ESOP ^d
Information	Medium	Medium	Mixed	High
Cooperation	Low	Medium	Mixed	High
Commitment	Low	Medium	Mixed	High

Source: after Hamel and Prahalad (1994).

^a *Core Focus* refers to the restructuring of a corporation around what many analysts believe is the firm's principal assets and competencies.

^b *Stock Options* is a strategic option that rewards key managers for decisions about the structure and form of the firm, recognizing the possibility of internal loyalties.

^c *Management Leveraged Buy Out* is an option in which firms increase their level of debt by borrowing against future cash flow.

^d *Employee Stock Ownership Plan* is an option built around the belief that workers, when committed through ownership, enhance internal decision making.

course, the management of the firm may only be interested in a short-term effect. The management of the firm may also have different priorities with regard to each problem and with regard to each plant and its desired local and firmwide flow of information, cooperation, and commitment. We contend that these institutional options are indicative of recent practice in the Anglo-American world (see Hamel and Prahalad 1994). We also recognize, however, that the particular relevance and significance of each option is contingent upon the inherited circumstances of particular firms. And in this regard, we also hypothesize that the implementation of each option may have a close, even intimate relationship with the plant-by-plant configuration of the firm. For instance, selecting among the firm's plants for a suitable site for a core-focus strategy may be a very important element in the success of such a venture. Even so, we think it is practically impossible to a priori define the virtues of each option with regard to these three issues, and with regard to the inherited spatial configuration of the firm, without further detailed research.

More generally, each institutional option for realizing the value of sunk costs depends upon a set of implicit or explicit rules (or norms) which together define the power relations among the various stakeholders in the firm. These rules define who has authority over what issues. It is apparent that a firm could treat the spatial configuration of the company as a portfolio of options, reflecting their past experience with unions, worker participation, and the like. In some cases, like the *core-focus* arrangement, the arrangement of power may favor management just because of the stability of production and the continuity of market position assigned to Plant b.²² In other cases, power may have to be shared, even given up, if management is to take

²² For the most part, the core-focus option has been an important aspect of corporate restructuring since the 1980s. This option has been an important motivation for divestiture and leveraged buy outs. The most comprehensive analysis done on the success of management-led leveraged buy outs is by Lichtenberg (1992).

advantage of the firm's capital configuration. We do not intend to take this point much further; it is sufficient to emphasize for the moment the possibility of a differentiated order of power between plants in the firm's overall configuration of production. This order would be in part instrumental, matching and overlapping the functional value of capital, and could be in part geographic, matching the role and significance of each plant in the (economic and social) evolution of the firm.

It is also possible that this order may be truncated by virtue of what management can achieve by way of its revenue goals outside of the firm. In this respect, our firm may become a single-plant firm, thereby being wholly centralized if it can utilize other firms' assets in ways that meet its strategic interests in its markets. In that case, the firm could become a spatially elongated production function sustained by external networks between firms rather than within firms.

Conclusions

In this paper, we have sought to make a number of contributions to the theory of corporate geography. First, we have argued for a better understanding of the spatial structure of the Anglo-American corporation. Whereas some analysts in economics and geography seem transfixed by Marshallian firms and the persistence of industry-regions, we argue that economic geographers should extend the focus by recognizing the concurrent geographic spread of productive capacity and the continuing tension within firms between spatial concentration and decentralization. Second, and in that context, we have argued that the separation between owners and managers and the contested relationship between managers and the various stakeholders in firms are vital aspects of the contemporary corporation. It seems odd that for all the work in economic geography on corporate governance the geographic implications of the separation between ownership and control have been relatively

ignored (but see Harrison 1994). Third, we have also suggested how and why the related notions of corporate strategy and sunk costs can help explain firms' spatial configuration of productive capacity.

To make our points about the configuration of the firm, the analysis began with an idealized model, which was then broadened using a set of tools that have their origin in corporate finance (Stern and Chew 1986). Here, notions of risk and uncertainty, portfolio management and diversification, and the functional value of capital were deployed in ways that demonstrated the value of corporate persistence and decentralization. Along the way, however, we also emphasized that identified corporate strategies should not be imagined to be perfect; we are not aiming to reinvent corporate geography as a set of efficient planning algorithms, as most economists would seem to want to design economic geography. We do not wish to reinvent Christaller or Weber. Quite the contrary. We are mindful of the evidence gleaned by geographers and others about the imperfect nature of corporate strategy (see Clark 1989, 1993; Schoenberger 1997; Wrigley 1994). If we take seriously the world of disequilibrium and contingency, we must also take seriously the wide scope of possible solutions which falls outside of the simplest optimizing models of economists and geographers.

Our approach to the spatial configuration of the firm has three features. Most generally, we are concerned with integrating or linking aspects of the firm with which we (as economic geographers) are familiar, such as the internal spatial division of labor, to elementary themes in corporate finance. To understand how Anglo-American corporations are managed in these last years of the twentieth century requires a greater appreciation of the insights to be gleaned from new developments in corporate finance. A second feature of our research has been to link geographers' detailed knowledge of the structure and performance of firms with more general threads and principles derived

from economics. This does not mean that our case material is simply the raw material for economic theory building. As we have tried to show, with reference to the work of Cyert and March and others, there are ways of proceeding that allow for a rapprochement between geography and economics that do justice to both perspectives in economic geography. Finally, we have tried to show that the spatial configuration of the firm is the result of a complex set of considerations: risk management, strategic management, and sunk costs management. Transactions costs are important. But we have sought an explanation of the spatial configuration of the firm that is principally about the internal structure of control, not the logic of spatial agglomeration economies (however important).

References

- Allen, F., and Gale, D. 1994. A welfare comparison of the German and US financial systems. Working Paper no. 13-94. Philadelphia: Wharton School, University of Pennsylvania.
- Aoki, M. 1988. *Information, incentives, and bargaining in the Japanese economy*. Cambridge: Cambridge University Press.
- Baker, G. 1992. Incentive contracts and performance measurement. *Journal of Political Economy* 100:598-614.
- Bartmess, A. 1994. The plant location puzzle. *Harvard Business Review* 72(2):20-37.
- Baumol, W.; Panzar, J. C.; and Willig, R. D. 1988. *Contestable markets and the theory of industrial structure*. Rev. ed. New York: Harcourt, Brace and Jovanovich.
- Berle, A., and Means, G. 1932. *The modern corporation and private property*. New York: Macmillan.
- Capozza, D., and Li, Y. 1994. The intensity and timing of investment: The case of land. *American Economic Review* 84:889-904.
- Chowdhry, B., and Nanda, V. 1994. Financing of multinational subsidiaries: Parent debt vs. external debt. Working Paper no. 1-93. Los Angeles: John E. Anderson School of Management, University of California.
- Christie, A.; Joyce, M. P.; and Watts, R. L. 1993. Decentralization of the firm: Theory and evidence. Mimeo. W.E. Simon Graduate School of Business Administration, University of Rochester, Rochester, N.Y.
- Christopherson, S. 1993. Market values and territorial outcomes: The case of the United States. *International Journal of Urban and Regional Research* 17:274-88.
- Clark, G. L. 1981. The employment relation and spatial division of labor: A hypothesis. *Annals of the Association of American Geographers* 71:412-24.
- . 1988. Corporate restructuring in the US steel industry: Adjustment strategies and local labor relations. In *America's new economic geography*, ed. G. Sternlieb and J. Hughes, 179-214. New Brunswick, N. J.: Center for Urban Policy Research, Rutgers University.
- . 1989. *Unions and communities under siege: American communities and the crisis of organised labour*. Cambridge: Cambridge University Press.
- . 1993. *Pensions and corporate restructuring in American industry: A Crisis of regulation*. Baltimore: Johns Hopkins University Press.
- . 1994. Strategy and structure: Corporate restructuring and the nature and characteristics of sunk costs. *Environment and Planning A* 26:9-32.
- Clark, G. L., and Wrigley, N. 1995. Sunk costs: A framework for economic geography. *Transactions of the Institute of British Geographers* n.s. 20:204-23.
- Comley, R. G., and Hanink, D. 1985. Location portfolio analysis. *Geographical Analysis* 17:318-30.
- Cyert, R., and March, J. 1992. *The behavioural theory of the firm*. 2d ed. Oxford: Blackwell.
- Demski, J. S., and Sappington, D. E. 1987. Delegated expertise. *Journal of Accounting Research* 25:68-89.
- Dicken, P., and Thrift, N. 1992. The organisation of production and the production of organisation: Why business enterprises matter in the study of geographical industrialisation. *Transactions of the Institute of British Geographers* n.s.17:279-91.
- Dixit, A. K., and Pindyck, R. 1994. *Investment under uncertainty*. Princeton: Princeton University Press.
- Froot, K.; Scharfstein, D.; and Stein, J. 1993. Risk management: Coordinating corporate investment and financing policies. *Journal of Finance* 48:1629-58.

- Geltman, E. A. G. 1992. Disclosure of contingent environmental liabilities by public companies under the federal securities law. *Harvard Environmental Law Review* 16:129-74.
- Gertler, M. 1993. Implementing advanced manufacturing technologies in mature industrial regions: Towards a social model of technology production. *Regional Studies* 27:665-80.
- Gordon, J. 1994. Institutions as relational investors: A new look at cumulative voting. *Columbia Law Review* 94:124-92.
- Grossman, S., and Hart, O. 1982. An analysis of the principal-agent problem. *Econometrica* 51:7-46.
- Hamel, G., and Prahalad, C. K. 1994. *Competing for the future*. Boston: Harvard Business School Press.
- Hanink, D. 1984. A portfolio theoretic approach to multiplant location analysis. *Geographical Analysis* 16:149-61.
- Harrison, B. 1994. *Lean and mean: The changing landscape of corporate power in the age of flexibility*. New York: Basic Books.
- Hart, O. D. 1995. *Firms, contracts and financial structure*. Oxford: Clarendon Press.
- Harvey, D. 1982. *The limits to capital*. Chicago: University of Chicago Press.
- Hodgson, E. M. 1994. Corporate culture and evolving competencies: An "old" institutionalist perspective on the nature of the firm. Mimeo. Judge Institute of Management Studies, University of Cambridge.
- Huddart, S. 1994. Employee stock options. *Journal of Accounting and Economics* 18:207-31.
- Huddart, S., and Lang, M. 1996. Employee stock options exercises: An empirical analysis. *Journal of Accounting and Economics* 20:236-49.
- Jensen, M., and Meckling, H. W. 1976. Theory of the firm: Managerial behaviour, agency costs and ownership structure. *Journal of Financial Economics* 3:305-60.
- Krugman, P. 1994. Complex landscapes in economic geography. *American Economic Review* 84:412-16.
- Laulajainen, R., and Stafford, H. 1995. *Corporate geography: Business location principles and cases*. London: Kluwer Academic.
- Lazonick, W. 1994. Social organization and technological leadership. In *Convergence of productivity*, ed. W. J. Baumol, R. Nelson, and E. Wolff, 164-93. New York: Oxford University Press.
- Liebowitz, S. J., and Margolis, S. E. 1995. Path dependence, lock-in, and history. *Journal of Law and Economics and Organisation* 7:205-26.
- Lintner, J. 1965. Security prices, risk and maximal gains from diversification. *Journal of Finance* 20:587-615.
- Litchenberg, F. 1992. *Corporate takeovers and productivity*. Cambridge: MIT Press.
- Lowenstein, L. 1993. More like whom? *Journal of Corporation Law* 18:697-706.
- Massey, D. 1995. Masculinity, dualisms, and high technology. *Transactions of the Institute of British Geographers* n. s. 20:487-99.
- Mata, J. 1991. Sunk costs and entry by small and large plants. In *Entry and market contestability*, ed. P. A. Geroski and J. Schwalbach, 49-62. Oxford: Blackwell.
- Mehta, S. R. 1992. Why do firms decentralize when they expand? Working Paper no. 1033. West Lafayette, Ind.: Krannert Graduate School of Management, Purdue University.
- Millward, N. 1994. *The new industrial relations*. London: Policy Studies Institute.
- Modigliani, F., and Miller, M. 1958. The cost of capital, corporation finance and the theory of investment. *American Economic Review* 48:261-97.
- Opler, T. C., and Titman, S. 1994. Financial distress and corporate performance. *Journal of Finance* 49:1015-40.
- Roe, M. J. 1994. *Strong managers, weak owners*. Princeton: Princeton University Press.
- . 1996. Chaos and evolution in law and economics. *Harvard Law Review* 109:641-68.
- Salais, R., and Storper, M. 1992. The four worlds of contemporary industry. *Cambridge Journal of Economics* 16:169-93.
- Scherer, F. M. et al. 1975. *The economics of multi-plant operation: An international comparisons study*. Cambridge: Harvard University Press.
- Schoenberger, E. 1997. *The cultural crisis of the firm*. Oxford: Basil Blackwell.
- Scott, A. 1988. *New industrial spaces: Flexible production organisation and regional development in North America and Western Europe*. London: Pion.
- Sharpe, W. F. 1964. Capital asset prices: A theory of market equilibrium under conditions of risk. *Journal of Finance* 19:425-42.
- Stern, J., and Chew, D., eds. 1986. *The revolution in corporate finance*. Cambridge, Mass.: Basil Blackwell.

- Trebilcock, M. J. 1993. *The limits of freedom of contract*. Cambridge: Harvard University Press.
- Walker, R. 1989. A requiem of corporate geography: New directions in industrial organisation, the production of place and uneven development. *Geografiska Annaler* 71B:43–68.
- Webber, M. J. 1987. Quantitative measurement of some Marxist categories. *Environment and Planning A* 19:1303–22.
- Williamson, O. 1988. Corporate finance and corporate governance. *Journal of Finance* 43:567–91.
- Wrigley, N. 1994. After the store wars: Towards a new era of competition in U.K. food retailing? *Journal of Retailing and Consumer Services* 1:5–20.
- . 1996. Sunk costs and corporate restructuring: British food retailing and the property crisis. In *Retailing, consumption and capital: Towards the new retail geography*, ed. N. Wrigley and M. S. Lowe, 116–36. London: Longman; New York: Addison-Wesley.
- . 1997. British food retail capital in the USA. Pts. 1 and 2. *International Journal of Retailing and Distribution Management* 25:7–21, 48–58.
- . 1998. Retailing and the arbitrage economy—market structures, regulatory frameworks, investment regimes, and spatial outcomes. In *Regional institutions and technology*, ed. T. Barnes and M. Gertler. London: Routledge, forthcoming.