UNIVERSITY OF CALIFORNIA
Los Angeles

Political Barriers to Market Convergence: Electoral Systems, Political Coalitions, and Corporate Governance

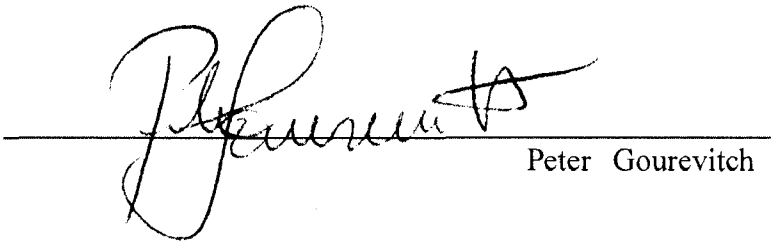
A dissertation submitted in partial satisfaction
of the requirements for the degree
Doctor of Philosophy in Political Science

by

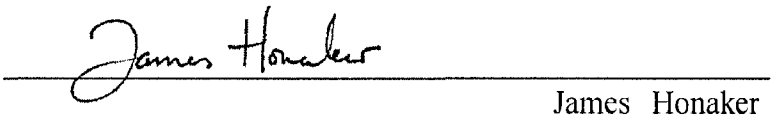
Jaekwon Suh

2008

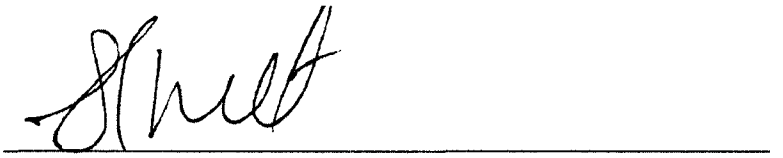
The dissertation of Jaekwon Suh is approved.



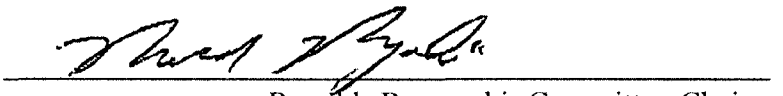
Peter Gourevitch



James Honaker



Jean-Laurent Rosenthal



Ronald Rogowski, Committee Chair

University of California, Los Angeles

2008

To my parents . . .

who were always standing next to me,

showing selfless love and unwavering trust

throughout my long journey to the doctoral degree

TABLE OF CONTENTS

3 Asset Specificity, Corporate Governance, and Market Competition?

LIST OF FIGURES

LIST OF TABLES

ACKNOWLEDGMENTS

I would like to start my acknowledgement by expressing my sincere gratitude to my mentors, who have been models of intellectual rigor and moral integrity. My most sincere appreciation goes to my advisor, Ronald Rogowski. This dissertation is the result of the seed he planted during the summer 2005. Even while he was busy as the Interim Dean and Vice-Provost of International Institute at UCLA, he consistently watered, trimmed and fertilized my intellectual curiosities.

I am also indebted to Barbara Geddes. Whenever I faced problems, not limited to academic matters, she encouraged me and showed me a way to move forward. James Honaker deserves my deep gratitude for his intellectual and moral influence as a teacher. He volunteered his support as well as kept up my morale by sharing his experience as a graduate student and a job searcher. I cannot forget the kindness he exhibited when he assisted me with my job placement. Peter Gourevitch always surprised me with how quickly he responded to my questions. In addition, I benefited from his social network because whomever he referred to offered generously of their knowledge and insights. Jean-Laurent Rosenthal enlightened me with his wide-ranging knowledge of economics, history and methodology and his constructive criticism.

I also thank Professors John Aldrich, David Austen-Smith, Kathleen Bawn, Michael Chwe, James DeNardo, Rob Franzese Jr., Jim Granato, Yong-Jick Kim, Jeffrey Lewis, Kigon Nam and Barry O'Neil. While all I can do not is show my appreciation in this limited space, their support and kindness will always be in my unlimited mind space.

I express my gratitude to my colleagues, Masahiko Asano, Lisa Blaydes, Eric Chang, Linda Choi Hasunuma, Ron Den Otter, Julia Gray, Scott Hoaby, Dan Kotin, John McCauley, Hiroki Takeuchi, Joe Wright, Shin-Shen Yuan, Stan Wong, Vivian Zhan, Xin Zhang and Eric Zusman. In particular, I would like to give my special thanks to Eric Zusman for his unyielding support and assistance during my entire UCLA life.

Namhee Lee, Yong Heun An, Jae Joon Jang, Woojin Moon, Minsik Choi, Sang Eul Shin, Doo Seop Jeong, Henry Hong Heo, Yoon Soo Choi, Hyunwook Kim, Jeongil Kim, Chang Suk Suh, Eunyoung Ha, Byung Il Ahn, Seung Woo Lee, Bon Sang Koo, Kyungjoon Han, Hyejee Cho, Woolyeal Paik, Jaehyoek Shin, Hye Yong Kim and Koo Hyun Jeong have refreshed my day by providing an atmosphere of collegiality. College friends, Young Sik Bong, Wook Heon Heo, Joon Yeon Kim, Hyuk Sung Kwon, Kwang Hwan Lee, Na Young Lee, Chang Ho Park, Je Sung Park, Il Kyung Ra, Jung Min Seo and Jin Seog Yu deserve my gratitude. I would like to give my special thanks to another college friend, Byung-Jae Lee. Without his support since our college days, my long journey to the doctoral degree would have been far more difficult.

My deepest appreciation goes to my parents. They were always standing next to me, showing selfless love and unwavering trust throughout my long graduate school years. I am grateful to my brothers and sisters, Sung Soo, Kyung-Ae, Jong Gui, Yeon Suk, and Ok Hee Kim, who always took care of my ego and morale. I also thank my nephews and niece, Jung Han, So Hyun, Woo Suk and Hyun Suk, who have given me more love and joy than they realize. I dedicate this dissertation to my family with all my love, admiration and gratitude.

VITA

1967	Born in Incheon, Korea
1990	B.A. (Political Science), Yonsei University, Seoul, Korea
1990 - 91	Research Assistant, Institute of East and West Studies, Yonsei University, Seoul, Korea
1992	M.A. (Political Science), The Graduate School of Yonsei University, Seoul, Korea
1992 - 95	Troop Teaching and Information Officer, Army, Korea
1994	A Committee Member for Military Reform, The Ministry of Defense, Korea
1996 - 98	Director for Planning and Management, Shilla Chemical Machinery Co., Incheon, Korea
2002 - 03	Teaching Assistant, Department of Political Science, University of California, Los Angeles
2003	M.A. (Political Science), University of California, Los Angeles
2004 - 05	Teaching Associate, Department of Political Science, University of California, Los Angeles
2005 - 06	Teaching Fellow, Department of Political Science, University of California, Los Angeles
2006	NSF Grant, Summer Institute for Empirical Implication of Theoretical Model, University of Michigan, Ann Arbor

2006 - 07	University Fellowship, Department of Political Science, University of California, Los Angeles
2007 - 08	Dissertation Year Fellowship, Department of Political Science, University of California, Los Angeles
2008	Ph.D. (Political Science), University of California, Los Angeles
2008 -	Visiting Assistant Professor, Department of Political Science, Truman State University, Kirksville, Missouri

ABSTRACT OF THE DISSERTATION

Political Barriers to Market Convergence :

Electoral Systems, Political Coalitions, and Corporate Governance

by

Jaekwon Suh

Doctor of Philosophy in Political Science

University of California, Los Angeles, 2008

Professor Ronald Rogowski, Chair

This dissertation is about the political causes and the economic consequences of corporate governance. I began this project with a big question: why have significant reductions in geographical and technological barriers to international trade and investment not led to greater market integration. Building on a two-step sequential causal model running from electoral systems, via corporate governance to national competitive prices, I answer three specific questions: how electoral systems shape political coalitions among corporate stakeholders (entrepreneurs, workers and rentiers); how government regulations from the political coalition reformulate the market environment; and how

firms adapt themselves to the market environment? Formalization of the theories and empirical tests are conducted in three independent but interrelated essays of the dissertation.

The first essay, titled "*Why People Pay Less under Majoritarian Systems*" demonstrates two points: 1) majoritarian electoral systems tend to produce a corporate governance structure that favors rentiers in the financial capital market while proportional electoral systems tend to produce a corporate governance structure favoring workers in the labor market; and 2) firms set different prices in goods and service markets depending *upon the corporate governance structure* which determines the level of market competition. To confirm this two-step sequential causation, I conduct two-stage least square regression analysis of cross-national variation of purchasing power parity.

The second essay, titled "*Corporate Governance under Proportional Electoral Systems.*" I elaborate upon the first step of the theoretical model in the previous essay by detailing the political process involved in electoral competition. Based on a multi-stage game-theoretic model of three-party competition under proportional electoral systems, I find that the electoral threshold — a minimum percentage of votes a party must receive to acquire at least one seat in parliament — has a negative effect on the degree of minority shareholder protection and ownership dispersion. This finding represents an important modification to formal models in the political economic literature that tend to omit the political process for convenience's sake during optimization. Using simple regression analyses, empirical tests confirm the effect of electoral threshold on minority shareholder protection and ownership structure.

The third essay is titled "*Asset Specificity, Corporate Governance and Market Competition: Consumer Price Implications.*" This essay refines the second-step of the theoretical model in the first essay linking corporate governance types to competitive price levels. Based on oligopolistic competition models whether there is competition with or without delegation between owners and managers, I show that firms under blockholder type corporate governance set prices higher than counterparts under the shareholder type of corporate governance. Utilizing industry level observations, empirical tests confirm the effect of corporate governance on industry level-prices measured by industrial concentration, but only with a subset of advanced countries. By relaxing a theoretical assumption about firms' choice of competition strategy, I show that corporate governance exerts a nonlinear effect on price levels between middle-income developing countries and high-income advanced countries.

CHAPTER 1

Why People Pay Less under Majoritarian Systems?:
Electoral Systems, Corporate Governance and Price

1.1 Introduction

National competitiveness refers to "the ability... to produce goods and services that meet the test of international markets and simultaneously to maintain and expand the real income of its citizens." (Buckley et al., 177) In recent years, the widening and deepening of globalization has generated a great deal of interest in this concept. Multinational corporations and investors weigh national competitiveness in their decision-making. International organizations and foreign consultants rank countries by their national competitiveness. And foreign governments recognize that national competitiveness is essential to surviving—if not prospering—in an increasingly integrated global economy.

The growing relevance of national competitiveness gives rise to an important question: how can one measure national competitiveness? Though there are numerous indices, in this study the focus is on the price level of goods and services. How do prices affect national competitiveness? All things being equal, the lower a country's price, the higher a country's national competitiveness. This is because, from the perspective of producers, lower prices reduce wage pressures, improve government services (due to limits on rent seeking), and ease access to factors of production. It is also because, from

the perspective of consumers, lower prices increase the purchasing power of disposable incomes.[1]

While the theory underlying the benefits of low prices is largely economic, price setting itself is frequently political. Because governments play a role in allocating scarce resources and privileging certain sectors over others (even in democratic countries), price setting cannot be divorced from politics. If so, how does politics affect prices? Or, to put it slightly differently, is there a political explanation for price differences across countries? This paper answers this question by, first, examining the relationship between electoral systems and prices; and, then, examining an intervening variable that has received insufficient attention in previous studies on the relationship between electoral systems and prices: *corporate governance.*

Defined broadly, corporate governance refers to private and public institutions, including laws, regulations and accepted business practices, which together govern the relationship between corporate managers and entrepreneurs, on the one hand, and those who invest resources in corporations, on the other hand. Investors can be rentiers such as shareholders and creditors and workers as suppliers of human capital. (Olman 2001, 13) In short, corporate governance is a bundle of institutions regulating two factor markets for production: *the financial market and labor market.*

In paying greater attention to this bundle of regulatory institutions, the study draws on two previous studies. The first is Rogowski and Kayser's (RK) political

[1] One might suggest that this assertion is too strong because prices measured by purchasing power parity cannot account for the quality of goods and service. Nevertheless, it is not possible to deny there is a welfare loss from higher prices.

explanation of prices (2002), which suggest that majoritarian electoral systems have lower prices than proportional systems. The second is Pagano and Volpin's (PV) political explanation of corporate governance (2005), which contends that majoritarian electoral systems bring about higher levels of shareholder protections at the expense of employment protections, while proportional electoral systems tend to result in higher levels of employment protections at the shareholders' expense.

Both of these studies point to electoral systems as the 'political' determinants of their respective dependent variables: RK explains price differences and PV explains differences in types of corporate governance. But what if the variation in prices is a function of different types of corporate governance, which is a function of different electoral systems? That is, what if corporate governance mediates the relationship between electoral systems and prices? Actually, these "what if" statements underpin the argument advanced in this study.

This argument is based on a two-stage sequential model. The first step concentrates on how different electoral systems generate different types of corporate governance, which captures a summary of two factor market situations. The second step brings in a firm's decision-making strategy on prices in the market for goods and services.[2] This paper contends that price depends on a firm's profit maximizing behavior constrained by a given country's type of corporate governance. The paper sets out to test the following proposition. Two equilibriums are found in a simple two-stage price setting

[2] As far as corporate governance is concerned, "firms" are limited to listed corporations in the stock market. Even with this limited definition of the firm, this paper's argument on prices at the national level is tenable. This is because those listed firms' shares in national economic activities should be large enough to affect the economy in general.

model: *A majoritarian electoral system leads to a low price equilibrium, while a proportional electoral system leads to a high price equilibrium.* Majoritarian electoral systems tend to produce a corporate governance structure that favors rentiers in the financial capital market. Proportional electoral systems tend to produce a corporate governance structure favoring workers in the labor market. Emphasizing the firm's decision-making strategy, I show why a firm bids differently for the price in goods and service markets depending *upon the corporate governance structure (blockholder or shareholder).*

The remainder of this paper is divided into three sections. The first section presents the theoretical intuition behind incorporating corporate governance into a model of electoral systems and prices. The second section provides the empirical implications of the model. The final section discusses related research issues and concludes.

1.2 Theoretical Model

This section will present a theoretical model that demonstrates how corporate governance mediates the relationship between electoral systems and prices. The model is based on a two-stage sequential game played across two factor markets and a product market. The two-stage sequential game illustrates, first, how electoral systems shape the type of corporate governance, and then, how firms set prices in a product market given a type of corporate governance.

1.2.1 First Stage: Factor Markets

1.2.1.1 Agents

The first stage of theoretical model shows how a certain type of electoral system results in a certain type of corporate governance. PV (2005) provides the base framework for this game. Three agents are assumed: Entrepreneur, Rentier and Worker. These three agents have a significant stake in the type of corporate governance, and will behave strategically to acquire the type of corporate governance that maximizes their perceived benefits. As mentioned previously, the type of corporate governance corresponds to a bundle of institutions regulating the capital and labor markets. Shareholder protection is the key issue between rentiers and entrepreneurs in the capital market. Employment protection is the key issue between workers and entrepreneurs in the labor market.

Entrepreneurs establish firms by hiring workers and raising capital. They are assumed to produce goods and services at a minimum cost. That is, they attempt to minimize labor (wage and worker's welfare) and capital costs (dividends and interest payment to bonds). Toward this end, entrepreneurs become involved in the political arena to limit challenges from labor and rentiers as well as extract regulatory decisions from governments that institutionalize limits on these challenges. They also become involved in the economic arena to increase the operating efficiency of their firm.

In the political and economic arena, entrepreneurs may confront three possible scenarios. The first and most preferred of the three is when entrepreneurs have exclusive control of their business vis-à-vis other factor owners. In this case, entrepreneurs consistently replace less productive with more productive workers and constantly exploit rentiers by concealing business accounts and other important financial information. This

first scenario is, by and large, untenable in mature democracies as numerous constitutionally protected avenues—chief among them the right to vote—allow workers and rentiers to influence labor market and corporate regulations that guard against such practices.

The second and the third scenario are more tenable but less preferred. In these cases, entrepreneurs strike a deal with labor or rentiers to form a coalition. The coalition allows entrepreneurs to gain greater, though not exclusive, control of their assets and thereby keep down production costs. Thus, for example, in the second scenario entrepreneurs may concede employment protections in exchange for the recognition that entrepreneurs can control their assets without undue influence from rentiers. Or, to provide another example, in the third and least favored scenario entrepreneurs agree to make business accounts and financial information more transparent in exchange for regulations that ease wage pressures. As an aside, it is important to point out that going public can place additional stress on an entrepreneur since it simultaneously weakens their bargaining leverage against employees.[3]

Rentiers want strong investor protections in capital markets to limit the private benefits extracted by entrepreneurs at their expense. Banks, pension funds, investment companies, and small private investors are all concrete examples of rentiers. They have clear and coherent political preferences not to mention clear and coherent political strategies. Protecting their economic interests comes first and foremost. Lobbying politicians and

[3] During a business downturn, going public can give entrepreneurs a means of demonstrating that they are facing a hardship and help them gain bargaining leverage against employees. Nevertheless, choosing this option is not straightforward because entrepreneurs are afraid that going public will hurt their managerial autonomy even after the business recovers.

mobilizing drifting voters are the desired means toward this end.[4] Moreover, though they do not compete with politically organized workers directly, rentiers know that there is a zero-sum relationship between their economic gains and workers' interests—the higher a firm's labor costs, the lower rentiers' profits. They therefore prefer a type of corporate governance that prioritizes both investor protections and increases labor market freedoms. Although they want entrepreneurs to keep corporate accounts open, they rightfully worry that doing so will increase wage pressure.

Workers want to restrict the entrepreneurs' right to dismiss them without just compensation. Employment protection from layoffs without said compensation provides workers with greater bargaining leverage in relation to employers. But getting this leverage is not easy. Although workers are the largest fraction of the organized electorate, they are typically spread out across multiple voting districts. Furthermore, they lack the same kinds of pecuniary resources that rentiers have to lobby and mobilize drifting voters. For these reasons, even though they are assumed to share a class-identity,[5] workers must form a coalition with either entrepreneurs or rentiers to influence the shape of corporate governance. In forming a coalition, workers tend to side with entrepreneurs rather than

---

[4] PV assumes that rentiers are heterogeneous, which will make the rentier group into a politically passive agent. I think that this assumption is increasingly losing its relevance. Instead, it is plausible that unorganized workers, self-employed workers, and small business owners will share common interests with rentiers and will form a coalition against organized workers. For instance, temporary employed workers can share interests with rentiers in support of a flexible labor market regulation. As actual happened in South Korea in August 2006, small business owners in Ulsan and Pohang industrial areas took counter-measures against labor strikes, accusing them of being primarily responsible for the economic slowdown.

[5] This does not necessarily mean that entrepreneurs and rentiers share the same class identity. The key feature of this informal model is that it relaxes the assumption of confrontation along a traditional left-right issue continuum. Even the degree of workers class unity varies depending on cultural and historical characteristics in the countries of interest (path-dependent). In addition, currently workers are given of derivatives (based on a firm's profits), which will tend to blur class identity in the traditional sense. However, we assume it is exogenously given and therefore holds constant.

rentiers because they are location specific.[6] In sum, the type of corporate governance workers prefer consists of higher employment protections and lower investor protections.

1.2.1.2 Electoral Systems

There are many dimensions on which to categorize electoral systems: ballot formats, district size, electoral formulas and so on. Nevertheless, electoral systems are broadly dichotomized in two ideal models: majoritarian (plurality) and proportional. PV captures the key difference between majoritarian (plurality) and proportional systems by suggesting that winning a majority of districts is crucial in the former, while winning a majority of the votes is crucial in the latter.[7] Though this is a useful distinction, better operationalization of electoral systems covering all variations between the two ideal

[6] I do not take into account a fourth scenario, a rentier-worker coalition, because entrepreneurs are assumed to have the flexibility to either close their business or relocate. This point differentiates the paper from two previous studies on corporate governance. First, compared to PV's entrepreneurs who establish firms first and then change contracts with production factor owners after observing how productive they are *ex post*, the entrepreneurs in this paper are more strategic in the sense that they make political calculations before setting up their firm. That is, it is unlikely that they would run their enterprise under strong shareholder protection and tight labor market regulations. Second, compared to Gourevitch and Shinn ('GS' 2005), I treat rentiers as a homogenous and coherent group. Decomposing this group into internal and external, GS takes into account rentier-worker coalition in the name of property-voice model of corporate governance. They therefore arrive at a factor and asset specific arguments to changing circumstances, where workers, to protect their pension funds or to protect their jobs, may find it strategically useful to challenge managers with the aid of external investors. Obviously, GS offers an explanation that is more micro-oriented than the one offered in this paper. Since its primary purpose is to explain the indirect effect of electoral rules on 'aggregated' price levels through corporate governance at country-level of analysis, the explanation in this paper is inherently more macro-oriented than the one offered in GS. Besides rentier-worker coalition, I do not consider the ideal relation of production in which all three agents are self-limiting and cooperate with one another as well.

[7] PV relies on a causal mechanism that connects electoral rules to corporate governance by focusing on the degree of homogeneity for each agent: proportional voting pushes political parties to cater more to social groups with homogeneous preferences (entrepreneurs and workers) whereas majoritarian system pushes them to cater more to social groups with heterogeneous preferences (rentiers). However, PV's reasoning is conditional. For instance, PV's sense that heterogeneous groups are given an advantage under majoritarian systems is tenable only with a key restriction: the parties must be equally effective in delivering transfers to any groups. Otherwise, majoritarian systems are not guaranteed to grant an advantage to heterogeneous groups (Dixit and Londregan 1996).

models is possible. As such, this paper uses a measure derived from the seat-vote elasticity.[8]

The seat-vote elasticity formula is based on the idea that every electoral system translates a party's share of votes into a share of seats in a given office (RK, 529). In this case, the given office is the legislature. The core insight is that more majoritarian systems are characterized by higher seat-vote elasticity and more proportional systems are characterized by lower seat-vote elasticity. The seat-vote elasticity of mixed electoral systems is located between these two prototypical systems.[9]

The key to understanding the effect of electoral systems on corporate governance formation is to specify the entrepreneurs' strategic choice under a certain type of electoral rules. Entrepreneurs do not hold a prior ideological bias, are able to freely locate their enterprises, and can, if so inclined, adjust production technology to a given set of factor endowments. Depending upon the electoral system, they form a coalition with either rentiers and workers, tipping the political balance of power in their favor in either case.

Entrepreneurs are, therefore, politically opportunistic in the sense that they can form a coalition with either rentiers or laborers to maintain control business assets as well as to keep production costs down. Entrepreneurs reason that higher seat-vote elasticity under

---

[8] Taagepera and Shugart (1989) have developed the following power function to approximate every extant electoral system):

$$L_i = V^{\tau_i} \Big/ \sum_i^n V^{\tau_i}$$

party's vote share, L_i is i_{th} party's seat share in legislature. τ is treated as seat-vote elasticity. Taagepera and Shugart approximate τ's 2.5 in a typical single member district and 8 in 'winner-take-all' US Electoral College (RK, 529). Thus, τ for a perfect proportional electoral system will be 1.

[9] For empirical tests, this paper will use categorical rather than continuous variables to measure electoral systems. There are two reasons for using categorical variables. First, seat-vote elasticity is a theoretically derived, not measured on a calibrated one-dimensional scale. Second, even if it can be measured, doing so lies outside the scope of this paper.

majoritarian rule tends to give an advantage to rentiers and, by contrast, lower seat-vote elasticity under proportional rule favors workers. For instance, assume that there are two prototypical electoral systems: single member districts with majority rule and one national electoral district with proportional rule. Resourceful candidates representing rentiers tend to have the upper hand in appealing to drifting voters in one single member district under majoritarian rule than in one unified national district under proportional rule.[10] On the contrary, class oriented candidates representing workers who are regionally dispersed but make up the largest fraction of the electorate should be capable of taking a large fraction of seats in legislature under proportional rule because it minimizes the number of votes which would be lost otherwise.

Because they are ideologically unbiased and have significant discretionary power in choosing production technology and location, entrepreneurs have fewer incentives to run their business under politically unfavorable conditions.[11] For instance, where workers possess political clout (i.e. strong union), it is unlikely that entrepreneurs will establish labor-intensive business or engage in efforts to weaken workers' political power. Even though this paper does not aim to build an open economy model, this logic can be applied to established firms because dissembling the production process and relocating

[10] Similar to the rationale presented in footnote 7, this paper employs a different logic for electoral outcomes than the one offered by PV, which bases its reasoning on agents' heterogeneity. Here, rentiers are characterized as having clear economic and political preferences. This fact is gaining more ground recently as financial globalization deepens. Private investors, pension beneficiaries and even bank account holders are organized and represented by institutional investors. However, even if the financial globalization phenomena renders rentiers less location-specific, they are assumed in this paper, just as a factor owners, to be hired by entrepreneurs. An extension of this closed economy model to an open economy model will be attempted in future work.

[11] This assertion is similar to "natural selection" in revolutionary biology. Institutional complementarities arguments regarding cross-national economic performance and a variety of capitalism arguments can be interpreted in the same context of this assertion.

production segments are easier. In short, entrepreneurs select the political circumstance they want for the ideal relationship of production and production technology for the target product.

The same reasoning can be applied to corporate governance formation. Knowing rentiers' and workers' preferences on regulatory policies for two factor markets and the effect of the electoral rule on the political power balance between the two factor owners, the entrepreneur behaves opportunistically in forming a winning coalition. Thus, under majoritarian rule, the rentier-entrepreneur coalition gives rise to higher investment protection and lower employment protection. Under proportional rule, worker-entrepreneur coalition brings about lower investment protection and high employment protection. For terminological convenience's sake, we call the former the *shareholder model* and the latter the *blockholder model.*

1.2.2 Second Stage: Product Market

This sub-section considers the second stage of the theoretical model in which prices are determined between firms (supply) and consumers (demand) in product markets. Although both the firms and consumers are often treated as price-takers in competitive markets, I treat the firm as a price tenderer and the consumer as a price-taker under different types of corporate governance (blockholder or shareholder). There are three reasons for the "firm-as-market-maker assumption." First, the very notion of corporate

governance is inconsistent with a competitive market.[12] Second, in contrast to previous research such as RK's consumer-biased price regulation model, more attention needs to be paid to the producers' side.[13] Third, the theory of the firm is based on the firm as a price-setter rather than a price-taker. This understanding of a firm is similar to Spulber's understanding of a firm as intermediaries (1999).

Rather than formalize an exhaustive game, I address two critical questions: How does the type of corporate governance influence the price a firm asks? How likely are consumers to take the asked price?

1.2.2.1 Firm's price asking as a function of wealth structure

To answer the first question, I start by specifying the *firm's primary sources of wealth*. For simplicity's sake, I assume that a firm's wealth comes from two sources. One is from the sales of products; the other is the value of the enterprise itself. Both sales and the value of the enterprise are positively related insofar as increasing profits from sales increases how much a business is worth. However, it is important to point out that the sales and the value of the enterprise weigh differently in the decision-making calculus

[12] If one suggested that 'invisible hand' governs the competitive market, I would reply, "What is the invisible hand?" Once governance matters in a competitive market, the market is not purely competitive.

[13] Basically, three central features of RK's model would weaken the producer's political leverage. 1) Legislative support (vote) is assumed to be independent of monetary support. In reality, both are closely related. The monetary contribution from the producer can be more important for politicians because they utilize it in mobilizing voters. As a result, RK's model downplays the producer's monetary contribution. 2) The producer's profit is assumed to be unrelated to price. If a producer's vote is a function of profit, her voting behavior must depend on price since profits are factored into prices. Once the price factor is taken into account in the producer's political support function, the politician must weigh these sources of legislative support. 3) Consumers are not as homogenous as producers. Therefore, it is difficult to consider that the consumer as a special interest group is as powerful as a producer in this political game.

of the firm. Their relative weight, as I will discuss below, depends on the type of corporate governance.

Firms tend to place more emphasis on sales under blockholder types of corporate governance than shareholder types. There are two reasons that this is the case. First, the existence of a developed financial and stock market is a precondition for a firm to maximize the value of its enterprise. Unfortunately, firms are rarely motivated to maximize their value since blockholder forms of corporate governance tend to be accompanied by less developed financial and stock markets. Second, under blockholder types of corporate governance, firms tend to pay higher welfare costs and/or face greater wage pressure because they must deal with stronger and thereby more demanding labor unions.[14] Operating with a narrow profit base and confronting greater cost pressures, firms have an understandable incentive to set prices high.

In contrast, *shareholder types of corporate governance give firms greater discretion to pursue profit-seeking activities.* The logic underlying this claim requires some elaboration. Suppose a firm can be decomposed into manager and the board of directors (representing shareholders). As a price tenderer, the professional manager has fewer incentives to increase prices to maximize profits than owner-mangers in a firm under blockholder corporate governance. This is because under a shareholder form of corporate governance a more competitive labor market eases cost pressures on managers. This is also because, even in the case of a business downturn, a firm has few incentives to raise

[14] Why a firm would take for granted such factor market situation is not an issue in this second stage. It is previously determined by a political coalition between either of factor owners and entrepreneurs, who sets the firm based on production technology and factor endowments during the first stage.

prices under the shareholder type of corporate governance but may instead try to boost the turnover of capital by reducing markups.[15] The third essay of this dissertation will explain this point using oligopolistic competition models (refer to Section 3.4.2). Instead, I elaborate it with verbal illustrations. Note that a manager's primary goal is to avoid being fired by the board of directors (representing the interest of shareholders) and maintain her managerial autonomy. To do both, the manager should keep the value of the firm from falling in the stock market. Because the stock value is a reflection of the public judgment of the firm's potential, a manager can emphasize the turnover of capital and reputational factors over the bottom line to keep her job and retain autonomy. At least she can employ these methods in the short term.[16]

1.2.2.2 Consumer's choice as price-taker

[15] Theories and empirical evidences in business management studies on determinants of firm profitability support this claim. First, flexible labor markets under shareholder type corporate governance tend to induce firms to use standardized production technologies and, therefore, produce standardized products. The higher the degree of product standardization, the higher market competition. Competitive markets tend to cause firms to cut prices more frequently to obtain greater volumes in an economic downturn (Schoeffler et al. 1974). As a result, firms under shareholder types of corporate governance tend to have more incentive to keep their market share at the expense of markup loss during a business downturn. Second, financial risk measured by the debt-equity ratio has a negative association with firm profitability. Relatively developed financial markets help firms reduce this kind of financial risk under shareholder types of corporate governance (Arditti 1967; Hall and Weiss 1967; Gale 1972; Barker 1973). If we assume that pricing is directly related to profits, firms under shareholder types of corporate governance tend to have less incentives to raise prices to achieve the same level of profit as their counterpart under blockholder types of corporate governance.

[16] This may sound strong. More concretely, managers may make a decision by price-profit elasticity and reputation-profit elasticity. Nevertheless, it is more probable that a firm relies on reputation-profit elasticity under shareholder type corporate governance. This claim is supported by the fact that mergers and annexations are the main tools used for rationalizing business under shareholder corporate governance. In the case of a fatal business downturn, a firm takes these tough measures to quickly improve its business reputation, which cannot be expected through price changes. This is because these tough measures are usually followed by mass layoffs, which are expected to relieve immediate cost pressures on firms from labor market.

So far, in terms of firm's pricing behavior, I have explained the reason that firms under blockholder type of corporate governance have less incentive to lower prices than counterparts under shareholder types. The problem that remains to be solved is that the price's determination occurs when the consumer accepts the tendered price. This leads to the following questions: why in the case of the blockholder type, should the consumer take the higher price? In the case of the shareholder type, why should a firm refrain from raising the price?[17] The answer lies in understanding the nature of the consumer, which is a composite and heterogeneous group, rather than a coherent and homogeneous group.

Under the blockholder type of corporate governance, relatively speaking, the largest portion of consumers should be the protected workers. Their average income and welfare level should be relatively higher than their counterparts under the shareholder type of corporate governance. In this case, even consumers have greater incentives to accept high prices for the following reason. Firms tend to take specialized and high-skill production technologies due to firm-specific (or industry-specific) job training systems and accompanying tight labor markets. Accordingly, firms tend to make quality-oriented products as well as a variety of product portfolios. In this case, consumers are more willing to pay higher price to enjoy quality products, knowing that their economy is sustained by higher price and that they can, otherwise, withstand the worst case, job loss.

In contrast, under the shareholder type of corporate governance, a significant proportion of consumers are politically marginalized workers, whose average income and

[17] This question is qualitatively different from the questions answered in the previous subsection—why do firms under shareholder type corporate governance have less incentive than their counterparts under blockholder types of corporate governance? In other words, what is the source of firms' self-limitations in terms of pricing, not from comparative perspective across corporate governance systems?

welfare levels should be relatively lower than their counterparts under the blockholder types of corporate governance. In this case, a firm has a lower incentive to raise price because, in particular, the manager would prefer to maintain flexibility in the labor market and the high rate of turnover in product markets. Given the consumer's limited income, higher prices will cut into a consumer's purchasing power in the product market. Reduced purchasing power would threaten the firm's ability to continue generating profits (due to increasing rates of turnover) and could hurt the firm's industrial relations since the slack business can lead to inevitable layoffs. For all of these reasons, firms have less incentive to push up prices under shareholder type of corporate governance.

Before moving forward, it may be useful to review what I have covered thus far. I have argued that electoral systems affect the type of corporate governance and that the type of corporate governance can affect prices. I then discussed the theoretical logic linking electoral systems to different forms of corporate governance and different forms of corporate governance to different prices. I showed why there is likely to be lower prices under shareholder types of corporate governance and higher prices under blockholder type corporate governance. The next section reviews empirical evidence in support of the arguments outlined so far.

1.3 Empirical Tests

1.3.1 Description of Data

1.3.1.1 Case Selection

The most important constraint for case selection is data availability of the corporate governance measurement since the primary contribution of this paper is to show how corporate governance mediates the effect of electoral systems on price. Gourevitch and Shinn ('GS' 2005) include the largest number of countries in their corporate governance measure but provide only one observation for each country. To obtain more observations, I impute the corporate governance measure with Fraser Economic Freedom Index (EFI) by benchmarking GS's dataset. Together I have 462 observations from 33 countries over 14 years from 1987 to 2000.

Table 1.1 Country Selection

	Asia/Oceania	The Americas	Europe	Row Total
OECD	Australia, Japan, New Zealand, South Korea, Turkey	Canada, Mexico, US	Austria, Belgium, Denmark, Germany, Greece, Finland, France, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, UK	24
Non-OECD	India, Israel, Malaysia, Philippines, Thailand	Argentina, Brazil, Chile, Venezuela		9
Column Total	10	8	16	33

Table 1.1 shows that the non-OECD group is less represented in this sample (24 OECD countries vs. 9 Non-OECD countries). This kind of selection bias is unfortunately unavoidable for two reasons. First, the majority of non-OECD countries are non-democratic so elections and, by extension, electoral systems do not matter. Second, in non-OECD countries, it is too early to put market democratization at the center of public

debate. For the same reasons, the African group is totally omitted from the sample. Both RK and PV suffer from the same selection bias issues for the same reasons.

1.3.1.2 Dependent Variable: Price

The measurement of price level should satisfy two conditions to conduct a proper empirical test. First, they should be comparable across countries. Second, they should indicate the purchasing power of disposable income for average people. Penn World Table Mark 6.1, which conveniently presents all Purchasing Power Parity data in dollar equivalents cross-nationally indexed to a base value of 100 for the United States, provides a price measure fulfilling the aforementioned requirements.

In this subsection, I provide summary statistics on prices by two kinds of institutional categories: Electoral systems and Legal Origin of Commercial Law.

By electoral systems. Figure 1.1 offers a visual presentation of price comparison by electoral systems. The right box (proportional electoral systems) covers higher scales on the y-axis than the other electoral systems (plurality and mixed). Although median price denoted by the horizontal line in the middle of the box is not especially different between plural systems and proportional systems, mean price looks quite different in Table 1.2. While average price difference between plurality and mixed systems is 5, a 20 point difference separates plurality from proportional systems. The reason for using three,

instead of dichotomous, categories for electoral systems will be discussed in the following subsection describing explanatory variables.[18]

Figure 1.1 Price Comparison by Electoral Systems

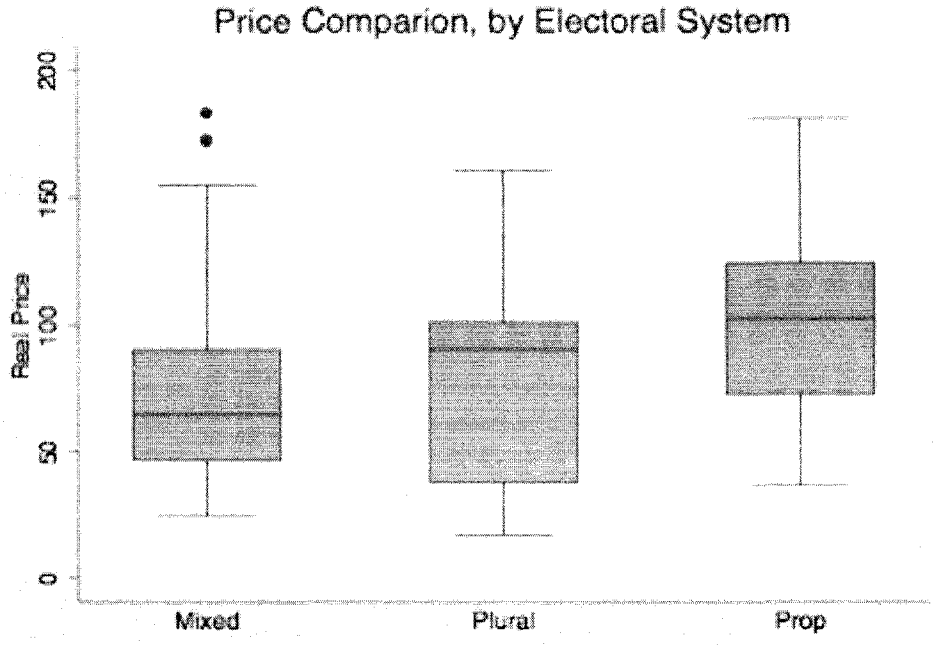


Table 1.2 Summary Statistics of Price by Electoral System

Elec Sys	No. Obs.	Mean	St. Dev.	Min	Max	Ex. Countries
Plural	132	76.6	36.7	17.1	160.8	Low: IND High: (pre) JPN
Mixed	67	72	34.5	24.9	183.5	Low: (pro) PHL High: (pro)JPN
Proportional	263	98.7	32.8	36.6	181	Low: TUR, ARG High: CHE, SWE, FIN

[18] This numerical gap relates to the fourth question raised by RK's formal derivation of the effect of seat-vote elasticity on price regulation if a mixed system is located between a SMD (single member district) and a proportional system according to the magnitude of seat-vote elasticity.

In terms of individual countries, India is the least expensive and pre-electoral reform Japan is the most expensive country (Refer to Table 1.4 for electoral rule changes). Argentina, Chile and Brazil in the late 1980's and Turkey have the lowest prices, while Switzerland and the Scandinavian countries have the highest prices among countries with proportional rule. Among countries with mixed electoral systems, Germany and post-reform Japan appear expensive, while pre-reform Philippines, Mexico and Venezuela are ranked at lower levels of the price index.

By origins of commercial law. It is also important to compare price differences to legal origins because legal origins of commercial law is taken as the instrumental variable (IV) for two-stage least square estimation (2SLS) conducted in this paper. As an IV, this variable should have a systematic relationship with the dependent variable at the first stage (corporate governance) and, at the same time, should not have a systematic relationship with the dependent variable at the second stage (price).[19]

La Porta, Lopez-de-Silanes, Shleifer and Vishny (LLSV) have already paid attention to the origins of commercial law to explain cross-national variation of corporate governance (1998). They argue that English legal origin (Common Law) tends to bring about corporate governance type characterized by strong investor protections and dispersed ownership structures. In contrast, to my knowledge, there have been no studies

[19] The most popular and easiest way to verify whether an IV is a good instrument is to check the correlation coefficients between the variables of interest. But it is difficult to rely on this method in this case because the legal origin variable is categorical. As a result, whether legal origin is a nice instrument or not is a theoretical question. In this connection, Jeff Lewis suggested that it is possible that legal origins have a systematic influence on price via such a third factor such as corruption. But, at this point, I cannot speculate what may be the causal connection between these two variables. Thus, I decided to rely on my own justification for using legal origins as an instrument.

theoretically or empirically explicating the linkage between legal origins and prices. For the sake of confirming the legal origins of commercial law as a working IV, it is necessary to check whether English legal origin brings about lower price than the other legal origins. Note that the main hypothesis at the second stage of the theoretical model is that shareholder type corporate governance contributes to lower prices.

Figure 1.2 Price Comparison by Legal Origins

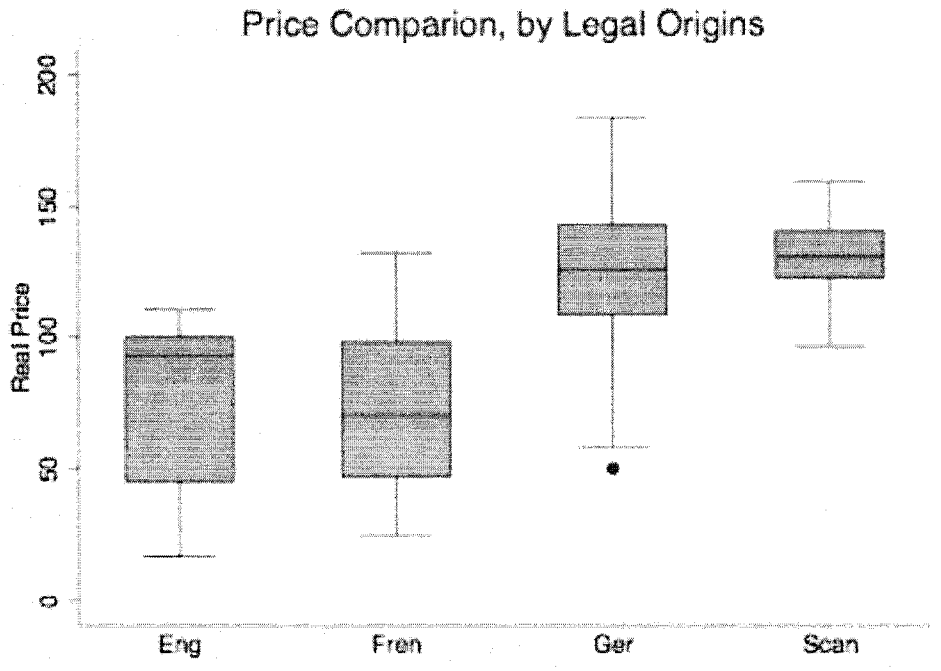


Figure 1.2 compares prices by legal origins of commercial law. At first glance, those countries with German and Scandinavian legal origins seem to have higher prices than those with English and French legal origins. When prices are compared between English and French legal origin, however, French legal origin (Civil Law) is no more

expensive than English legal origin (Common Law). Table 1.3 provides summary statistics of price by legal origins, demonstrating that French legal origin has the lowest mean price but is not markedly different from English legal origin's price. Both visual and numerical price comparisons suggest that the legal origins do not explain prices in the manner predicted by LLSV. Thus, the legal origins are qualified as a proper IV for conducting 2SLS.

Table 1.3 Summary Statistics of Price by Legal Origins

Legal Origin	Mean	St. Dev.	Min	Max	No. Obs.	Ex. Countries
English	77.5	29.9	17.1	110.2	140	Low: IND High: UK, Ireland
French	73.2	28.8	24.9	132.3	196	Low: PHL High: FRA, BEL, NDL
German	120	32.8	49.9	183.5	70	Low: ROK High: JPN, CHE
Scandina	130.4	13.9	96.0	159.3	56	Low: FIN High: SWE

In terms of price competitiveness, the French legal system's performance is comparable to the one of English legal origin. The Philippines has the lowest real price. France, Belgium and the Netherlands have the highest price in the French legal origin category. In the English legal group, India has the lowest real price, while UK and Ireland have the highest real price.

The important thing to take from these preliminary assessments is that, whether by electoral rule or by legal origins, it is not easy to confirm a systematic effect of political and legal factors on prices with simple summary statistics. One thing, however, is clear: when identifying countries with the lowest and the highest prices for each group, a

country's wealth is an important determinant of price levels. Now I use regression to test the effect of electoral rule on prices, controlling for the level of economic development.

1.3.1.3 Explanatory Variables

EFI (Economic Freedom Index). To check the causality outlined in the theoretical model, I use the major component indices of EFI (Fraser Institute 2005) such as government size (GovSize), property rights (PRPT), sound money (MNY), tariff (TRF), regulatory trade barrier (TDBAR), international capital market control (ConCPT), credit market control (ConCRD), labor market regulation (LabReg) and business regulation (BizReg). Although government regulation is not directly translated into corporate governance, it provides useful information about the institutional environments in which firms operate. All components are listed on a 1 to 10 scale. Higher scores imply score more liberal economic systems.

GSmsp. Gourevitch and Shinn's corporate governance index (2005, 48). They measure this proxy variable by averaging 4 sub-indices of corporate governance: disclosure and audit, board independence, control rules, and managerial incentives. The scale is 0-100. The higher value of this proxy implies that the corporate governance type is closer to shareholder type.

Frasreg: Computed Corporate Governance. Since the above *GSmsp* is available only for the year 2000, I compute my own scale *Frasreg* as a measure of corporate governance from EFI data to obtain panel data. The EFI is revised every five years, thus for the year

that it is revised and the four years that follow I use the same EFI value (under the assumption that governance is relatively stable over that short period).

Plural, Mixed and Proportional: These are Dummy Variables for Electoral Systems. I use the electoral laws for the national assembly (the lower chamber in two chamber system) to measure this variable.[20] The primary source for this categorical variable is Colomer (2004). Table 1.4 provides the full list of countries' electoral systems and electoral rule changes.

Table 1.4 Electoral System and Electoral Rule Changes

	Plurality	Mixed	Proportional
Year 2000	Australia, Canada, France, UK, India, Malaysia, Thailand, US	Italy, Japan, Mexico, South Korea, New Zealand, Philippines	Argentina, Austria, Belgium, Brazil, Switzerland, Chile, Denmark, Germany, Finland, Greece, Spain, Ireland, Israel, Netherlands, Norway, Portugal, Sweden, Turkey, Venezuela
Changes		⇐	Italy (1993), Venezuela(1989)
	New Zealand (1993), Japan (1994), Philippines (1994)	⇒	
		Venezuela (1999)	⇒

Originally, RK measured electoral systems in two ways. One is a binary coding of a single member district representing majoritarian (plurality) system. The other is a measure of district magnitude. Why should a mixed electoral system be categorized qualitatively different from plurality and proportional systems? This is primarily to compensate for RK's test scheme. RK's seat-vote elasticity argument is confirmed only

[20] Of course, the primary reason for this is to standardize the measure. Two assumptions are required to choose the lower chamber, instead of the upper chamber and the executive body. First, the lower chamber is more responsible to the constituents than the upper chamber. Second, even though the executive body puts laws into practice, it is the legislative body that makes the laws that are related to corporate governance and price regulation.

in their statistical test with a binary variable of electoral systems. If district magnitude as a continuous measure of electoral system does not work well, a finer grained categorical variable measuring electoral system is a second best option.[21] A mixed system falls between plurality and proportional systems using seat-vote elasticity.

LnEnergy. Natural log of domestic energy production is divided by total final energy consumption. This is an indicator of factor endowments. Its effect on price is expected to be negative. Non-OECD countries do not have standardized measures covering all energy resources like those found in OECD countries. Thus, I measure energy consumption for non-OECD countries with three major energy data sources: petroleum production, electricity and natural gas. The algorithm averages $\ln\left\{\left(\frac{production}{consumption}\right)+1\right\}$ of three energy sources. Source: Energy Balance of OECD Countries and Non-OECD Countries (IEA Statistics), 2001 and 2003 eds.

LnCGDP. Natural log of Gross Domestic Product per Capita in thousand US dollars. Income levels are positively associated with price levels. Source: PWT (Penn World Table). Mark 6.1.

ΔXR3. Percentage change in exchange rate for three years. Conventionally, depreciating currency is associated with higher price levels through an inflationary effect. Source: PWT. Mark 6.1.

[21] Daniel Ho applies matching techniques to more explicitly test matters of causality in RK's argument (2004). But his test cannot reject the null hypothesis in RK's argument. Matching techniques do not perform as well at hypothesis testing as RK's dummy variable test. The 2SLS regression analysis with a finer grained electoral rule variable conducted in this paper can be a better alternative than Ho's test.

Open. Trade openness measured by *Import*/GDP. This measure is negatively associated with price levels. Source: PWT. Mark 6.1.

LnPop. Natural log of population. This measure indicates specialization and economy of scale effect. Source: PWT. Mark 6.1.

LnAraPop. Natural log of per capita arable hectares of land. $\ln\left\{\frac{land}{pop}+1\right\}$. This variable measures another factor endowment, land relative to the abundance of labor. This measure is expected to be negatively associated with price. Source: World Development Indicators CD-ROM (2004), ag.lnd.arbl.ha.pc.

Eng, Frnc, Ger and Scan: Dummy variable for origins of commercial law. These variables denote English, French, German and Scandinavian legal origin, respectively. Source: LLSV 1998.

1.3.2 Regression Analyses

1.3.2.1 Multiple Regression Analysis

In this subsection, I conduct multiple regression analyses to check the causality suggested in the theoretical model, whether corporate governance mediates the relationship between electoral system and price. I employ two proxy variables for corporate governance. One is GS's index (*GSmps*) and the other is a bundle of EFI component indices. Since I take RK's regression model as the standard model, I employ

two categories for electoral systems at this moment: majoritarian and non-majoritarian. Table 1.5 summarizes the regression outcomes.[22]

First, in Column (1), as RK's statistical model suggests, majoritarian electoral systems (*Plur*) decrease price levels. Substantively, majoritarian systems decrease price levels by 9.7 points. To interpret the coefficient more meaningfully, I use a hypothetical country with a mean price (93.27) in a non-majoritarian country. The coefficient indicates that price will decrease by 10 percent if the country changes its electoral system to a majoritarian system. This effect is also statistically significant at the .01 level of statistical significance.

However, it is important to point out that the effect of electoral systems on prices disappears as soon as the corporate governance variables are included in the statistical model. When the corporate governance variables are entered into the model, the slope coefficient of *Plur* remains negative as RK' model predicts, but it does not remain statistically significant. When I put GS's corporate governance index (*GSmsp*), *Plur* does not explain prices (Column (2)). Columns (3) and (4) are even more revealing than Column (2). Inclusion of 9 component indices of the EFI blurs the effect of electoral systems on price too. In addition, the individual effect of the indices on price looks stable and systematic across the two columns. Seven out of 9 indices have statistically and substantively significant effects on prices.[23]

---

[22] To avoid redundancy, I save the specification of regression models and estimation methods for the following subsection, where I conduct 2SLS regression analysis.

[23] It is interesting that property rights protections, control of credit markets, control of capital markets have positive effects on prices. However, it is necessary to be careful in interpreting the impacts of these subcategories. I will save theoretical speculations on these variables for future work.

Table 1.5 Multiple Regression Resuls

Depend: Price	(1)	(2)	(3)	(4)	(5)	(6)
Electoral						
Plur	-9.65	-6.70	-1.68	-5.19	13.62	-3.32
	(3.31)	(9.77)	(5.15)	(9.75)	(10.40)	(2.82)
CorpGov						
GSmsp		.04				
		(.19)				
Frasreg						-2.04
						(.89)
Fraser						
Govsize			-7.44	-6.71	-9.79	
			(1.31)	(2.43)	(2.86)	
PRPT			10.44	8.19	18.49	
			(2.40)	(4.64)	(4.91)	
MNY			-3.83	-4.62	-1.28	
			(1.03)	(2.17)	(2.21)	
TRF			-3.48	-5.65	4.92	
			(1.46)	(2.79)	(2.87)	
TDBAR			-9.15	-9.51	-8.28	
			(1.61)	(3.07)	(3.42)	
ConCPT			4.78	4.42	6.02	
			(1.13)	(2.14)	(2.46)	
ConCRD			9.31	9.66	7.37	
			(1.19)	(4.05)	(4.86)	
LabReg			-.47	-1.58	3.29	
			(1.45)	(2.73)	(3.07)	
BizReg			-3.09	-1.61	-7.73	
			(2.06)	(3.90)	(4.42)	
Control						
LNCGDP	11.19	43.32	23.88	35.00	-17.25	24.25
	(2.97)	(4.99)	(5.00)	(9.74)	(8.25)	(2.79)
Open	-.56	-.14	-.12	-.04	-.39	-.47
	(.05)	(.07)	(.04)	(0.09)	(.08)	(.04)
XR3	.00	-.03	.00	-.00	.00	.00
	(.00)	(.05)	(.00)	(.00)	(.00)	(.00)
LnAraPop	99.82	-29.46	-42.73	-43.28	-41.89	-10.43
	(23.55)	(12.07)	(6.04)	(11.22)	(13.09)	(10.02)
LnPop	50.07	.69	-3.47	-1.67	-10.05	-11.84
	(13.43)	(2.79)	(1.61)	(3.18)	(3.36)	(2.08)
LnEnergy	-12.42	22.11	-8.40	-14.34	.89	-2.74
	(8.96)	(21.54)	(12.31)	(24.41)	(19.04)	(8.71)
Cons.	-501.27	-351.24	-73.22	-161.58	268.88	28.27
	(120.39)	(73.74)	(45.39)	(87.80)	(78.40)	(35.12)
Est. Method	Fixed Effect	OLS	Pooled OLS	Between Effect	Random Effect	Random Effect
No of obs.	462	33	165	165	165	462
N	33			33	33	33
T	14				5	14
Adj. R^2		.81	.85			
Within	.24			.22	.43	.17
Between	.07			.95	.84	.61
Overall	.06			.88	.81	.58

Standard Error in ( )

In Column (6), the computed corporate governance index (*Frasreg*) explains price at the .05 level of statistical significance.[24] A one unit increase in this 1-10 scale index decreases price by 2.4 percent points in a country with a mean price level (88.4). Meanwhile, *Plur* does not explain price at the conventional level of statistical significance as well. The coefficient estimates of the other control variables look very stable. In particular, average income (*LNCGDP*) and trade openness explain prices with substantive and statistical significance. The richer the country, the more expensive its goods and services. A more open economy tends to have lower price levels.

In sum, the multiple regression analyses show that electoral systems have an effect on prices via a third factor. According to the theoretical model presented in this paper, this factor is corporate governance. In the following subsection, I conduct the 2SLS regression analysis to replicate the two-step model, and more explicitly examine the causality through corporate governance.

1.3.2.2 2SLS Estimation with TSCS data

Empirical tests of the theoretical model are conducted in three steps. First, I estimate the effect of two institutional variables—electoral systems and legal origins of commercial law—on corporate governance type (the first-stage equation). Second, from the first-stage equation, I generate fitted values of corporate governance. This fitted

[24] I compute the corporate governance index from the Fraser EFI by taking GS's corporate governance measure as the standard. First, I select subcategories of the EFI in the year 2000 which are closely related with credit market regulation, labor market regulation and business regulation and then calculate composite measures of corporate governance by averaging subcategory indices. I made various combinations of these subcategory indices and generated many composite indices. Second, I found the composite measure which has the highest correlation coefficient with *GSmsp* (= .72). With those categories, I computed corporate governance indices for the other years.

corporate governance variable is assumed to be a more accurate measure of corporate governance.[25] Lastly, I estimate the effect of the fitted corporate governance on prices.

As widely recognized, TSCS (or Panel) data has numerous merits over pure cross-sectional or time-series data in regression analyses. More specifically, this data format allows researchers to solve the omitted variable problem. The most convenient way to solve this problem is to control the effect of "time-invariant" omitted variables by including unit-dummies in regression analyses. By doing so, I am constructing a 'unit-fixed effects model' for TSCS (or Panel) data.

A drawback of the unit-fixed effects model, however, is that it cannot estimate the coefficient of theoretically interesting time-invariant variables. The first-stage estimation of the theoretical model suffers from the same problem because legal origins of commercial law do not change during the period of interest. Even though the focal point of this study is the effect of electoral systems on corporate governance, the effect of legal origins on corporate governance should be reflected as instrument variable in this first-stage estimation. Estimation methods for each stage will be specified in order.

First Stage Estimations

A. Model selection and specification

[25] Another important reason for 2SLS estimation related to the procedure. As shown in Column (2) of Table 5, there is a possible measurement error in corporate governance variable that is attributable to the following two reasons. First, although the inclusion of *GSmsp* in the equation blurs the effect of majoritarian electoral systems on prices, at the same time, it does not explain prices at the conventionally accepted statistical significance level. Second, measurement error can occur in the process of generating *Frasreg* from the EFI subcategories. Johnston and DiNardo suggest using an instrumental variable (IV) to correct for this kind of measurement error (1997, 157). Thus, the 2SLS estimation conducted for empirical analyses corrects errors in variables as well as helps to realize the two-stage sequential model.

To avoid losing information from time invariant variables—the legal origins of commercial law for the first stage estimation, I conduct three alternative procedures to the unit-fixed effect model: pooled OLS, FGLS (feasible generalized least square) and between-effects models. The specifications are as follows.

Pooled OLS model. The simplest alternative procedure is a pooled OLS model. To make the pooled OLS model work with my TSCS data in hand,

$$Frasreg_{it} = \alpha + elec_{it}\beta_1 + legal_i\beta_2 + \upsilon_{it}\,, \qquad (1)$$

where *Frasreg* is the generated proxy variable of corporate governance, $elec_{it}$ consists of categorical variables for electoral systems, $legal_i$ consists of categorical variables for legal origins of commercial law and $\upsilon_{it} = c_i + \mu_{it}$ are the composite errors of unobserved effects *and* the idiosyncratic error.[26]

Another alternative Pooled OLS model is specified as follows,

$$Frasreg_{it} = \alpha + elec_{it}\beta_1 + legal_i\beta_2 + d88\gamma_1 + d89\gamma_2 + ... + d00\gamma_{13} + \upsilon_{it}, \qquad (2)$$

which allows for aggregate time effects with the inclusion of the year dummies. *d*88, *d*89 and *d*00 indicate dummy variables for years 1988, 1989 and 2000 respectively.

FGLS model. One of two frequently used models for TSCS data is the random effects model. The key feature of random effects lies in the assumption of the (unconditional) variance matrix of υ_{it} such that $\Omega \equiv \mathrm{E}(\upsilon_i\upsilon_i')$ is necessarily the same for all i because of the random sampling assumption in the cross section. However, this random effects model does not work for the data in hand. The regression results are totally misleading. All the

[26] The idiosyncratic error term is characterized by a zero mean, uncorrelated with itself, uncorrelated with x and homoskedastic. Pooled OLS estimators cannot differentiate two error components from each other.

explanatory variables of interest do not explain the corporate governance (*Frasreg*). As an alternative to random effect models, I conduct FGLS estimation.

$$\hat{\beta}_{FGLS} = \left(\sum_{i=1}^{N} X_i' \hat{\Omega}^{-1} X_i \right)^{-1} \left(\sum_{i=1}^{N} X_i' \hat{\Omega}^{-1} y_i \right)$$

$$\hat{\Omega} = N^{-1} \sum_{i=1}^{N} \hat{v}_i \hat{v}_i', \qquad (3)$$

where $\hat{v}_i$ would be the pooled OLS residuals from Model (1) with an additional assumption of heteroskedacity across panels.

Between-effects model. Note that time-invariant variable, *legal* is the same as its average during the period of concern.

$$\overline{Frasreg}_i = \alpha + \overline{elec}_i \beta_1 + legal_i \beta_2 + c_i + \bar{\mu}_i , \qquad (4)$$

where $c_i + \bar{\mu}_i$ is treated as a residual. To justify this between-effects model, an additional assumption is required: unobserved unit effect, c_i, and explanatory variables should not be correlated. Otherwise, the estimator could not determine how much of the change in $\overline{Frasreg_i}$ is associated with a change in $\overline{elec_i}$, to assign to β_1 versus how much to attribute to the unknown correlation. This fact demands the use of instrument-variable estimator, correlated with $\overline{elec_i}$ but uncorrelated with c_i. But this approach is not implemented here, since searching for the instrument is beyond the scope of this paper. Instead, I suggest this between-effects models as an alternative estimation method.

B. Results: What determines corporate governance?

The first-stage estimations are summarized in Table 1.6. The column numbers from (1) to (4) indicate the models specified above. In terms of the effect of electoral systems on corporate governance, all the statistical tests say two things. One is that majoritarian electoral systems (*Plur*) improve corporate governance compared with either mixed system or proportional system. The other is that a mixed electoral system and proportional system are not different in determining corporate governance.

In terms of the effect of majoritarian electoral systems on corporate governance, FGLS with the assumption of heteroskedacity across panels gives the most conservative estimation. Compared to non-majoritarian electoral systems, majoritarian electoral systems improve corporate governance by about 9 percent.[27] To clarify the maximum effect estimated, the between-effects model in Column (4) shows that majoritarian electoral systems improve corporate governance by 15 percent. This is a sizable effect. In terms of explained variation of corporate governance, the between-effect model performs well. With only categorical variables, this estimation model explains 44 percent of the cross-country variation of the average corporate governance.

In terms of the effect of legal origins on corporate governance, there is interestingly no difference between English and Scandinavian legal origins. However, French and German legal origins look significantly different from Scandinavian legal origin. For a hypothetical mean country with German legal roots, if I take Column (1), corporate governance level is lower by 7 percent compared to the counterpart with Scandinavian

[27] I take the median of corporate governance in non-majoritarian countries, 5.55 (Austria and Finland). Thus, the coefficient (0.48) is approximately 9 percent (.086) greater than the mean value (5.55). That is, hypothetically speaking, if Austria or Finland changed from proportional to majoritarian systems, their corporate governance would improve by 9 percent.

Table 1.6 2SLS Regression Results

	Dep: Frasreg		(1)	(2)	(3)	(4)	
First Stage (Standard Error in ( ))	**Elecsys**	*Plur*	.51	.64	.48	.84	
			(.13)	(.11)	(.09)	(.40)	
		Mixed	.06	.13	-.03	-.24	
			(.13)	(.11)	(.10)	(.42)	
		Prop					
	LegOrig	*Eng*	-.02	-.10	.80	-.25	
			(.17)	(.14)	(.14)	(.50)	
		Frnc	-.80	-.77		-.77	
			(.14)	(.12)		(.40)	
		Ger	-.41	-.37	-.34	-.36	
			(.17)	(.14)	(.07)	(.47)	
		Scan			.73		
					(.11)		
	Cons.		6.18	5.75	5.38	6.18	
			(.12)	(.16)	(.05)	(.34)	
	Est. Methods		Pooled OLS	Pooled OLS	FGLS w / Hetero	Between-Effects	
	No. Obs.		462	462	462	462	
	N		-	-	33	33	
	T		-	14	14	-	
	Log Likelihood		-	-	-515.03	-	
	Adj. R^2		.23	.46	-	-	
	Within R^2					.04	
	Between R^2					.44	
	Overall R^2					.22	
	$s.d(c_i+\overline{\mu}_i)$					.68	
Second Stage	Dep: Price		(5) - 1	(5) - 2	(5) - 3	(5) - 4	(6) - 4
	$\hat{Fra}sreg$		-21.90	-10.04	-17.02	-6.64	-6.64
			(5.27)	(3.23)	(4.83)	(2.30)	(2.14)
	LnCGDP		21.06	20.72	20.90	20.61	20.61
			(5.46)	(5.52)	(5.50)	(5.52)	(5.51)
	Open		-.42	-.42	-.42	-.42	-.42
			(.04)	(.04)	(.04)	(.04)	(.04)
	ΔXR3		-.00	-.00	-.00	-.00	-.00
			(.00)	(.00)	(.00)	(.00)	(.00)
	LnAraPop		82.27	76.31	79.00	74.82	-21.62
			(19.61)	(19.89)	(19.80)	(19.91)	(7.71)
	LnPop		55.99	57.76	57.19	57.99	-12.13
			(11.58)	(11.68)	(11.64)	(11.70)	(1.85)
	LnEnergy		-3.49	-3.48	-3.51	-3.44	-3.45
			(7.67)	(7.74))	(7.71)	(7.75)	(1.95)
	Cons.		-539.47	-626.88	-578.34	-643.72	92.55
			(127.64)	(125.88)	(127.15)	(125.75)	(2.67)
	Est. Methods		Two-Way Fixed Effects				FEVD
	No. Obs.		462 (N × T = 33 × 14)				
	Within R^2		.50	.49	.50	.49	
	Between R^2		.07	.07	.07	.07	
	Overall R^2		.06	.06	.06	.06	(Adj. R^2) .96

legal roots. In the case of French legal origins, corporate governance gets worse by 15 percent vis-à-vis the Scandinavian counterpart. Since there is no difference between English and Scandinavian legal origins, we can apply this pair-wise interpretation of coefficients correspondingly to the case in which English legal origin is taken as the benchmark in the statistical test.

What about the combined effect of two institutional variables on corporate governance? For instance, Column (3) shows the difference between countries with plurality electoral system plus English legal origin and one with proportional system plus French legal origin. The intercept, 5.38, can be understood as the average corporate governance for the latter case. The coefficients of plurality and English legal origin and the intercept sum to 6.64, the average value of corporate governance in the former case. On average, the former case improves corporate governance by 23 percent compared with the latter case.

All in all, four different specifications of statistical models confirm two things. First, plurality system brings about more liberal corporate governance. Second, less liberal (more coordinated) form of corporate governance originates from French legal origin. Although the foremost important task at this first-stage statistical estimation is to confirm the hypothesis related to the effect of electoral system on corporate governance; the second most important task is to generate the fitted value of corporate governance, the main explanatory variable for price levels at the second stage equation.

Second Stage Estimation

A. Model selection and specification

For the second stage equation, I estimate the effect of corporate governance on price in two ways. One is the conventional fixed-effects model and the other is fixed-effects vector decomposition model (FEVD, Plümper and Troeger 2007).

Fixed-effects model. I set up the second stage estimation with reference to two-way fixed effects.

$$P_{it} = \alpha + \mathrm{X}_{it}\beta + \upsilon_{it}$$

$$\upsilon_{it} = c_i + \lambda_t + \mu_{it}\,, \qquad (5)$$

where P is price, X is a matrix of explanatory variables including the fitted values of corporate governance ($\hat{Fra}reg$) and υ_{it} is a two-way error component disturbances. υ_{it} consists of three components (Baltagi 2001: 31). c_i denotes the unobserved individual effect, λ_t is individual-invariant and accounts for any time-specific effect, and μ_{it} is the remainder stochastic disturbance term.

FEVD model. The reason for employing an FEVD model is that two control variables have unexpected coefficients in the fixed effect model—*LnAraPop* and *LnPop*. A possible cause lies in their rarely changing nature. Plümper and Troeger develop this estimation model to preserve the small sample properties and the unbiasedness of the fixed effects model, even in the presence of time-invariant and rarely changing variables. The base model is specified as follows:

$$P_{it} = \alpha + \mathrm{X}_{it}\beta + Z_i\gamma + c_i + \mu_{it}\,, \qquad (6)$$

where X denotes varying explanatory variables, Z denotes time invariant variables, c_i indicates the unit-specific unobserved effect, and μ_{it} is the idiosyncratic error terms.[28] The intuition is straightforward. In Model (5), unit fixed-effects are a vector of the mean effect of omitted variables (c_i) including the effect of time-invariant variables. In other words, the unit effects of a fixed-effects model contains the vector of the time-invariant variables if they are included in the covariate matrix, X for Model (5). The key to the FEVD technique is to decompose the estimated unit effects into two parts, an explained and an unexplained part. The procedure consists of three steps. First, average Model (6), subtract the averaged equation from Model (6) to remove the unit fixed effect, c_i (the constant term α as well) and then conduct Pooled OLS with the resulted equation after subtraction. At this moment, the "estimated unit effects" include all time-invariant variables, Z, the overall constant term, α, and the mean effects of the time-varying variables, X. Second, regress the unit effects estimated from the first step on the observed time-invariant and rarely changing variables, Z, to decompose it into an explained and an unexplained part. Lastly, rerun Model (6) by substituting c_i with the unexplained part decomposed at the second step.[29]

B. Results: what determine prices?

The lower part of Table 1.6 shows the second stage estimations. The number in the parentheses corresponds to the number of the statistical model. (5) and (6) correspond

[28] In this model, I do not assume time-specific effect, λ_t. Even though λ_t is taken into account, the statistical outcome is not different except that R^2 slightly increases to .96.
[29] See Plümper and Troeger 2007, 127-9 for the functional forms of the procedure.

with the fixed-effect model and the fixed-effect vector decomposition model respectively. The number following the dash indicates which predicted corporate governance measure is employed. Thus, (6) – 4 in the right end column of Table 1.6 is the statistical outcome of the fixed-effect vector decomposition model estimation with $\widehat{Fra}\widehat{sreg}$ from between-effects (Column (4) at the first stage estimation). Based on the R^2, the fixed-effect models explain equally 50 percent of price variations. FEVD model explains 96 percent of price variation.

The overall pattern of the estimation based on the fixed-effects models looks similar in terms of statistical and substantive significance. First, income level has strong effects on price both statistically and substantively, although it is not easy to interpret the substantive effect of *LnCGDP*. A one unit increase in logged income gives rise to about 20 percent increase in price. As people become wealthier, they can afford to purchase more expensive and quality goods and service. Second, it is intuitive that trade openness has a negatively significant effect on national price level but its substantive significance is not sizable.

Third, the fixed effect models do not capture the effects of factor endowments and market size on price. Two measures of factor endowments, relative land to labor abundance (*LnAraPop*) and energy production to consumption (*LnEnergy*) do not explain the variation of price. In the case of *LnAraPop*, the sign of the coefficient is opposite to theoretical prediction. The effect of market size (*LnPop*) is also contrary to theoretical predictions. A possible reason for these anomalies has already been mentioned when I specified the remedial estimation technique, FEVD model.

To implement FEVD technique, I let the time invariant Z matrix consist of *LnAraPop and LnPop.* As shown in Column (6) – 4, the FEVD model confirms the expected effects of *LnAraPop* and *LnPop. LnEnergy* also explains price level using a 90 percent confidence interval. The deceasing effects of two factor endowments and economy of scale variables are confirmed by FEVD model.

Last but not the least, the fitted corporate governance ($\hat{Fra}sreg$), the variable of primary interest, has a negative effect regardless of statistical model specifications. That is, *the more liberal shareholder type corporate governance, the lower price.* But the substantive effects of corporate governance on price are quite different. Depending on the specification of the first stage estimation, the coefficients vary from –21.90 to –6.64. If I take Column (6) – 4 because of its high R^2 and the reasonable coefficient estimations, a one unit improvement in $\hat{Fra}sreg$ lowers price by 7 percent in a hypothetical mean country in terms of price.[30]

1.4 Discussion and Conclusion

The paper offers a different causal mechanism to explain cross-national variation of prices than the one provided in studies that focus on electoral systems. The key to this alternative mechanism is examining a firm's pricing behavior. More specifically, the mechanism suggests that electoral system determines the form of corporate governance and the form of corporate governance shapes a firm's pricing behavior. The added value from this two-stage model setup is that it comes closer to detailing the critical

[30] Take the mean price of the sample, 88.4. Other things being equal, the effect of a one unit improvement in $\hat{Fra}sreg$ results in 7 percent decrease in prices. ($6.6/88.4 \times 100 \cong 6.7$)

intermediary linkage between electoral systems and prices. Instead of offering hard and fast conclusions, the paper closes by reviewing the current theoretical and empirical limitations that may be overcome in future iterations of the project.

First, the paper focuses on the formation of different types of corporate governance in a factor-specific one-country framework. Accordingly, once mobile factors are incorporated in the model, a more complex game of corporate governance may be necessary.

Second, the model does not address out-of-equilibrium path cases. For instance, the model is not able to predict price determination for either blockholder type of corporate governance under mixed electoral systems (e.g. South Korea) or in-between corporate governance types under proportional systems (e.g. Scandinavian countries). In this sense, the descriptive model should be developed into a formal model, which can comprehend out-of-equilibrium path behavior.

Third, this paper does not pay sufficient attention to how to relate three agents and drifting voters at the first stage to consumers at the second stage. Instead, consumers at the second stage are implicitly assumed to align with the dominant political coalition at the first stage. Though beyond the scope of this paper, country-specific, historical and cultural factors often play a critical role in determining consumer behavior. Comparative studies on consumer politics (e.g. Maclachlan's analysis of Postwar Japan 2001) may provide valuable insights into these country-specific factors.

Fourth, external shocks may matter. Exogenous changes strong enough to alter consumer behavior can lead to reforms of corporate governance structures as well as

electoral systems. At this point, the paper employs electoral systems as exogenously given institution, but there may be room to incorporate exogenous shocks in the future.

Fifth, better empirical tests require more accurate measure of two main explanatory variables: *Electoral Systems and Corporate Governance*. For instance, the effect of mixed electoral systems on corporate governance type is not clearly differentiated from that of proportional systems. Measurement error in either institutional variable can weaken the validity of the empirical tests. The second stage estimation on determinants of national price level may have limited utility without more precise first-stage estimations.

Last but not least, selective cases studies may also prove revealing even though large N statistical tests confirm the hypotheses. This is because large N statistical tests cannot illustrate micro-behaviors predicted in the model.

According to "law of one price," there should exist one price for one goods or service if there is no barrier to transactions of resources and information. This paper demonstrates a political institutional barrier to price convergence, that is, electoral systems. The added value of the theoretical model in this paper is to elaborate the intervening mechanism between electoral systems and determined price level, which had been a black box called government regulation. This paper fills the black box with corporate governance, which summarizes two factor market regulations: employment protection and shareholder protection. Corporate governance is expected to shed analytical light on future political economic analyses. This paper shows one example in that direction by focusing firm's pricing behavior under a given type of corporate governance.

CHAPTER 2

Corporate Governance under Proportional Electoral Systems

2.1 Introduction

In recent years, governance has drawn attention from policy-makers, business leaders, social activists and social scientists. Although governance is defined in many ways, the term typically involves the interface between government and non-government institutions and the need to develop legal and administrative mechanisms that protect against shortsighted political-economic opportunism. As such, the governance literature emphasizes accountability, participation, predictability, and transparency as means to reduce the kind of rent-seeking behavior that can occur when private actors manipulate public institutions for their own narrow gains (Ahrens 2002, 10).

As a subset of the broader concept of governance, studies of corporate governance are interested in similar issues. In the case of corporate governance, however, the focal point is the separation between ownership and control within firms. More specifically, controlling shareholders (or entrepreneurs) can use their control over the firm's resources to their own advantage at the expense of non-controlling shareholder (or minority shareholder). As a result, the primary concern in studying corporate governance is to identify ways of limiting managerial opportunism while maintaining a firm's economic performance. This challenge is more generally known as an 'agency problem.'

The degree of effort to overcome the agency problem may vary across firms or industries due to numerous firm-specific or industry-specific characteristics such as technology and factor intensiveness in production, ownership structure, and asset-specificity. Yet, in examining firm or industry-specific explanations it is easy to overlook country-specific factors that may contribute to this variation. In particular, it is critical to consider cross-national variation in political institutions because the manner in which these institutions influence the stringency of corporate oversight laws and regulations can systematically lead to different forms of corporate governance.

Typically, these different forms of corporate governance have been described in terms of dichotomies: outsider vs. insider, shareholder vs. blockholder, Anglo-American vs. Continental European and so on. The first term in each of these dichotomies are characterized by high level of minority shareholder protections (MSP) and dispersed ownership structures, while the latter are characterized by lower levels of MSP and concentrated ownership structures. The primary purpose of this paper is to provide a political explanation for cross-national variation in these two aspects of corporate governance.

In so doing, the paper draws upon and extends the seminal research of Pagano and Volpin (hereafter PV). PV claim that electoral systems have a systematic effect on corporate governance such that majoritarian systems bring about a shareholder type (or outsider model) while proportional systems bring about a blockholder type (or insider model) (PV 2005). They suggest that this is because majoritarian rule tends to make heterogeneous electorate's votes (rentiers including shareholders) more valuable, whereas

proportional rule tends to make the homogeneous electorate (worker) more valuable. They, moreover, demonstrate that their argument is consistent with data from OECD countries.

Though PV find empirical confirmation for their stylized model, their argument raises four questions regarding an electoral-system's effect on corporate governance. First, the stylized effects of electoral systems need be explored closely. For instance, the presumable advantage given to the heterogeneous electorate under majoritarian rule is only valid when parties are equally effective in delivering transfers to interest groups. Otherwise, that kind of advantage is not guaranteed (Dixit and Londregan 1996). Second, recent phenomena like global financial integration and the creation of massive pension funds require a revision of the assumption that the rentier is a heterogeneous part of the electorate. In recent years, rentiers have come to have their own political economic interests (Gourevitch and Shinn 2005, hearafter GS). Third, their formal model would be more accurate if it offered a more realistic model of electoral competition. For instance, their model's two-party competition makes it easy to solve their optimization problem but sacrifices the key electoral dynamics of the political process and political coalitions. Lastly and related to the third point, the effect of electoral systems on corporate governance (or any government policy) can be discrete, rather than continuous, across two families of electoral systems (Austen-Smith and Banks 1988). Upon closer examination, the statistical leverage of majoritarian countries is high enough to change the outcome of PV's statistical tests: the proportionality across all forms of electoral

systems does not explain variation in MSP once majoritarian electoral systems are excluded from their sample.

Table 2.1 Bivariate Regression Results: Proportionality and MSP

Dep: MSP	Majoritarian Systems (included)	Majoritarian Systems (excluded)
Proportionality	- .27 (.05)	-.04 (.08)
Constant	3.73 (.11)	3.14 (.20)
R^2	.07	.00
No. of Obs.	354	268

Standard error in ( )
Source: Pagano and Volpin, AER 2005

Table 2.1 shows a simple bivariate regression outcome under the pooled OLS assumption. The left column shows that proportionality of electoral systems is negatively associated with minority shareholder protections with statistical and substantive significance. However, the exclusion of majoritarian systems erases the association between the two variables as shown in the right column.

The paper aims to build off of PV's argument by showing how correcting for some of the above oversights could alter the effect of electoral systems on corporate governance formation. The approach used here is to analyze a sequential model of multistage electoral and legislative decision making in three-party proportional representation (PR) systems. That is, following an election, parties attempt to form a governing coalition, which subsequently chooses a final policy outcome. The main finding is that the electoral threshold— a minimum percentage of votes a party must receive to get at least one seat in parliament of PR systems— has a negative effect on the degree of MSP and ownership dispersion.

This finding challenges both PV's as well as Roe's (2003) research on the political determinants of corporate governance. In terms of PV, the finding calls for a reconsideration of the generalized effect of electoral systems on corporate governance formation. For instance, if a hypothetical electoral threshold of majoritarian systems is higher than a counterpart PR system, the relationship between electoral systems and corporate governance becomes non-linear across the two families of electoral systems.

In terms of Roe's claims, the partisan explanation of corporate governance needs to be reconsidered as well. Roe suggests that social democracy led by leftist governments can be an important political determinant of corporate governance, emphasizing the impact of these leftist governments on ownership structure: Where labor is strong, blockholding prevails. Where labor is weak, diffuse ownership structures develop. However, a key empirical finding in this paper does not support Roe's argument. Within PR countries, partisan or social democratic power does not explain cross-national variation of ownership structure.

The paper is divided into three sections. The first section specifies the electoral competition model under proportional electoral systems. Statistical tests are conducted in the second section. The final section discusses the policy implications and a research agenda for future studies.

2.2 The Model

2.2.1 Timeline and Basic Setup

The model is based on Austen-Smith and Banks' multi-stage game-theoretic model of three-party competition under PR system (1988).[31] Although additional restrictions are required to produce a meaningful solution to this game about corporate governance formation, this subsection illustrates the general model of three-party multistage electoral competition.

Figure 2.1 Time Line

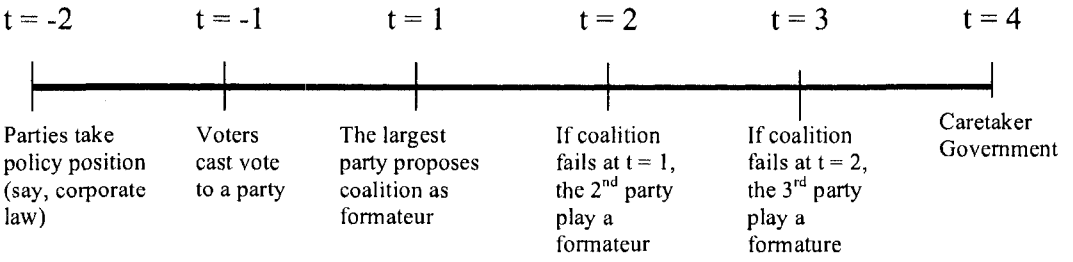


Figure 2.1 illustrates the time line of the game. Broadly, the model consists of two main stages. One is the electoral stage and the other is the legislative stage. In other words, the game begins with making the party platform (taking a policy position) before an election and goes to government formation (implying the realization of a certain policy). Formally, two main stages are differentiated with negative and positive signs, respectively.

At t = -2, there are three risk-neutral parties, α, β and γ. Let $S(\Omega)$ denote the set of all subsets of Ω, where $\Omega = \{\alpha, \beta, \gamma\}$. All the parties are assumed to compete on a one-dimensional finite policy space $P \subset R$. All the parties should declare simultaneously

[31] For those who want the exhaustive equilibrium outcomes, I use the same formal notations as Austen-Smith and Banks use in their paper.

their policy positions p_k on P where k is party index. Let $\mathbf{p} = (p_\alpha, p_\beta, p_\gamma)$ denote a policy vector.

At t = -1, voters cast a single ballot for one of the three parties. The number of voters, n, is assumed to be odd and sufficiently large, i.e. no less than 15. The method of electing legislators is proportional rule. As usual, there is a threshold to gain a seat in legislature, s, which is assumed to be odd and falls into the range [3, n/3). Party k receives a certain ratio of total votes, w_k. Election outcome at t = -1 is expressed in a weight vector, $\mathbf{w} = (w_\alpha, w_\beta, w_\gamma)$. As usual, for the case in which any party fails to pass the threshold, there is a certain method of avoiding dead votes so that the sum of w's is 1. I will not consider a weight vector the elements of which are less than 3 because the most interesting and contrasting political procedure in countries under PR systems vis-à-vis those under majoritarian counterpart is inter-party coalition government. The following time lines after the aforementioned legislative stage refer to how to form a government with an assumption that all three parties successfully establish legislative influence by acquiring the minimum votes designated by election law.

From t = 1 on, the mechanism of formateur rule is based on a non-cooperative bargaining game. The party with the largest number of seats proposes a coalition. If the first trial fails, the second largest party proposes a coalition at t = 2. If a government fails to be formed even after t = 3, then a 'caretaker' government is brought about at t = 4. It is assumed to make the government policy equitably.

2.2.2 Strategy

In the model, voters take into account the subsequent legislative game in making their decisions at the electoral stage. In turn, parties take into account of such deliberations in selecting their electoral strategy and subsequent legislative behavior conditional on electoral outcome. Strategies for parties and voters are defined as follows.

2.2.2.1 Party's strategy

For the legislative stage, let $w_c = \Sigma\, w_k$ for any coalition $C \in S(\Omega)$ and define the set of winning coalitions in the legislature given the party weight vector $\mathbf{w}$ from $t = -1$ such as $D(\mathbf{w}) = \{C \in S(\mathbf{\Omega}): w_c > 1/2\}$ and the set of winning coalitions where party k is a member such as $D_k(\mathbf{w}) = \{C \in S(\mathbf{\Omega}): k \in C\}$. In addition, because only one policy can be implemented and parties have different preferences over what it should be, coalition governments are sustained partly through sharing the benefits of being a member of government. Thus, along the coalition part (legislative stage) of the timeline, the parties attempting to make a government are assumed to take a policy position $y \in P$ and make an offer about how to divide a fixed amount G of transferable benefits across the parties.[32] Let me define all the set of possible benefit vectors, $\Delta(G) = \{(g_\alpha, g_\beta, g_\gamma): g_k \geq 0, \forall\, k \in \Omega \text{ and } \Sigma\, g_k = G\}$.

Now party k's strategy is described with the following three elements:

i) Electoral position $p_k \in P$,

ii) Proposal $\Gamma_k \in D(w) \times P \times \Delta(G)$,

[32] G is assumed to be large enough to make it possible to form a coalition at any formateur round (i.e. $\geq |P|^2$).

iii) Response r_k: $D_k(w) \times P \times \Delta(G) \times T \rightarrow \{0, 1\}$, where T indicates the formateur round, 1 means accept and 0 means reject.

For tractability's sake, subscript t (= 1, 2, 3) is also omitted for Γ and r. Let $\boldsymbol{\Gamma} = (\Gamma_\alpha, \Gamma_\beta, \Gamma_\gamma)$ and $\mathbf{r} = (r_\alpha, r_\beta, r_\gamma)$.[33]

2.2.2.2 Voter's strategy

Voters are assumed to conduct probabilistic voting. Thus, a voter's strategy is a function specifying the probability that a voter votes for each party given their policy positions, σ_i: $P \times P \times P \rightarrow \Delta(\Omega)$. Let $\boldsymbol{\sigma}_i(p) = (\sigma_i(\alpha), \sigma_i(\beta), \sigma_i(\gamma))$, where the element $\sigma_i(k)$ is the probability that voter *i* casts her vote to party k and a vector of voters' probabilistic voting given parties' policy positions $\mathbf{p}$, $\boldsymbol{\sigma}(\mathbf{p}) = (\sigma_1(p), \ldots\ldots, \sigma_n(p))$.

2.2.3 Utility Function

2.2.3.1 Voter's utility

Purely policy oriented voter's preferences are characterized with quadratic utility functions $u_i = u(\bullet ; x_i)$, where x_i is voter *i*'s ideal point in policy space P. Each voter's ideal point are assumed as common knowledge and located so that $\forall\ i < n$, $x_i < x_{i+1}$. Voters' ideal points are distributed symmetrically about the median voter's ideal point, $\mu = (n+1)/2$. Since voters vote without knowing the final policy outcome, the expected utility of voter *i* should include this uncertainty factor.

---

[33] A complete description of a strategy must be the proposal being a function of past electoral positions, proposals and responses. But in this model, it is assumed to be ahistorical for tractability's sake as well.

Now that ρ (•) is a probability distribution over policy space P, I can figure out the expected utility of voter *i* over the final policy outcome y such that,

$$E_\rho [u_i (\bullet)] = - (y^\rho - x_i)^2 - s^\rho,$$

where y^ρ and s^ρ are the mean and the variance of the distribution, ρ, respectively.

2.2.3.2 Party's utility

Whether a party succeeds in getting into the legislative bargaining game is the primary determinant of party's utility. That is, if a party fails to get the electoral threshold, s, the utility is just a certain amount of cost, -c. In contrast, if it succeeds in gaining, at least, s votes, two sources of utility are taken into account. One is the final policy outcome, y on P, a non-pecuniary benefit, and the other is the redistribution of transferable benefit, $\Delta(G)$, a pecuniary benefit. I assume a quasi-linear utility function, U_k for party k, which is additively separable and linear in g_k and quadratic in y. That is, party k's utility function given parties' *ex ante* policy position p is expressed like $U_k (y, g; \mathbf{p}) = g_k - (y - p_k)^2$.

Now, I can figure out the expected utility for party k by making an additional assumption of the distribution f(•) over $\Delta(G)$ such that,

$$E_{f,\rho} [U_k(\bullet,\bullet; \mathbf{p})] = g_k^f - (y^\rho - p_k)^2 - s^\rho,$$

where g_k^f is the mean value of g_k with respect to the distribution f(•).

2.3 Equilibrium

The model is solved backwards, from the legislative stage to voting stage and then to taking party's policy position. By the sequential nature of the decision-making at the legislative stage, I solve for the optimal proposal and response at $t = 3$, then for the optimal proposal and response at $t = 2$ as a function of the previous optimal behavior, and so on. At the voting stage, voters deduce the final legislative outcome with the given $\mathbf{p}$ and their voting strategies, $\sigma(\mathbf{p})$. This backward induction, in turn, allows me to analyze voters' equilibrium behavior. Finally, I can analyze the competition among parties at the electoral stage because parties' vote share ($\mathbf{w}$) is a function of parties' policy positions ($\mathbf{p}$) in equilibrium, where voters' voting strategies σ influence the relationship between $\mathbf{w}$ and $\mathbf{p}$.

To apply the generalized model to the central question of the paper, voters and parties need to be specified with regard to the policy space of interest, corporate governance. First of all, voters are assumed to be corporate stakeholders. They can be entrepreneurs (controlling owners), shareholders (non-controlling owners), workers, suppliers, consumers and so on. Parties represent each stakeholder but for simplicity three major parties are assumed to exist representing three major stakeholders: E (entrepreneurs), W (workers) and R (rentiers).

Formally, each party's policy position is assumed as in $p_W < p_E < p_R$ on policy space, P. The fact that party E's policy position is located between the other two parties implies two things. One is that there is relatively broad choice of production location and technology available to entrepreneurs. As far as a certain amount of corporate control and/or pecuniary benefit are secured, they establish their business by hiring workers and

borrowing capital. The other is that there is a conflicting interest in both production participation and profit sharing between workers and rentiers. Although additional constraints on parties' policy position will be illustrated shortly, such cases as $p_W = p_E = p_R$, $p_W = p_E < p_R$ and $p_W < p_E = p_R$ are excluded from theoretical consideration because they do not show interesting dynamics for the legislative stage of the sequential game. If all three parties pick the same policy position, the legislative stage should be the same as a lottery situation for government formation. If either of the extreme parties takes the same policy position as party E does, the whole game is similar to a two-party competition under majoritarian systems.[34]

To materialize the policy space, suppose the degree of minority shareholder protection (MSP), the most salient aspect of corporate governance. As I assumed previously, rentiers and workers have conflicting interests. Accordingly, party R wants higher levels of MSP while party W prefers lower levels of MSP. Generally speaking, MSP is negatively correlated with employment protection at the country level,[35] which implies that workers' job security lies in a zero-sum relationship with rentiers' claim for corporate profit sharing. Party E may well pick a policy position between party W and party R. Entrepreneurs want a higher level of MSP than workers prefer because it can be utilized as a bargaining leverage vis-à-vis workers in terms of wage and work condition. In contrast, they want a lower level of MSP than rentiers demand to keep corporate control against the corporate outsider.

---

[34] If two parties declare the same policy position, they are considered to make a political coalition even before election stage. Since the timing of party coalition is an important feature of this sequential process of three-party electoral competition under proportional systems, these cases are excluded from consideration.

[35] The correlation coefficient between MSP and employment protection is -.54 in PV's dataset (2005).

As another important dimension of corporate governance, I consider ownership structure—the degree of ownership dispersion.[36] Party W prefers lower ownership dispersion because striking a deal with the most powerful blockholder is easier than bargaining with a top executive officer representing large numbers of minority shareholders.[37] In contrast, party R prefers higher ownership dispersion because concentrated blockholders can encroach upon their shareholder rights. Party E is located between two parties.[38] Entrepreneurs prefers more dispersed ownership structure than workers because they need to share business risks as well as to use shareholder interest for controlling workers. In contrast, they prefer less dispersed ownership structure than rentiers want to secure corporate control. For empirical tests, I will examine what determines these two aspects of corporate governance.

To illustrate the most relevant equilibrium solution to my interest in corporate governance formation, I will focus on the case in which E-W coalition comes into existence at the legislative stage. The reason for placing the emphasis on this coalition formation rather than E-R or W-R coalitions is that E-W corporatist coalition is likely to occur under PR systems while it is inhibited by majoritarian systems (GS: 72; PV:1007). Note that the initial motivation of this paper is to explain within-variation of corporate

---

[36] Ownership concentration is a better known concept. To avoid a possible confusion, I use the opposite concept of ownership structure such that $p_W < p_E < p_R$ is maintained.

[37] In a similar vein, Hoepner explains the main cause of labor's resistance to reforming corporate governance in Germany. For instance, introducing hostile takeovers to increase shareholder orientation is not welcomed by workers because hostile takeovers replace the managements that have been the former bargaining partners (Hoepner 2007). In addition, the existence of market for CEOs and the pecuniary incentive for corporate managers make it tougher for organized labor to bargain with corporate top management.

[38] Some may argue tha party R may prefer moderate levels of ownership concentration because too dispersed ownership structure can impose huge monitoring cost on minority shareholders. Even though this is true, however, it is unlikely that it prefers more concentrated ownership than party E does.

governance under PR systems with a suspicion that the effect of electoral systems on corporate governance (or any government policy) is discrete rather than continuous across two families of electoral systems. In actuality, the degree of MSP variation in a subset of PR countries is as much as the MSP variation in PV's whole dataset including majoritarian countries. This fact also raises a question about what explains within-variation of MSP in PR countries.

For E-W coalitions to occur, I need the following additional constraints.

(c1) Any party has neither majority votes nor less than electoral threshold, s, at the electoral stage because I have interest in dynamic party coalition in legislative stage.

(c2) Party E does not gain the largest weight of votes. Otherwise, a static equilibrium outcome occurs where p_E is always equilibrium policy, y*, and G is g_E*.[39]

(c3) Voters are assumed to vote strategically. Otherwise, the stability of equilibrium is not guaranteed.[40]

(c4) The rule of minimum winning coalition should be applied for this game.

An equilibrium consists of three behavioral components along the path from legislative stage to electoral stage, that is, legislative coalition and outcomes (C*, y*, g*), voters' voting behavior (σ*) and party's policy positioning (p*). The equilibrium path will be described backward as follows.

2.3.1 Legislative coalitions and policy outcomes

[39] In addition, this constraint should be realistic in terms of voters composition. If I assume that the constituents are composed of corporate stakeholders, it is no doubt that the Entrepreneur group is the least in number.

[40] For more detail, refer to p. 415 of Austen-Smith and Banks (1988).

Because of (c4), either $w_E > w_R > w_W$ or $w_W > w_R > w_E$ can bring about E-W coalition at legislative stage. However, I should rule out the former case because y* and g* are not so interesting in the case that party E gains the largest weight of votes. The sequential nature of the game renders legislative outcomes susceptible to parties' policy position (**p**) and voters' voting behavior (σ) at the previous stages. Let each party's policy position be captured by the extreme parties' distance from the middle party such that $d_L=|p_E - p_L|$, where L = W, R.

There are two cases. One is the case where party W is farther away from party E than party R. The other is the case where party W is no farther away from party E than party R. The equilibrium outcomes of y*, g* in addition to C* = {E, W} are summarized. For notation, let $p_{jk} = \frac{p_j + p_k}{2}$ (j, k = W, E, R and j ≠ k) indicate the mid point between parties' policy positions.

(Eq-L1) If $w_W > w_R > w_E$ and $d_W > d_R$, then $y^* = p_{WE}$, $g_E^* = (p_E - p_{WE})^2 - (p_{RE} - p_E)^2$, and $g_W^* = G - g_E^*$.

Eq-L1 shows that the parameterized form of benefit equilibrium (**g***) is not changed no matter how farther party W takes its policy position from party E's policy position given the parties' weight. However, where party R's policy difference from party E is no shorter than party W's, three different equilibriums occur as follows.

(Eq-L2) If $w_W > w_R > w_E$ and $d_R \leq 2d_W$, then $y^* = p_{WE}$, $g_E^* = (p_E - p_{WE})^2 - (p_E - p_{RW})^2$, and $g_W^* = G - g_E^*$.

(Eq-L3) If $w_W > w_R > w_E$ and $2d_W < d_R \leq 3d_W$, then $y^* = 2p_E - p_{RW}$, and $g_W^* = G$.

(Eq-L4) If $w_W > w_R > w_E$ and $d_R > 3d_W$, then $y^* = p_W$, and $g_W^* = G$.

The intuition from Eq-L2 to Eq-L4 is that if party R's policy position is too far away from party E (to put it another way, party E and party W is too close), then the minority party's (party E) interest in the government coalition is not reflected in both policy position and benefit distribution given the party weight, $w_W > w_R > w_E$. (Refer to Austen-Smith and Banks 1988:418).

2.3.2 Equilibrium Voting Strategies

Given the vector of weights **w** and positions **p** at the legislative stage, let y (**w**, **p**) be the equilibrium policy outcome. Define $\Lambda(p) = \{y \in P: y = y(\mathbf{w}, \mathbf{p}) \text{ for some } \mathbf{w}\}$ to be the set of possible equilibrium policy outcome given **p**. The party weight vector **w** will be determined by the individual voting behavior. Here I assume that all voters adopt pure strategies, for any $k \in \Omega$,

$$w_k = |\{i \in N: \sigma_i(k)=1\}|/N \equiv v_k(\sigma(p))/N,$$

where $\sigma(\mathbf{p}) = (\sigma_1(p), \ldots\ldots, \sigma_n(p))$. Thus the probability of any specific policy $y \in \Lambda(p)$ being the final outcome is a function of voter strategies. Formally, I denote this probability with $\pi(\bullet\,|\sigma, p) : \Lambda(p) \rightarrow [0,1]$.

A voting equilibrium is defined as an n-tuple $\sigma^*(\mathbf{p})$ such that $\forall \mathbf{p}$, $\forall i \in N$, $\forall\, \sigma(\mathbf{p})$: $E_{\pi(\sigma^*, p)}[u_i(y)] \geq E_{\pi(\sigma i, \sigma^*\_i, p)}[u_i(y)]$. Thus, given **p**, a voting equilibrium is just a Nash equilibrium to the game with n players and payoffs induced by the equilibrium behavior in the legislative game generated by **p**.

Since voting outcomes depend on the distribution of voters, multiple equilibriums for voter strategies come out depending on the location of the median voter's ideal policy position x_μ. The voters' strategies on the equilibrium of interest are illustrated as follows:

(Eq-V) If $x_\mu = p_E$, and $d_R = d_W = d \geq (x_{(2\mu+s+1)/2} - x_\mu) \bullet 8/3$, then voters' voting strategy is as follows:

$\sigma_i^*(W) = 1, \ i = 1, \ldots, (2\mu\text{-}s\text{-}3)/2,$

$\sigma_i^*(E) = 1, \ i = (2\mu\text{-}s\text{-}1)/2, \ldots, (2\mu\text{+}s\text{-}1)/2,$

$\sigma_i^*(R) = 1, \ i = (2\mu\text{+}s\text{+}1)/2, \ldots, n.$

If party E's policy position does not coincide with the median voter's ideal point, if the distance of the other two parties W and R from party E is not equal or if the distance is less than $(x_{(2\mu+s+1)/2} - x_\mu) \bullet 8/3$, the aforementioned constraints are violated. The reasons of these three conditions will be explained intuitively in the following section. (For the formal proof, refer to Austen-Smith and Banks 1988:419)

2.3.3 Party's Policy Positions

So far, I have shown that political coalitions on equilibriums at the legislative stage are conditioned by parties' relative weight (by vote gain) and the extreme parties' relative distance from party E and that voters' strategies on equilibrium at the voting stage depend on the ideal point of the median voter, the relative distance of extreme parties from party E and their absolute distance from party E. Now I examine parties' policy position just before voters cast their vote. Intuitively, first off, the aforementioned constraint (c1) designates that party E should not deviate from the median voter's ideal

policy position. Otherwise, either of the extreme parties, W and R, can gain a majority of votes as far as $p_W < p_E < p_R$. Second, either of the extreme parties has no incentive to keep farther away from party E than the counterpart. Otherwise, it must be penalized in terms of vote weights. Rather, if there is no constraint (c1), both extreme parties want to come closer to party E as possible as they can to maximize their vote share. On balance, on the equilibrium path, each party takes policy position as follows:

(Eq-E) (1) $p_E^* = x_\mu$

(2) $d_W^* = d_R^*$ or $(p_E^* - p_W^*) = (p_R^* - p_E^*)$

d^* on equilibrium must have a range as a function of electoral threshold, s, such that $d^* \in [8/3 \bullet (x_i^* - x_\mu), 4 \bullet (x_j^* - x_\mu))$, where $i^* \equiv \mu + (s-1)/2$, $j^* \equiv \mu + int[(n-1)/4]$.[41] To illustrate an outcome of election, party E gains exactly s and party W and R gain (n-s)/2 when $d^* = 8/3 \bullet (x_i^* - x_\mu)$. Meanwhile if d^* is an integer number bigger than (n-1)/4, party E comes to gain the largest vote weight, which violates (c2). Thus, d^* should be an integer less than (n-1)/4 (For the exhaustive formal proof, refer to Austen-Smith and Banks 1988:420-422).

2.3.4 Corporate Governance on Equilibrium: Applications

The equilibrium path of interest is summarized forwardly from party policy positioning to government formation in the legislature.

(1) At the stage of party's policy positioning, party E picks the ideal policy position of the median voter and party W and R take their policy position symmetrically against party E's policy position (x_μ).

[41] *int*[a] means the smallest integer greater than or equal to a..

(2) At the election stage, under the assumption of a symmetric distribution of voter ideal points centering on the median voter, the equilibrium vote share would be $w_R = w_W > w_E$ because party E gains at least the electoral threshold, s due to the constraint (c1).

(3) At the legislative stage, although party W and party R are equally likely selected to be the first proposer, note that I am primarily interested in explaining the variation of corporate governance under E-W political coalition. Thus, I assume that flipping biased coin makes party W the first formateur so that E-W political coalition can be made for government formation. Although there are various reasons for the coin being biased,[42] let me treat this biasness as a sort of historical path-dependency.[43] In this paper, I will not explain the dependence but treat as it is given.

Now I know that *(Eq-E)*, *(Eq-V)* and then *(Eq-L2)* are correspondent to the equilibrium path. To generate testable hypothesis, I give attention to the institutional parameter, s, electoral threshold of PR systems. Suppose that policy space P refers to corporate governance as illustrated at the beginning of this section. I have following two testable hypotheses.

H1: If electoral threshold s increases, then y* moves toward left on the policy space P.

When I apply H1 to the degree of MSP, I predict that the increase of the threshold s of proportional electoral systems weakens the degree of MSP. Meanwhile, H1 can be applied to another dimension of corporate governance, ownership dispersion: as s

[42] For instance, Germany has had a long ideological and political encounter with codetermination, which has be exampled as labor dominant cases (Roe 204: 257 in Gorden and Roe).
[43] In Mares' terms, 'prestrategic' preferences of voters for German electoral condition can be an example of the causes of the biasedness. Isabel Mares, *Politics of Social Risk: Business and Welfare State Development* (Cambridge University Press, 2003).

increases, the level of ownership dispersion gets lower (more concentrated ownership structure).

H2: If electoral threshold s increases, then g_E^* increases whereas g_W^* decreases.

Since I examine corporate governance, G can be understood a certain amount of firm profit and the benefit vector **g*** on the equilibrium is expressed as (g_W, g_E, 0). g_W can be translated into wage, unemployment insurance, welfare benefit etc. while g_E can be understood as managerial incentives like salary, stock option etc.

Table 2.2 Simulation Table: The Effect of Electoral Threshold on Policy Outcome and Benefit Sharing

s	w^*_W	w^*_E	w^*_R	d*	y* ($\mu = 51$)	g_R^*
3.0	49.0	3.0	48.0	2.7	49.7	1.8
5.0	48.0	5.0	47.0	5.3	48.3	7.1
7.0	47.0	7.0	46.0	8.0	47.0	16.0
9.0	46.0	9.0	45.0	10.7	45.7	28.4
11.0	45.0	11.0	44.0	13.3	44.3	44.4
13.0	44.0	13.0	43.0	16.0	43.0	64.0
15.0	43.0	15.0	42.0	18.7	41.7	87.1
17.0	42.0	17.0	41.0	21.3	40.3	113.8
19.0	41.0	19.0	40.0	24.0	39.0	144.0
21.0	40.0	21.0	39.0	26.7	37.7	177.8
23.0	39.0	23.0	38.0	29.3	36.3	215.1
25.0	38.0	25.0	37.0	32.0	35.0	256.0
27.0	37.0	27.0	36.0	34.7	33.7	300.4
29.0	36.0	29.0	35.0	37.3	32.3	348.4
31.0	35.0	31.0	34.0	40.0	31.0	400.0

Table 2.2 shows a simulation outcome by setting 101 for the total number of voters (n) and by picking the minimum $d^* = 8/3 \bullet (x_i^* - x_\mu)$ where $i^* \equiv \mu + (s-1)/2$.[44] In

[44] I take the right hand side of policy space P to get positive integer number for the distance between the middle party and the extreme parties. The actual policy outcomes are understood with points of symmetry on the left hand side of space P.

addition, I take one voter from party R's vote gain and add it to party W's to avoid a tie between two extreme parties—return to the beginning of this section for the reason I focus E-W coalition among multiple equilibriums for party coalitions. According to the 5th column, d* increases as s increases. At the same time, y* decreases as well, which means policy outcomes moves toward left. If I apply MSP or ownership dispersion to the policy space, they get lower as electoral threshold s increases.

Figure 2.2 Simulation Graph

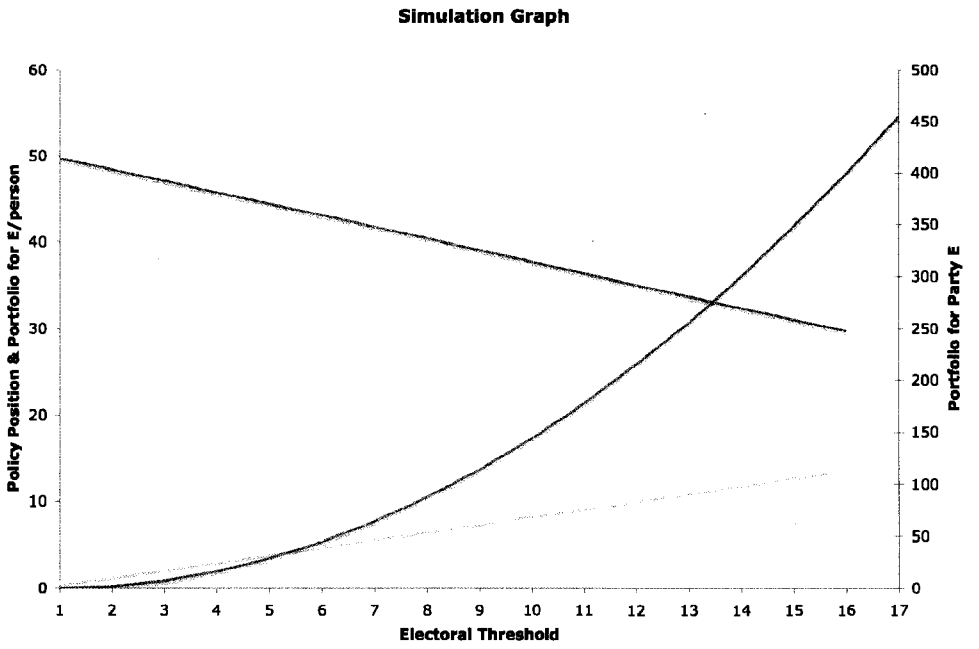


Figure 2.2 provides additional information about pecuniary benefit share for party E: g_E* grows by increasing margins as the electoral threshold gets higher (the right y axis indicates the scale). To make a conservative interpretation, I simulate the average pecuniary benefit of party E supporters depending on the electoral threshold of electoral

systems. The yellow line has a positive slope as H2 suggests (the left y axis indicates the scale). The red line indicates policy outcomes of the coalition government (refer to the left y axis for the scale). The line has a negative slope as H1 proposes.

2.4 Empirical Tests

This section conducts statistical tests based on a simple regression model. Taking two aspects of corporate governance such as MSP and ownership structure, I test H1 against country-level data using GS's corporate governance indices.[45] There are two reasons I selected the GS index. One is that GS's dataset is the most up-to-date and complete measure of corporate governance. The other is that GS's measure is more calibrated than any other measures. For instance, while numerical measures of MSP found in LLSV (1998) and PV (2005) are ordered scales, GS's MSP is measured on 1-100 scale. A more calibrated measure is expected to capture nuance in cross-national variation of corporate governance.

Table 2.3 shows the list of countries and variables used in the regression analyses. The total number of countries is 28, out of which 16 countries are European, 8 countries come from the Asia-Pacific and 4 countries come from Central and South America. The United States and the United Kingdom representing Anglo-American corporate governance are inevitably excluded from this empirical investigation. Those purely majoritarian systems do not have any threshold as an electoral system feature in the sense that the legislative body does not have any proportional characteristics and two-party

[45] Due to data unavailability, I leave testing H2 for future studies.

Table 2.3 Countries and Variables

Country	Code	Threshold	GSmsp	GSowner	Leftist
Argentina	ARG	3	50	72.5	0
Australia	AUS	0	71	27.5	0
Austria	AUT	4	30	52.8	1
Belgium	BEL	0	34	51.5	0
Brazil	BRZ	5	32	63	1
Denmark	DEN	0	36	37.5	1
Finland	FIN	0	43	48.8	1
France	FRA	5	52	64.8	1
Germany	GER	5	33	64.6	0
Greece	GRC	3	27	75	1
India	IND	0	39	43	1
Ireland	IRE	0	70	24.6	0
Israel	ISR	1.5	48	55	0
Italy	ITAL	4	24	59.6	0
Japan	JPN	0	37	4.1	0
Malaysia	MAL	0	67	42.6	0
Mexico	MEX	2	26	66	1
Netherlands	NED	1	36	20	1
Norway	NOR	0	48	38.6	0
New Zealand	NZ	0	52	27	1
Philippines	PHL	2	35	46.4	0
Portugal	POR	0	26	60.3	1
South Korea	SK	5	37	31.8	0
Spain	SPN	3	50	55.8	0
Sweden	SWD	4	46	46.9	1
Switzerland	SWT	0	38	48.1	0
Turkey	TURK	10	23	58	1
Venezuela	VEN	0	41	49	0

Electoral Threshold: Pagano and Volpin 2005 **GSmsp**: Minority Shareholder Protection Index. Gourevitch and Shinn 2005. **GSonwer**: Ownership Concentration Gourevitch and Shinn 2005.
Left: Dummy Variable for Leftist Government.

Table 2.3.1 Summary Statistics of Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Thresh	28	2.05	2.50	0	10
GSmsp	28	41.11	13.13	23	71
GSowner	28	47.67	16.78	4.1	75

system prevail. Conversely, well-known majoritarian rule countries like India, Malaysia and France are included. India adopts proportional rules for the upper chamber. Malaysia and France are difficult to categorize as purely majoritarian because their governments are mostly coalitional as usually occurs in proportional system countries.

The statistical model employs two features of the theoretical model for the right hand side of the statistical equation. One is the parameterized factor, electoral threshold. The other is the equilibrium constraint imposed on the legislative stage, E-W political coalition. This constraint is realized with a dummy variable for leftist government. The statistical equation is expressed as follows:

$$y_i = \alpha + \beta_1 Threshold_i + \beta_2 Left_i + \beta_3 (Threshold_i \times Left_i) + \varepsilon_i,$$

where y is a corporate governance measure. I will examine cross-national variation in MSP and ownership dispersion in order.

Table 2.4 Regression Results

Dep. Var / Exp. Var	MSP			Ownership Concentration		
	I	II	III	IV	V	VI
Thresh	-2.10 (.95)	-1.76 (.94)	-3.41 (1.61)	3.18 (1.16)	3.05 (1.21)	4.27 (2.02)
Left		-7.68 (4.60)	-12.40 (5.91)		3.03 (5.93)	6.56 (7.78)
Thresh*Left			2.46 (1.97)			-1.84 (5.18)
Cons.	45.41 (3.02)	48.30 (3.40)	50.87 (12.92)	41.15 (3.72)	40.01 (4.38)	38.09 (5.18)
Adj. R^2	.13	.18	.20	.19	.17	.15

Standard Error in ( )

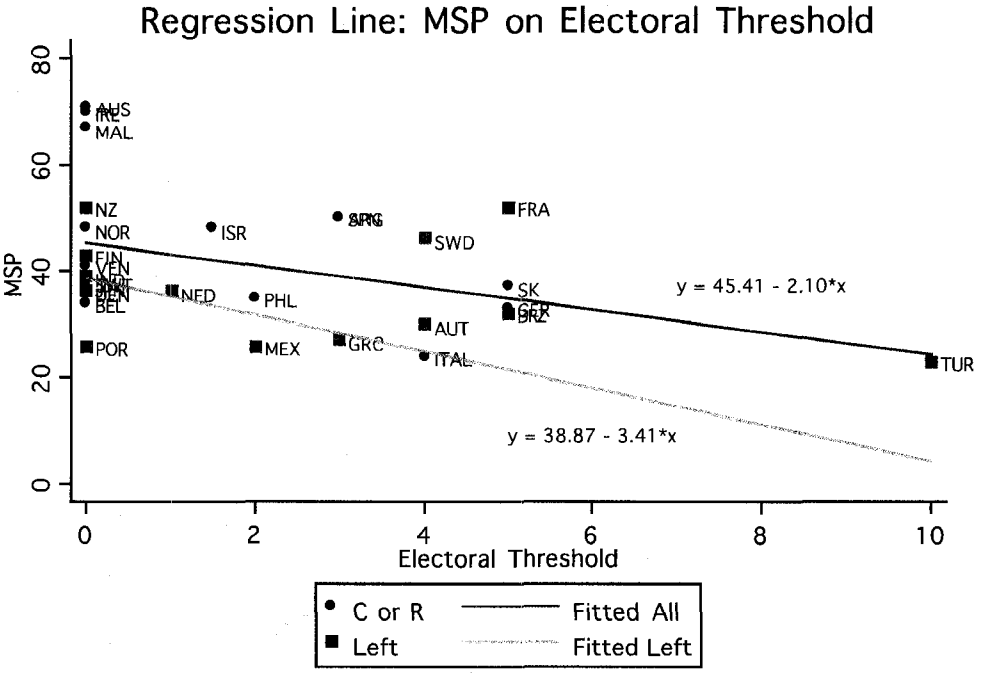
2.4.1 Minority Shareholder Protection (MSP)

A simple bivariate regression analysis confirms what the theoretical model predicts (See Table 2.4). As the electoral threshold gets higher, minority shareholders become more protected (Column I). The electoral threshold explains the variation of MSP at a .5 level of statistical significance. Its effect on MSP is also substantively significant such that an increase in the electoral threshold by one standard deviation (2.5, refer to Table 2.3.1) reduces MSP by 5.25 percent. Column II shows that the electoral threshold still explains cross-national variation of MSP at a conventionally accepted level of statistical significance even with the dummy variable for Leftist government included. Substantively, a one standard deviation increase in the electoral threshold lowers MSP by 4.4 percent. However, the dummy variable for Left does not explain cross-national variation of MSP.

Column III provides a more interesting regression outcome by checking the effect of the electoral threshold on MSP conditional upon Leftist governments. The effect of the electoral threshold on MSP becomes greater. A one standard deviation increase of the electoral threshold decreases MSP by 8.5 percent points. A huge intercept change occurs as well. Leftist government decreases MSP by 12.4 percent points. Substantively, this result is tantamount to one standard deviation of the distribution of MSP in the sample. In terms of slope, however, there is no difference between Leftist and Central or Rightist

government. Figure 2.3 helps clarify the regression outcomes in Column III. The lower fitted line indicates the regression line for counties under leftist government. While the intercept of the line comes down, its slope gets steeper.

Figure 2.3 Regression Lines: MSP on Electoral Threshold



This finding challenges PV's argument on the effect of electoral systems on corporate governance calling for a reconsideration of the generalized effect of electoral systems on corporate governance formation. For instance, if a hypothetical electoral threshold of majoritarian systems is higher than a counterpart PR system, the relationship between electoral systems and corporate governance becomes non-linear across the two

families of electoral systems. This if-clause derives from the institutional effect of the electoral threshold. The effect of the threshold is to deny small parties the right of representation, or force them into coalitions. It makes party systems more stable by keeping out radical factions. In the sense that majoritarian systems bring about two-party systems catering more to the median voter, their hypothetical threshold can be said to be higher than proportional systems. The finding further suggest the need to reconsider theories that contend electoral systems have a systemic effect on corporate governance by comparing two families of electoral systems: majoritarian vs. proportional electoral systems.

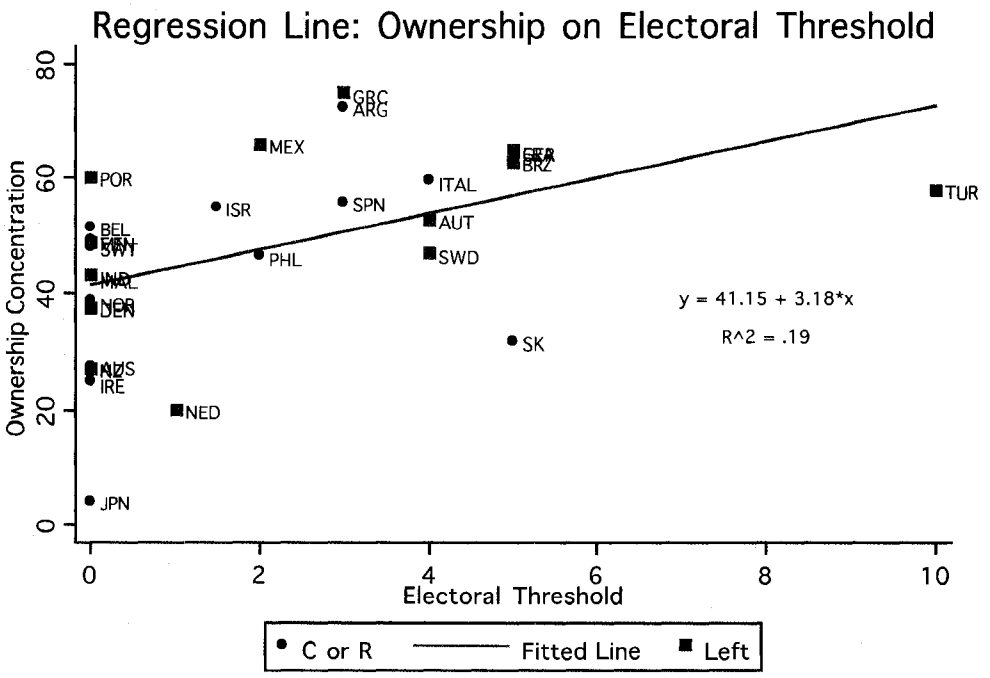
2.4.2 Ownership Structure

As mentioned above (H1), electoral thresholds are expected to decrease the level of ownership dispersion. Since the data in hand is ownership concentration, the expected slope sign of the fitted line of ownership concentration to electoral thresholds must be positive. Figure 2.4 shows the fitted line of ownership concentration to electoral thresholds. Japan has the most diffuse ownership structure while Greece has the most concentrated ownership structure. Interestingly, Netherlands is the second to the most dispersed ownership despite the fact that a Leftist government runs this country.

Columns IV to VI in Table 2.4 summarize the regression outcomes. Column IV provides the substantive effect of the electoral threshold on ownership concentration: an increase in the electoral threshold by one standard deviation makes ownership

concentration grow by 8 percent. Its effect is statistically significant at .5 level. In terms of adjusted R^2, almost 20 percent of the total variation of ownership concentration is explained by only one explanatory variable. Columns V and VI shows that a leftist government does not have any statistically significant effect on ownership structure.

Figure 2.4 Regression Line: Ownership Concentration on Electoral Threshold



This finding is contrasting to Roe's theory and evidence of political determinants of ownership structure. He argues that social democracy affect the firm directly and also induces a counter-pressure against strong stakeholder pressure (i.e. employees) inside the

firm, usually for more focused, concentrated ownership (Roe 2003). If we take into account that social democracy tends to be paralleled with and sustained by leftist governments, the regression results do not evidence that Roe's claim is relevant to this sample consisting PR countries.

2.5 Discussion and Conclusion

The theoretical model suggests a positive effect of electoral threshold on managerial compensation (executive compensation in general) although empirical evidence is not provided due to the absence of comparable data at the country level.[46] The literature on the determinants of executive compensation has been truly interdisciplinary, spanning accounting, economics, finance, industrial organization, law and organizational behavior (Murphy 1999, Barkema and Gomez-Mejia 1998, Ezzamel and Watson 2002, Gedajlovic 1998, Hadlock and Lumer 1997, Kaplan 1994, Pavik and Belkaoui 1991, Thomsen and Pedersen 2000). This paper proposes a hypothesis through the lens of political science, which has given relatively scant attention to this research area.[47] This hypothesis leads to an interesting relation between ownership concentration and executive compensation. Note that the increase in the electoral threshold renders ownership structure more concentrated while increasing managerial compensation. Thus,

[46] GS measures managerial incentive index at the country level (GS: 48). But it is the ratio of long-term incentive compensation (largely stock options in practice) to total compensation for CEOs in listed firms. Electoral threshold does not explain the variation in GS's managerial incentive index in the regression analyses. However, conceptually, GS's index does not operationalize exactly what this paper means by executive compensation.

[47] Joskow et al (1996) is exceptional. But they examine only one Electric utility indsutry.

we draw a positive correlation between ownership concentration and managerial compensation in countries with PR systems.

This is a contrast to agency theories' prediction of the relation between ownership concentration and executive compensation. Agency theories suggest that agency costs, usually high in a diffused ownership structure, tend to make owners pay more managerial compensation to align managers' interest to theirs. If the equilibrium path of interest reaches E-R coalition at legislative stage, the predicted relation between ownership structure and managerial compensation becomes consistent with what agency theories suggest. One possible speculation drawn from this counterfactual exercise is that agency theories may not be relevant when it comes to explaining cross-national variation in corporate governance. As mentioned at the beginning of this essay, the primary concern in studying corporate governance is to identify ways of limiting managerial opportunism while maintaining a firm's economic performance—more generally known as an 'agency problem.' As the model shows, the nature of agency problem depends on political context and political institution.

This paper provides a political explanation of corporate governance. Based on a multi-stage game-theoretic model of three-party competition under proportional electoral systems, I find that the electoral threshold— a minimum percentage of votes a party must receive to acquire at least one seat in parliament — has a negative effect on the degree of minority shareholder protection (MSP) and ownership dispersion. This finding represents an important modification to formal models in the political economic literature that tend to omit the political process for convenience's sake during optimization.

It is worth noting, in conclusion, two limits of this research. First, I examine only one equilibrium path to reach E-W political coalition among many equilibrium paths found in the theoretical model. I justify the choice of equilibrium path by recalling the tendency of PR systems to have political coalitions and attribute it to historical path-dependence. It implies that further investigations are required to better understand the effect of political institutions on corporate governance from historical, social and cultural perspectives. Second, the theoretical model is so static that it cannot explain any transition among multiple equilibria (i.e. from E-W to E-R political coalition at the legislative stage). A possible way to compensate for this weakness is to take into account various forms of asymmetric distributions of voters with the help of a computer simulation technique. I leave it as an area for further research.

CHAPTER 3

Asset Specificity, Corporate Governance and Market Competition: The Industry-level Implications of Corporate Governance on Consumer Prices

3.1 Introduction

In February 2008, the manufacturer's suggested retail price for the *Genesis*, a new full-size luxury car developed by Hyundai, was $32,000 in the United States and $60,740 in South Korea.[48] Why should Korean customers pay almost double what their American counterparts do for the same car? If South Korea were still a non-democratic developmental state (as it was until the mid 1980s), the price difference could have been attributed to government austerity policies or other measures intended to suppress luxury consumption. However, as the thirteenth-largest trading country in the world, South Korea is deeply integrated into the global economy and cannot control prices as it did in the 1980s.[49] Then what explains the price difference? The starting point for my argument is that the reason for the price difference can be found in the differences between democracies.

---

[48] I apply the exchange rate (₩ 959.82 : $ 1) as of March 12 2008. *Jungang Ilbo*, February 13 2008; *Chosun Ilbo*, March 24 2008. Although Hyundai Motor Co. attributes this price gap to the exchange rate and different tax systems between South Korea and US, it is hard to rationalize the price gap if we take into account the cost to transport the cars to the U.S. and the increased product cost of meeting the U.S.'s higher automobile safety standards.

[49] This question is not limited to the automobile industry. Korean customers pay 30 percent more than American customers for electronic products (*Chosun Ilbo* April 17). Of course, it is well known that producers tend to discriminate prices depending on the price-demand elasticity in their various markets. Also, the fact that the Korean Fair Trade Commission has yet to rule on a consumer group's claim that Hyundai has engaged in unfair pricing for the *Genesis* shows that firms' pricing behavior has a regulatory, and thus political, dimension. This essay will contribute to this stream of research.

If we understand contemporary liberal democracy as a form of government that ensures the replacement of leaders through competitive elections, it is intuitive that national price levels will reflect political competition between economic interests—most notably consumers versus ~~vs.~~ producers. Rogowski and Kayser (2002; hereafter "RK") provide some theoretical insights into how the competition between consumers and producers might influence prices. Formalizing an electoral competition model where politicians compete for the support of producers and consumers (who have an economic stake in product markets), RK suggest that electoral systems have a systemic effect on price levels such that prices in product markets tend to be lower in countries with majoritarian systems than in countries with proportional systems. Their argument begins with the idea that elections motivate politicians to campaign strategically given the seat-vote elasticity of electoral systems. They then argue that the higher seat-vote elasticity associated with majoritarian systems makes politicians cater more to consumers than to producers, while the lower seat-vote elasticity associated with proportional systems makes politicians cater more to producers. As a result, RK understand consumer prices as a reflection of the relative distribution of power between producers and consumers that is, in turn, translated into voting power and/or lobbying power and eventually prices.

Despite their formal derivations of testable hypothesis and rigorous statistical tests, RK's theoretical setup leaves open several important questions. For instance, are consumers a homogenous special interest group and, thus, as powerful as producers? Is it true that the electoral outcome is translated seamlessly into regulations, without becoming distorted by post-election legislative outcomes? Most importantly, even if RK

are right in suggesting that there is a link between electoral competition and price regulations in product markets, what about electoral competition in factor markets? If we consider that price is a function of production costs, technologies, market structures etc. and if we suppose that constituents come from three production-factor owners—workers, rentiers and entrepreneurs (e.g. Pagano and Volpin 2005)—then we must build an analytical framework that can apply to factor markets as well as product markets. It is for this reason that I refer to the concept of corporate governance. The inclusion of corporate governance can provide a wider theoretical domain for analyzing the causes and the consequences of changes in national economic systems.

Since Beale and Means (1932), corporate governance has been understood as the set of control mechanisms that regulates owner-manager relations. Good governance systems are those that reduce conflicts of interest between shareholders and managers (Munari and Sobrero 2003; Fama and Jensen 1983; Shleifer and Vishny 1986). Using this definition, the literature on corporate governance has focused on a narrow set of issues related to principal-agency problems, i.e. how shareholders monitor and motivate management to act in their interests (Keasey and Wright 1997; Prowse 1994). What this literature has neglected to consider, however, is why different countries have different owner-manager relations. For instance, why are the United Kingdom and United States characterized by dispersed ownership structures, whereas continental European countries and Japan are characterized by concentrated ownership structures? Theories focusing on principal-agency problems cannot answer this question.

As in the first chapter of this dissertation, I take an institutional embeddedness view of corporate governance (Aguilera and Jackson 2003; Dacin et al. 1999; Granovetter 1985).[50] In other words, characterizing corporate governance as a national economic system, I borrow Aoki's definition of corporate governance, "the structure of rights and responsibilities among the parties with a stake in the firm." (Aoki 2000, cited in Aguilera and Jackson 2003, p. 447) For theoretical purposes, I am interested in factor markets. Defining corporate governance as a regime that regulates two factor markets—labor and capital—I suggest that corporate governance affects firms' pricing behavior in product markets by influencing cost conditions in the factor markets and thus changing firms' objective function of total wealth after sales in product markets. From there, I argue that blockholder types of corporate governance, characterized by tightly regulated labor markets and underdeveloped capital markets, lead to higher price equilibria than shareholder types of corporate governance, which are characterized by flexible labor markets and well-developed external forms of corporate finance.

The primary purpose of this research is to provide a micro-economic explanation for the link between corporate governance and price differences. I also aim to offer better evidence of this link by conducting industry-level analyses with the utilization of heterogeneity in industrial asset specificity. The main argument is summarized as follows. In general, blockholding forms of corporate governance increase prices. However, blockholding's marginal effect on prices gets smaller as industrial asset specificity

[50] Institutional approaches address the embeddedness of corporations in a nexus of formal and informal rules (North 1990). Institutional researchers have criticized theories focusing on principal-agency problems by showing how politics shapes corporate governance and how various institutional constraints—stemming from coercive political regulation, social democracy (Roe 1994, 2003), and imitation of cognitive models in response to uncertainty--are reflected in cross-national diversity of corporate governance.

increases. This argument is confirmed by empirical tests on a subset of advanced countries. Moreover, relaxing some of the assumptions of the theoretical models shows that corporate governance may exert a different effect on price levels in middle-income developing countries versus in high-income advanced countries.

The remaining part of this chapter proceeds in four steps. The following section theorizes how corporate governance affects price levels in two ways. First, I explain output changes depending on a manager's objective function—whether the manager seeks to maximize profit or revenues. Price implications are then drawn from output changes where I assume that demand is fixed. Second, maintaining the assumption of the firm-as-a-profit-maximizer, I formalize firms' pricing behavior based on two types of oligopolistic competition models, one in which there is competition with delegation and another in which competition exists without delegation. In the third section I do empirical tests. I build a hierarchical model for regression analyses with an assumption that national corporate governance influences prices through specific and invariant industrial factors across countries. The fourth section discusses the statistical findings and expands the applicability of the theoretical model by relaxing those assumptions. The fifth section concludes with suggestions for future research.

3.2 Theories on Firms' Pricing Behavior

In a competitive market, prices are determined where the demand and the supply curves intersect and thus individual producers and consumers are just price-takers. In this essay, I assume that firms as producers create and operate markets: setting prices,

carrying out transactions, producing and distributing information, and forming and monitoring contracts (Spulber 1999: 7). In other words, firms are economic organizations that, rather than being guided by the invisible hand of the market, guide the market with their visible hand. In addition, I treat prices not only as a function of production but also as firms' strategic choices about the nature of market competition under certain types of corporate governance. In the first essay of this dissertation, I suggested two mechanisms that impact how corporate governance affects a firm's pricing. One mechanism suggests that cost conditions are associated with two factor markets and the other mechanism suggests that there is competition strategy in product markets. In this section, using oligopolistic competition models I will elaborate upon firms' behavior in product markets depending on the form of corporate governance.

3.2.1 A Static Oligopoly Model: Are firms really profit-maximizers?

The view of the firm as a profit-maximizer has been well-established in the mainstream micro-economic literature.[51] However, what if firms are heterogeneous in terms of the objective of their business? This 'what if' clause is more than a conjecture when we take into account the internal structure of firms. Studies on corporate governance have suggested that the owner-manager relationship is one of the most important dimensions in the taxonomy of corporate governance. If owners are also managers, as usual in small traditional firms, it is plausible that their primary goal is to

[51] There are two concepts of profit: economic and accounting. Here, profit means economic. As the residual after taking out total cost from total revenue, economic profit tells the firm whether it should remain in business or instead shut down. In contrast, accounting profit is a measure used for quite different purposes. Among them, it is for controlling fraud and computing tax liabilities (Hirshleifer et al. 2005: 160-1).

maximize business profits.[52] However, when owners and managers are not identical and managers take charge of ordinary business operations (involved in production and sales in modern corporations), it is not guaranteed that owners and managers have the same goals for the business. This is business firms' classical governing concern in the context of principal-agency problems. How to align managers' interests to the owners' is the central issue in contemporary large corporations.

It is widely accepted that firm owners pay higher agency costs under shareholder types of corporate governance than under blockholder types of corporate governance.[53] Put another way, under shareholder types it is harder to align managers' interests to the owners' interests. Since managers tend to have more discretion under shareholder types than under blockholder types, we need to question the assumption that firms are primarily driven by profit maximizing as we theorize firms' pricing behavior.

For an alternative to the assumption that managers are profit maximizers, Baumol suggests that managers instead pursue revenue maximization (1967). He writes:

> Though businessmen are interested in the scale of their operations partly because they see some connection between scale and profits, I think management's concern with the level of sales goes considerably further. In my dealings with them I have been struck with the importance the oligopolistic enterprises attach to the value of their sales. A small reversal in an upward sales leads to a major review of the concern's selling and production methods, its product lines, and even its internal

[52] Empirical studies on industrial pricing have shown that profit maximization is the main objective for many firms (Diamantopoulos and Mathews 1994), but it is not the main goal for all firms (Diamonatopoulos 1991). Rather, these studies show that a typical firm uses multiple pricing objectives and the choice of objectives is related to the pricing environment of the firm (Diamantopoulos and Mathews 1994).

[53] Nonetheless, why ownership-control separation happened is another issue. I will not deal with the historical origin and its rationales in this paper. Instead, I suggest that those who have interest in the issue refer to Micklethwait and Wooldrige (2003).

organizational structure (p. 45).

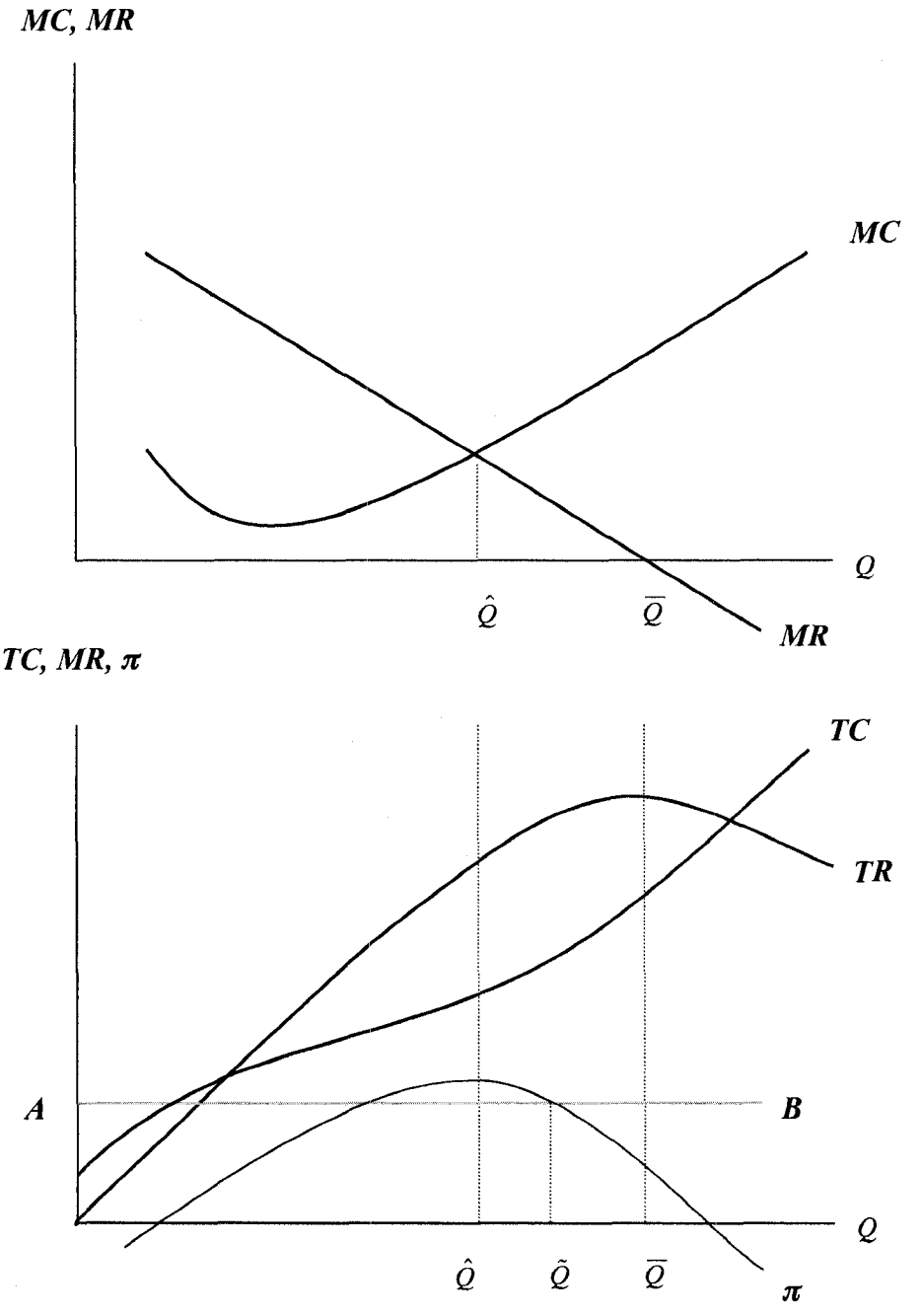
Managers under shareholder types of corporate governance are closer to Baumol's description of the businessmen than those under blockholder types of corporate governance. Professional managers in shareholder types of corporate governance tend to prefer big companies to small ones even though the profit rate is lower in the former than the latter. This is because the prestige and reputation from obtaining market power are more influential in determining their salary and provide greater reward in managerial markets.

Now I will explain the implications on prices from two types of managers (corresponding to each type of corporate governance). I predict that firms run by revenue maximizing managers under shareholder types of corporate governance are more likely to emphasize the output of products than those run by profit maximizing owner-managers under blockholder types of corporate governance. Given a fixed demand for products, it is obvious that the greater output lowers the price of the product.

The upper graph in Figure 3.1 shows the profit maximizing quantity of output, $\hat{Q}$, which is determined where the MR (marginal revenue) curve and the MC (marginal cost) curve intersect.[54] In contrast, $\overline{Q}$ indicates the quantity maximizing the total revenue. We can see that the revenue- maximizing output is larger than the profit-maximizing one. However, $\overline{Q}$ is unlikely to be the final quantity because managers should fulfill a certain demand of profit given them by the owners.

[54] For the graphical setup, I refer to *Microeconomics* by Joon Goo Lee (2002).

Figure 3.1 Quantity Change: Profit Maximizing vs. Revenue Maximizing



***MC**: marginal cost*
***MR**: marginal revenue*
***Q** : output*

***TC**: total cost*
***TR**: total revenue*
***π** : profit*

The lower graph in Figure 3.1 illustrates how the revenue-maximizing managers pick the output level given a profit constraint that will satisfy the owners. The horizontal line AB indicates the profit constraint by which managers should be able to satisfy owners.[55] Now, a new output level, $\tilde{Q}$, is determined that is more than the profit maximizing output, $\hat{Q}$, but is less than the revenue maximizing output, $\overline{Q}$. Given that demand is fixed, the increased output by $\tilde{Q}$ - $\hat{Q}$ brings down the price.

If so, why would the owners be satisfied with the profit at $\tilde{Q}$, which is less than the optimal profit at $\hat{Q}$, under shareholder type corporate governance? The answer lies in the owners' utility function. It consists of two sources of their wealth as suggested in the first essay in the dissertation, business profit and the value of the business. In other words, well-developed finance markets under shareholder types of corporate governance provide another chance for the owners to increase their wealth. Meanwhile, owners are conscientious in aligning managers' objective with theirs through managerial compensation systems such as cash or stock bonuses and profit sharing, stock options, deferred compensation, performance shares, and so on (Pavlik and Belkaoui 1991).

3.2.2 Dynamic Oligopolistic Competitions: price or quantity

This subsection is devoted to building a more sophisticated explanation than the previous subsection. Previously we examined an individual firm's different choices of output depending on alternative assumptions about the managers' objectives. Retaining the assumption of a profit-maximizing firm, I distinguish two corporate governance types

[55] If the line AB is tangent to the mode of profit curve, π, it implies that there is no principal-agency problem. In other words, managers are identical to owners or under owners' perfect control.

with two types of oligopolistic competition models: nondelegation vs. delegation. While oligopolistic competition under blockholder types of corporate governance is expressed in a one-stage nondelegation game, the counterpart under shareholder types of corporate governance is expressed in a two-stage delegation game.

This theoretical framework can provide more dynamic explanations of the effect of corporate governance on price levels than the framework of a firm's output decision depending on managers' motives for the business operation explained in the previous subsection. I will examine strategic interactions between firms, which compete against each other on either price or quantity.

As in the first essay of this dissertation, however, I suggest that corporate governance types affect the strategy that firms choose. Recall that I assumed previously that corporate governance is a bundle of regulations in two factor markets and that there are two ideal types of corporate governance. The blockholder type is characterized as having tight regulations in the labor market and a less developed financial market. The shareholder type has a flexible labor market and a developed financial market.

Firms under blockholder types of corporate governance are limited in price competition due to rigid cost conditions in production factor markets (such as not being able to hire and fire labor at will), whereas firms under shareholder types of corporate governance have more discretion over their prices due to flexible factor market conditions. Furthermore, blockholder types of corporate governance tend to be subjected to stronger entry-to-market regulations (as a sub-system of coordinated market systems) than are shareholder types of governance (as a subsystem of liberal market systems).

These situations reinforce firms' strategic choices for competition. Given the difference in the degree of entry-to-market barriers between these two types of corporate governance, and the way that industries respond to shocks to their growth opportunities (depending on the degree of entry barrier), I am able to suggest the following systemic tendency of firms' choices of strategy for competition. In countries with high entry regulations (blockholder types of corporate governance), industries tend to respond to them through the expansion of existing firms, while in countries with low entry regulations (shareholder type of corporate governance) industries tend to respond primarily through the creation of new firms (Fisman and Sarria-Allende 2004). The expected competitive situation can be summarized, therefore, as the following: blockholder types of corporate governance lead firms to compete over quantity, whereas shareholder types of corporate governance lead firms to compete over price.[56]

The following subsection will examine two equilibrium outcomes, first, in quantity competition under blockholder types of corporate governance and, second, in price competition under shareholder types of corporate governance. Then we will compare the two equilibrium outcomes with a simple illustration.

3.2.2.1 Quantity Competition under Blockholder Types of Corporate Governance

Suppose that two firms i and j compete with each other, where $i, j \in \{1, 2\}$ $(i \neq j)$. The firms produce differentiated products, either substitutes or complements. Consider

[56] To contrast two oligopolistic competitions, on the one hand, I assume that price competition usually occurs under shareholder type of corporate governance. On the other hand, I refer to the fact that predatory pricing often occurs for the case of a new entry into an industry. The cases for alternative strategic choice in each corporate governance will be discussed in the fourth section.

the general linear inverse-demand system used by Singh and Vives (1984) as follows:

$$p_i = \alpha_i - \beta_i q_i - \gamma_i q_j \tag{1}$$

where all prices (p) and quantities (q) are non-negative. Thus, the corresponding direct demand system is expressed by

$$q_i = a_i - b_i p_i + z_i p_j \tag{2}$$

where $a_i = \frac{\alpha_i \beta_j - \alpha_j \gamma_i}{\beta_i \beta_j - \gamma_i \gamma_j}$, $b_i = \frac{\beta_j}{\beta_i \beta_j - \gamma_i \gamma_j}$ and $z_i = \frac{\gamma_i}{\beta_i \beta_j - \gamma_i \gamma_j}$. Each firm produces output at constant marginal cost $c_i \geq 0$. Additional restrictions are required on the parameters:

$$a_i > c_i,\ \beta_i > 0,\ 0 < |\gamma| < 1,\ 0 < |z| < 1, \text{ and } \beta_i \beta_j - \gamma_i \gamma_j > 0. \tag{3}$$

Since the model describes a duopoly competition where two firms produce differentiated products, we need to differentiate the characteristics of product differentiation. If the signs of γ and z are positive, the products are gross substitutes. If the signs are negative, they are gross complements. The restrictions, $\beta_i > 0$ and $\beta_i \beta_j - \gamma_i \gamma_j > 0$, imply that $b_i > 0$. In addition, the parameters of the demand system should be restricted such that if firms i and j charge prices $p_i = c_i$ and $p_j = c_j$, consumers demand positive quantities of each product:

$$(\alpha_i - c_i)\beta_j - (a_j - c_j)\gamma_i > 0 \tag{4}$$

Condition (4) implies that $\alpha_i \beta_j - a_j \gamma_i > 0$, which in turn implies that $q_i(0,0) = a_i > 0$.

Solving simultaneous equations results in the following equilibrium where the firms compete over quantities.

$$\overline{p}_i^{qblock} = \frac{2(\alpha_i + c_i)\beta_i \beta_j - (\alpha_j - c_j)\beta_i \gamma_i - c_i \gamma_i \gamma_j}{4\beta_i \beta_j - \gamma_i \gamma_j} \quad \left(\text{suff. con. } (\alpha_i - c_i) \geq \frac{\alpha_j \gamma_i}{\beta_j}\right) \tag{5}$$

$$\overline{q}_i^{qblock} = \frac{2(\alpha_i - c_i)\beta_j - (\alpha_j - c_j)\gamma_i}{4\beta_i\beta_j - \gamma_i\gamma_j} \tag{6}$$

Proof: See Appendix 1.

The sufficient condition for the price equilibrium says that the size of the market must be larger than the firm's per unit cost. Put another way, the cost must be smaller than $\frac{\alpha_i\beta_j - \alpha_j\gamma_i}{\beta_j}$, where the numerator is proportional to the quantity firm i sells if both firms sell products at zero price (Refer to Appendix 1 for the sufficient condition).

3.2.2.2 Price Competition under Shareholder Type of Corporate Governance

For comparability, I use the same setup from (1) to (4) in the previous section on oligopolistic competition under a blockholder type of corporate governance. As mentioned before, what distinguishes firms under shareholder types of corporate governance from those under blockholder types is the existence of delegation between owner and manager. I therefore set up a two-stage delegation game for oligopolistic competition based on Miller and Pazgal (2001). The equilibrium concept for the solution is sub-game perfect.

Let us examine the case in which the firms (the managers) compete with each other by setting prices.[57] Each firm has an owner and a manager. While the manager takes charge of ordinary business operations including the choice of the firm's competition strategy, the owner is the residual claimant to the firm's profit at the second

[57] They can compete by setting quantities as well. Miller and Pazgal's original contribution to the literature on oligopolistic competitions lies in their finding the equivalence of price and quantity competition in this two-stage delegation game. Thus, it is enough to examine the price competition for the purpose of illustration.

stage. The owner rewards the manager depending on her firm's profit and her rival's profit during the first stage. Consider the managers' objective functions, which are a linear combination of their firm's profit and the rival firm's profit. Their owner decides upon a compensation scheme by placing the weight θ on the profit of her rival firm's.[58] The objective function is given by

$$m_i = (p_i - c_i)q_i(p_i, p_j) + \theta_i(p_j - c_j)q_j(p_i, p_j). \quad (7)$$

We can get the equilibrium price at the second-stage by getting the manager's reaction function, the first derivative of (7) with respect to p_i, setting it equal to zero, and solving it for p_i. The second stage equilibrium prices are given by

$$p_i(\theta_i, \theta_j) = \frac{2a_ib_i + 2b_ib_jc_i + z_i(a_j + b_jc_j - c_iz_i\theta_j) + z_j(a_j - b_jc_j - c_iz_i\theta_j)\theta_i}{4b_ib_j - (z_iz_j + z_i^2\theta_j + z_j^2\theta_i + z_iz_j\theta_i\theta_j)}. \quad (8)$$

Given (8), the owner chooses θ_i to maximize her firm's profit at the first stage. Firm i's profit, x, is given by

$$x_i = (p_i(\theta_i, \theta_j) - c_i)q_i(p_i(\theta_i, \theta_j), p(\theta_i, \theta_j)). \quad (9)$$

Differentiating (9) with respect to θ_i, setting the result equal to zero, and solving for θ_i and θ_j yields the equilibrium incentive parameters as follows:

$$\bar{\theta}_i = \frac{(\alpha_i - c_i)\gamma_i}{2\beta_i(\alpha_j - c_j) - (\alpha_i - c_i)\gamma_j}. \quad (10)$$

Substituting these values into (8) results in the following:

$$\bar{p}_i^{pshare} = \frac{2\beta_j(\alpha_i + c_i) - (\alpha_j - c_j)\gamma_i}{4\beta_j} \quad (11)$$

---

[58] If products are complementary, the owner will assign a positive value of θ. If they are substitutes, she will assign a negative value of θ. See (A4-8) or (A4-15) in Appendix 4.

$$\bar{q}_i^{pshare} = \frac{(\alpha_i - c_i)(\beta_i\beta_j - \gamma_i\gamma_j) + \beta_i(\beta_j(\alpha_i - c_i) - (\alpha_j - c_j)\gamma_i)}{4\beta_i(\beta_i\beta_j - \gamma_i\gamma_j)}. \quad (12)$$

Proof: See Appendix 2.

3.2.3 Comparisons of the equilibrium outcomes

3.2.3.1. Price

Since our primary interest lies in comparing the equilibrium prices, let us start there. Once we subtract the equilibrium price under shareholder types of corporate governance from the equilibrium price under blockholder types, the outcome is as follows:

$$\bar{p}_i^{qblock} - \bar{p}_i^{pshare} = \frac{\{2(\alpha_i - c_i)\beta_j - (\alpha_j - c_j)\gamma_i\}\gamma_i\gamma_j}{4\beta_j(4\beta_i\beta_j - \gamma_i\gamma_j)} > 0. \quad (13)$$

First, as mentioned in subsection 2.1, the sufficient condition for $\bar{p}_i^{qblock}$ is $\alpha_i - c_i \geq \frac{\alpha_j\gamma_i}{\beta_j}$, which means that the size of the market is sufficiently larger than the firm's unit cost. This condition transforms $\{2(\alpha_i - c_i)\beta_j - (\alpha_j - c_j)\gamma_i\}$ into $\alpha_j\gamma_j + c_j\gamma_i$ in the numerator. Since $\gamma_i\gamma_j$ is positive, the whole numerator turns out to be positive. Next, the restrictions in (3) render the denominator positive.

In sum, we find the following inequality between two equilibrium prices from (13),

$$\bar{p}_i^{qblock} > \bar{p}_i^{pshare}, \quad (14)$$

which suggests that *the equilibrium price in quantity competition under the blockholder type of corporate governance is always higher than that in price competition under the*

shareholder type of corporate governance.

3.2.3.2 Quantity

The result of the quantity comparison is of secondary importance to this study but needs to be examined. The outcome from comparing two equilibrium quantities depends on the characteristics of the differentiated products, whether they are substitutes or complements. If they are complements, $\bar{q}_i^{pshare}$ is always larger than $\bar{q}_i^{qblock}$. If they are substitutes in highly competitive markets, $\bar{q}_i^{qblock}$ can be larger than $\bar{q}_i^{pshare}$. (Refer to Appendix 3)

3.3 Methodology

3.3.1. Hypothesis and Model Specification

To test the argument of Section 3.2.3.1 more rigorously, I disaggregate country-level data into industry-level data. The idea is that by taking advantage of heterogeneity across industries, I can provide more micro-economic based evidence of how national corporate governance influences prices in industrial markets. Thus, the aforementioned equilibrium price outcomes can be used to generate a hypothesis for this purpose. Straightforwardly, since industries vary in their degree of oligopoly we need to take into account industry-specific factors in specifying the statistical model for empirical testing.

I assume that there are industries with naturally high entry barriers or high asset specificity (Fisman and Sarria-Allende 2004; Williamson 1985). This industry-specific factor is invariant across countries and has a systemic effect on price levels by

influencing industrial structures. A higher industrial asset specificity indicates naturally higher entry barriers to the industry and thus greater oligopoly in the market..

Since I use average firm size for an indicator of industrial price level, I generate a testable hypothesis based on Fisman and Sarria-Allende's formal derivation about the effect of government entry regulation on average firm size (which is applicable to the degree of blockholder type corporate governance in this essay). Typically, firm entry (i.e. start-up) models with fixed cost predict a convex relationship between the size of fixed costs and the number firms in an industry. Suppose the total start-up cost to be $K_i + R_c$, where K_i is natural entry barriers in industry i (applicable to Industrial Asset Specificity in this essay) and R_c is the cost associated with government entry regulation in country c. Since the number of firms, N_{ic}, is convex in $K_i + R_c$, then its partial derivative $\partial^2 N_{ic} / \partial K_i \partial R_c > 0$. Given a constant demand for an average firm size of Q_{ic}/N_{ic}, then its partial derivative $\partial^2 (Q/N)_{ic} / \partial K_i \partial R_c < 0$, where Q_{ic} is total industry output.

If we equate R_c to the degree of blockholder type corporate governance, intuitively, we can predict the effect of the type of national corporate governance in the context of changing industrial asset specificity (or natural entry barrier) on industrial price level: if asset specificity (or industry entry barrier) is high in an industry, then the marginal effect of an increase in the degree of blockholding on industrial price will be small. In contrast, if asset specificity is low, the marginal effect of the increase may be quite significant.

This prediction can be tested by using an interaction term between the industry-specific variable and corporate governance in the multiple regression model, as follows:

$$\text{Price}(AvgFirmSize)_{ic} = \alpha_i + \alpha_c + \beta_1(Assetspec)_i(CorpGov)_c + \cdots + \varepsilon_{ic} \quad \text{(M1)}$$

where i and c index industry and country respectively. If a higher value of *Corporate Governance* indicates a greater degree of blockholder type, I predict a negative coefficient on the interaction term (β_1). Since I use US industrial turnover rate—an inverse of Asset Specificity, β_1 should be positive in the regression results.[59]

An alternative statistical model is required for a robust check of the regression model (M1) as well as a possible endogenous relationship between corporate governance and industrial structure (average firm size). Since I conceptualize corporate governance as a regulatory regime on two factor markets (labor and capital) and take industrial concentration as the dependent variable, there can be a reverse causation between the two variables: countries with high industrial concentration may have tight regulations in the factor markets because it reinforces political coalitions based on special interests and thus helps strengthen their influence on regulatory decisions.

To address the potential endogeneity problem, I use two variables, *Legal Origins* and *Electoral Systems*, as my instruments. As shown in the first essay, these variables are predictive of the extent of corporate governance and, as the instruments, affect price levels through corporate governance.

A 2SLS (two-stage least squares) regression model is as follows:

$$\begin{aligned} &Upper: \text{Price}_{ic}(AvgFirmSize) = \alpha_i + \alpha_c + \beta_1(Assetspec)_i(\hat{CorpGov})_c + \cdots + \varepsilon_{ic} \\ &Lower: CorpGov = \gamma_i + \gamma_c + \varphi_1(Assetspec)_i(LegalOrigin)_c + \varphi_2(Assetspec)_i(ElecSys)_c + \eta_{ic} \end{aligned} \quad \text{(M2)}$$

[59] The coefficient, β_1, is interpreted in two ways, either conditionally or marginally. Given an industry, it indicates a conditional effect of corporate governance on price levels. As industrial asset specificity varies, it informs a marginal effect of corporate governance on price levels. Since I utilize industrial asset specificity as a 'filtering' (or screening) variable in the regression analyses, I do not give primary attention to the effect of this variable.

where the right hand side of the lower-level equation consists of interaction terms between the instruments and *Asset Specificity*. Note that I interact the two instruments with Asset Specificity because I am interested in identifying the different effect, across industries, of corporate governance on prices.[60]

3.3.2 Data

3.3.2.1 Dependent Variable: Industrial Price

I measure industrial concentration (average firm size) as a proxy for industrial price. The idea is that the higher industrial concentration, the lower will be market competition and the higher will be industrial average prices. I obtain this variable from the United Nations Industrial Development Organization's Industrial Statistics Database 4 2006 ISIC Revision 2 (INDSTAT 4 2006 Rev. 2). It provides data on production, value-added, number of employees, number of establishments and total wages by industry.

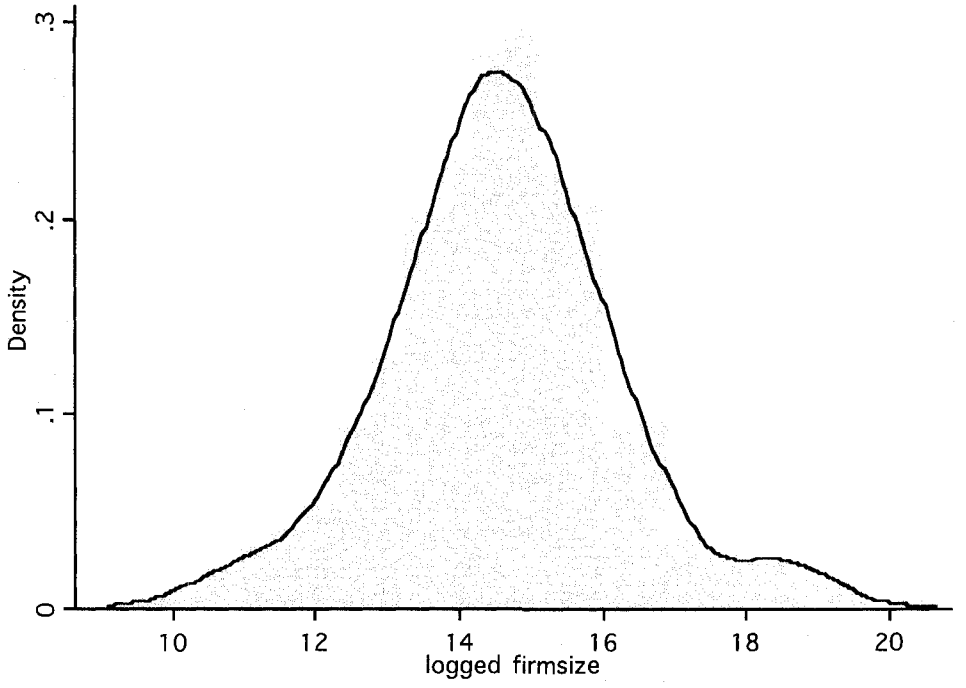
I generate average firm size (***Frmsize***), defined as the ratio of value added to total number of establishments by industry. Taking logs of *Frmsize*, I attenuate the effect of any outliers and ease the interpretation of coefficients. By taking logs, I get a nice Normal distribution of this variable (Figure 3.2), which eases statistical inference.

The five industries with the smallest average firm size are found in the Philippines and India. In the Philippines they are Footwear except Rubber and Plastic (ISIC 324), Furniture except Metal (ISIC 323) and Fabricated Metal product (ISIC 381), and in India

[60] I use categorical variables for two instrumental variables. Thus, actual coefficient terms are five since I use four categories for legal origins and three categories for electoral systems.

they are Wood products except Furniture (ISIC 331) and Metal Fabricated (ISIC 332). The five industries with the largest average firm size are petroleum refineries (ISIC 353) in Chile, South Korea, the Philippines, and Venezuela, and Tobacco (ISIC 314) in the United States. From this simple check of the tails of the Normal distribution of *Frmsize*, we can see that a country's income level and industrial asset specificity have a sizable impact on its average firm size. Furthermore, we might note that transitional democracies' petroleum refinery industries have four of the five highest firm sizes.

Figure 3.2 Distribution of Average Firm Size



3.3.2.2 Explanatory Variables

Industrial Turnover (Reverse Asset Specificity). Following Rajan and Zingale (1998) and Fisman and Sarria-Allende (2004), I utilize U.S. data at the industry level as proxies for underlying industry characteristics because the US economy is clearly a liberal economy where relatively few institutional constraints exist. I obtain these data from Dunne, Roberts and Samuelson (1988), which contains firm-level entry and exit data based on U.S. census data. The algorithm is the sum of entry and exit divided by the number of firms in the industry. The higher the ratio is in an industry, the lower the asset specificity of the industry. Note that this variable is assumed to be industry specific and invariant across countries.

Income Level: LnCGDP. Natural log of Gross Domestic Product per Capita in thousands of US dollars. Although I am interested in the differentiated effect of corporate governance across different industries, this variable controls for a country's demand level. Note that I generate the main hypothesis on the effect of corporate governance on industrial price given a constant demand. Just as I assume that a country's corporate governance has the differentiated impact industry by industry, I also assume that a country's demand has a differentiated impact on industrial price. Thus, I predict that the coefficient of the interaction between *LnCGDP* and *Turnover* will be negative.[61] Source: PWT (Penn World Table). Mark 6.1.

Corporate Governance: Block and GSowner. I use two corporate governance indices.

[61] Basically, the estimated coefficient is a within-industry coefficient. Since there is no solid theoretical prediction on the interaction effect between industrial turnover and income level, I predict a negative sign of the interaction effect in a simple way such that turnover and demand have a negative and a positive effect on industrial price level and thus their interaction has a negative effect ultimately.

GSowner is ownership concentration measured by Gourevitch and Shinn (2005). *Block* is a blockholding index measured based on the Fraser Economic Freedom Index (10 minus *Frasreg* used in the first essay of this dissertation) (Fraser Institute 2005; the first essay discusses how this variable is generated). *Block* is scaled from 0 to10 and *GSowner* is scaled from 0 to 100. The higher the value indicates a type of corporate governance that approaches the blockholder ideal type.

Legal Origin and Electoral Systems. These variables are instruments for removing any endogenous effects which might be in my model. By adding them, they provide a robustness check in my statistical estimation. I have chosen four categories for legal origins of commercial laws and three categories for electoral systems for the instruments in my two-stage least squares regression model (M2). Sources: La Porta et al (1998) and Colomer (2004).

Other Control Variables: Although the effects of these variables on industrial price levels are of secondary importance to my study, they are plugged into the statistical equations for another robust check. I control for the effects of three variables the literature has hypothesized / discovered because they may also affect price levels: trade openness, a country's factor endowments, and economies of scale.

- ***Open***. Trade openness measured by *Import*/GDP. Source: PWT. Mark 6.1.
- ***LnEnergy***. Natural log of domestic production is divided by total final energy consumption. Source: Energy Balance of OECD Countries and Non-OECD Countries (IEA Statistics), 2001 and 2003 eds.

- ***ΔXR3***. Percentage change in exchange rate for three years. Source: PWT. Mark 6.1.

- ***LnPop***. Natural log of population. Source: PWT. Mark 6.1

- ***LnAraPop.*** Natural log of per capita arable hectares of land._ $\ln\left\{\frac{land}{pop}+1\right\}$.

  Source: World Development Indicators CD-ROM (2004), ag.lnd.arbl.ha.pc.

3.3.3 Results

3.3.3.1 Data Summary

The usable data contain 28 industries in the manufacturing sector from 25 countries for the year 1990. The total number of observations is 639.[62] The number indicates that the data is in an unbalanced format. Table 3.1 provides the list of countries, the number of observations, and the two corporate governance indices. Table 3.2 provides summary statistics for each industry. The two indicators for corporate governance are positively correlated but their correlation is modest (correlation coefficient = .51). The ownership concentration ratio (*GSowner*) measured by Gourevitch and Shinn suggests that Japan has the least concentrated corporate ownership whereas

[62] Although the 2006 edition of the INDSTAT 4 database contains time series data for the period from 1980 to 2003 and for 118 countries, it suffers from a tremendous amount of missing data. When combined with the data availability for the corporate governance variable, the missing data problem reduces the total number of usable observations dramatically. In the end, I choose observations in 1990 for two reasons. First, even though I assume industry specific factors to be invariant across countries, the estimated industry factor based on US census data may vary in a time series context (e.g. capital reallocation across borders due to technological development). If I adopt the US turnover rate estimated by Dunne, Roberts and Samuelson without generating annual turnover rates, it is better to choose observations closer to 1988 when Dunne, Roberts and Samuelson produced their publication. Second, to make an additional contribution to Fisman and Sarria-Allende's research (2004) (one of the seminal works for this research), by exploring what they leave out, I need to choose the observations in the same year they examine. Note that their data is different from mine.

Chile has the most concentrated ownership structure. The blockholding indicator (*Block*) suggests that Brazil has the most blockholder type of corporate governance whereas the UK has the most shareholder type of corporate governance in the sample. Sweden is located around the median in both indicators.

Table 3.1 Numbers of Industries by Country and Corporate Governance

Country	Observations	Corporate Governance	
		GSowner	Blockholding
Australia*	28	27.5	3.59
Austria *	28	52.8	4.64
Brazil	1	63	5.64
Canada*	28	27.5	3.35
Chile	28	90	4.16
Denmark*	28	37.5	4.15
Finland*	28	48.8	4.45
Greece	28	75	5.54
India	28	43	4.85
Italy*	27	59.6	4.85
Japan*	28	4.1	3.83
Malaysia	28	42.6	3.71
Mexico	26	66	5.28
Netherlands*	27	20	4.63
Norway*	28	38.6	4.63
New Zealand*	2	27	3.45
Philippines	28	46.4	3.66
Portugal	26	60.3	5.34
South Korea	28	31.8	4.99
Spain	28	55.8	4.59
Sweden*	28	46.9	4.57
Thailand	26	51.9	4.38
Turkey	28	58	4.67
UK*	28	23.6	3.26
Venezuela	28	49	5.4
Total	639		

* Advanced Country (GDP/c > US$13,000)

In Table 3.1, the asterisk in the parenthesis indicates rich countries, those above

13,000 US dollars median GDP per capita. In a moment, I will explain why the data is partitioned (besides for the aforementioned reason of checking the end tails of the distribution of average firm size). The total number of rich countries is 12. The total number of industry observations in those countries is 308.

Table 3.2 Industry-Level Summary Statistics

ISIC Code	No. of Obs.	Turnover	Value Added (in US$)	No. of Establishments	Average Firm Size
311	22	.552	732783363	856.33802	855717.4
313	23	.552	602021635	180.72464	3331154
314	23	.428	882777405	369.78261	2387288
321	23	.744	999841776	771.09348	1296654
322	23	.856	1654195232	3622.1304	456691.3
323	22	.684	144273511	205.79545	701052.9
324	23	.684	374004510	560.21739	667606.1
331	23	.938	634555130	1257.3623	504671.7
332	23	.902	1159001624	2425.7826	477784.6
341	24	.613	973468243	322.00694	3023128
342	23	.919	4681757187	3740.8696	1251516
351	24	.61	1345450178	142.10417	9468056
352	24	.61	1172871463	213.94792	5482042
353	20	.634	1739685680	26.15	6.65e+07
354	21	.634	269078064	124.7619	2156733
355	23	.733	691871171	277.04348	2497338
356	23	.733	2643142880	1914.087	1380890
361	23	.651	436519365	430.17391	1014751
362	23	.651	823154368	241.47826	3408814
369	23	.651	1198992251	786.50725	1524452
371	23	.596	4179135965	778.43478	5368640
372	22	.596	1519068078	479.40909	3168626
381	23	.784	1665518885	1622.2681	1026661
382	23	.838	1696875681	936.1587	1812594
383	23	.812	2567348205	748.38043	3430539
384	23	.792	1535851526	284.27754	5402648
385	23	1.071	376345605	210.47101	1788111
390	23	.812	368673310	476.25725	774105.4
Total	639				

Table 3.2 shows a snapshot of the dataset from an industrial perspective. First of all, the dataset has a relatively balanced format in terms of number of observations. Industrial turnover rate is the lowest in Tobacco (ISIC 314) while it is the highest in Professional and Scientific Equipments (ISIC 385). Turnover rate and average firm size are negatively correlated as expected though the negative correlation is modest (= -.40). Wearing Apparel (except Footwear) (ISIC 322) has the smallest average firm size whereas Petroleum Refineries (ISIC 353) has the largest average firm size. These simple industry level summary statistics are quite reasonable.

3.3.3.2 Description of Regression Tables

The leftmost column of Table 3.3 indicates that the upper half of the table contains the regression results based on the M1 statistical model and the lower half presents results based on the M2 statistical model. As mentioned before, the lower part of Table 3 is mainly referred to for a robustness check for M1 in varying specifications. For an additional reference, I put the specification numbers in parentheses for model M1, and the hyphenated number following "IV" for model M2.

For simpler presentation, I omit all the coefficients for industry and country fixed effects. Columns (5), (10), (IV-5), and (IV-10) are for another robust check. These specifications include interaction terms between industrial turnover and country-level controls for trade openness, economy of scale and factor endowments (*Open, LnEnergy, ΔXR3, LnPop, and LnAraPop*). To help readers focus on the main results, I omit the

Table 3.3 Regression Results

	Dep: Price (*frmsize*)	All Countries					Rich Countries (CGDP > $13000)				
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
OLS	***CorpGov***										
	*TO*Block*	.16 (.31)		.03 (.32)		.88** (.40)	1.14*** (.38)		1.17*** (.38		2.01*** (.60)
	*TO*GSowner*		.01 (.01)		.001 (.01)			.04*** (.01)		.05*** (.01)	
	TO*LnCGDP			-.67** (.29)	-.66**	.19 (.45)			2.20 (.005)	4.13 (3.57)	7.36 (4.91)
	Constant	13.94*** (.54)	14.09*** (.22)	17.74*** (1.72)	17.73*** (11.70)	5.08 (4.39)	12.58*** (.66)	14.00*** (.24)	.83 (18.52)	-8.06 (19.00)	-33.18 (29.88)
	Adj. R^2	.81	.82	.82	.82	.84	.85	.85	.85	.85	.85
2SLS		(IV-1)	(IV-2)	(IV-3)	(IV-4)	(IV-5)	(IV-6)	(IV-7)	(IV-8)	(IV-9)	(IV-10)
	CorpGov										
	*TO*Block*	-.86** (.40)		-.57 (.38)		.24 (.54)	1.19*** (.39)		1.21*** (.40)		2.05*** (.60)
	*TO*GSowner*		-.02 (.02)		-.01 ()			.02 (.01)		.03*** (.20)	
	TO*LnCGDP			-.76*** (.29)	-.79**	.02 (.46)			2.25 (3.48)	2.72 (.00)	7.40 (4.91)
	Constant	15.57*** (.67)	14.40*** (.25)	19.21*** (1.80)	18.59*** (1.79)	8.50* (4.80)	12.49*** (.68)	14.23*** (.26)	.46 (18.54)	-.33 (19.45)	-33.48 (29.88)
	Adj. R^2	.81	.81	.82	.82	.82	.85	.85	.85	.85	.85
	No. of Obs.	639					308				

Standard Errors in parentheses.

* .90 ** .95 *** .99 level of statistical significance.

- Columns (5) (10) (IV-9) and (IV-10) include the interactions between *Turnover* and the control variables as follows: *Open, LnEnergy, ΔXR3, LnPop, and LnAraPop.* Coefficients are omitted for simpler presentation.
- For 2SLS, two instruments are chosen for the first stage equation: *Legal Origins and Electoral Systems*. Coefficients are omitted for simpler presentation as well.

Table 3.4 Significance Comparison Table

	Dep: Price (*frmsize*)	All Countries					Rich Countries (CGDP > $13000)				
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
OLS	***CorpGov***										
	*TO*Block*	X		X		O	O		O		O
	*TO*GSowner*		X		X			O		O	
	TO*LnCGDP			- O	- O	X			X	X	X
		(IV-1)	(IV-2)	(IV-3)	(IV-4)	(IV-5)	(IV-6)	(IV-7)	(IV-8)	(IV-9)	(IV-10)
2SLS	***CorpGov***										
	*TO*Block*	- O		X		X	O		O		O
	*TO*GSowner*		- X		- X			X		O	
	TO*LnCGDP			- O	- O	X			X	X	X

O : statistically significant X: statistically insignificant
- : negative coefficient

coefficients of these controls as well.[63]

In contrast to the conventional presentation of results, I begin with a robustness check for my regression outcomes. If the robustness is good, then we can have greater confidence in our results, that is, in the regression coefficients, and I think it is useful to know this up front. Table 3.4 is prepared for this purpose. It excludes numerical information and instead keeps only the statistical significances and signs of the coefficients of my corporate governance variables (*Block and Gsowner*), and one influential control variable (*LnCGDP*). The "O" and "-" indicate conventionally accepted statistical significance and negative signs of the explanatory variables respectively.

Let us focus on the left half part of Table 3.4 (Regression results with all 25 countries). A vertical comparison between the upper (OLS) and the lower (2SLS) suggests that statistical estimations are unstable. Only Column (IV-1) contains a statistically significant coefficient but the sign is opposite to the theoretical prediction. The only consistent pattern of the estimation is found in the coefficients of the interaction term between turnover and income level. I interpret that the income level has an influential impact on average firm size (hereafter I interpret the coefficients as the effect of average firm size, which is a proxy of industrial price). That is, the control variable for the demand side is the more influential factor than my corporate governance variable in explaining the variation of average firm size in the all-country dataset.[64] To reduce the

[63] The full regression table is available from the author upon request.

[64] There is one caveat in reading the coefficient. As mentioned in the description of data and footnote 61 in Section 3.2.2, there is no solid theoretical prediction of the conditional effect between industrial turnover and country's income level on average firm size like the theoretical prediction of the interaction effect between industrial turnover and corporate governance (Section 3.1). I would rather interpret the coefficient

income effect, I partition the 25 country data by taking the median income country (Spain) for the cut point and get a subset of data consisting of 12 countries.

3.3.3.3 Corporate Governance and Industrial Price in Rich countries

The regression results with Rich Countries (the right half part of Table 3.4) shows a pattern that is distinct from those with all countries. Most of all, as expected, the all income effect on average firm size disappears (See rows for *TO*LnCGDP*). A vertical comparison between the upper (OLS) and the lower (2SLS) suggests that the statistical estimates are stable. The corporate governance variable of interest explains average firm size with the expected sign and at the 0.01 level of statistical significance. For instance, Column (6) shows that the interaction between blockolding index (*Block*) and industrial turnover explains average firm size without any additional controls at the 0.01 level of statistical significance.

To check its substantive effect, suppose the median industry in terms of turnover rate (ISIC 323 Leather Products). A one-standard-deviation increase in *Block* enlarges the average firm size by 63 percent.[65] Column (10) shows an even greater effect of blockholding on average firm size with all control variables (110 percent). To make a conservative interpretation, I use Column (6) to read the conditional effect of corporate governance.

As predicted in Section 3.3.1, the marginal effect of *Block* gets weaker as

---

holding fixed a median income country's GDP per capita. Given this, the coefficient indicates the conditional effect of industrial turnover on average firm size.

[65] Since I use logged average firm size, the conditional effect of *Block* on average firm size is directly calculated in .55*1.14 = 0.627.

industrial asset specificity increases. More concretely, by moving from Australia (25th percentile) to Norway (75th percentile in the distribution of *Block*), the difference between the average firm size in Paper and Products (25th of percentile, ISIC 341) and the average firm size in Electrical Machinery (75th percentile in the distribution of asset specificity, ISIC 383) narrows by 24 percent.[66]

In sum, the conditional effect of corporate governance (the degree of blockholding) on average firm size (industrial price level) is positive. The marginal effect of corporate governance gets weaker as industrial asset specificity gets higher (lower industrial turnover rate). However, these effects of corporate governance are observed only in partitioned data consisting of rich countries. Why does the predicted effect of corporate governance on average firm size not appear in the all-country dataset? I discuss this question in the following section.

3.4 Discussion

In this section I discuss two points. One is the question raised above, why corporate governance fails to explain industrial prices in the all-country dataset. The other is, what if quantity competition occurs in the shareholder holder type of corporate governance?

3.4.1 Why does corporate governance fail to explain industrial prices in the all-country dataset?

[66] (.81-.61)*(3.59-4.63)*(1.14) = -.237.

To answer this question, we need to reconsider the effect of corporate governance on industrial prices. To do so, it is useful to return to Section 3.3.1. We start with the question about the convex relationship between the number of firms and total costs of establishing firms. That is, although the convex relationship between costs associated with industrial asset specificity (natural industry entry barrier) and the number of firm is undeniable, it may be that the convexity between costs associated with national corporate governance and the number of firms only holds when the country of interest reaches a mature economic development stage.

Suppose a country is experiencing high economic growth as well as being under the blockholder type of corporate governance. At this economic developmental phase, most industries have growth potential and thus profit-seeking opportunities. Large corporations having highly concentrated ownership—that usually have very large market power in a few industries and withhold investment capital from the industries—try to enter other industries where they think profit potential exists. It is not unusual that investment efficiency in terms of inter-industry relations is ignored.[67] This inefficient entry may well give rise to irrational market competition which may lead to price competition given a fixed demand, as opposed to the scenario suggested in the model in Section 3.2.2.1.

[67] The history of South Korean industrialization is an example. Especially before democratization, *Chaebols*' (large corporate conglomerations) ruthless market entry used to be compared with an octopus's catching of food. It hurt the Korean economy by bringing about inefficient capital allocation. Even after democratization, it took more than ten years for an industrial rationalization policy to come to fruition. Ironically, due to the 1997-8 financial crisis, the Kim Dae Jung government could correct the distorted industrial structure through so-called "Big Deal."

The non-delegated oligopolistic competition model, where firms compete with each other by setting prices, provides a reasonable explanation of why corporate governance does not explain the variation of industrial price in the all-country dataset. The equilibrium price in a non-delegated price competition under the blockholder type of corporate governance can be lower than the equilibrium price in a delegated price competition under the shareholder type of corporate governance. Even without solving an oligopolistic price competition game without delegation (refer to Singh and Vives 1984 for the formal derivation), comparative statics with the oligopolistic competition models in Section 3.2.2 helps us understand this point. Let us return to Equation (5) in Section 3.2.2.1. The sufficient condition for the equilibrium price, $\overline{p}_i^{qblock}$, suggests that the market size should be larger than the firm's unit cost. Otherwise, $\overline{p}_i^{qblock}$ is irrelevant in Equation (5) and, as a result, the inequality between $\overline{p}_i^{qblock}$ and $\overline{p}^{pshare}$ in (14) collapses. In other words, if the market size is not sufficiently larger than the firm's unit cost, $\overline{p}_i^{qblock}$ can be no more than $\overline{p}^{pshare}$. Where there exists irrational market competition caused by inefficient market entry (as above), it is highly probable that the actual market size is not sufficiently large compared to a firm's unit cost. Thus, the expected sign and substantive effect of the coefficient of the interaction between turnover and corporate governance go away as soon as developing countries are included in the regression analyses.

Regression analyses with a subset of data consisting of 13 countries (GDP per capita < US$ 13,000) support the proposition in the comparative statics above. In Column (1) specification, the sign of *To*Block* is negative but the coefficient is statistically insignificant. In the Column (5) specification, its sign is also negative and its coefficient

is significant both substantively and statistically. However, the estimations do not survive robustness checks with the instruments, suggesting that endogeneity is occurring.

What are the theoretical implications of this empirical result? It is reasonable to start with a question, namely, whether the decreasing effect of blockholding on price benefits people in developing countries. I suggest it does not, because a positive welfare effect of decreasing price is, at best, a short-term benefit and the inefficient allocation of production resources can hurt the whole economy in the long term. From this standpoint, the political dimension of corporate governance and the role of the state in developing countries needs to be examined more carefully than in developed countries. This need is intensified by the contrasting statistical outcomes between two subgroups, especially in cases of the intervention of two instruments. Why do the political and legal instruments blur the effect of corporate governance on price in developing countries whereas they do not change its effect in developed countries? This fact may explain the conflicting results of two previous research projects that had comprehensive samples consisting of 85 and 57 countries respectively, but obtained contrasting conclusions of the nature of government regulation. Taking the Public Choice view (Stigler 1971; Peltzman 1976), Djankov and others suggest that government regulations benefit politicians and economic agents protected by the politicians (2002). In contrast, taking the Public Interest view (Pigue 1938), Fisman and Sarria-Allende (2004) suggest that government regulations correct market failures and are thus required to achieve socially efficient outcomes. My empirical results based on industry-level evidence show ambivalence between these two perspectives, and rather emphasize that there must be qualitative differences in countries'

political logics of corporate governance and, in general, government regulation between two worlds, developing or developed. Since this line of research is beyond the scope of this essay, I save it for future study.

Just as price competition under blockholder types of corporate governance can happen due to (irrational) market entries (as illustrated so far), so can quantity competition occur under shareholder types of corporate governance, especially in the short term. As mentioned in Section 3.2.2, firms under shareholder types of corporate governance are flexible in their strategic choices due to flexible factor market conditions. Thus, without any new entries in the short term, firms under shareholder types of corporate governance can compete with each other by setting quantities as well. I therefore conduct comparative static analyses of managers' objective functions to answer the following question.

3.4.2 Why are managers concerned with the turnover of their firm under shareholder type?

This question lets us conduct comparative static analyses of managers' incentives to better understand their strategic choices under delegated oligopolistic competition. To summarize the main finding, managers behave more aggressively when they are competing on quantity than on price. I interpret this finding as suggesting that managers cannot be satisfactorily compensated through the price mechanism under shareholder types of corporate governance. This finding supports my theoretical speculation of managers' behavior in the first essay: even in the case of business downturns (thus, no

new entries into an industry), under shareholder types of corporate governance managers may try to boost turnover by reducing markups (refer to Section 1.2.2.2 in Chapter 1). It also suggests that the revenue-maximizing manager assumed in Section 3.2.1 is more of an actual reflection of, than an assumption of, managerial behavior.

For simplicity, suppose that two firms compete against each other without any new entries into the industry in the short term. Now let me check how managerial compensation varies depending upon whether managers compete on price or quantity. Since the equilibrium outcomes of delegated oligopolistic competition do not depend on whether firms choose either a "price" or "quantity" strategy,[68] it is sufficient to analyze a manager's objective function.

For an easy illustration, suppose a simplified demand function and zero production cost: $q_i = 1 - p_i + zp_j$ and $c_i = 0$. We have manager i's objective function when managers compete against each other by setting prices as follows (the superscript indicates price and quantity competition with p and q, respectively):

$$m_i^p = (1 - p_i + zp_j)p_i + \theta_i^p(1 - p_j + zp_i)p_j. \tag{15}$$

Differentiating this objective function with respect to p_i and setting the result equal to zero, we find p_i as a function of p_j, which is manager i's reaction function.

$$p_i(p_j) = \frac{(1 + z(1 + \theta_i^p)p_j)}{2}. \tag{16}$$

Next, we suppose that they compete by setting quantities. Manager i's objective function is given by

[68] Appendix 4 illustrates the solutions to the oligopolistic competition game with delegation for two strategies, price and quantity. For the complete solution, refer to Miller and Pazgal (2001).

$$m_i^q = \left(\frac{1+z-q_i-zq_j}{1-z^2}\right)q_i + \theta_i^q\left(\frac{1+z-q_j-zq_i}{1-z^2}\right)q_j. \qquad (17)$$

Differentiating this objective function with respect to q_i and setting the result equal to zero, we find q_i as a function of q_j, which is manager i's reaction function.

$$q_i(q_j) = \frac{1+z-z(1+\theta_i^q)q_j}{2}. \qquad (18)$$

If goods are substitutes ($0 < z < 1$), the owner assigns a positive weight (θ_i^p) to the competitor's profit to maximize their firm's profit[69] (See (A4-8) in Appendix 4). Suppose firms choose price for their competition strategy and manager i lowers the price for his firm's goods. Under this incentive scheme, any gain in profit due to the lower price is partially offset by the accompanying decrease in firm j's profit. From this point, we can infer that managers are less aggressive in price competition. Conversely, in the case that firms choose to compete on quantity, the owner assigns a negative weight (θ_i^q) to the competitor's profit (See (A4-15) in Appendix 4). If manager i increases quantity, his gain is augmented by the corresponding decrease in firm j's profit. From this point, we can infer that managers are more aggressive when they compete on quantity.

These simple comparative static analyses shed light on how managers behave under shareholder types of corporate governance, especially in economic downturns—when there is no new entry into the industry: managers try to boost the turnover of their firm. Assuming an ordinary concave production function, they would do so even by reducing the markup of prices.

---

[69] In the case of complement goods ($-1 < z < 0$), the sign of the equilibrium $\bar{\theta}$ is opposite. But the outcome of the comparative static analyses I do here is consistent regardless of the characteristics of goods of interest. Refer to pp. 286-7 in Miler and Pazgal (2001) for the equilibrium $\bar{\theta}$.

3.5 Conclusion

In this essay, I have shown how corporate governance influences a firm's pricing behavior. I provide two theoretical answers to this question. On the one hand, challenging the standard neoclassical theory where economic agents maximize profit free of agency problems, I explain how output increases under the assumption of a revenue-maximizing manager and thus how the price becomes lower given fixed demand. On the other hand, using two oligopoly models where two firms compete over either price or quantity, I show that non-delegated oligopolistic competition under blockholder types of corporate governance has an increasing effect on the equilibrium price compared to delegated oligopolistic competition under shareholder types of corporate governance. Empirically, I use industry level data to conduct regression analyses and confirm the expected conditional and marginal effect of national corporate governance on industrial market prices. The conditional effect of blockholder types of corporate governance is an increase in industrial market prices, while its marginal effect weakens as industrial asset specificity gets higher.

However, the expected effects of corporate governance are confirmed only with a sample of advanced industrial countries. Rather than undermining the theoretical models, this partial confirmation motivates me to make sense of the sub-group heterogeneity of market competition. Relaxing an assumption about firms' strategic choice of competition under blockholder types of corporate governance, I provide an explanation that is internally consistent with the theoretical models. In developing countries, irrational

market competition caused by inefficient allocation of production resources can lead to price outcomes that differ from my initial predictions, which are based on rational markets where production resources are efficiently allocated.

Since I characterize corporate governance as a regulatory regime in factor markets, my finding of sub-group heterogeneity according to economic development sheds light on two contrasting views of government regulation: the public choice vs. the public interest view. The former understands regulations as a set of rules needed to achieve socially efficient outcomes, while the latter treats regulations as reflecting the interest of socially powerful groups. My empirical results allude to qualitative differences in the political logics of corporate governance and government regulation between the developing and developed world.

Finally, I should mention the limitations of this research and suggest future research directions. Theoretically, on the one hand, I assume that owners have perfect information about managerial behavior under shareholder types of corporate governance. However, in reality, they may well suffer from varying degrees of uncertainty about managerial behavior. On the other hand, I assume firms' stylized strategic choices for competition, either price or quantity, depending on corporate governance. Although I infer the stylized pattern from the literature on industrial organization, it is hard to obtain precise observations since firms adopt mixed strategies in reality.

There are several opportunities for further studies. Empirically, although I find sub-group differences between developing and developed countries in the effect of corporate governance on prices, more micro-behavioral evidence is required to confirm

that corporate governance constrains a firm's pricing behavior. Qualitative research with the help of case studies of marketing strategies might be a useful step in this direction. In one direction, comparative case studies of pricing behavior of a multinational corporation's subsidies under different corporate governance deserve attention. Examining the price determination mechanism of the Hyundai *Genesis* (mentioned at the beginning of this essay) may be a good case to pursue this line of research. In another direction, selective case studies of industries whose firms are relatively homogenous in their marketing strategy and then comparing product prices in cross-national context might also be useful.

In liberal market economies like those in the US and UK, there has been much discussion of the deficiencies of market systems in delivering effective corporate governance. In advanced European countries and Japan, there is a continuing concern that existing corporate governance systems fail to promote technological innovation and economic growth. Even in Eastern Europe and the BRICs, mega-scale privatization inevitably necessitates reforming corporate governance. All of these trends have raised the public profile of corporate governance. This essay tries to better understand yet another implication of corporate governance: consumer prices. The unfair price issue raised by a Korean social movement group against Hyundai *Genesis* is still waiting for the Korean Fair Trade Commission's ruling as of writing this conclusion. It is very suggestive to the main purpose of this essay that the social movement group is campaigning to improve Korean corporate governance as well. At this writing, the claim by a Korean Social movement group, Consumers Korea, of unfair pricing of the Hyundai

Genesis is still awaiting the Korean Fair Trade Commission's ruling. Consumers Korea's claim, an effort to improve Korean corporate governance as well, is another example of the growing public recognition of the importance of corporate governance.

BIBLIOGRAPHY

Acemoglu, D, Johnson, S, Robinson, J., 2002. Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution. *Quarterly Journal of Economics* 118: 1231-94.

Agrawal, A., Knoeber, C. R., 1996. Firm Performance and Mechanisms to Control Agency Problems between Managers and Shareholders, *Journal of Financial and Quantitative Analysis* 31-3, 377-97.

Aguilera, R. V., Jackson, G., 2003. The Cross-National Diversity of Corporate Governance: Dimensions and Determinants. *Academy of Management Review* 28-3, 447-65.

Ahrens, J., 2002. *Governance and Economic Development* (Edward Elgar. London).

Alt, J. E., Carlsen, F., Heum, P., Johansen, K., 1999. Asset Specificity and the Political Behavior of Firms: Lobbying for Subsidies in Norway. *International Organization* 53, 99-116.

Anderson, R. C., Bates, T. W., Bizjak, J. M., Lemmon, M. L., 2000. Corporate Governance and Firm Diversification. *Financial Management* 29-1, 5-22.

Aoki, M., 2000. *Information, corporate governance, and institutional diversity: Competitiveness in Japan, the USA, and the transnational economies* (Oxford University Press).

Aoki, M., Jackson, G., Miyajima, H., eds., 2007. *Corporate Governance in Japan: Institutional Change and Organizational Diversity* (Oxford University Press).

Apel, M., Friberg, R., Hallsten, K., 2005. Microfoundations of Macroeconomic Price Adjustment: Survey Evidence from Swedish Firm. *Journal of Money, Credit and Banking* 37-2, 313-38.

Arditti, F., 1967. Risk and the Required Return on Equity. *The Journal of Finance* 22-1, 19-36.

Austen-Smith, D., Banks, J., 1988. Elections, Coalitions, and Legislative Outcomes. *American Political Science Review* 82, 405-22.

Balakrishnan, S., Fox, I., 1993. Asset Specificity, Firm Heterogeneity and Capital Structure. *Strategic Management Journal* 14, 3-14.

Baltagi, B. H., 2001. *Econometric Analysis of Panel Data* (John Wiley & Sons, New Jersey).

Barkema, H. G., Gomez-Mejia, L. R., 1998. Managerial Compensation and Firm Performance: A General Research Framework. *The Academy of Management Journal* 41-2, 135-45.

Baumol, W. J., 1958. On the Theory of Oligopoly. *Economica* 25-99, 187-98.

Baumol, W. J., 1967. *Business Behavior, Value and Growth* (Harcourt, Brace & World).

Beard, D. W., Dess, G. G., 1981. Corporate-Level Strategy, Business-Level Strategy, and Firm Performance. *The Academy of Management Journal* 24-4, 663-88.

Berger, S., 2006. *How We Compete: what companies around the world are doing to make it in today's global economy* (Doubleday Business).

Bergstrand, J. H., 1991. Structural Determinants of Real Exchange Rates and National Price Levels: Some Empirical Evidence. *The American Economic Review* 81-1, 325-34.

Bergstresser, D., 2002. Essays on the taxation and regulation of financial markets. Ph.D. thesis. MIT.

Bhagwati, J., 1984. Why are Services Cheaper in Poor Countries?. *Economic Journal* 94, 279-86.

Blinder, A. S., 1982. Inventories and Sticky Prices: More on the Microfoundations of Macroeconomics. *The American Economic Review* 72-3, 334-48.

Blinder, A. S., Canetti, E. R. D., Lebow, D. E., Rudd, J. B., 1998. *Asking About Prices: A New Approach to Understanding Price Stickiness* (Russell Sage).

Blume, L., Easley, D., O'Hare, M., 1994. Market Statistics and Technical Analysis: The Role of Volume. *The Journal of Finance* 49-1, 153-81.

Brawley, M., 1997. Factoral or Sectoral Conflict? Partially Mobile Factors and the Politics of Trade in Imperial Germany. *International Studies Quarterly* 41, 633-53.

Buckley, P. J., Pass, C., Prescott, K., 1988. Measures of International Competitiveness: A Critical Survey. *Journal of Marketing Management* 4, 175-200.

Calderini, M., Garrone, P., Sobreno, M., eds., 2003. *Corporate Governance, Market Structure and Innovation* (Edward Elgar).

Carlin, W., Mayer, C., 1999. How do Financial Systems Affect Economic Performance?, *Manuscript.*

Chintagunta, P. K., 2002. Investigating Category Pricing Behavior at a Retail Chain. *Journal of Marketing Research* 39-2, 141-54.

Chintagunta, P. K., Desiraju, R., 2005. Strategic Pricing and Detailing Behavior in International Markets. *Marketing Science* 24-1, 67-80.

Chintagunta, P. K., Rao, V. R., 1996. Pricing Strategies in a Dynamic Duopoly: A Differential Game Model. *Management Science* 42-11, 1501-14.

Cini, M. M., 1994. Policing the internal market: the regulation of competition in the European Commission. Ph.D. thesis, University of Exeter.

Clague, C., 1977. Information Cost, Corporate Hierarchy and Earnings Inequality. The American Economic Review 67-1, 81-85.

Clague, C., 1993. Why are Prices So Low in Latin America?. *The World Economy* 16, 601-10.

Clague, C.,1986. Determinants of the National Price Level: Some Empirical Results. *Review of Economics and Statistics* 86, 320-23.

Clarke, T., 2007. *International Corporate Governance: a comparative approach.* (Routledge).

Clarke, T., dela Rama, M., eds., 2006. *Corporate Governance and Globalization Vol. 1.* (Sage Publications).

Clarke, T., dela Rama, M., eds., 2006. *Corporate Governance and Globalization Vol. 2.* (Sage Publications).

Colomer, J., 2004. *Handbook of Electoral System Choice* (Palgrave Macmillan).

Conrad, K., Unger, R., 1989. Productivity Gaps and Capacity Utilization in the Manufacturing Sectors of Five OECD-Countries, 1963-1982. *The Journal of Productivity Analysis* 1, 101-22.

Cornelius, P., 2003. *Corporate Governance and Capital Flows in a Global Economy* (Oxford University Press).

Cornille, D., Dossche, M., 2006. The Patterns and Determinants of Price Setting in the

Belgian Industry. *European Central Banking Working Paper Series* 618.

Cubukcu, K. K., 2003. Geography and the cost of network infrastructure. Ph.D. thesis. Ohio State University.

Cyert, R. M., Hedrick, C. L., 1972. Theory of the Firm: Past, Present, and Future: An Interpretation. *Journal of Economic Literature* 10-2, 398-412.

Dacin, M. T., Ventresca, M. J., Beal, B. D., 1999. The embeddedness of organizations: Dialogue and directions. *Journal of Management* 25-3, 317-56.

Danziger, L., 1987. Inflation, Fixed Cost of Price Adjustment, and Measurement of Relative-Price Variability: Theory and Evidence. *The American Economic Review* 77-4, 704-713.

Danziger, L., 1987. On Inflation and Real Price Variability. *Economic Inquiry* 25-2, 285-98.

De Jong, H. W., 1997. The Governance Structure and Performance of Large European Corporations. *The Journal of Management and Growth* 1, 5-27.

Deakin, S., Slinger, G., 1997. Hostile Takeovers, Corporate Law, and the Theory of Firm. *Journal of Law and Society* 24-1, 124-51.

Demise, N., Miwa, Y., Nakabayashi, M., Nakoshi, Y., 2006. *Corporate Governance in Japan: from the viewpoints of management, accounting, and the market* (Springer).

Diamantopoulos, A., Mathews, B. P., 1994. The Specification of Pricing Objectives: Empirical Evidence from an Oligopoly Firm. *Managerial and Decision Economics* 15-1, 73-85.

Dixit, A. 1979. A Model of Duopoly Suggesting a Theory of Entry Barriers. *The Bell Journal of Economics* 10-1, 20-32.

Dixit, A., Londregan, J., 1996. The Determinants of Success of Special Interests in Redistributive Politics. *The Journal of Politics* 58-4, 1132-55.

Djankov, S., La Porta, R., Lopez-de-Silanes, F., Shleifer, A., 2002. The Regulation of Entry. *The Quarterly Journal of Economics* 117-1, 1-37.

Dore, R., 2000. *Stock Market Capitalism: Welfare Capitalism: Japan and Germany versus Anglo-Saxons* (Oxford University Press).

Dunlavy, C., 1998. Corporate Governance in Late 19th-Century Europe and the US: The

Case of Shareholder Voting Rights. in Hopt, K.J. et. al (eds.) *Comparative Corporate Governance: The State of the Art and Emerging Research* (Oxford University Press).

Dunne, T., Roberts, M. J., Samuelson, L., 1988. Patterns of Firm Entry and Exit in U.S. Manufacturing Industries. *The RAND Journal of Economics* 19-4, 495-515.

Ebbinghaus, B., Manow, P., eds., 2001. *Comparing Welfare Capitalism: Social policy and political economy in Europe, Japan and the USA* (Routledge).

Estelami, H., De Maeyer, P., 2004. Product category determinants of price knowledge for durable consumer goods. *Journal of Retailing* 80, 129-37.

Esteves-Abe, M., Iversen, T., Soskice, D., 2001. Social Protection and the Formation of Skills: A Reinterpretation of the Welfare State in Hall, P. and Soskice D. (eds.), *Varieties of Capitalism* (Oxford University Press).

Estrin, S., 2002. Competition and Corporate Governance in Transition. *The Journal of Economic Perspectives* 16-1, 101-24.

Evans, P., 2005. International regulation of official trade finance: competition and collusion in export credits and foreign aid. Ph.D. thesis. MIT.

Evans, W. N., Froeb, L. M., Werden, G. J., 1993. Endogeneity in the Concentration-Price Relationship: Causes, Consequences, and Cures. *Journal of Industrial Economics* 41-4, 431-38.

Ezzamel, M., Watson, R, 2002. Pay Comparability Across and Within UK Boards: An Empirical Analysis of the Cash Pay Awards to CEOs and Other Board Members. *Journal of Management Studies* 39-2, 207-32.

Federowickz, M., Aguilera, R. A., eds., 2003. *Corporate Governance in a Changing Economic and Political Environment: Trajectories of Institutional Change* (Palgrave).

Fink, R. C., Edelman, L. F., Hatten, K. J., James, W. L., 2006. Transaction cost economics, resource dependence theory, and customer-supplier relationships. *Industrial and Corporate Change* 15-3, 497-529.

Fishman, A., 1992. Search Technology, Staggered Price-Setting, and Price Dispersion. *The American Economic Review* 82-1, 287-98.

Fisman, R., Love, I., 2004, Financial Development and Intersectoral Allocation: A New Approach. *The Journal of Finance* 59-6, 2785-2807.

Fisman, R., Sarria-Allende, V., 2004. Regulation of Entry and the Distortion of Industrial Organization. *NBER Working Paper Series* 10929.

Fligstein, N., 1990. *The transformation of corporate control* (Cambridge University Press).

Fulghieri, P., Suominen, M., 2004. Does Bad Corporate Governance Lead to Too Little Competition?: Corporate governance, capital structure, and industry concentration. *Manuscript.*

Gale, B., 1972. Market Share and Rate of Return. *The Review of Economics and Statistics* 54-4, 412-23.

Gedajlovic, E. R., Shapiro, D. M., 1998. Management and Ownership Effects: Evidence from Five Countries. *Strategic Management Journal* 19-6, 533-53.

Geroski, P. A., Schwalbach, J., eds., 1991. *Entry and Market Contestability* (Blackwell).

Ghosh, M., John, G., 1999. Governance Value Analysis and Marketing Strategy. *Journal of Marketing* 63, 131-45.

Gordon, R. J., 1983. A Century of Evidence on Wage and Price Stickiness in the United States, the United Kingdom, and Japan in Tobin, J. (ed.), *Macroeconomics, prices, and quantities: essays in memory of Arthur M. Okun* (The Brookings Institution).

Gospel, H., Pendleton, A., eds., 2005. *Corporate Governance and Labour Management: An International Comparison* (Oxford University Press).

Gourevitch, P., 2003. The Politics of Corporate Governance Regulation. *The Yale Law Journal 112*, 1829-80.

Gourevitch, P., Shinn, J., 2005. Political Drivers of Diverging Corporate Governance Pattern. *Manuscript.*

Gourevitch, P., Shinn, J., 2005. *Political Power and Corporate Control* (Princeton University Press).

Granovetter, M., 1985. Economic action and social structure: The problem of embeddedness. *American Journal of Sociology* 91-3, 481-510.

Granovetter, M., 2005. The Impact of Social Structure on Economic Outcomes. *Journal of Economic Perspectives* 19-1, 33-50.

Gugler, K., 2001. *Corporate Governance and Economic Performance* (Oxford University Press).

Hadlock, C. J., Lumer, G. B., 1997. Compensation, Turnover, and Top Management Incentives: Historical Evidence. *The Journal of Business* 70-2, 153-87.

Hall, M., Weiss, L., 1967. Firm Size and Profitability. *The Review of Economics and Statistics* 49, 319-31.

Hall, P. A., Soskice, D., eds., 2001. *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage* (Oxford University Press).

Hall, P., Gingerich, D., 2004. Varieties of Capitalism and Institutional Complementarities in the Macroeconomy: An Empirical Analysis. *MPIfG Discussion Paper* 04/5.

Hall, P., Soskice, D., 2003. Varieties of Capitalism and Institutional Change: A Response to Three Critics. *Comparative European Politics* 1, 241-50.

Hall, S., Walsh, M., Yates, A., 2000. Are UK companies' prices sticky? *Oxford Economic Papers* 52, 425-46.

Hancke, Bob, R. M., Thatcher, M., eds., 2007. *Beyond varieties of capitalism: conflict, contradiction, and complementarities in the European economy* (Oxford University Press).

Hart, O., 1995. Corporate Governance: Some Theories and Implications. *The Economic Journal* 105-430, 678-89.

He, L., 2005. An Integrated System of Corporate Governance: Regulation, Internal Control and Managerial Attributes. Ph.D. thesis, The University of Pennsylvania.

Heinrich, R., 1999. Complementarities in Corporate Governance: A Survey of the Literature with Special Emphasis on Japan. *Kiel Working paper.*

Hertner, P., 1998. Corporate Governance and Multinational Enterprise in Historical Perspective. in Hopt, K.J. et. al (eds.) *Comparative Corporate Governance: The State of the Art and Emerging Research* (Oxford University Press).

Hirshleifer, J., Glazer, A., Hirshleifer, D., 2005. *Price Theory and Applications: Decisions, Markets and Information* (Cambridge University Press).

Ho, D. E., 2003. Majoritarian Electoral System and Consumer Power: A Matching Rejoinder. *Manuscript.*

Hoepner, M., 2007. Corporate Governance Reform and the German Party Paradox. *Comparative Politics* 39-4, 401-20.

Honaker, J., 2004. A Downsian model of long standing legislative majorities. *Manuscript.*

Huang, C. J., Crooke, P. S., 1997. *Mathematics and Mathematica for Economists* (Blackwell).

Iversen, T., Soskice, D., 2006. Electoral Institutions and the Politics of Coalitions: Why Some Democracies Redistribute More Than Others. *American Political Science Review* 100-2, 165-81.

Jackson, G., 2005. Towards a Comparative Perspective on Corporate Governance and Labour Management: Enterprise Coalitions and National Trajectories in Gospel, H., Pendleton, A. (eds.), *Corporate Governance and Labour Management: An International Comparison* (Oxford University Press).

Johnston, J., DiNardo, J., 1997. *Eonometric Methods* (McGraw-Hill, New York).

Joskow, P. L., Rose, N. L., Wolfram, C. D., 1996. Political Constraints on Executive Compensation: Evidence from the Electric Utility Industry. *The RAND Journal of Economics* 27-1, 165-82.

Kandil, M., 1996. Price Flexibility and Aggregate Stability: Some Evidence Contrasting Developing and Developed Countries. *The Canadian Journal of Economics* 29-2, 414-35.

Kaplan, S. N., 1994. Top Executives, Turnover, and Firm Performance in Germany. *Journal of Law, Economics & Organizations* 10-1, 142-59.

Kaufmann, D., Kraay, A., Mastruzzi, M., 2003. Governance Matters III: Governance Indicators for 1996-2002. *World Bank Policy Research Working Paper* No. 3106.

Keasey, K., Wright, M., eds., 1997. *Corporate Governance: Responsibilities, Risks and Remuneration* (Wiley).

Kim, H. Y., 1999. Economic Capacity Utilization and Its Determinants: Theory and Evidence. *Review of Industrial Organization* 15, 321-39.

King, J., ed., 1996. *An Alternative Macroeconomic Theory: The Kaleckian Model and Post-Keynesian Economics* (Kluwer Academic Publishers).

Klemperer, P., Meyer, M., 1986. Price Competition vs. Quantity Competition: The Role of Uncertainty. *The RAND Journal of Economics* 17-4, 618-38.

Kravis, I. B., Lipsey, R. E., 1988. National Price Level of Tradables and Nontradables. *American Economic Review* 78, 474-78.

Kravis, I. B., Lipsey, R. E., 1988. Toward an Explanation of National Price Levels. *Princeton Studies in International Finance* 52.

La Porta, R., Lopez-de Silanes, F., Shleifer, A., Vishny, R., 1997. Legal Determinants of External Finance. *Journal of Finance* 52, 1131-50.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R. W., 1998. Law and Finance. *The Journal of Political Economy* 106-6, 1113-55.

Lee, F. S, 1998. *Post Keynesian Price Theory* (Cambridge University Press).

Lee, J., 1993. International Trade, Distortions and Long-Run Economic Growth. *IMF Staff Papers.*

Lee, J.G. 2000, *Microeconomics* (Bummoonsa) *in Korean.*

Leibenstein, H., 1987. *Inside the Firm: The Inefficiencies of Hierarchy* (Harvard University Press).

Leiblein, M. J., Reuer, J. J., Dalsace, F., 2002. Do Make Or Buy Decisions Matters?: The Influence of Organizational Governance on Technological Performance. *Strategic Management Journal* 23, 817-33.

Lombardo, D., Pagano, M., 2002. Law and Equity Market: A Simple Model. in McCahery, J. A.; Moerland, P.; Raaijmakers, T. & Renneboog, L. (eds.) *Corporate Governance Regimes: Convergence and Diversity* (Oxford University Press).

Maclachlan, P. L., 2001. *Consumer Politics in Postwar Japan* (Columbia University Press).

Maher, M., Ansersson, T., 2002. Corporate Governance: Effects on Firm Performance and Economic Growth. in McCahery, J. A., Moerland, P., Raaijmakers, T., Renneboog, L., (eds.) *Corporate Governance Regimes: Convergence and Diversity* (Oxford University Press).

Mares, I., 2001. Firm and the Welfare State: When, Why, and How Does Social Policy Matter to Employers?, in Hall, P. A., Soskice, D. (eds.) *Varieties of Capitalism*

(Oxford University Press).

Mares, I., 2003. *Politics of Social Risk: Business and Welfare State Development* (Cambridge University Press).

Martin, C., 1997. Price Formation in an Open Economy: Theory and Evidence for the United Kingdom, 1951-1991. *The Economic Journal* 107-444, 1391-1404.

Mayer, C., 1996. Corporate Governance, Competition and Performance. *Economics Department Working Paper* 164.

McCahery, J. A., Moerland, P., Raaijmakers, T., Renneboog, L., eds., 2002. *Corporate Governance Regimes: Convergence and Diversity* (Oxford University Press).

McCarty, N., Meirowitz, A., 2007. *Political Game Theory: An Introduction* (Cambridge University Press).

Milgrom, P. R., Roberts, J., 1992. *Economics, organization and management* (Prentice-Hall).

Miller, N. H., Pazgal, A. I., 2001. The equivalence of price and quantity competition with delegation. *The RAND Journal of Economics* 32-2, 284-301.

Millstein, I., 1998. *Corporate Governance: Improving Competitiveness and Access to Capital in Global Markets* (OECD Publications).

Morck, R., Wofenzon, D., Yeung, B., 2005. Corporate Governance, Economic Entrenchment, and Growth. *Journal of Economic Literature* 43-3, 655-720.

Morgan, S. L., Winship, C., 2007. *Counterfactuals and Causal Inference: Methods and Principles for Social Science* (Cambridge University Press).

Munari, F., Sobrero, M., 2003. Corporate Governance and Innovation. in Calderini, M., Garrone, P., Sobreno, M., (eds.) *Corporate Governance, Market Structure and Innovation* (Edward Elgar).

Murphy, K. J., 1999. Executive Compensation. *Manuscript.*

Myerson, R., 1999. Theoretical Comparisons of Electoral Systems. *European Economic Review* 43, 671-97.

Noble, P. M., Gruca, T. S., 1999. Industrial Pricing: Theory and Managerial Practice. *Marketing Science* 18-3, 435-54.

North, D., 1990. *Institutions, institutional change, and economic performance* (Cambridge University Press).

OECD, 2004. *Corporate Governance: A Survey of OECD Countries* (OECD Publications).

Oman, C. P., 2001. Corporate Governance and National Development. *OECD working paper 180.*

Pagano, M., Volpin, P., 2005. The Political Economy of Corporate Governance. *American Economic Review* 95-4, 1005-30.

Pavlik, E. L., Belkaoui, A., 1991. *Determinants of Executive Compensation: Corporate Ownership, Performance, Size, and Diversification* (Greenwood).

Peltzman, S., 1976. Toward a More General Theory of Regulation. *Journal of Law and Economics* 19-2, 211-40.

Perotti, E., von Thadden, E., 2002. Investor Dominance and Strategic Transparency: On the Role of Corporate Governance for Product and Capital Market Competition. in McCahery, J. A., Moerland, P., Raaijmakers, T., Renneboog, L., (eds.) *Corporate Governance Regimes: Convergence and Diversity* (Oxford University Press)

Persson, T., Tabellini, G., 2003. *The Economic Consequence of Constitutions* (The MIT Press).

Pinto, P. M., Timmons, J. F., 2005. The Political Determinants of Economic Performance: Political Competition and the Sources of Growth. *Comparative Political Studies* 38-1, 25-50.

Plümper, T., Troeger, V. E., 2007. Efficient Estimation of Time-Invariant and Rarely Changing Variables in Finite Sample Panel Analyses with Unit Fixed Effects. *Political Analysis* 15, 124-39.

Powell, G. J., 1989. Constitutional Design and Citizen Electoral Control. *Journal of Theoretical Politics* 1, 107-30.

Rajan, R. G., Zingales, L., 1998. Financial Dependence and Growth. *The American Economic Review* 88-3, 559-86.

Roberts, M. J., Tybout, J. R., eds., 1996. *Industrial Evolution in Developing Countries: Micro Patterns of Turnover, Productivity, and Market Structure* (Oxford University Press).

Roe, M. J., 1994. *Strong Managers, weak owners: The Political roots of American corporate finance* (Princeton University Press).

Roe, M., 2003. *Political Determinants of Corporate Governance: Political Context, Corporate Impact* (Oxford University Press).

Rogowski, R., Kayser, M., 2002. Majoritarian Electoral Systems and Consumer Power: Price-Level Evidence from the OECD Countries. *American Journal of Political Science* 46-3, 526-39.

Ruth, A., Jackson, G., 2003. The Cross-National Diversity of Corporate Governance: Dimensions and Determinants. *Academy of Management Review* 28-3, 447-65.

Schjelderup, G., Weichenrieder, A. J., 1999. Trade, Multinationals, and Transfer Pricing Regulations. *The Canadian Journal of Economics* 32-3, 817-34.

Schneiberg, M., Bartley, T., 2001. Regulating American Industries: Markets, Politics, and the Institutional Determinants of Fire Insurance Regulation. *The American Journal of Sociology* 107-1, 101-46.

Schoeffler, S., Buzzell, R. D., Heany, D. 1974. The Impact of Strategic Planning on Profit Performance. *Harvard Business Review* 52, 137-45.

Shinn, J., Gourevitch, P., 1999. *How Shareholder Reforms Can Pay Foreign Policy Dividends* (Council on Foreign Relations).

Shleifer, A., Vishny, R. W., 1986. Large Shareholders and Corporate Control. *The Journal of Political Economy* 94-3, 461-88.

Singh, N., Vives, X., 1984. Price and Quantity Competition in a Differentiated Duopoly. *The RAND Journal of Economics Department Working Paper* 15-4, 546-54.

Soskice, D., 1997. German technology policy, innovation, and national institutional frameworks. *Industry and Innovation* 4-1, 75-96.

Spulber, D. F., 1999. *Market Microstructure: Intermediaries and the Theory of the Firm* (Cambridge University Press).

Steinmo, S., 1989. *Political Institutions and Tax Policy in the United States, Sweden and Britain. World Politics* 41-4, 500-35.

Stigler, G. J., 1971. The Theory of Economic Regulation. *Bell Journal of Economics and Management Science* 2, 2-21.

Taagepera, R., Shugart, M. S., 1989. *Seats and Votes: The Effects and Determinants of Electoral Systems* (Yale University Press).

Tate, J., 2001. National Varieties of Standardization. in Hall, P. A., Soskice, D. (eds.) *Varieties of Capitalism* (Oxford University Press).

Thaler, R. H., 1989. Anormalies: Interindustry Wage Differentials. *The Journal of Economic Perspectives* 3-2, 181-93.

Thomsen, S., Pedersen, T., 2000. Ownership Structure and Economic Performance in the Largest European Companies. *Strategic Management Journal* 21-6, 689-705.

Thomson Financial. Worldscope Data.

Tiberghien, Y., 2007. *Entrepreneurial States: Reforming Corporate Governance in France, Japan, and Korea* (Cornell University Press).

Tirole, J., 2006. *The Theory of Corporate Finance* (Princeton University Press).

United Nation Industrial Development Organization, 2006. UNIDO INDSTAT REV. 2. UNIDO.

Vives, X., 1999. *Oligopoly Pricing: Old Ideas and New Tools* (The MIT Press).

Whitley, R., 2007. *Business Systems and Organizational Capabilities: The Institutional Structuring of Competitive Competences* (Oxford University Press).

Williamson, O. E., 1985. *The Economic Institutions of Capitalism* (The Free Press).

Williamson, O. E., 1988. Corporate Finance and Corporate Governance. *Journal of Finance* 43, 567-91.

Wooldridge, J., 2002. *Economic Analysis of Cross Sectional and Panel Data* (The MIT Press).

Wright, P., Ferris, S. P., Sarin, A., Awashi, V. 1996. Impact of Corporate Insider, Blockholder, and Institutional Equity Ownership on Firm Risk Taking. *The Academy of Management Journal* 39-2, 441-63.

Zbaracki, Mark J., Ritson, M., Levy, D., Dutta, S., Bergen, M., 2004. The Managerial and Customer Costs of Price Adjustment: Direct Evidence from Industrial Markets. *The Review of Economics and Statistics* 86-2, 514–33.

Appendix 1. Quantity Competition under Blockholder Type Corporate Governance

1. Basic Setup

Suppose Two Firms compete each other $i, j \in \{1, 2\}$ $(i \neq j)$
Demands for each firm are given by

$$q_i = a_i - b_i p_i + z_i p_j,$$

where q_i, p_i, and z_i refer to quantities, prices and $0 < |z| < 1$ for stability of the demand systems.

Suppose the following inverse-demand systems,

$$p_i = \alpha_i - \beta_i q_i - \gamma_i q_j$$

In Mathematica (**bold** and plain fonts indicate input and output lines, respectively)

```
pone[q1_, q2_] = α1 - β1 q1 - γ1 q2
ptwo[q1_, q2_] = α2 - β2 q2 - γ2 q1
qone[p1_, p2_] = a1 - b1 p1 + z1 p2
qtwo[p1_, p2_] = a2 - b2 p2 + z2 p1

Simplify[Solve[{pone[q1,q2]==p1, ptwo[q1,q2]==p2}, {q1,q2}]]
```

$$\left\{\left\{q1 \to \frac{p1\,\beta2 - \alpha1\,\beta2 - p2\,\gamma1 + \alpha2\,\gamma1}{-\beta1\,\beta2 + \gamma1\,\gamma2},\ q2 \to \frac{p2\,\beta1 - \alpha2\,\beta1 - p1\,\gamma2 + \alpha1\,\gamma2}{-\beta1\,\beta2 + \gamma1\,\gamma2}\right\}\right\}$$

Rearrange the solutions to p_1 and p_2, then

$$a_i = \frac{\alpha_i\beta_j - \alpha_j\gamma_i}{\beta_i\beta_j - \gamma_i\gamma_j},\ b_i = \frac{\beta_j}{\beta_i\beta_j - \gamma_i\gamma_j} \text{ and } z_i = \frac{\gamma_i}{\beta_i\beta_j - \gamma_i\gamma_j}. \tag{A1}$$

We assume that $a_i > c_i \geq 0$ (c is constant marginal cost), $\alpha_i\beta_j - \alpha_j\gamma_i > 0$, $\beta_i > 0$, $0 < |\gamma| < 1$, and $\beta_i\beta_j - \gamma_i\gamma_j > 0$.

Quantity Competition in Blockholder Type Corporate Governance (non-delegation)

Now, we solve for the equilibrium quantity by taking the first derivative of firm *i*'s profit π_i.

$$\pi_i = (p_i - c_i) q_i(p_i, p_j)$$

```
Simplify
  [Solve[
         {D[(pone[q1, q2]-c1) q1, q1] == 0,
          D[(ptwo[q1, q2]- c2) q2, q2] == 0}, {q1, q2}
         ]
   ]
```

$$\left\{\left\{q1 \to \frac{2\,c1\,\beta2 - 2\,\alpha1\,\beta2 - c2\,\gamma1 + \alpha2\,\gamma1}{-4\,\beta1\,\beta2 + \gamma1\,\gamma2},\ q2 \to \frac{2\,c2\,\beta1 - 2\,\alpha2\,\beta1 - c1\,\gamma2 + \alpha1\,\gamma2}{-4\,\beta1\,\beta2 + \gamma1\,\gamma2}\right\}\right\}$$

The equilibrium quantity is rearranged in the following form,

$$\frac{2(\alpha_i - c_i)\beta_j - (\alpha_j - c_j)\gamma_i}{4\beta_i\beta_j - \gamma_i\gamma_j} = \bar{q}_i^{qblock}.$$

To get the equilibrium price, plug the equilibrium quantity into the inverse demand function.

```
Simplify[{pone[q1, q2], ptwo[q1, q2]}] /.
  {q1 → (2 c1 β2 - 2 α1 β2 - c2 γ1 + α2 γ1)/(-4 β1 β2 + γ1 γ2), q2 → (2 c2 β1 - 2 α2 β1 - c1 γ2 + α1 γ2)/(-4 β1 β2 + γ1 γ2)}

Together[%]

(* rename the equilibrium outcomes for later usage*)
```

$$\left\{\frac{2\,c1\,\beta1\,\beta2 + 2\,\alpha1\,\beta1\,\beta2 + c2\,\beta1\,\gamma1 - \alpha2\,\beta1\,\gamma1 - c1\,\gamma1\,\gamma2}{4\,\beta1\,\beta2 - \gamma1\,\gamma2},\ \frac{2\,c2\,\beta1\,\beta2 + 2\,\alpha2\,\beta1\,\beta2 + c1\,\beta2\,\gamma2 - \alpha1\,\beta2\,\gamma2 - c2\,\gamma1\,\gamma2}{4\,\beta1\,\beta2 - \gamma1\,\gamma2}\right\}$$

$$\left\{p1ndeq = \frac{2\,c1\,\beta1\,\beta2 + 2\,\alpha1\,\beta1\,\beta2 + c2\,\beta1\,\gamma1 - \alpha2\,\beta1\,\gamma1 - c1\,\gamma1\,\gamma2}{4\,\beta1\,\beta2 - \gamma1\,\gamma2},\ p2ndeq = \frac{2\,c2\,\beta1\,\beta2 + 2\,\alpha2\,\beta1\,\beta2 + c1\,\beta2\,\gamma2 - \alpha1\,\beta2\,\gamma2 - c2\,\gamma1\,\gamma2}{4\,\beta1\,\beta2 - \gamma1\,\gamma2}\right\}$$

$$\left\{q1ndeq = \frac{2\,c1\,\beta2 - 2\,\alpha1\,\beta2 - c2\,\gamma1 + \alpha2\,\gamma1}{-4\,\beta1\,\beta2 + \gamma1\,\gamma2},\ q2ndeq = \frac{2\,c2\,\beta1 - 2\,\alpha2\,\beta1 - c1\,\gamma2 + \alpha1\,\gamma2}{-4\,\beta1\,\beta2 + \gamma1\,\gamma2}\right\}$$

The equilibrium price is rearranged in the following form,

$$\frac{2(\alpha_i + c_i)\beta_i\beta_j - (\alpha_j - c_j)\beta_i\gamma_i - c_i\gamma_i\gamma_j}{4\beta_i\beta_j - \gamma_i\gamma_j} = \overline{p}_i^{qblock}.$$

(Sufficient Conditions)

The equilibrium outcomes should fulfill two conditions;

$$\overline{p}_i^{qblock} - c_i > 0, \qquad \overline{q}_i^{qblock} > 0$$

```
Simplify[p1ndeq - c1]

β1 (-2 c1 β2 + 2 α1 β2 + (c2 - α2) γ1)
-------------------------------------
              4 β1 β2 - γ1 γ2
```

Since the denominator is positive, the numerator should be positive.
Rearrange the numerator such that

$$\begin{aligned} & -2c_1\beta_1\beta_2 + 2\alpha_1\beta_1\beta_2 - 2\alpha_2\beta_1\gamma_1 + c_2\beta_1\gamma_1 + \alpha_2\beta_1\gamma_1 \\ = \; & 2\beta_1((\alpha_1 - c_1)\beta_1 - \alpha_2\gamma_1) + (\alpha_2 + c_2)\beta_1\gamma_1 \end{aligned} .$$

Since $(\alpha_2 + c_2)\beta_1\gamma_1$ is positive, it is enough to find a condition such that $(\alpha_1 - c_1)\beta_1 - \alpha_2\gamma_1 \geq 0$.

$$\alpha_i - c_i \geq \frac{\alpha_j\gamma_i}{\beta_j} \quad \text{or} \quad c_i \leq \frac{\alpha_j\gamma_i - \alpha_i\gamma_j}{\beta_j} .$$

Appendix 2. Price Competition under Shareholder Type Corporate Governance

The time line of this oligopolistic competition game with delegation is that the manager sets prices at the second stage and the owner chooses a managerial incentive scheme to maximize her profit at the first stage. Sub-game perfect equilibrium is the solution concept for this two-stage sequential game model.

In addition to the basic setup for the demand system in Appendix 1, manager i's objective function, m_i, and firm i's profit, π_i are given by

$$m_i = (p_i - c_i)q_i(p_i, p_j) + \theta_i(p_j - c_j)q_j(p_i, p_j)$$

$$\pi_i = (p_i(\theta_i, \theta_j) - c_i)q_i(p_i(\theta_i, \theta_j), p(\theta_i, \theta_j)).$$

To get the equilibrium price at the second stage, set the first derivative of manager i's objective function with respect to p_i and p_j

In Mathematica (owner's weight (θ) is coded with y)

```
FullSimplify[
   Solve[{D[(p1-c1) qone[p1,p2] + y1 (p2-p1) qtwo[p1,p2], p1] == 0,
          D[(p2-c2) qtwo[p1,p2] + y2 (p1-p2) qone[p1,p2], p2] == 0},
          {p1, p2} ]
            ]
```

$$\left\{\left\{p1 \to \frac{2\,a1\,b2 + 2\,b1\,b2\,c1 + z1\,(a2 + b2\,c2 - c1\,y2\,z1) + y1\,(a2 - b2\,c2 - c1\,y2\,z1)\,z2}{4\,b1\,b2 - (y2\,z1 + z2)\,(z1 + y1\,z2)},\right.\right.$$
$$\left.\left.p2 \to \frac{2\,a2\,b1 + b1\,(2\,b2\,c2 - c1\,y2\,z1 + c1\,z2) + (y2\,z1 + z2)\,(a1 - c2\,y1\,z2)}{4\,b1\,b2 - (y2\,z1 + z2)\,(z1 + y1\,z2)}\right\}\right\}$$

Now we get the equilibrium price at the second stage in a function of owners' weight in the managers' objective function.

$$\bar{p}_i^{2nd}(\theta_i, \theta_j) = \frac{2a_ib_j + 2b_ib_jc_i + z_i(a_i + b_jc_j - \theta_jc_iz_i) + \theta_i(a_j - b_jc_j - \theta_jc_iz_i)z_j}{4b_ib_j - (\theta_jz_i + z_j)(z_i + \theta_iz_j)} \qquad \text{(A2)}$$

Rename $\bar{p}_i^{2nd}$ in Mathematica for later usage.

```
{eqp1at2 = (2 a1 b2 + 2 b1 b2 c1 + z1 (a2 + b2 c2 - c1 y2 z1) + y1 (a2 - b2 c2 - c1 y2 z1) z2)/
           (4 b1 b2 - (y2 z1 + z2) (z1 + y1 z2)),
 eqp2at2 = (2 a2 b1 + b1 (2 b2 c2 - c1 y2 z1 + c1 z2) + (y2 z1 + z2) (a1 - c2 y1 z2))/
           (4 b1 b2 - (y2 z1 + z2) (z1 + y1 z2))}
```

Find owner i's weight, θ_i, to maximize π_i.

```
FullSimplify[
        Solve[{D[eqp1at2-c1) qone[eqp1at2, eqp2at2], y1]==0,
               D[eqp2at2-c2) qtwo[eqp1at2, eqp2at2], y2]==0},
               {y1,y2}]]
```

$$\left\{\left\{y1 \to \frac{z1\,(a1\,b2 - b1\,b2\,c1 + z1\,(a2 + c1\,z2))}{2\,b1\,b2\,(a2 - b2\,c2) + (-a2\,z1 + b2\,(a1 + b1\,c1 + 2\,c2\,z1))\,z2 - c1\,z1\,z2^2},\right.\right.$$
$$\left.\left. y2 \to \frac{z2\,(a2\,b1 - b1\,b2\,c2 + (a1 + c2\,z1)\,z2)}{b1\,(2\,a1\,b2 - 2\,b1\,b2\,c1 + (a2 + b2\,c2)\,z1) - z1\,(a1 - 2\,b1\,c1 + c2\,z1)\,z2}\right\}\right\}$$

Now we can get the equilibrium price by plugging the equilibrium $\bar{\theta}$ into (A2)

```
FullSimplify[{eqp1at2, eqp2at2}] /.
```

$$\left\{y1 \to \frac{z1\,(a1\,b2 - b1\,b2\,c1 + z1\,(a2 + c1\,z2))}{2\,b1\,b2\,(a2 - b2\,c2) + (-a2\,z1 + b2\,(a1 + b1\,c1 + 2\,c2\,z1))\,z2 - c1\,z1\,z2^2},\right.$$
$$\left. y2 \to \frac{z2\,(a2\,b1 - b1\,b2\,c2 + (a1 + c2\,z1)\,z2)}{b1\,(2\,a1\,b2 - 2\,b1\,b2\,c1 + (a2 + b2\,c2)\,z1) - z1\,(a1 - 2\,b1\,c1 + c2\,z1)\,z2}\right\}$$

$$\left\{\left\{2\,a1\,b2 + 2\,b1\,b2\,c1 + \left(z1\,z2\,(a1\,b2 - b1\,b2\,c1 + z1\,(a2 + c1\,z2))\left(a2 - b2\,c2 - \frac{c1\,z1\,z2\,(a2\,b1 - b1\,b2\,c2 + (a1 + c2\,z1)\,z2)}{b1\,(2\,a1\,b2 - 2\,b1\,b2\,c1 + (a2 + b2\,c2)\,z1) - z1\,(a1 - 2\,b1\,c1 + c2\,z1)\,z2}\right)\right)\Big/\right.\right.$$
$$(2\,b1\,b2\,(a2 - b2\,c2) + (-a2\,z1 + b2\,(a1 + b1\,c1 + 2\,c2\,z1))\,z2 - c1\,z1\,z2^2) + z1\left(a2 + b2\,c2 - \frac{c1\,z1\,z2\,(a2\,b1 - b1\,b2\,c2 + (a1 + c2\,z1)\,z2)}{b1\,(2\,a1\,b2 - 2\,b1\,b2\,c1 + (a2 + b2\,c2)\,z1) - z1\,(a1 - 2\,b1\,c1 + c2\,z1)\,z2}\right)\Big)\Big/$$
$$\left(4\,b1\,b2 - \left(z2 + \frac{z1\,z2\,(a2\,b1 - b1\,b2\,c2 + (a1 + c2\,z1)\,z2)}{b1\,(2\,a1\,b2 - 2\,b1\,b2\,c1 + (a2 + b2\,c2)\,z1) - z1\,(a1 - 2\,b1\,c1 + c2\,z1)\,z2}\right)\right.$$
$$\left.\left(z1 + \frac{z1\,z2\,(a1\,b2 - b1\,b2\,c1 + z1\,(a2 + c1\,z2))}{2\,b1\,b2\,(a2 - b2\,c2) + (-a2\,z1 + b2\,(a1 + b1\,c1 + 2\,c2\,z1))\,z2 - c1\,z1\,z2^2}\right)\right),$$
$$\left(2\,a2\,b1 + b1\left(2\,b2\,c2 + c1\,z2 - \frac{c1\,z1\,z2\,(a2\,b1 - b1\,b2\,c2 + (a1 + c2\,z1)\,z2)}{b1\,(2\,a1\,b2 - 2\,b1\,b2\,c1 + (a2 + b2\,c2)\,z1) - z1\,(a1 - 2\,b1\,c1 + c2\,z1)\,z2}\right) + \right.$$
$$\left(z2 + \frac{z1\,z2\,(a2\,b1 - b1\,b2\,c2 + (a1 + c2\,z1)\,z2)}{b1\,(2\,a1\,b2 - 2\,b1\,b2\,c1 + (a2 + b2\,c2)\,z1) - z1\,(a1 - 2\,b1\,c1 + c2\,z1)\,z2}\right)$$
$$\left(a1 - \frac{c2\,z1\,z2\,(a1\,b2 - b1\,b2\,c1 + z1\,(a2 + c1\,z2))}{2\,b1\,b2\,(a2 - b2\,c2) + (-a2\,z1 + b2\,(a1 + b1\,c1 + 2\,c2\,z1))\,z2 - c1\,z1\,z2^2}\right)\Big)\Big/$$
$$\left(4\,b1\,b2 - \left(z2 + \frac{z1\,z2\,(a2\,b1 - b1\,b2\,c2 + (a1 + c2\,z1)\,z2)}{b1\,(2\,a1\,b2 - 2\,b1\,b2\,c1 + (a2 + b2\,c2)\,z1) - z1\,(a1 - 2\,b1\,c1 + c2\,z1)\,z2}\right)\right.$$
$$\left.\left.\left(z1 + \frac{z1\,z2\,(a1\,b2 - b1\,b2\,c1 + z1\,(a2 + c1\,z2))}{2\,b1\,b2\,(a2 - b2\,c2) + (-a2\,z1 + b2\,(a1 + b1\,c1 + 2\,c2\,z1))\,z2 - c1\,z1\,z2^2}\right)\right)\right\}$$

```
(* To put terms in a sum over a common denominator and cancel
factors in the result*)

Together [%]
```

$$\left\{\frac{2\,a1\,b1\,b2 + 2\,b1^2\,b2\,c1 + a2\,b1\,z1 + b1\,b2\,c2\,z1 - a1\,z1\,z2 - 2\,b1\,c1\,z1\,z2 - c2\,z1^2\,z2}{4\,b1\,(b1\,b2 - z1\,z2)},\right.$$
$$\left.\frac{2\,a2\,b1\,b2 + 2\,b1\,b2^2\,c2 + a1\,b2\,z2 + b1\,b2\,c1\,z2 - a2\,z1\,z2 - 2\,b2\,c2\,z1\,z2 - c1\,z1\,z2^2}{4\,b2\,(b1\,b2 - z1\,z2)}\right\}$$

```
(* Rename this equilibrium price at the first stage*)
```

$$\left\{eqpone = \frac{2\,a1\,b1\,b2 + 2\,b1^2\,b2\,c1 + a2\,b1\,z1 + b1\,b2\,c2\,z1 - a1\,z1\,z2 - 2\,b1\,c1\,z1\,z2 - c2\,z1^2\,z2}{4\,b1\,(b1\,b2 - z1\,z2)},\right.$$
$$\left. eqptwo = \frac{2\,a2\,b1\,b2 + 2\,b1\,b2^2\,c2 + a1\,b2\,z2 + b1\,b2\,c1\,z2 - a2\,z1\,z2 - 2\,b2\,c2\,z1\,z2 - c1\,z1\,z2^2}{4\,b2\,(b1\,b2 - z1\,z2)}\right\}$$

For comparability, convert **eqpone** and **eqptwo** in Greek using (A1).

```
FullSimplify[{eqpone, eqptwon}] /.
{a1 → (α1 β2 - α2 γ1) / (β1 β2 - γ1 γ2), b1 → β2 / (β1 β2 - γ1 γ2), z1 → γ1 / (β1 β2 - γ1 γ2),
 a2 -> (α2 β1 - α1 γ2) / (β1 β2 - γ1 γ2), b2 → β1 / (β1 β2 - γ1 γ2), z2 → γ2 / (β1 β2 - γ1 γ2)}
```

$$\left\{\frac{1}{4}\left(2\,c1+\frac{\frac{\beta1\,(\alpha1\,\beta2-\alpha2\,\gamma1)}{(\beta1\,\beta2-\gamma1\,\gamma2)^2}+\frac{\gamma1\,(\alpha2\,\beta1-\alpha1\,\gamma2)}{(\beta1\,\beta2-\gamma1\,\gamma2)^2}}{\frac{\beta1\,\beta2}{(\beta1\,\beta2-\gamma1\,\gamma2)^2}-\frac{\gamma1\,\gamma2}{(\beta1\,\beta2-\gamma1\,\gamma2)^2}}+\frac{(\beta1\,\beta2-\gamma1\,\gamma2)\left(\frac{c2\,\gamma1}{\beta1\,\beta2-\gamma1\,\gamma2}+\frac{\alpha1\,\beta2-\alpha2\,\gamma1}{\beta1\,\beta2-\gamma1\,\gamma2}\right)}{\beta2}\right),\right.$$

$$\left(\left(\beta1\,\beta2-\gamma1\,\gamma2\right)\left(-\frac{c1\,\gamma1\,\gamma2^2}{(\beta1\,\beta2-\gamma1\,\gamma2)^3}+\frac{2\,\beta1\,\beta2\left(\frac{c2\,\beta1}{\beta1\,\beta2-\gamma1\,\gamma2}+\frac{\alpha2\,\beta1-\alpha1\,\gamma2}{\beta1\,\beta2-\gamma1\,\gamma2}\right)}{(\beta1\,\beta2-\gamma1\,\gamma2)^2}+\right.\right.$$

$$\left.\left.\frac{\gamma2\left(\frac{c1\,\beta1\,\beta2}{(\beta1\,\beta2-\gamma1\,\gamma2)^2}+\frac{\beta1\,(\alpha1\,\beta2-\alpha2\,\gamma1)}{(\beta1\,\beta2-\gamma1\,\gamma2)^2}-\frac{\gamma1\left(\frac{2\,c2\,\beta1}{\beta1\,\beta2-\gamma1\,\gamma2}+\frac{\alpha2\,\beta1-\alpha1\,\gamma2}{\beta1\,\beta2-\gamma1\,\gamma2}\right)}{\beta1\,\beta2-\gamma1\,\gamma2}\right)}{\beta1\,\beta2-\gamma1\,\gamma2}\right)\right)\Big/$$

$$\left.\left(4\,\beta1\left(\frac{\beta1\,\beta2}{(\beta1\,\beta2-\gamma1\,\gamma2)^2}-\frac{\gamma1\,\gamma2}{(\beta1\,\beta2-\gamma1\,\gamma2)^2}\right)\right)\right\}$$

```
Together [%]
```

$$\left\{\frac{2\,c1\,\beta2+2\,\alpha1\,\beta2+c2\,\gamma1-\alpha2\,\gamma1}{4\,\beta2},\ \frac{2\,c2\,\beta1+2\,\alpha2\,\beta1+c1\,\gamma2-\alpha1\,\gamma2}{4\,\beta1}\right\}$$

```
(* Rename the equilibrium price*)
```

$$\left\{p1eq=\frac{2\,c1\,\beta2+2\,\alpha1\,\beta2+c2\,\gamma1-\alpha2\,\gamma1}{4\,\beta2},\ p2eq=\frac{2\,c2\,\beta1+2\,\alpha2\,\beta1+c1\,\gamma2-\alpha1\,\gamma2}{4\,\beta1}\right\}$$

We get the equilibrium price in price competition under shareholder corporate governance,

$$\frac{2c_i\beta_j+2\alpha_i\beta_j+c_j\gamma_i-\alpha_j\gamma_i}{4\beta_j}=\frac{2\beta_j(\alpha_i+c_i)-(\alpha_j-c_j)\gamma_i}{4\beta_j}=\overline{p}_i^{pshare}.$$

Next, to find the equilibrium quantity, plug **eqpone** and **eqptwo** into the demand system and convert the outcome in Greek.

```
{qone[eqpone, eqptwo], qtwo[eqpone, eqptwo]}/.
{a1 → (α1 β2 - α2 γ1) / (β1 β2 - γ1 γ2), b1 → β2 / (β1 β2 - γ1 γ2), z1 → γ1 / (β1 β2 - γ1 γ2),
 a2 -> (α2 β1 - α1 γ2) / (β1 β2 - γ1 γ2), b2 → β1 / (β1 β2 - γ1 γ2), z2 → γ2 / (β1 β2 - γ1 γ2)}
```

$$\left\{\frac{\alpha1\,\beta2-\alpha2\,\gamma1}{\beta1\,\beta2-\gamma1\,\gamma2}-\frac{\frac{2\,c1\,\beta1\,\beta2^2}{(\beta1\,\beta2-\gamma1\,\gamma2)^3}+\frac{c2\,\beta1\,\beta2\,\gamma1}{(\beta1\,\beta2-\gamma1\,\gamma2)^3}+\frac{2\,\beta1\,\beta2\,(\alpha1\,\beta2-\alpha2\,\gamma1)}{(\beta1\,\beta2-\gamma1\,\gamma2)^3}-\frac{2\,c1\,\beta2\,\gamma1\,\gamma2}{(\beta1\,\beta2-\gamma1\,\gamma2)^3}-\frac{c2\,\gamma1^2\,\gamma2}{(\beta1\,\beta2-\gamma1\,\gamma2)^3}-\frac{\gamma1\,(\alpha1\,\beta2-\alpha2\,\gamma1)\,\gamma2}{(\beta1\,\beta2-\gamma1\,\gamma2)^3}+\frac{\beta2\,\gamma1\,(\alpha2\,\beta1-\alpha1\,\gamma2)}{(\beta1\,\beta2-\gamma1\,\gamma2)^3}}{4\left(\frac{\beta1\,\beta2}{(\beta1\,\beta2-\gamma1\,\gamma2)^2}-\frac{\gamma1\,\gamma2}{(\beta1\,\beta2-\gamma1\,\gamma2)^2}\right)}+\left(\gamma1\left(\frac{2\,c2\,\beta1^2\,\beta2}{(\beta1\,\beta2-\gamma1\,\gamma2)^3}+\frac{c1\,\beta1\,\beta2\,\gamma2}{(\beta1\,\beta2-\gamma1\,\gamma2)^3}-\frac{2\,c2\,\beta1\,\gamma1\,\gamma2}{(\beta1\,\beta2-\gamma1\,\gamma2)^3}+\frac{\beta1\,(\alpha1\,\beta2-\alpha2\,\gamma1)\,\gamma2}{(\beta1\,\beta2-\gamma1\,\gamma2)^3}-\frac{c1\,\gamma1\,\gamma2^2}{(\beta1\,\beta2-\gamma1\,\gamma2)^3}+\frac{2\,\beta1\,\beta2\,(\alpha2\,\beta1-\alpha1\,\gamma2)}{(\beta1\,\beta2-\gamma1\,\gamma2)^3}-\frac{\gamma1\,\gamma2\,(\alpha2\,\beta1-\alpha1\,\gamma2)}{(\beta1\,\beta2-\gamma1\,\gamma2)^3}\right)\Big/\left(4\,\beta1\left(\frac{\beta1\,\beta2}{(\beta1\,\beta2-\gamma1\,\gamma2)^2}-\frac{\gamma1\,\gamma2}{(\beta1\,\beta2-\gamma1\,\gamma2)^2}\right)\right),\right.$$

$$\frac{\alpha2\,\beta1-\alpha1\,\gamma2}{\beta1\,\beta2-\gamma1\,\gamma2}+\left(\gamma2\left(\frac{2\,c1\,\beta1\,\beta2^2}{(\beta1\,\beta2-\gamma1\,\gamma2)^3}+\frac{c2\,\beta1\,\beta2\,\gamma1}{(\beta1\,\beta2-\gamma1\,\gamma2)^3}+\frac{2\,\beta1\,\beta2\,(\alpha1\,\beta2-\alpha2\,\gamma1)}{(\beta1\,\beta2-\gamma1\,\gamma2)^3}-\frac{2\,c1\,\beta2\,\gamma1\,\gamma2}{(\beta1\,\beta2-\gamma1\,\gamma2)^3}-\frac{c2\,\gamma1^2\,\gamma2}{(\beta1\,\beta2-\gamma1\,\gamma2)^3}-\frac{\gamma1\,(\alpha1\,\beta2-\alpha2\,\gamma1)\,\gamma2}{(\beta1\,\beta2-\gamma1\,\gamma2)^3}+\frac{\beta2\,\gamma1\,(\alpha2\,\beta1-\alpha1\,\gamma2)}{(\beta1\,\beta2-\gamma1\,\gamma2)^3}\right)\Big/\left(4\,\beta2\left(\frac{\beta1\,\beta2}{(\beta1\,\beta2-\gamma1\,\gamma2)^2}-\frac{\gamma1\,\gamma2}{(\beta1\,\beta2-\gamma1\,\gamma2)^2}\right)\right)-\right.$$

$$\left.\frac{\frac{2\,c2\,\beta1^2\,\beta2}{(\beta1\,\beta2-\gamma1\,\gamma2)^3}+\frac{c1\,\beta1\,\beta2\,\gamma2}{(\beta1\,\beta2-\gamma1\,\gamma2)^3}-\frac{2\,c2\,\beta1\,\gamma1\,\gamma2}{(\beta1\,\beta2-\gamma1\,\gamma2)^3}+\frac{\beta1\,(\alpha1\,\beta2-\alpha2\,\gamma1)\,\gamma2}{(\beta1\,\beta2-\gamma1\,\gamma2)^3}-\frac{c1\,\gamma1\,\gamma2^2}{(\beta1\,\beta2-\gamma1\,\gamma2)^3}+\frac{2\,\beta1\,\beta2\,(\alpha2\,\beta1-\alpha1\,\gamma2)}{(\beta1\,\beta2-\gamma1\,\gamma2)^3}-\frac{\gamma1\,\gamma2\,(\alpha2\,\beta1-\alpha1\,\gamma2)}{(\beta1\,\beta2-\gamma1\,\gamma2)^3}}{4\left(\frac{\beta1\,\beta2}{(\beta1\,\beta2-\gamma1\,\gamma2)^2}-\frac{\gamma1\,\gamma2}{(\beta1\,\beta2-\gamma1\,\gamma2)^2}\right)}\right\}$$

```
Together[%]
```

$$\left\{\frac{-2\,c1\,\beta1\,\beta2+2\,\alpha1\,\beta1\,\beta2+c2\,\beta1\,\gamma1-\alpha2\,\beta1\,\gamma1+c1\,\gamma1\,\gamma2-\alpha1\,\gamma1\,\gamma2}{4\,\beta1\,(\beta1\,\beta2-\gamma1\,\gamma2)},\right.$$

$$\left.\frac{-2\,c2\,\beta1\,\beta2+2\,\alpha2\,\beta1\,\beta2+c1\,\beta2\,\gamma2-\alpha1\,\beta2\,\gamma2+c2\,\gamma1\,\gamma2-\alpha2\,\gamma1\,\gamma2}{4\,\beta2\,(\beta1\,\beta2-\gamma1\,\gamma2)}\right\}$$

```
(* Rename the equilibrium quantity *)
```

$$\left\{q1eq=\frac{-2\,c1\,\beta1\,\beta2+2\,\alpha1\,\beta1\,\beta2+c2\,\beta1\,\gamma1-\alpha2\,\beta1\,\gamma1+c1\,\gamma1\,\gamma2-\alpha1\,\gamma1\,\gamma2}{4\,\beta1\,(\beta1\,\beta2-\gamma1\,\gamma2)},\right.$$

$$\left.q2eq=\frac{-2\,c2\,\beta1\,\beta2+2\,\alpha2\,\beta1\,\beta2+c1\,\beta2\,\gamma2-\alpha1\,\beta2\,\gamma2+c2\,\gamma1\,\gamma2-\alpha2\,\gamma1\,\gamma2}{4\,\beta2\,(\beta1\,\beta2-\gamma1\,\gamma2)}\right\}$$

Finally, we find the equilibrium quantity in price competition under shareholder type corporate governance.

$$\begin{aligned}
&\frac{-2c_i\beta_i\beta_j+2\alpha_i\beta_i\beta_j+c_j\beta_i\gamma_i-\alpha_j\beta_i\gamma_i+c_i\gamma_i\gamma_j-\alpha_i\gamma_i\gamma_j}{4\beta_i(\beta_i\beta_j-\gamma_i\gamma_j)}\\
&=\frac{(a_i-c_i)\beta_i\beta_j-(a_i-c_i)\gamma_i\gamma_j+(a_i-c_i)\beta_i\beta_j-(a_i-c_i)\beta_i\gamma_j}{4\beta_i(\beta_i\beta_j-\gamma_i\gamma_j)}\\
&=\frac{(\alpha_i-c_i)(\beta_i\beta_j-\gamma_i\gamma_j)+\beta_i(\beta_j(\alpha_i-c_i)-(\alpha_j-c_j)\gamma_i)}{4\beta_i(\beta_i\beta_j-\gamma_i\gamma_j)}=\bar{q}_i^{\,pshare}.
\end{aligned}$$

Appendix 3. Comparing Equilibriums

Equilibrium Prices

Now we compare two equilibrium outcomes, $\bar{p}_i^{pshare}$ and $\bar{p}_i^{qblock}$.

```
FullSimplify[p1ndeq - p1eq]
```

$$\frac{\gamma 1\ (-2\ c1\ \beta 2 + 2\ \alpha 1\ \beta 2 + (c2 - \alpha 2)\ \gamma 1)\ \gamma 2}{4\ \beta 2\ (4\ \beta 1\ \beta 2 - \gamma 1\ \gamma 2)}$$

$$\bar{p}_i^{qblock} - \bar{p}_i^{pshare} = \frac{\{2(\alpha_i - c_i)\beta_j - (\alpha_j - c_j)\gamma_i\}\gamma_i\gamma_j}{4\beta_j(4\beta_i\beta_j - \gamma_i\gamma_j)} > 0.$$

From Appendix 1, a sufficient condition for $\bar{p}_i^{qblock}$ is $\alpha_i - c_i \geq \frac{\alpha_j\gamma_i}{\beta_j}$, which means that the size of the market is sufficiently larger than the firm's unit cost. This condition transforms $\{2(\alpha_i - c_i)\beta_j - (\alpha_j - c_j)\gamma_i\}$ into $\alpha_j\gamma_j + c_j\gamma_i$ in the numerator. Since $\gamma_i\gamma_j$ is positive, the whole numerator turns out to be positive. Next, the restrictions, $\beta_i > 0$ and $\beta_i\beta_j - \gamma_i\gamma_j > 0$, render the denominator positive.

Equilibrium Quantity

Now we compare two equilibrium outcomes, $\bar{q}_i^{pshare}$ and $\bar{q}_i^{qblock}$.

```
FullSimplify[q1eq - q1ndeq]
```

$$\frac{\gamma 1\ \gamma 2\ (3\ (c2 - \alpha 2)\ \beta 1\ \gamma 1 - c1\ (2\ \beta 1\ \beta 2 + \gamma 1\ \gamma 2) + \alpha 1\ (2\ \beta 1\ \beta 2 + \gamma 1\ \gamma 2))}{4\ \beta 1\ (\beta 1\ \beta 2 - \gamma 1\ \gamma 2)\ (4\ \beta 1\ \beta 2 - \gamma 1\ \gamma 2)}$$

Since the denominator is positive by assumption (refer to (A1)), it is enough to check the numerator.

```
Numerator[%]
γ1 γ2 (3 (c2 - α2) β1 γ1 - c1 (2 β1 β2 + γ1 γ2) + α1 (2 β1 β2 + γ1 γ2))

Apart[%]
β1 γ1 (-2 c1 β2 + 2 α1 β2 + 3 c2 γ1 - 3 α2 γ1) γ2 - (c1 - α1) γ1^2 γ2^2

FullSimplify[%]
γ1 γ2 (3 (c2 - α2) β1 γ1 - c1 (2 β1 β2 + γ1 γ2) + α1 (2 β1 β2 + γ1 γ2))
```

Since $\gamma_i\gamma_j$ is positive, take out this term for simplicity and rearrange the remaining terms.

$$\begin{aligned} & 3(c_j-\alpha_j)\beta_i\gamma_i - c_i(2\beta_i\beta_j+\gamma_i\gamma_j)+\alpha_i(2\beta_i\beta_j-\gamma_i\gamma_j) \\ = & -2c_i\beta_i\beta_j+2\alpha_i\beta_i\beta_j+3c_j\beta_i\gamma_i-3\alpha_j\beta_i\gamma_i-c_i\gamma_i\gamma_j+\alpha_i\gamma_i\gamma_j \\ = & 2(\alpha_i-c_i)\beta_i\beta_j-3(\alpha_j-c_j)\beta_i\gamma_i+(\alpha_i-c_i)\gamma_i\gamma_j \end{aligned}$$

Suppose $(\alpha_i-c_i)\beta_i\beta_j-3(\alpha_j-c_j)\beta_i\gamma_i+(\alpha_i-c_i)\gamma_i\gamma_j>0$, which means $\bar{q}_i^{pshare}>\bar{q}_i^{qblock}$.

$$\begin{aligned} & (\alpha_i-c_i)(2\beta_i\beta_j+\gamma_i\gamma_j)-3(\alpha_j-c_j)\beta_i\gamma_i>0 \\ \Leftrightarrow \quad & (\alpha_i-c_i)>\frac{3(\alpha_j-c_j)\beta_i\gamma_i}{(2\beta_i\beta_j+\gamma_i\gamma_j)}, \end{aligned}$$

whether this inequality holds depends on γ_i.

That is, if $\gamma_i<0$, it is true ($\bar{q}_i^{pshare}>\bar{q}_i^{qblock}$). If γ_i is positive and sufficient large, it will not hold.

Appendix 4. An Illustration: Comparing manager's incentive between Price vs. Quantity Competitions under Shareholder Type of Corporate Governance

Price Competition

Suppose a simplified demand system,

$$q_i = 1 - p_i + zp_j. \tag{A4-1}$$

The inverse demand systems are expressed as follows:

$$p_i = \frac{1+z}{1-z^2} - \frac{1}{1-z^2} q_i + \frac{-z}{1-z^2} q_j. \tag{A4-2}$$

Now we have manager i's objective function when they compete each other by setting price,

$$m_i^p = (1 - p_i + zp_j)p_i + \theta_i^p(1 - p_j + zp_i)p_j. \tag{A4-3}$$

Differentiating this objection function w.r.t. p_i and setting the result equal to zero, we find p_i as a function of p_j, which is a manager i's reaction function.

$$p_i(p_j) = \frac{(1 + z(1+\theta_i^p)p_j)}{2}. \tag{A4-4}$$

Solving system of the equations above implies the equilibrium prices at the second stage:

$$\overline{p}_i^{2nd} = \frac{(2 + z + \theta_i^p z)}{4 - (1+\theta_i^p)(1+\theta_j^p)z^2}. \tag{A4-5}$$

Let $\pi_i = (1 - p_i + zp)p_i$ be the profit earned by Firm i. Find Firm i's profit function at the equilibrium price as a function of owners' weights (θs).

$$\pi_i(\theta_i^p, \theta_j^p) = \frac{(2 + z + \theta_j^p z)(2 + z - z\theta_i^p(1 + z + z\theta_j^p)}{(4 - (1+\theta_i^p)(1+\theta_j^p)z^2)^2}. \tag{A4-6}$$

To get the equilibrium owner's weight, let me differentiate π_i w.r.t, θ_i and set the result equal to zero and solving for θ_i. Now we get owner i's reaction function.

$$\theta_i^p(\theta_j^p) = \frac{(1+\theta_j^p)(z+2)z}{4+2z-(z+\theta_j^p z-2\theta_j^p)z}. \quad \text{(A4-7)}$$

The equilibrium owner's weight that fulfills the firms' second-order condition is as follows:

$$\bar{\theta}_i^p = \frac{z}{2-z}. \quad \text{(A4-8)}$$

We find the equilibrium price $\bar{p}^p$ by plugging $\bar{\theta}^p$ in $\bar{p}^{2nd}$ and the equilibrium quantity by plugging $\bar{p}^p$ into the demand function. The results are as follows

$$\bar{p}_i^q = \frac{2-z}{4(1-z)}, \quad \bar{q}_i^q = \frac{2+z}{4}. \quad \text{(A4-9)}$$

Quantity Competition

In the case of quantity competition, manager i's objective function is given by

$$m_i^q = q_i\left(\frac{1+z}{1-z^2} - \frac{1}{1-z^2}q_i + \frac{-z}{1-z^2}q_j\right) + \theta_i^q q_j\left(\frac{1+z}{1-z^2} - \frac{1}{1-z^2}q_j + \frac{-z}{1-z^2}q_i\right). \quad \text{(A4-10)}$$

Differentiating this objection function w.r.t. q_i and setting the result equal to zero, we find q_i as a function of q_j, which is a manager i's reaction function.

$$q_i(q_j) = \frac{1+z-z(1+\theta_i^q)q_j}{2}. \quad \text{(A4-11)}$$

Solving the system of the equations above implies the equilibrium quantities at the second stage:

$$\bar{q}_i^{2nd} = \frac{(1+z)(2-z-\theta_i^q z)}{4-(1+\theta_i^q)(1+\theta_j^q)z^2}. \quad \text{(A4-12)}$$

Let $\pi_i = q_i\left(\frac{1+z}{1-z^2} - \frac{1}{1-z^2}q_i + \frac{-z}{1-z^2}q_j\right)$ be the profit earned by Firm i. Find Firm i's profit function at the equilibrium quantity as a function of owners' weights (θs).

$$\pi_i(\theta_i^q, \theta_j^q) = \frac{(1+z)(2-z-\theta_i^q z)(2+z(1+\theta_i^q(1-z-\theta_j^q z)))}{(1-z)(-4+(1+\theta_i^q)(1+\theta_j^q)z^2)^2}. \quad \text{(A4-13)}$$

To get the equilibrium owner's weight, let me differentiate π_i w.r.t, θ_i and set the result equal to zero and solving for θ_i. Now we get owner i's reaction function.

$$\theta_i^q(\theta_j^q) = \frac{(1+\theta_j^q)(z-2)z}{4-(1+\theta_j^q)(2+z)z}. \tag{A4-14}$$

The equilibrium owner's weight that fulfills the firms' second-order condition is as follows:

$$\bar{\theta}_i^q = \frac{-z}{z+2}. \tag{A4-15}$$

We find the equilibrium quantity $\bar{q}^q$ by plugging $\bar{\theta}^q$ in $\bar{q}^{2nd}$ and the equilibrium price by plugging $\bar{q}^q$ into the inverse demand function. The results are as follows

$$\bar{q}_i^q = \frac{2+z}{4}, \quad \bar{p}_i^q = \frac{2-z}{4(1-z)}. \tag{A4-16}$$