

COMPETING CAPITALISMS: CAPITAL INVESTMENT IN AMERICAN, GERMAN, AND JAPANESE FIRMS

L. G. THOMAS III¹ and GEOFFREY WARING^{2*}

¹Goizueta School of Business, Emory University, Atlanta, Georgia, U.S.A.

²Australian Graduate School of Management, Sydney, Australia

This study explains one way the home country institutional environment causes strategy differences across firms from different countries. It contrasts the investment conduct of American, German, and Japanese firms in the 10 largest manufacturing industries. We find profound national differences among these firms that are stable across industries. These differing conducts are tied to the institutional environments of the home market. The shareholder firms of the United States make investments primarily in response to expected investment returns, measured by Tobin's Q ratio. The coalitional firms of Germany and Japan make investments primarily in response to the availability of internal finance, measured by operating cash flow. Copyright © 1999 John Wiley & Sons, Ltd.

There is much evidence that firms from different countries tend to follow different strategies (Erramilli, 1996; Kogut and Singh, 1988; Nohria and Garcia-Pont, 1991), suggesting strong home country effects on strategy choice. However, we have little formal understanding of these home country effects; e.g., why have Japanese firms tended to favor market share over profits more than U.S. firms; why do German and Japanese firms invest more in physical capital as a share of GDP than U.S. firms (see Figure 1)?¹ These

differences also clash with the theory that firms should follow the single optimal strategy determined by the global industry environment (Porter, 1986; Yip, Loewe, and Yoshino, 1988). Several explanations for these country-based similarities in strategy have been posed,² but little empirical work has been done.

Key words: home country; investment; governance; international competitiveness

⁹ For an overview of the Japanese firm's institutions, see Aoki and Dore (1994). For references to Japanese capital relations, see Abegglen and Stalk (1985), Kaufman (1992) and Kester (1991). For references to the keiretsu structure, see Caves and Uekusa (1976), Gerlach (1992) and Kester (1991). For references to Japanese governments relations, see Badaracco (1985) and Johnson *et al.* (1989). The term 'alliance capitalism' is from Gerlach (1992).

¹ The data in Figure 1 include both government and private investments in physical capital, as opposed to the corporate investments that are alone examined here. We use the IMF data to launch our paper because they are the most widely referenced in current debates (see, for example, President's Commission, 1985) and also because they are based on value

added rather than sales and hence avoid double counting sales among corporations. We have also calculated the ratio of investment in physical capital to production (OECD, 1994) and gross physical investment to sales (Worldscope, 1994) at the industry and manufacturing sector level. These alternate data also show lower investment by the United States.

² Various explanations have been offered in the literature for national differences in investment, including macroeconomic policies that lead to a higher cost of capital in the United States (Hatsopolous and Brooks, 1986; Bernheim and Shoven, 1987; Kester and Luehrman, 1992), national management cultures that lead to excessive analytical detachment in the United States (Hayes and Abernathy, 1980), and failings in the design of capital markets that lead to excessive pressure on U.S. managers for short-term improvement in measurable financial ratios (Myers and Majluf, 1984; Stein, 1989; Jacobs, 1991; Porter, 1992). All of these explanations suggest that U.S. capitalism may be inferior to the capitalisms of our chief competitors. We offer a very different explanation based on the contrasting nature of the firm, and stress that these contrasts provide strengths as well as weaknesses for U.S. firms.

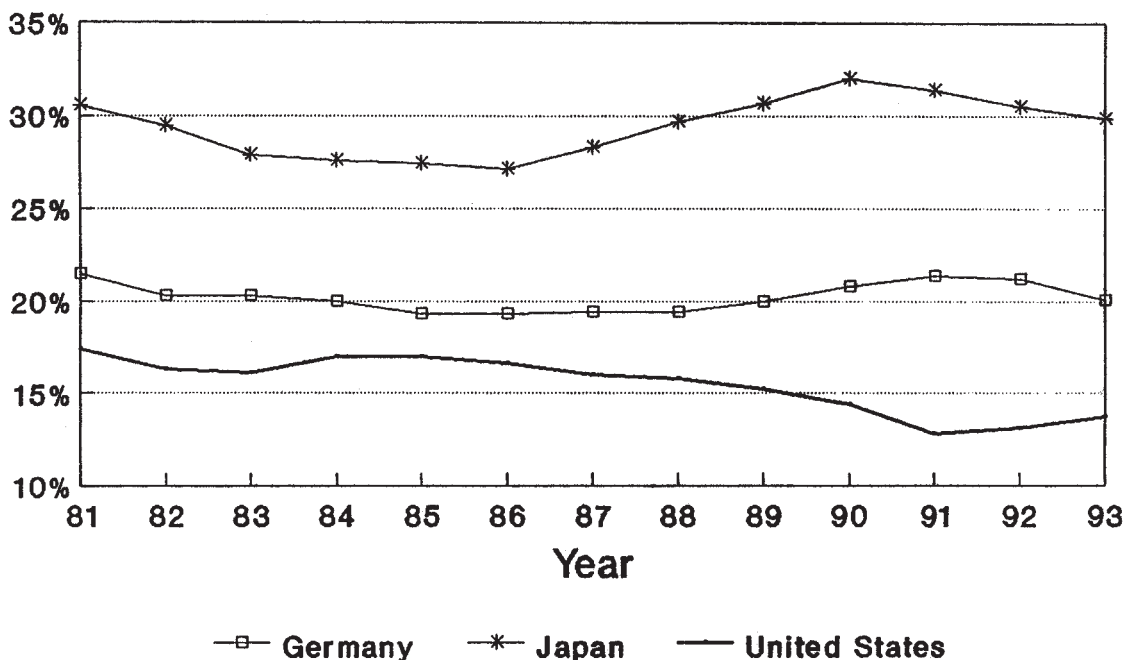


Figure 1. Investment in physical capital as share of GDP (Source: IMF, 1994)

Our contribution is to give one simple explanation for these similarities in strategy by home country and support it with rigorous empirical evidence. We formalize and test the hypothesis that differences in investment patterns across countries are due to a particular difference in national institutional systems—the way that various stakeholders are organized into firms. Our approach differs fundamentally from other explanations based on macroeconomics, culture, and financial systems and embodies an important and controversial assumption—that firms have distinct organizational identities derived from their domestic national environments. In other words, American firms behave systematically differently from German or Japanese firms, even though they compete in common global product markets. If these national differences exist, then there are actually multiple, competing forms of capitalism rather than a single form. Our study formalizes this argument into an *environment–conduct–performance* model and applies this model to Germany, Japan, and the United States. We trace the differences in the institutional environments of these three nations and tie these differences to corporate investment conduct.

Theoretically, we differentiate between the *shareholder firms* of the United States and the

coalitional firms of Germany and Japan, drawing from game-theoretic work by Aoki (1984, 1988). All firms face a common investment game, though the solutions to this game differ in each nation due to their divergent institutional environments. Empirically, we statistically examine investments in physical capital for the 10 largest industries of the manufacturing sector. These industries collectively account for 85 percent of manufacturing investment in physical capital in the three countries studied.³ Our empirical tests are patterned after earlier nation-specific work by Fazzari, Hubbard, and Peterson (1988) for the United States and by Hoshi, Kashyap, and Scharfstein (1991) for Japan.

We both theoretically predict and empirically find large, significant, and stable differences for the conduct of American vs. German vs. Japanese firms in these industries. American firms are far more responsive to capital market valuations of investment opportunities than German and Japanese firms. Conversely, German and Japanese firms make investments with greater responsiveness to available internal cash flows. Our findings

³ The 85 percent number used in the text is obtained by comparing investment in the 10 sample industries with all manufacturing investment for physical capital (OECD, 1994).

document the differences across national firms, rather than condemning one set of firms for 'underinvestment' or another set for 'overinvestment.' We argue in the conclusion that neither form of capitalism should be seen as superior, and that it is an empirical question whether country-specific advantages (CSAs) or the product market environment should drive strategy choice.

The paper is structured as follows. The next section presents the literature underlying the debate and the environment-conduct-performance model, while the following section outlines the differing institutions of capitalism in Germany, Japan, and the United States. Theories of investment in physical capital are outlined in the fourth section, and tied to the institutional differences across nations. Subsequent sections specify the empirical model, outline the data used, summarize the regression results, and offer our conclusions and directions for further research.

LITERATURE UNDERLYING THE DEBATE

The role of country factors in strategy came to prominence with Porter (1990), arguing the home country's environment (which determines the pressure to continually innovate) is the main cause of international competitive advantage. Nelson (1993) and Soskice (1997) identified elements of countries' national innovation systems that assisted this process. Kogut (1991, 1993) built on this by recognizing that the difference in diffusion of knowledge within and across borders would maintain the innovation's advantage. Our view differs from these early perspectives on the role of home country by treating investment (rather than innovation) as the source of CSAs.

More recent perspectives give greater emphasis to government policy and cultural cognitive differences accounting for differences in strategy across countries. Murtha and Lenway (1994) argue that differences in government policy approaches create the CSAs, which require appropriate MNC strategies to align with them. Rather than the rationalist approach of earlier studies, Hitt *et al.* (1997) show that managers' home country orientation creates different decision criteria weightings, so while the economically optimal strategy may not differ, the choice made by executives across countries will differ.

Most studies on the role of country in strategy emphasize the role of the home country. Rugman and Verbeke (1992) distinguished between location-bound firm-specific advantages (FSAs) and CSAs (common to all firms from that country) and suggested firms could leverage CSAs from the host country as well as the home country. Our article argues it is the governance system that creates the CSA, so merely selling or operating in the host country is not enough to access the CSA.

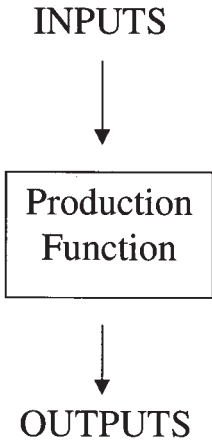
There is a long history of writers who have looked at the effect of different governance systems across countries. Aoki (1984, 1988) uses cooperative game theory to argue the benefits of Japanese capitalism. Fitzroy and Kraft (1986, 1987) find that profit sharing with labor leads to higher productivity and profitability in Germany. Kaplan (1994) finds that Japanese top executives' employment and compensation are positively tied to performance to a similar degree as U.S. executives. Gorton and Schmid (1996) find that German banks' large shareholdings have at times created a conflict of interest with other shareholders. The importance of different governance systems for influencing performance is supported by Lee (1997), who shows that lay-offs lead to different stock price reactions between Japan and the United States. However, none of these have considered the relationship between governance systems and investment or strategy.

Underlying the issue of home country effects on strategy choice is an unanswered debate over the theory of the firm, and whether product markets or institutions determine optimal strategy. The neoclassical economics view underlying the idea that the global industry environment determines the optimal strategy is the idea that product market competition ensures only the most efficient firm strategies will survive, so firms from all countries can be treated as a homogeneous production function (see Figure 2). The implication is that there is only one efficient firm strategy determined by the environment.

This view contrasts with the newer view where the firm is regarded as a collection of resources/skills embedded in a network of implicit contracts with other agents (also depicted in Figure 2).⁴ The resources/skills of the firm are

⁴For studies that view the firm as a collection of resources/skills, see Barney (1991), Rumelt (1984), and Wer-

**A. Neoclassical
Economics:
Black Box**



**B. Organizational
Economics: Capabilities
in a Network**

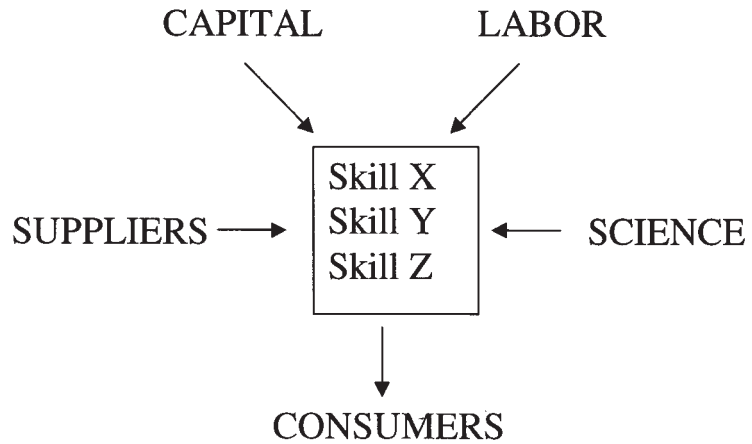


Figure 2. Investment conduct depends on the theory of the firm

accumulated in the process of interactions with agents in the network, and this network of relations is precisely the domestic institutional environment.

An important difference in the predictions of these two views is whether firms have distinct national identities. The latter view predicts that firms based in different countries will choose different strategies, even in the same globalized industry. We formalize this flow of logic as the *environment–conduct–performance* model, presented simply in Figure 3. We argue that corporate resources/skills and internal organizations are formed over time in specific institutional environments and are costly to change. These internal attributes will be costly to imitate, creating durable competitive advantages or disadvantages. Further, because resources are accumulated in specific competitive environments, imitation of needed resources may mean reshaping not only the firm itself but also other important actors in the environment. The complexity of this

task will further impede imitation. As a result, firms will possess resources that match the distinctive institutional environments of their own nation. The strategies followed by firms will be significantly enabled and constrained by this collection of resources. Thus in their strategic conduct firms will display distinct national identities, leading to distinctive performances in the global economy. The downward, solid arrows in Figure 3 trace the flow of this organizational reasoning.

INSTITUTIONAL ENVIRONMENTS OF AMERICA, JAPAN, AND GERMANY

This paper will examine the empirical merits of the organizational approach to the firm. As a first step, we review the institutional environments of America, Germany, and Japan, demonstrating the differences among them.^{5,6} Some illustrative sta-

nerfelt (1984). For studies that present the firm as a network of relations with other local transactors, see Chandler (1990), Freeman (1987), Jensen and Meckling (1976), Kogut (1993), Milgrom and Roberts (1992), Porter (1990), Williamson (1985).

⁵ Our study examines Germany, Japan, and the United States. We do not presume that these three nations exhaust the possibilities for organization of national systems of capitalism. The institutional environments of other nations, such as France or northern Italy or Taiwan, may in fact be quite different from those we study here.

⁶ The national institutional environments of Germany, Japan, and the United States have each evolved over the last 15

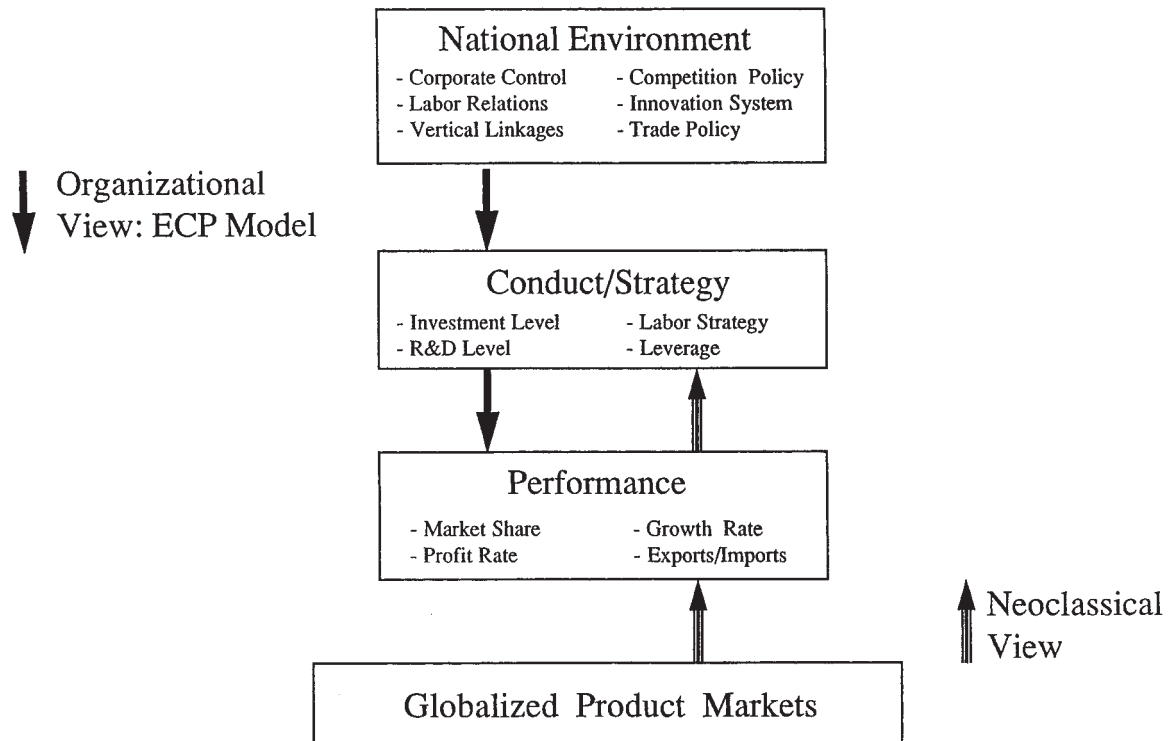


Figure 3. Organizational view vs. neoclassical view

tistics from the large literature on this subject are given in Table 1. In each nation, the firm is the center of a network of relations with core constituencies: workers, suppliers, providers of capital, providers of science, and government, again as in Figure 2. The different structuring of these relationships across nations yields fundamentally different firms, which conduct themselves in very different ways. The key distinction arises from the arms-length structuring of these

network relationships in the Anglo-Saxon economy of the United States and the more integrated structuring in East Asia and Continental Europe. Throughout our review, we stress two points. First, these national institutions constitute an integrated system. Second, there are advantages and disadvantages to each system so that no one system is unambiguously better than the other is.

The national institutional environment of the United States is characterized by extraordinary transience, fragmentation, and formality. As a consequence, there is a sharp separation between the firm and its external transactors. In capital markets, U.S. firms are increasingly controlled by pension funds and other third-party investors that are regularly evaluated on the basis of short-term investment performance. These third-party investors now account for over 60 percent of U.S. equity market holdings, up from 8 percent in 1960 (Porter, 1992; for the contrasting minimal impact of pension funds in Germany and Japan, see Table 1).⁷ These traits carry over throughout

years (Bishop, 1994; Emmott, 1991; Jensen, 1991; Kochan, Katz, and McKersie, 1986). Some would interpret this evolution as a convergence of different national systems towards one common institutional system. We have two reactions to this argument of convergence. In the first place, this is ultimately an empirical question and our statistical findings clearly indicate that convergence has yet not been achieved as of the most recent decade. In the second place, we very much wonder as to the extent of any institutional convergence. Yes, the industrial institutions of Germany and Japan have both changed moderately in recent years. But during this same time period, the United States has nearly dismantled 50-year-old systems of labor relations and corporate governance established by the New Deal. In terms of the key issues for this study (mobility and commitment of various transactors and the dominance of shareholders), U.S. firms have perhaps become even more different from those of Germany and Japan, rather than more similar.

⁷ Much of this firm/capital relationship arose under New Deal regulations in the 1930s: the Glass-Steagall Act of 1933 that

Table 1. National institutional environments: Selected attributes

	U.S.A.	Japan	German	Source
<i>Capital</i>				
Pension fund assets as share of GDP	35%	5%	3%	Davis (1992)
Financial corporate ownership of other firms (% of listed shares)	5%	42%	20% ^a	Kester (1992)
<i>Labor</i>				
Job tenure (% of employees holding jobs for less than 2 years)	39%	19%	19%	Emerson (1988)
% of firms where employees hold more than 40% of directorships	35%	93%	100% ^b	Fukao (1995)
<i>Science</i>				
Business R&D as share of national R&D	48%	78%	64%	Nelson (1993)
<i>Vertical</i>				
Nonfinancial corporate ownership of other firms (% of listed shares)	~0%	25%	39%	Kester (1992)

^aGerman banks additionally control and vote a large share of equity that is owned by individuals, but held in trust by banks.

^bFor German firms with more than 2000 employees, one-half of the supervisory board must be employee representatives.

the system. Antitrust laws sharply restrict vertical ties between the firm and key suppliers and buyers (Howard, 1983). Not only is formal ownership of related firms limited (compare the three nations in Table 1), but much of the full range of quasi-vertical ties such as exclusive dealing are proscribed as well. Business/government relations in the United States are properly renowned for their hostility and distance (Badaracco, 1985). Finally, much of U.S. science is conducted in universities and government laboratories that provide equal access to all and specific ties to none (again, Table 1). The result of this 'New Deal Capitalism' is an economy that is remarkably fluid, open, and fair—but also atomized, transient, and legalistic.

restricts commercial bank equity holdings, the Chandler Act of 1935 that restricts commercial bank reorganization of failing firms in which they provide debt, the McCann-Ferguson Act of 1940 that extends similar restrictions to insurance companies, and so on (Jensen, 1991). Other U.S. laws, and perhaps more important U.S. culture, insist on treating all providers of capital equally, whether the provider is large and sophisticated or an amateur individual investor. Yet U.S. firms are appropriately reluctant to reveal detailed strategic and financial information to every isolated investor, and thus to competitors. This setup reduces all investors to the status of outsiders. The need to preserve this insider/outsider distinction obstructs the presence of truly knowledgeable parties, such as key suppliers or key customers, on the boards of directors of U.S. firms.

In contrast, firms in Germany and Japan are embedded in networks of relations that are more permanent, with a greater and less formal sharing of control. We argue that this reduced mobility and shared control are inescapably related, as the greater permanence of German and Japanese industrial relations gives rise to transaction and agency costs that must be solved by shared control. Further, the costs of control are more efficiently borne by concentration of transactions into fewer agents than in the United States. The resulting shared and concentrated control blurs the lines of separation between the firm and its external transactors and sustains a reduction of formality and hostility in interactions. Note that while Japan and Germany are very different, they are similar enough relative to the United States on the involvement of labor in decision making for us to classify them together.

German 'Eurocapitalism' exhibits consensual and committed constituents for large firms, with a sharing of control across partners.⁸ The bulk of

⁸For references on German capital relations, see Baums (1992), Frankel and Montgomery (1991), Glouchevitch (1992), Kaufman (1992) and Mowery (1992). For references on German relations with government, see Badaracco (1985) and Glouchevitch (1992). For general discussion of the German system, and the term 'Eurocapitalism,' see Henzler (1992) and Thurow (1992).

German external capital comes not from equity markets, but from loans from universal banks that execute both commercial and investment functions (compare with the United States in Table 1). Labor is also more tightly and intimately bound to firms in Germany than the United States. Under codetermination law, German union representatives constitute one-half of the boards of directors of major firms and thus possess detailed strategic information and significantly influence major decisions. Additionally, German law severely restricts firings and lay-offs of workers, with a result that turnover across jobs for German workers is less than half that of the United States (on both labor points, compare Table 1). Finally, relations with government are more cordial and cooperative in Germany than the United States.

Japanese 'alliance capitalism' embeds large firms in an equally broad network of long-term relationships.⁹ One distinctive feature of Japanese capitalism is the linkages across groups of firms sharing cross holdings of equity, with equity and debt links to common financial institutions, the *keiretsu* structure (compare with the United States in Table 1). These capital holdings parallel trade relations among Japanese firms, and are reinforced by personnel transfers and implicit contracts. Many large firms in Japan are vertically linked to suppliers and distributors in such 'lifetime' relationships, which again contain both explicit (equity holdings) and implicit (reputation) components. For labor, 'lifetime' employment binds workers to the major firms, producing an aggregate level of labor mobility that is less half that of the United States (see Table 1). Large Japanese firms have since the 1950s relied on the resulting long-term commitment from workers to decentralize significant control of operations to workers. Relations with government are vastly more cooperative than in the United States. Finally, Japan conducts a remarkably high proportion of its scientific research within private corporations, as opposed

to the more public nature of U.S. R&D (see Table 1).

The conduct of firms embedded in these very distinctive forms of capitalism should be quite different. In the United States, actors have little long-term relationship with the firm. In this environment, shareholders of common equity enjoy primacy in their claims on management. Firms must report adequate returns on equity investments or face attacks from equity investors that can culminate in proxy battles and hostile takeovers. We characterize U.S. corporations as *shareholder firms*, where investments are made primarily to maximize shareholder wealth. Conversely, in Germany and Japan, many external transactors are bound to the firm in long-term relationships and share control of the firm's strategic decisions. Labor, banks, and government have far more prominent roles in these two nations than in the United States, and in Japan the role of suppliers and distributors is also conspicuous. Firms in these industrial cultures promote multiple interests in strategic decisions, with much less attention to shareholder wealth than would be present in the United States. We characterize German and Japanese corporations as *coalitional firms*, where investments are the outcome of a cooperative bargaining process among a broad array of constituencies.

We must stress two points on the differences between these two capitalisms. First, we emphasize that the entire range of relationships that make up the institutional environment, determines corporate conduct, not just relationships with capital markets. Our argument contrasts with recent studies that give primacy to capital relations alone (for example, Porter, 1992; for a view similar to our own, see Fukao, 1995). Second, while we do not examine performance implications in this study, it is clear that there are both advantages and disadvantages for each type of firm. An excellent example of both points is provided by the semiconductor industry. In the semiconductor memory chip (e.g., DRAM) market, Japanese firms have outinvested their American counterparts. The long-term commitments from labor and suppliers and the internal corporate location of science in Japan have strongly facilitated a focus in Japanese firms on improvements in process technology, enabling the low-cost production necessary for strategic success in memory chip markets (Johnson, Tyson,

⁹ For an overview of the Japanese firm's institutions, see Aoki and Dore (1994). For references to Japanese capital relations, see Abegglen and Stalk (1985), Kaufman (1992) and Kester (1991). For references to the keiretsu structure, see Caves and Uekusa (1976), Gerlach (1992) and Kester (1991). For references to Japanese governments relations, see Badaracco (1985) and Johnson *et al.* (1989). The term 'alliance capitalism' is from Gerlach (1992).

and Zysman, 1989; Prestowitz, 1988). While Japanese capital markets have facilitated investment and success in semiconductor memory chips, this outcome is clearly based more strongly on distinctive features of relations with labor, suppliers, and government in Japan. Conversely, in the logical chip (e.g., microprocessor) markets of the same industry, U.S. firms have outinvested and triumphed over their Japanese competitors. The fluidity and speed of diffusion that characterize U.S. markets for capital, labor, equipment, and basic science greatly facilitate a focus in U.S. firms on product innovation. Note first that in both market segments of this industry, capital relations were only one of several critical determinants of investment conduct. Note second that while the commitment and long-term focus of coalitional firms proved superior in the memory segment, the speed and dynamism of shareholder firms proved triumphant in the logical segment.

In the next section, we examine how shareholder and coalitional firms will exhibit different conduct in investment. We will thus be examining the environment–conduct link in Figure 3.

CORPORATE CONDUCT AND INVESTMENT

In the previous section, we traced the differing institutional environments of America, Germany, and Japan, and demonstrated how these environments directly affect the conduct of firms. In this section, we formally model how these institutional environments affect firm investment conduct, with a focus on testable empirical predictions. For simplicity, we examine investments in physical assets (ignoring investments in intangible capital such as R&D). Also, we specify only common equity holders and labor as external transactors. We expect that our theoretical and empirical findings will generalize to other forms of conduct and other stakeholders.

We begin by contrasting the determination of investment rates in physical capital by shareholder firms in the United States and coalitional firms in Germany and Japan. The game-theoretic model predicts that investment rates in coalitional firms are higher than in shareholder firms, even facing the same industry parameters. Also, investment by shareholder firms is mainly determined by equity market valuations (Tobin's Q ratio), while

investment by coalitional firms is mainly determined by internal cash flows. The first prediction is the stylized aggregate behavior we observe across countries that motivates this paper.

The fundamental reason for the differing conducts, as explained in the previous section, is that investment rates in shareholder firms are determined in the sole interests of holders of common equity. In coalitional firms, investments are determined jointly by shareholders, labor, and other stakeholders in their mutual interests. We model the firm as a cooperative game, where the relative bargaining power of labor is far stronger in coalitional firms than in shareholder firms. For a more detailed game-theoretic treatment, see the work of Aoki (1984, 1988).

Let us begin by modeling the choice for a firm of the investment rate in physical capital. Consider a firm that grows in steady state at a constant rate forever. Denote the aggregate value of common equity (shareholders' pay-off) as V and the aggregate utility of labor (labor's pay-off) as U . Management chooses the rate of investment in physical capital, denoted ι . Worker utility is an increasing function of investment, or $U(\iota)$ with $U_\iota > 0$ and $U_{\iota\iota} < 0$. Workers benefit from higher investment as it increases the productivity of their labor, justifying higher wages, and it increases the growth rate of the firm, increasing the stability of their jobs and improving prospects for promotion. The rate at which cash flow is generated from physical capital is denoted π , the cost of equity is denoted κ , and the initial stock of physical capital is denoted S . The cash flow rate is a concave function of the investment rate ι , or $\pi(\iota)$ with $\pi_{\iota\iota} < 0$. In this simple model, cash flow not invested is paid out as dividends to equity shareholders, and there is no debt. As a consequence, the investment rate ι is also the growth rate of the firm, and is equal to the product of the retention rate from cash flow times the cash flow rate itself. Finally, Tobin's Q equals V/S , or the ratio of the equity market value of the firm V divided by the initial stock of capital S .

The objective functions for equity shareholders and labor are then respectively:

$$V = \int_0^{\infty} S[\pi(\iota) - \iota] \exp[(\iota - \kappa)t] dt$$

implying $V = S(\pi - \iota)/(\kappa - \iota)$ with $0 \leq \iota \leq \pi(1)$

$$U = U(\iota) \quad (2)$$

The cooperative solution for capital and labor can be obtained as the maximum of the weighted sum of these two objective functions (Aoki, 1988; Sen, 1966).

$$V(\iota) + \beta U(\iota) \text{ with } 0 \leq \beta \quad (3)$$

The weight β gives the bargaining power of labor relative to equity shareholders under the institutional environment of a nation. We define a shareholder firm as one with a low value of β . At the extreme with $\beta = 0$, we have a neoclassical firm or a *pure shareholder firm*. A coalitional firm exhibits high β , as workers are committed to the firm in the long run and share in its governance. The solution to this cooperative game is given by the first-order condition:

$$V_{\iota} + \beta U_{\iota} = 0 \quad (4)$$

Two key factors drive the investment conduct embodied in Equation 4. First, Tobin's Q , the ratio of the market value of the firm to its current replacement value, is a positive determinant of investment. The logic is the more the market value of the firm exceeds its replacement costs, the greater the return to equity shareholders from further investment. In the neoclassical model of corporate conduct (β equals 0), Tobin's Q is sufficient to predict investment levels (Hayashi, 1982; for derivation, see the Appendix). But as discussed earlier, the neoclassical model abstracts completely from the network of relationships that constitute the modern firm, and the information and control problems these relationships are designed to address.

A second determinant of investment is internal liquidity, for two non-neoclassical reasons: liquidity constraint and coalitional decision making. Liquidity constraint is not visible in our formal model, as it is a single-play game with no uncertainty. In more complex reality, firms will experience surprises or shocks to both the cash flow function π and the cost of capital κ that will shift the optimal rate of investment. On a period-to-period basis, the firm may optimally seek rates of investment that violate its liquidity constraint, $\iota \leq \pi$. The firm would then need to raise capital from external investors to finance its excess investment. But as the organizational economics literature stresses, outside investors face significant problems of information costs and agency

costs.¹⁰ These non-neoclassical problems make the cost of capital from outside investors larger than that for internal cash flows. Under these circumstances, the chosen level of investment will vary with and be constrained by the magnitude of cash flows, so that the internal cash flow rate will be a second determinant of investment.

An additional non-neoclassical reason as to why cash flow affects investment rests on the commitments made to labor, and the reflection of labor interests in control of the firm. Increased cash flows can be reinvested in the firm or paid out as dividends to equity shareholders. A coalitional firm is less likely to pay out unexpected shocks to cash flow as dividends.¹¹

Comparing the shareholder firm with the coalitional firm, we make three findings or hypotheses. Each of these findings is mathematically derived in detail in the Appendix. The intuition of the findings is summarized here.

Hypothesis 1: The investment rate in coalitional firms exceeds that of shareholder firms facing similar industry circumstances (ceteris paribus).

To see this first finding, return to Equation 4. As β increases in Equation 4, by definition the bargaining power of labor increases. Labor prefers higher investment rates than do equity shareholders: utility for labor monotonically increases with higher investment rates, while shareholder value peaks at the maximum value of Tobin's Q and then declines with further investment.¹²

¹⁰ Key references on the costliness of external finance are Jaffee and Russell (1976), Jensen and Meckling (1976), Myers and Majluf (1984) and Harris and Raviv (1991).

¹¹ Abegglen and Stalk (1985) have argued that common shareholders in Japan are reduced to a status similar to preferred stock holders, receiving set payments under an implicit contract. Under these circumstances, unanticipated cash flows are used for investments that benefit all stakeholders, rather than being paid out in higher dividends. If this argument is valid, then in Germany and Japan shocks to cash flow will be observed more in investments than in dividends. Note in Table 2 that there is significantly more variation in the payment rate for dividends out of cash flows (and assets) for the United States than for Germany and Japan.

¹² The finding that coalitional firms invest more is unambiguous given the specification of the model, especially a single-play game with no uncertainty and with costless decision making. Note, however, that decision making in coalitional firms will be slower, more costly, and more cumbersome and that their strategic options will be not only enabled but also constrained by the network of commitments they have made. In a dynamic environment, with unexpected shocks to the

Our second finding concerns Tobin's Q as a determinant of the investment rate.

Hypothesis 2: Tobin's Q has greater impact on the investment rate in shareholder firms than in coalitional firms (ceteris paribus).

The intuition for this second finding is straightforward. Tobin's Q does not affect worker utility. As workers have higher bargaining power, Tobin's Q will have less influence on investment in a coalitional firm where β is higher. More formally, we must take care to analytically distinguish between shifts in cash flows and shifts in Tobin's Q . Consider an upward shift in the cost of capital κ , with no shift in the cash flow function π . This shift reduces V and Q , and promptly reduces investment in the shareholder firm. This increased cost of capital, however, has no impact on worker utility (assuming workers' wages are a larger form of income than their income from shares in the company), and thus will have less impact in the weighted decision of the coalitional firm.

Our third finding concerns internal cash flow as a determinant of the investment rate.

Hypothesis 3: Internal cash flow has smaller impact on the investment rate in shareholder firms than in coalitional firms (ceteris paribus).

The intuition for this third finding is that shareholder firms will consider the impact of cash flow only to the extent that it actually increases the value of the firm, or only until $V_t = 0$. Coalitional firms additionally will value cash flow for its benefits to other stakeholders. Again, we must formally take care to analytically distinguish shifts in cash flow from shifts in Tobin's Q (of which cash flow is a component). Consider a 'value-neutral' shift in parameters for the firm, so that both π and κ increase in a way that leaves the equity market value of the firm unchanged. In shareholder firms, managers will weigh the benefits of greater cash flows against the greater capital costs, and decide not to alter investment levels. In coalitional firms, managers will comparably weigh the benefits and costs of a value-neutral

shift. Yet in the coalitional firm, the benefits of greater cash flow accrue to both parties, as both capital and labor benefit from higher investment, but the costs accrue only to shareholders. A value-neutral shift is neutral only for shareholders, not for labor and the interests of other nonshareholder transactors, and so labor will thus push management to expend at least some of the greater cash flows on increased investment.¹³ This result that investment will be more responsive to cash flow in coalitional firms will be offset by agency problems (Jensen, 1986) in shareholder firms.

There is an additional reason coalitional firms are more sensitive to cash flow determining their investment rates. Coalitional firms choose higher rates of investment (our first finding above) and thus are far more likely to face a liquidity constraint in any one period. As mentioned earlier, firms facing a binding liquidity constraint will adjust investments as a rather direct function of cash flows. To examine the extent of any liquidity constraint for coalitional firms, we computed the mean and quartiles of dividend pay-out ratios for the firms in our sample (the sample is discussed below). These numbers are reported in Table 2, Panel A. We find that German and Japanese firms pay out as dividends a significantly smaller share of cash flows and a markedly smaller share of assets than American firms, indicating their greater vulnerability to liquidity constraint.¹⁴

In summary, our model explains linkages between the institutional environment and corporate conduct, the top two boxes in Figure 3. An additional, hotly debated topic lies in the performance implications of these different con-

¹³ Note this prediction is opposite to what we would expect from an investment model based on just information asymmetries without national differences in control by stakeholders. Japan's keiretsu system and Germany's universal banking system should create lower information asymmetries than the arm's length U.S. system. These reduced problems of information asymmetries would indicate that cash flow should be less of a determinant of investment in Japan and Germany than in the United States.

¹⁴ The pay-out rates from net income are actually very similar across nations. This similarity arises not because German and Japanese firms pay-out large dividends. Indeed, the other pay-out ratios reported in Table 1 clearly indicate that they do not. Rather the similarity in net income payout rates arises because net income levels in Germany and Japan are every bit as low as dividend levels, so that the ratio is similar to that of the United States. Table 1 also reports returns on equity across nations, confirming the low levels of net income in Germany and Japan.

industry and rewards for swiftness and flexibility, it is not at all clear that coalitional firms would outinvest or outperform shareholder firms.

Table 2. Sample data, 1983–93, basic statistics

(A) Liquidity constraint? Means and Quartiles

	Germany			Japan			U.S.A.		
	25%	Mean	75%	25%	Mean	75%	25%	Mean	75%
Dividends/Net income	0.00	0.42	0.63	0.18	0.41	0.45	0.04	0.43	0.46
Dividends/Cash flow	0.02	0.12	0.17	0.07	0.12	0.16	0.06	0.17	0.28
Dividends/Total assets	0.001	0.01	0.02	0.005	0.007	0.009	0.01	0.02	0.03
Return on equity	0.05	0.08	0.13	0.04	0.07	0.09	0.07	0.13	0.19

(B) Means and standard deviations

	Germany		Japan		U.S.A.	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Investment rate in physical capital (I/K)	0.35	0.19	0.29	0.15	0.22	0.15

ducts, or the linkages between the next two boxes in Figure 3. Examination of the conduct–performance link in Figure 3 is well beyond the scope of this paper.

In the next section, we test empirical predictions from our model as to differences in investment conduct of shareholder firms in the United States and coalitional firms in Germany and Japan.

ESTIMATION AND DATA

To test our hypotheses on investment conduct, we examine investment rates in physical capital. Our independent variables are Tobin’s Q and internal cash flow rates, controlling for other determinants of investment. The principal other factor influencing investment is the relationship between sales and capital stock. This so-called accelerator model has no real theoretical justification, but it is widely used in the empirical literature. We will report the accelerator model in percentage changes (the growth rate of sales), though we also performed estimation using the accelerator in levels (the ratio of sales to capital stock) and obtained similar findings. The reduced form investment equation is thus

$$\frac{I}{K} = a_0 + a_1 \text{Tobin's } Q$$

$$+ a_2 \frac{\text{Cash flow}}{K} + a_3 \text{Grow} + \epsilon \quad (5)$$

I/K represents the gross flow of funds invested in fixed assets by a given firm in a given period, divided by the beginning of period stock of fixed assets. *Tobin’s Q* is an adjusted beginning-of-period value, and is calculated as the sum of the market value of equity, the book value of debt, and deferred taxes divided by the book value of total assets minus intangible assets. *Cashflow/K* is the internal cash flow of the firm (funds from operations) normalized by the beginning-of-period capital stock.^{15,16} *Grow* is the accelerator model expressed in percentage change, meaning the

¹⁵ We also included the *stock* of cash divided by the stock of fixed assets as an alternate measure of internal liquidity to *cash flow* divided by the stock of fixed assets. The above results were robust to this variation in the specification. However, due to multicollinearity between the two measures of internal liquidity, the sign of the cash stock variable was often unexpectedly negative when both were included.

¹⁶ Several readers of our paper have suggested concern that Tobin’s Q and the *Cash flow/K* variables are excessively correlated. We in fact found only the mildest correlation between this variable pair. For America, Germany, and Japan respectively the correlations were 0.23, 0.13, and 0.20. Actually, the only variable pair for which correlations were large were *Sales/K* and *Cash flow/K*, which makes the *Sales/K* coefficients unstable. The correlations for this latter variable pair are respectively for America, Germany, and Japan 0.67, 0.45, and 0.38. This multicollinearity problem is an additional reason why we did not report results using the accelerator model in levels (*Sales/K*).

growth rate of sales during the period. The error term is denoted by ϵ . More detailed definitions of the variables are given in a variable glossary following the references at the end of the paper. Normalizing investment and other nominal levels by dividing by the capital stock reduces heteroscedasticity.

This approach is quite similar to single-country studies by Fazzari, Hubbard, and Peterson (1988) for the United States and by Hoshi *et al.* (1991) for Japan. The single-nation findings we report below for investments in physical capital are quite comparable to theirs. Our work departs from these studies by using matched samples of firms in the same industry across three nations, grounding our predictions in the comparative institutional environments of the three nations.

Data for the statistical regressions come from Worldscope (1994). These annual report data on publicly listed companies are adapted by Worldscope to insure comparable definitions of variables across countries. All data are in local currency. Following Rajan and Zingales (1995), two adjustments were made to provide greater compatibility of accounting data across nations. First, we subtracted pension fund liabilities from the assets of German firms in the sample. German firms do not separate pension assets for their balance sheets, unlike U.S. firms. Our procedure assumes that German pensions are fully funded (pension assets equal pension liabilities), and nets out reported pension liabilities. Second, we subtracted intangible assets from total assets in all three nations, though this tactic is targeted at the United States and has most of its impact there. Due to the merger wave during the 1980s in the United States, acquisition premiums were capitalized as intangible capital on U.S. firms' balance sheets. Because Germany and Japan did not experience a comparable merger wave, their assets would not be revalued upward.¹⁷

Our sample includes manufacturing firms from the United States, Germany, and Japan for the years 1983–92. Only firms from the following

industries were selected: apparel, textiles, and leather goods; chemicals (excluding drugs); drugs; electrical products; electronic products; food and beverages; machinery; motor vehicles; paper; and steel. Industries were defined by the groupings provided by Worldscope. Observations for firms experiencing a merger were deleted for the year of merger. Often, Worldscope data recorded a single merger as occurring over 2 years, as sales changes were recorded for two different years—in this case, both years were deleted. Many Japanese firms changed their fiscal years during the sample period of our study. These changes resulted in reported fiscal years of less than 12 months. These shortened fiscal years were not deleted, rather flow variables (e.g., sales) were multiplied by a factor of 12 divided by the number of months in the fiscal year to achieve comparability. Finally, many observations in Japan and Germany were deleted because data for individual variables were not reported, such as cash flow.

Results are reported for fixed effects regressions using year and industry effects. Estimates were also run for year and firm effects, and again for just year effects. The conclusions were robust to the different forms of estimation.

EMPIRICAL FINDINGS

Regression results for investment conduct in physical capital for the three sample nations are reported in Tables 3–5. The dependent variable is I/K , or investment is fixed assets divided by the stock of fixed assets, as in Equation 5 above. Three findings in these tables stand out. First, the tables show that Tobin's Q ratio is very significant for the United States, but is not significant at all for Germany and Japan. The estimated magnitude of the impact of Tobin's Q is four to five times larger for the United States, even ignoring the statistical insignificance of the coefficients in Germany and Japan.¹⁸ This first finding is as predicted. Second, cash flow is a statistically significant determinant of investment decisions in all three nations, but the coefficient is larger by

¹⁷ Rajan and Zingales (1995) make two additional corrections to their accounting data that we do not employ. They add both deferred taxes and other liabilities to the book value of equity, arguing that both are really dubious provisions for future liabilities and thus are really equity. We use the market value (not book value) of equity in our computation of Tobin's Q . These two corrections are thus not relevant for our study.

¹⁸ The means for the variables used in estimation are very similar across the three nations. Thus the differences in the estimated elasticities for these variables closely follow the differences in the coefficients reported in Tables 3–5.

Table 3. Physical capital investments, Germany, 1984–93
Regression estimates for Equation 5 in text

Industry	Independent variables				
	Cash flow/ PPE	Growth rate of sales	Tobin's Q	N	R^2
Apparel & Textiles	0.09 (1.16)	0.99 (3.35)	0.09 (1.23)	42	0.52
Chemicals	0.14 (1.29)	0.32 (1.38)	0.05 (0.95)	101	0.24
Drugs	0.30 (1.71)	-0.25 (-0.91)	0.001 (0.02)	36	0.23
Electrical	0.63 (7.90)	-0.25 (-1.44)	0.02 (0.31)	87	0.51
Electronics	0.13 (2.42)	0.03 (0.21)	-0.04 (-2.47)	44	0.43
Food & Beverage	0.73 (5.68)	0.15 (0.89)	0.05 (1.40)	88	0.43
Machinery	0.22 (5.46)	0.24 (3.83)	0.03 (0.97)	168	0.44
Motor Vehicles	0.45 (5.52)	0.03 (0.15)	0.01 (0.48)	103	0.42
Paper	1.33 (4.50)	-0.04 (-0.07)	-0.13 (-0.63)	30	0.68
Steel	0.52 (2.88)	0.17 (0.97)	0.12 (0.71)	58	0.38
Manufacturing sector	0.32 (11.91)	0.22 (4.24)	0.01 (1.14)	752	0.31

Notes:

Each observation is a firm in a given year, 1983 to 1992.
1983 observations lost in construction of sales growth variable.
Dependent variable for each regression is Investment/ K .
Each industry regression controls for fixed year effects.
The sector regression controls for fixed effects of year and industry.

a factor of about four to five in Germany and Japan. Again, this finding is as predicted. Third, growth in sales (the accelerator model in percentage change) is significant for Germany and Japan, but not for the United States. While this third finding was not predicted, given the poor theoretical grounding of the accelerator model, it is consistent with a choice of higher growth rates in coalitional firms. All coefficient estimates in the sector-wide sample have the expected sign.

Importantly, our findings are consistent across industries within each country. In nearly all sample industries, cash flow tends to be a more significant explanatory variable for investment in Germany and Japan than the United States. Also, Tobin's Q ratio tends to be far less significant in

Germany and Japan than in the United States. Tobin's Q is positive and significant in no industries in Japan or Germany, yet it is significant in eight of the 10 industries in the United States. The number of observations (N) in each industry is small, so the point estimates of coefficients vary widely.

Finally, we computed F -tests for the null hypotheses that coefficients were equal across nations in the investment equation (5) as reported in Tables 3–5. These F -tests are reported in Table 6. We reject the null hypothesis that the investment conduct of all three nations is identical (equal coefficients in Equation 5) at the 1 percent level in all 10 individual industries and in the pooled manufacturing sector as a whole. Further,

Table 4. Physical capital investments, Japan, 1984–93
Regression estimates for Equation 5 in text

Industry	Independent variables				
	Cash flow/ PPE	Growth rate of sales	Tobin's Q	N	R^2
Apparel & Textiles	0.30 (1.37)	3.57 (1.26)	-0.23 (-0.78)	17	0.68
Chemicals	0.60 (7.56)	0.23 (2.16)	-0.07 (-3.08)	138	0.47
Drugs	0.29 (4.23)	0.06 (0.30)	0.01 (1.73)	84	0.33
Electrical	0.81 (4.17)	0.11 (0.24)	0.05 (0.60)	39	0.65
Electronics	0.30 (4.24)	0.49 (4.80)	-0.01 (-0.92)	183	0.51
Food & Beverage	0.11 (0.66)	0.36 (1.17)	-0.02 (-0.65)	80	0.13
Machinery	0.26 (4.19)	0.35 (3.39)	-0.001 (-0.04)	183	0.33
Motor Vehicles	0.36 (4.31)	0.32 (1.72)	0.01 (0.43)	124	0.30
Paper	##	##	##	6	##
Steel	0.40 (3.75)	0.36 (2.72)	0.01 (0.50)	84	0.44
Manufacturing sector	0.31 (11.56)	0.32 (6.60)	-0.01 (-0.97)	931	0.39

Notes:

Each observation is a firm in a given year, 1983 to 1992.
1983 observations lost in construction of sales growth variable.
Dependent variable for each regression is Investment/ K .
Each industry regression controls for fixed year effects.
The sector regression controls for fixed effects of year and industry.
denotes insufficient observations.

we reject the null hypothesis that U.S. investment conduct is equivalent to that of a pooling of German and Japanese firms at the 1 percent level in all 10 industries and in the manufacturing sector as a whole. Conversely, we are unable to reject the hypothesis at the 5 percent level that German and Japanese firms exhibit identical investment conduct in seven of 10 industries. In only three industries (electronics, machinery, and steel), and in the manufacturing sector as a whole, do we find that German and Japanese firms exhibit statistically different conduct. We should stress, however, that the sample size is quite small in several industries, so that the power of the reported F -tests may not be great there.

CONCLUSIONS AND IMPLICATIONS FOR STRATEGY

We have documented significant differences in the conduct of U.S., German, and Japanese firms. These differences are stable across 10 manufacturing industries. This provides evidence that the home country environment (in particular, the institutional bargaining power between owners and labor in strategy decisions) causes differences in strategy choices. We thus provide an explanation for the well-recognized differences in strategy across firms from different countries that occur, despite having a common global industry structure.

Aside from the value of better understanding home country effects on strategy, this explanation

Table 5. Physical capital investments, United States, 1984–93
Regression estimates for Equation 5 in text

Industry	Independent variables				
	Cash flow/ PPE	Growth rate of sales	Tobin's Q	N	R^2
Apparel & Textiles	0.01 (1.22)	0.28 (5.27)	0.07 (6.76)	389	0.28
Chemicals	0.10 (5.50)	0.01 (1.09)	0.02 (3.46)	536	0.21
Drugs	-0.10 (3.11)	0.34 (5.10)	0.04 (4.00)	250	0.23
Electrical	0.07 (2.22)	0.17 (3.34)	0.04 (1.99)	200	0.23
Electronics	0.09 (4.92)	0.28 (4.71)	0.06 (3.27)	378	0.36
Food & Beverage	0.07 (3.27)	0.17 (4.42)	0.01 (2.29)	476	0.15
Machinery	0.12 (5.99)	0.10 (3.04)	0.03 (2.08)	495	0.20
Motor Vehicles	0.12 (5.78)	0.19 (4.71)	0.01 (0.71)	399	0.34
Paper	0.26 (2.06)	0.05 (0.55)	0.02 (0.82)	125	0.23
Steel	0.14 (3.12)	0.04 (0.79)	0.12 (6.19)	319	0.24
Manufacturing sector	0.05 (10.05)	0.20 (12.47)	0.04 (12.79)	3575	0.29

Notes:

Each observation is a firm in a given year, 1983 to 1992.
1983 observations lost in construction of sales growth variable.
Dependent variable for each regression is Investment/ K .
Each industry regression controls for fixed year effects.
The sector regression controls for fixed effects of year and industry.

has implications for two main issues in strategy. These two issues are: which form of home country capitalism is superior, and; when should strategy be based more on home country factors than the industry structure?

In answer to the first issue, we cannot say one country's form of capitalism is superior to another's based on just one criterion like level of investment. U.S. firms have lower investment rates in physical capital than do the coalitional firms of Japan and Germany. But this is only one of many attributes that differ among the firms of these three nations. The fundamental trade-off between commitment/shared governance in Japan and Germany and flexibility/independence in the United States that we stressed earlier in our paper

should indicate that we cannot usefully fixate on just one attribute of a particular form of capitalism and leap to conclusions as to its long-term performance against other capitalisms.

We question the very impulse that causes some scholars to transform observable differences across capitalisms into across-the-board, full-economy rankings of 'better' and 'worse.' In a sense, this impulse is a version of the ecological extremism embedded in neoclassical economics—an extremism that views competition as promptly annihilating any organizational differences across firms. Our study, based on the most recent 10 years of data, finds no such obliteration of difference. We would argue that a central benefit of international commerce is that it enables multiple

Table 6. *F*-Statistics for Chow tests across nations

	Null hypothesis for physical capital investment		
	U.S.A. = Japan = Germany	U.S.A. = (Japan and Germany)	Japan = Germany
Apparel & Textiles	7.69*	6.33*	0.42
Chemicals	12.40*	10.70*	1.53
Drugs	2.50*	2.18*	1.81 [#]
Electrical	20.39*	17.89*	1.16
Electronics	3.74*	2.81*	1.85 [#]
Good & Beverage	33.24*	21.69*	1.78 [#]
Machinery	12.02*	10.37*	1.25
Motor Vehicles	7.01*	6.16*	0.64
Paper	7.45*	4.55*	0.80
Steel	11.00*	6.20*	0.56
Manufacturing Sector	36.79*	33.57*	3.04*

*Represents significance at 1% level; [#]represents significance at 5% level.

forms of capitalism to each flourish in varying industries and market segments. Our analysis suggests that firms of certain nations may succeed in certain industries predominantly because of their organizational characteristics. In a sense, organizational attributes may supplement and perhaps even replace natural resources as determinants of comparative advantage. Anglo-American firms may dominate industries with low levels of current cash flow but high equity market valuations (such as perhaps biotechnology). Conversely, East Asian and Continental European firms may dominate mature industries with high, steady cash flows but low stock market valuations, and where worker commitment is important (such as perhaps machine tools). We are all better off due to the ongoing diversity of competing capitalisms.

The second important issue is: when should managers care more about the industry structure than their home country environment when choosing strategy? In other words, under what circumstances would the neoclassical approach of industry structure determining the single best strategy provide superior predictions of optimal strategy? First, product markets would need to be highly globalized and vigorous competition in them would have to force all firms to behave in an identical, most efficient manner or cease to survive. Second, history would have to weigh lightly on modern firms so that the diverse local experiences of firms could be easily transcended in favor of a newer, common global experience—

technically, strategy would be path independent. The flow of this neoclassical reasoning is represented in Figure 3 by the upward, dashed arrows. Put simply, the neoclassical approach may be regarded as one where *future prospects and product market discipline dominate*.¹⁹ The organizational view would provide more accurate predictions of corporate conduct under quite different circumstances. First, relations for the firm beyond product markets would have to be highly important, and these nonmarket and nonproduct-market relations would have to be very differently organized across nations. Second, the distinctive historical accumulation of skills and resources by firms would have to significantly constrain and enable corporate conduct—technically, strategy would be path dependent. Put equally simply, the organizational approach is one where *historical experience and factor market advantages dominate*. Of course, product and factor markets and both the past and future affect modern firms, and it is therefore an empirical issue as to which approach is most accurate.

There are several applications of our findings that offer promise for future research:

¹⁹ Others besides neoclassical economists would agree with this view. For example, Bartlett and Goshal (1989) examine the internal structure of multinational corporations from an organizational theory perspective. They also argue that intense competition in global product markets is forcing firms from all nations to move towards a common internal structure—their 'transnational solution.'

Strategic trade policy

The use of protectionism to nurture domestic firms has been widely used in East Asia (Johnson *et al.*, 1989; Prestowitz, 1988). Yet when this tactic has been tried in the United States, American firms have often raised prices and used the resulting increased cash flow to increase dividends or to seek diversification, not for reinvestment in their core business. Our analysis explains why a tactic that would work reasonably well in East Asia would prove so counterproductive in the United States. This lesson presumably applies to other tactics of industrial policy, such as research consortia and worker training.

Joint ventures

The goals and aims of U.S. firms and their joint venture partners in East Asia and Continental Europe are fundamentally different. The central importance of cash flow for coalitional firms vs. the central importance of equity market valuations for Anglo-American firms offers potential conflict for every investment decision. With the increasing use of joint ventures and strategic alliances, particularly for U.S. entry into the booming markets of East Asia, such conflict poses a threat to the success and viability of these ventures.

Management strategies

This paper tries to help managers understand how their national environment can be a resource advantage to be leveraged, by linking the environment to conduct and performance. Managers should view their distinctive national environment and the resulting organization and conduct as a strategic resource. Though there has been some research in this area (Porter, 1990), it is still very limited. More research needs to go into understanding the various ways the home country's environment can be a resource for the firm.

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VARIABLE GLOSSARY

- Investment (I)** Funds used to acquire fixed assets. Excludes company acquisitions.
- Capital stock (K)** The stock of fixed assets (tangible assets with an expected useful life over 1 year) as of the beginning of the fiscal year. This variable is also denoted as property, plant, and equipment (PPE).
- Cash flow (CF)** Funds from operations during the fiscal year. When a funds flow statement was not given, cash flow was estimated by Worldscope from net profit (before preferred dividends) plus (minus) all noncash charges (credits).
- Growth in sales (GROW)** Net sales in current fiscal year minus net sales in previous fiscal year divided by previous year's net sales.
- Market value of equity (MV)** The market price of shares of common equity at the beginning of the fiscal year times the number of common shares outstanding at that time. For U.S. firms only, this data item is taken from Compustat. All other data items are from Worldscope.
- Debt (D)** Book value of current liabilities plus book value of long-term debt.
- Total assets (TA)** Book value of total assets of the firm. For German firms, the value of pension liabilities is subtracted from reported total assets. For firms of all three nations, the value of intangible capital is subtracted from reported total assets. See text for discussion.
- Tobin's Q ratio (Q)** Theoretically, the market value of the firm divided by its replacement cost. To operationalize this, the numerator is the sum of the market value of common equity (MV), the book value of preferred stock, the book value of debt (D), and deferred taxes. The denominator is the adjusted book value of total assets (TA) of the firm. Tobin's Q is calculated from the beginning of the fiscal year.

APPENDIX

In this appendix we derive the three hypotheses in the article (H1, H2 and H3). We use the notation that the subscript is the variable the function is to be derived with respect to. For example V_i is the derivative of the V function with respect to i .

First we show that the investment rate in coalitional firms exceeds that of shareholder firms facing similar industry circumstances (H1). The first order conditions given by Equation 4 are required for the optimal level of investment. When $\beta=0$ (the shareholder firm), $V_i=0$ and shareholders receive their non-cooperative optimum. When $\beta>0$ (the coalitional firm), then $V_i<0$ as anywhere but the non-cooperative equilibrium is a loss in value for shareholders. With $V_i<0$, then $\beta U_i>0$ to ensure Equation 4 still holds. Then $U_i>0$, as $\beta>0$. If $U_i>0$, then investment must have increased relative to when $\beta=0$ as U is monotonically increasing in i .

Second, we show that Tobin's Q has greater impact on the investment rate in shareholder firms than in coalitional firms (H2). Using the definition of Tobin's Q as $Q=V/S$, we use the quotient rule and simplify to show that:

$$V_i = Q - 1 + \pi_i \quad (\text{A1})$$

Using the implicit function theorem, we can derive $I_Q (= -V_Q/V_i)$

$$I_Q = -1/\pi_i \quad (\text{A2})$$

Given $\pi_u<0$, $I_Q>0$ (Tobin's Q predicts investment levels for the shareholder firm in a positive way).

For the coalitional firm, the first order conditions will be $V_i + \beta U_i = 0$ (Equation 4). Multiplying both sides by $1-\alpha$ (where $\beta = \alpha/(1-\alpha)$), we transform the first order conditions.

$$(1-\alpha)V_i + \alpha U_i = 0 \quad (\text{A3})$$

Using the quotient rule and implicit function theorem as for the non-cooperative shareholder firm solution, we derive:

$$I_Q = -(1-\alpha)/(\pi_u + \alpha U_u) \quad (\text{A4})$$

Given $U_u = 0$ and $\pi_u<0$, any increase in α (equivalent to an increase in β) will lead to a decrease in I_Q (the impact of Tobin's Q on investment).

Third, we show that internal cashflow has smaller impact on the investment rate in shareholder firms than in coalitional firms (H3). From the first result above, we know that the optimal level of investment in a shareholder firm is less than for a coalitional firm. This means the cash flow liquidity constraint ($i \leq \pi$) will more likely be binding for the coalitional firm rather than the shareholder firm. Thus internal cash flow will more likely be a determinant of investment for the coalitional firm than the shareholder firm.