

Corporate Restructuring in Japan

Part I. Can M-Form Organization Manage Diverse Businesses?*

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Abstract

The purpose of this paper is to seek to understand the recent organizational restructuring in Japan in the framework of organizational economics, given the product/market portfolio of the firm fixed: Given a set of businesses, how does the firm organize them internally? I first summarize stylized facts on corporate diversification strategy and M-form organization of the large Japanese firm from comparative perspectives. I then analyze the problem to choosing an organizational form. I in particular argue that exactly because of its related diversification, the multi-business Japanese firm adopting the M-form finds it difficult to differentiate its diverse businesses internally.

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1 Introduction

Today Japanese firms are involved in restructuring their businesses. Many multi-business corporations have been reforming their multidivisional (M-form) organizational structure so as to transform the divisions into more independent units (in-house “companies”) and the corporate headquarters into more lean and strategic office. Sony, the first company to introduce the in-house “company” form on April 1994, has been since then continuing to implement various organizational reform, including executive directors (1997), centralization of domestic sales and marketing functions into a wholly-owned subsidiary Sony Marketing of Japan (1997), conversion of three listed group companies into wholly owned subsidiaries (1999), the issuing of tracking stocks (TS) for a wholly owned subsidiary Sony Communication Network (2001), and so on. Even Sony’s internal organizational structure has been continuing to change since 1994.

Institutional environments surrounding Japanese firms are changing as well. The 1997 Revision of the Antitrust Law added a new organizational form, pure holding company, to their alternatives. The 2000 Amendment of the Commercial Code introduced procedures for company split-up so as to facilitate restructuring through spinoffs or divestitures. Consolidated financial statements attract more and more attention and hence companies are forced to assess the performance of the business group as a whole, including subsidiaries and related companies.

The purpose of this paper, as well as a follow-up paper in preparation, is to seek to understand this recent corporate restructuring wave in Japan in the framework of organizational economics. There is little academic work, not only in economics but also in other disciplines, that rigorously studies corporate restructuring in Japan. Although empirically oriented researchers want to wait to see when data will become available, I believe theorists can go ahead to offer a conceptual framework, define various reform precisely, identify issues to be analyzed, and point out some trade-offs.

What is corporate restructuring? Restructuring encompasses a broad range of issues. For example, much of the debate on corporate governance, in association with financial structure of the firm, is certainly relevant to corporate restructuring. I do not cover this aspect of corporate restructuring, because it has been extensively studied elsewhere.¹ The aspects I want to address are what Bowman and Singh (1993) call portfolio restructuring and organizational restructuring, that is, changes in the firm’s configuration of lines of business and its internal organizational structure.

The business portfolio configuration concerns the scope of the firm, or the firm bound-

¹For economics and finance perspectives of corporate governance, see Shleifer and Vishny (1997), Tirole (2001), and Vives (2000). For Japan, see, for example, Hoshi (1999).

aries, and the organizational structure concerns assignment of formal authority and responsibility within the firm boundaries. It is a bare-bone strategic decision for the firm to tackle the issues such as what and to whom this firm sells, what operations it does in-house, and how various businesses and operations are to be structured. There are two directions of the boundaries, horizontal and vertical. The horizontal boundaries of the firm define the products it offers and the markets it serves. Whether to diversify into related products or focus on a few narrow businesses is a typical example. The vertical boundaries of the firm define, for each product/market, those activities in the vertical chain (research, product development, material, parts, assembly, marketing, and so on) the firm does in-house (make) and those it does not (buy).

Since the pioneering work by Coase (1937), Williamson (1975, 1985), and Grossman and Hart (1986), the boundaries of the firm have been one of the staple research themes in the modern economics of organization.² However, this set of literature essentially focuses on vertical boundaries or make-or-buy decision. The diversification strategy of the firm, that determines its horizontal boundaries, does not appear to attract as much attention as it deserves.³ Disproportionate focus on the vertical boundaries also holds for studies of the Japanese firm. While economics and management researchers, both in Japan and elsewhere, have vigorously analyzed the vertical relationships between manufacturers and their suppliers,⁴ analysis of the multi-business organization is scarce, partly because of the extensive focus on the automobile industry.

The existence of business groups further complicates the firm boundaries. Large firms in Japan maintain networks of affiliated companies, which I call “business groups” throughout this paper. There are then two distinct boundaries. First, there are the legal boundaries that distinguish between the in-house businesses of the core firm and those businesses by the affiliated companies. PC is a product of Sony Corporation while movie is not: The latter is the product of Sony Pictures Entertainment, which is owned by Sony. Second, there are the informal boundaries of the business group. The core firm may move into a new business by establishing a related company or divest a subsidiary to another large firm to exit from a market. Although the group boundaries are often more ambiguous than the legal boundaries of the firm, the scope of the group is as important as that of the core firm itself.

²See Holmstrom and Tirole (1989), Hart (1995), and Holmström and Roberts (1998) for surveys.

³Corporate diversification has been an important topic in the field of strategic management probably since the seminal work by Rumelt (1974). See Ramanujam and Varadarajan (1989) for a survey. Motivated by the decline of conglomerate firms during the 1980s, the value of diversification, along with the performance of internal capital markets, has been extensively studied in finance. See part two of Stein (2001) for a survey.

⁴For example, see Fujimoto, Nishiguchi, and Itoh (1998), the collection of ten papers on suppliers system in Japan, which limits the entries to those written by Japanese scholars (often with non-Japanese co-authors). Many of the papers included were originally published in international academic journals.

In this research, I thus study portfolio and organizational restructuring with a particular emphasis on the horizontal boundaries of the firm as well as those of the business group. And the current paper (Part I) focuses on the structure of internal organization, the product/market portfolio of the firm being fixed: Given a set of businesses, how does the firm organize them internally? This is a relevant question for many of the recent corporate restructuring movement, such as M-form organization, in-house “company” structure, performance-based compensation, executive directors system, tracking stock, and so on. And the decision concerning the scope of the firm, which is the theme of the subsequent paper (Part II), depends on how well the firm can organize its businesses.

The rest of the paper is organized as follows. In Section 2, I summarize stylized facts on corporate diversification strategy and M-form organization in Japan from comparative perspectives. Since little attention has been paid to these topics despite their importance in light of the recent corporate restructuring wave, I believe that this section has its own modest contribution. The theme of Section 3 is “structure follows strategy.” I conduct simple analyses of a problem to choosing an organizational form, and explain why the M-form structure is an efficient choice for multi-business enterprises. I summarize the reasons as follows: (i) coordination benefits and the resulting separation of strategic decisions and operating decisions; (ii) improved information for incentives and control; and (iii) efficiency of internal capital markets.

Although the M-form structure appears to be a superior choice for diversified firms, it is not without a problem. In particular, the decline of conglomerate firms in the U.S. has led researchers to questioning the efficiency of internal capital markets, and the recent focus, both theoretically and empirically, is on the “dark side of internal capital markets,” that is, the possibility that an internal capital market can reduce the firm’s value. However, conglomerates have never been substantial in Japan, and then why do Japanese multi-business firms restructure their organization? In Section 4, I address this question and argue that exactly because of its related diversification, the multi-business Japanese firm finds it difficult to differentiate its diverse businesses.

2 Stylized Facts

2.1 Corporate Diversification

Although I regard business portfolio of the firm as given throughout the current paper, it is instructive to start with the stylized facts on corporate diversification in Japan, partly because readers may be unfamiliar with them, and more importantly, because diversification strategy is relevant to structures of internal organization, the main topic of the paper. Although

supporting evidence is incomplete, the stylized facts on the Japanese diversification strategy can be summarized as follows:

- (a) The large Japanese firm was on average “less diversified” than the U.S. counterpart during the 1960s, while it may be “more diversified” during the 1990s.
- (b) The Japanese firm tends to diversify into more “related” businesses than the U.S. firm.
- (c) Internal development is a more common method of diversification for the Japanese firm than M&A.

The diversified corporation is the dominant form of business firm in the industrialized world. However, it is not a easy task to measure the degree of diversification quantitatively. The simplest measure counts, for each firm, the number of product categories it sells, using some standard classification codes. Imai (1976) reports the average number of product categories (based on two-digit classification codes of Japan Standard Product Classification) for the largest 124 Japanese industrial firms (as of 1970): 3.24 in 1960 and 3.46 in 1972. The comparable average number based on two-digit classification of Standard Industrial Classification (SIC) for the largest 494 American industrial firms is found in Berry (1975): 3.8 in 1960 and 4.4 in 1965. On the other hand, Claessens, Djankov, Fan, and Lang (1999) conduct international comparison for the period between 1990 and 1996. Using the database covering smaller companies than those cited above, they report that the average number of two-digit segments during that period is 3.2 for Japan and 2.5 for the U.S. They also classify firms as multi-segment if they report sales from more than one two-digit SIC code industries and none of their segments accounts for more than 90 percent of total firm sales. During 1990–96, 67% of the total Japanese firm-years are multi-segment in contrast to 20% for the American firm-years.

The main reason for this reversal appears to be due to changes at the side of the American firm. During the 1960s, in both countries, the degree of diversification was increasing. According to Davis, Diekmann, and Tinsley (1994), in 1980 only 25% of the *Fortune* 500 largest industrial corporations made all their sales within one two-digit SIC industry. And 52% operated in three or more industries. Ten years later, however, the ratio of single-segment firms increased from 25% to 41% and only 30% did operate in three or more industries: The U.S. firms started to pursue corporate specialization. And Claessens, Djankov, Fan, and Lang (1999) show that this trend for refocusing continues during the 1990s: The average number of two-digit segments decreases over time (1990–96) and the decrease is statistically significant at the 1% level. On the other hand, I do not find data showing the long-term trend of the Japanese firm from the 1960s through the 1990s, but Claessens,

Djankov, Fan, and Lang (1999) report that the average number of segments *increases* for Japanese firms during 1990–96 (significant at 5% level).

Counting the number of segments is obviously an incomplete measure of diversification. In particular, it does not take into account the relative importance of each product. There are actually more elaborate measures of diversification, such as Harfindahl index (Berry 1975, Yoshihara, Sakuma, Itami, and Kagono 1981) or entropy (Davis, Diekmann, and Tinsley 1994, Jacquemin and Berry 1979); yet the international comparison using those measures is limited.⁵ However, it appears to be safe to state that during the 1960s, the degree of diversification was increasing in both countries, while it is decreasing in the U.S. during the 1980s and the 1990s.

The second stylized fact is concerning interrelation among the products of each firm. Rumelt (1974) classifies the diversification strategy of the largest U.S. industrial firms (approximately 200 randomly chosen from *Fortune* 500), and Yoshihara, Sakuma, Itami, and Kagono (1981) apply the same scheme to the Japanese firms. Using objective as well as subjective criteria, they classify the firms into the following five strategy types; single, vertical, dominant, related, and unrelated.⁶ A firm is single-type if the specialization ratio, the proportion of the sales from the largest sales segment to the total firm sales, is 95% or more. A firm is vertical-type if 70% or more of the total sales are derived from the (largest) segments of vertically related activities. The dominant type is the firm with the vertical ratio less than 70% and the specialization ratio 70% or more. A firm is related-type if the proportion of the sales from the (largest) business segments which are related in terms of market

⁵For example, Yoshihara, Sakuma, Itami, and Kagono (1981), which uses the same database as Imai (1976), assigns each firm with the following Harfindahl index of corporate diversification.

$$HJ = 1 - \sqrt{\sum_{i=1}^n p_i^2}$$

where n is the number of product categories and p_i is the ratio of sales from product i to the total firm sales. $HJ = 0$ if the firm is single-segment, while $HJ = 1 - \sqrt{1/n}$ if the firm sells its products equally in n segments, and hence this index depends on the number of segments as well as the distribution of sales across segments. According to Yoshihara, Sakuma, Itami, and Kagono (1981), the average value of the largest Japanese firms shifts as follows: 0.375 in 1963, 0.384 in 1968, and 0.405 in 1973 (based on three-digit classification). Unfortunately, the exactly identical index is not available for the U.S. firm. Berry (1975) instead uses

$$HA = 1 - \sum_{i=1}^n p_i^2$$

and reports 0.548 in 1960 and 0.586 in 1965 for the largest American firms (three-digit classification). Since $HA \geq HJ$ for each firm, it does not necessarily imply that the Japanese firm is less diversified.

⁶Both of them actually use more detailed categories, such as dominant-constrained and dominant-linked, based on how the diversified activities are related to the dominant business, specific central skill or resource.

or technology is 70% or more. Finally, neither of the above is classified as unrelated.

According to their analysis, in both countries, during 1949–1974 (U.S.) and 1958–1973 (Japan), the proportion of the single-type firms was decreasing, from 34.5% to 6.2% in the U.S., and from 26.3% to 16.9% in Japan. In both countries, related diversification was increasing from 26.7% to 45.2% in the U.S., and from 30.7% to 39.8% in Japan. In Japan, the fraction of the vertical-type firms was also increasing (13.2% to 18.6%) while the proportion is constant in the U.S., around 15%. On the other hand, although the ratio of the unrelated-type firms was increasing in the U.S. (3.4% to 19.4%), it was decreasing in Japan (8.8% to 6.8%). Overall, these observations confirm the stylized fact (b).⁷ Yoshihara, Sakuma, Itami, and Kagono (1981) further point out that the movement of the Japanese firm toward diversification is much slower than that of the American firm, and even slower than that of the European firm.

Fligstein (1991) covers the longer period, 1919–1979 for the U.S. largest firms. His classification of strategy types, product-dominant, product-related, and product-unrelated, roughly follows Rumelt (1974). His analysis reveals that during the 1960s and 1970s, the U.S. firms moved rapidly toward unrelated diversification. The proportion of unrelated type was increasing from 6.0% (1948–1959) to 17.4% (1959–69), and 27.8% (1969–1979).

Beyond 1980, many acquisitions were made to break up poorly performing conglomerate firms in the U.S., and the move toward unrelated diversification was turned around. There are many empirical studies that explain the takeover wave of the 1980s as a response to the disappointment with conglomerates, and hence I do not discuss it here.⁸ And then how about the 1990s? Claessens, Djankov, Fan, and Lang (1999), using new measures of vertical relatedness and complementarity developed by Fan and Lang (2000), compare diversification strategy of American firms with that of East Asian firms.⁹ They report that during the 1990s, (i) the mean relatedness measure of multi-segment U.S. firms is still lower than that of the Japanese counterparts; (ii) U.S. firms increase complementary diversification

⁷Odagiri (1992) reports more recent data (1978, 1981, 1984) in Japan, according to which the proportion of related diversification increases to 41–42%, while interestingly the fraction of unrelated diversification also increases to 11%.

⁸See, for example, Bhagat, Shleifer, and Vishny (1990) and Davis, Diekmann, and Tinsley (1994).

⁹Fan and Lang (2000) utilize *Use Table of Benchmark Input-Output Accounts for U.S. Economy*. The vertical relatedness of two industries i and j is defined by the average of v_{ij} and v_{ji} where v_{ij} is the dollar value of industry i 's output required to produce one dollar's worth of industry j 's output. The complementarity between i and j is defined by the average of two correlation coefficients, one of which measures overlap in inputs required by industries i and j , the other of which measures overlap in outputs in the markets to which i and j sell their products. The two firm-level measures are defined by taking sales-weighted averages of the industry-level measures across diversifying industries.

by divesting unrelated assets; and (iii) Japanese firms are increasing vertical relatedness.¹⁰

The empirical evidence of the third stylized fact is scarce because of few studies of M&A in Japan. One such study finds that during the 1980s there is some tendency that more Japanese firms use M&A as a means of diversification, while most of such M&A are directed to the related businesses in which the acquiring firms also make efforts to develop internally, and hence the M&A complement internal diversification, in contrast to conglomerates in the U.S. (Odagiri and Hase 1989).

2.2 Organizational Form

The internal organizational structures of large corporations that are widely implemented in practice can be understood as variants of the following three basic structures. The *unitary functional* form (U-form) consists of a set of units each of which specialize in basic business function, such as manufacturing, marketing, finance, human resources, accounting, R&D, and so on. In the *multi-divisional* form (M-form), the organization is divided into a set of autonomous, self-contained divisions based on product, region, or customer type. Each division is, like a unitary functional form, subdivided in terms of basic functions. The *matrix* form is organized along multiple (usually two) dimensions (e.g., product and geographic region) of reporting and authority structure, in contrast with the other forms where the principle of unity of command is preserved. Those at the intersection of the matrix must report information to and accept command from two bosses in terms of two dimensions (e.g., product manager and geography head) of the organization.

The M-form structure is dominant among the largest American companies. Fligstein (1985) examines the spread of the M-form among the 100 largest nonfinancial corporations (in terms of assets) during 1919–1979. Although in 1929 only 1.5% of the firms had adopted the M-form, the proportion has risen to 84.2% by 1979. In Kagono, Nonaka, Sakakibara, and Okumura (1985), the proportion is 94.4% (among approximately 220 of the *Fortune* 1,000 industrial firms in 1980).

The first stylized fact concerning the organizational form of the Japanese firm is that compared with these figures, the M-form organization is less prevalent among the largest Japanese firms. In Kagono, Nonaka, Sakakibara, and Okumura (1985), only 59.8% adopt the M-form in 1980. The proportion is even smaller in other studies, partly due to differences

¹⁰Note that (i) is not inconsistent with the fact that the large U.S. firm is on average less diversified than the Japanese counterpart during the 1990s (the second half of fact (a)). Remember that the evidence for this fact is based on the comparison of the average number of business segments and the ratio of multi-segment firms between the U.S. and Japan. It appears to be the increase of single-business firms that accounts for the smaller average degree of diversification in the U.S. during the 1990s.

in years and samples (Kono 1984, Yoshihara, Sakuma, Itami, and Kagono 1981).

Table 1: Comparison of Self-Contained Divisions under the M-Form

Function	U.S.	Japan
Production	96.7%	85.5%
Sales	94.8%	91.5%
Marketing	89.6%	82.6%
Personnel	84.4%	35.5%
Control	82.0%	40.1%
Finance	38.4%	12.2%
Basic research	19.9%	28.5%
Applied research	62.1%	75.6%
Purchasing	77.3%	52.4%

Each number represents the percentage of the firms in which the function is performed by divisions. Source: Kagono, Nonaka, Sakakibara, and Okumura (1985).

Second, the M-form structure adopted by Japanese firms is distinct from that of the U.S. firms in several respects. Table 1 shows how self-contained the M-form structure of the largest firms in the U.S. and Japan is. It provides for each function the fraction of the firms in which the divisions perform that function. Although in the M-form each division is supposed to be autonomous and self-contained, the table shows that the M-form is not as self-contained in Japan as in the U.S. Two observations are worth mentioning. First, not a few Japanese companies have divisions without production, sales, marketing, or purchasing. Kagono (1993) argues that in the Japanese M-form structure, especially in electronics and machinery industries, divisions specializing in manufacturing and product development and those specializing in marketing and sales are separated, and calls them functional divisions. Second, the proportion of the M-form with personnel, control, and finance functions is smaller in Japan than in the U.S. The centralized personnel department is an important feature of the internal organization of the Japanese firm, and the table confirms this feature. Furthermore, although most U.S. firms maintain the finance function at the corporate level and hence only 38.4% of the American firms keep finance at the division level, the proportion is even smaller in Japan (12.2%).

Another feature of the Japanese M-form is that performance-based control of divisions

is less strict than the M-form of the U.S. firm. Kagono, Nonaka, Sakakibara, and Okumura (1985) report the following results: (i) Divisional performance evaluation is significantly more sophisticated in the U.S. than in Japan, in the sense that the criteria and/or the weights attached on common criteria are different across divisions; (ii) Divisional performance affects the bonus and/or salary of the division head significantly more in the U.S. than in Japan. The important feature of the M-form structure is that there is a corporate headquarters office, along with autonomous divisions, specializing in control thorough monitoring, evaluation, and resource allocation, as well as strategic decision making. However, Kagono, Nonaka, Sakakibara, and Okumura (1985) argue that the U.S. firm is characterized by output control while the Japanese firm utilizes sharing of values and information to motivate its managers to work appropriately.

3 Strategy and Structure: Theories

The development of corporate diversification and the movement toward the M-form structure are logically linked. According to Chandler (1962), the classic account of the history of business enterprises in the U.S., several large companies had actively diversified in related businesses, found it necessary to reorganize their internal structures, and resulted in the M-form innovation after World War I. Thus “structure follows strategy.” Several empirical studies confirm this prediction. Palmer, Friedland, Jennings, and Powers (1987) find that those firms industrially diversified and geographically dispersed are more likely to adopt the M-form structure. Fligstein (1985) finds that firms in those industries where diversification strategies dominated adopted the M-form relatively early, while firms in vertically integrated industries adopted the M-form later and to a lesser degree.

In Japan Matsushita (Panasonic) was the first company to adopt the M-form. Although Matsushita adopted the M-form at the size smaller than those U.S. innovators, it appears to share with them the feature that the growth and diversification of the company motivated the implementation of the M-form. The movement toward the M-form became popular during the 1960s when large Japanese firms were growing and diversifying rapidly. The empirical analysis of Yoshihara, Sakuma, Itami, and Kagono (1981) confirms “structure followed strategy” in Japan.

Why does the firm adopt the M-form when it grows in terms of scale and scope? What are costs and benefits of the M-form vis-a-vis the U-form? In this section I summarize theories behind the choice of the M-form organization.

Two pioneers of research on the M-form, Chandler (1962, 1990) and Williamson (1975, 1985), have already offered informal analyses of the efficient M-form organization. How-

ever, formal models of their informal theories are still scarce.¹¹ I thus complement their argument with the analysis of simple models. Based on the arguments by Chandler and Williamson, I summarize the advantages of the M-form as follows: (i) coordination benefits and the resulting separation of strategic decisions from operating decisions; (ii) improved information for incentives; and (iii) development of internal capital markets.

3.1 Coordination Benefits

First, the M-form structure removes top executives from involvement in the functional affairs and enables them to concentrate on strategic decision making. Chandler's argument emphasizes the administrative overload of senior management under the U-form structure. He argues that under the U-form, senior managers cannot have the time and the information necessary to be involved in day-to-day operations through coordination and monitoring, as well as to make and implement strategic decisions on product portfolio. However, a question remains: Why do senior managers have to be involved more in day-to-day operations under the U-form than under the M-form?

Williamson offers an information processing view. Managers are boundedly rational in information acquisition and processing. Their attention to data and their information processing capacities are scarce resources. One advantage of the organization is that it can have its members specialize in different information sources. However, the resulting differential information among the members implies the possibility that their independent decisions are far from desirable from the organizational viewpoint, even if all the members share the same goal. Since functional tasks are closely linked, rapid growth of the U-form firm demands more and more coordination tasks on top management.

The M-form structure enables the firm to separate operating decisions from strategic decisions and to assign the former responsibilities to the divisions because it changes the U-form's functional divisions into autonomous, self-contained operating divisions between which interactions are weak, so that there are far less coordination needs.

Although there are some theoretical analyses of firm organization from the information processing viewpoint,¹² none of them offers insights into the choice between the M-form and the U-form structures. The analysis that follows is based on an unpublished work of mine.

Consider a firm that engages in two lines of business $i = 1, 2$. Performance of business i is determined by production activity p_i and sales activity s_i along with uncertainty. These

¹¹Aghion and Tirole (1995), Maskin, Qian, and Xu (2000), and Rotemberg (1999) are exceptions.

¹²A partial list includes Aoki (1986, 1995), Bolton and Dewatripont (1994), Crémer (1980, 1990), Geanakoplos and Milgrom (1991), Marschak and Radner (1972), and Radner (1993).

two activities jointly determine the firm's overall decision in business i , which is supposed to be represented by $d_i = p_i + s_i$, and the firm wants to adapt the decision to environmental uncertainty represented by θ_i as closely as possible. To capture this feature in a simple way, I assume that the firm makes losses at business i that are quadratic in $d_i - \theta_i$. This term represents a direct effect of joint activities on business i .

I also assume that production activity and sales activity are complementary. That is, raising both production and sales activities simultaneously results in larger increases in performance than raising each of them unilaterally. I capture this effect by assuming that the firm makes additional losses at business i that are quadratic in $p_i - s_i$.¹³ This term represents a coordination benefit across functional tasks within business i .

The firm thus wants to minimize the following loss function:

$$L = (p_1 + s_1 - \theta_1)^2 + (p_2 + s_2 - \theta_2)^2 + D_1(p_1 - s_1)^2 + D_2(p_2 - s_2)^2 \quad (1)$$

where D_i is a positive constant, representing the importance of two functional activities' being aligned with each other within business i . I assume θ_1 and θ_2 are independent and are Normally distributed with mean zero and precision (inverse of variance) h_1 and h_2 , respectively. To conform to the information processing perspective, I assume there is no conflict of interest among the members of the firm: All the members share the same organizational goal, minimizing (the expected value of) L .

The firm consists of the headquarters and two managers A and B . The headquarters hires the managers and chooses between the U-form and the M-form organization. If the firm is organized in the U-form, one of two managers specializes in production activity and the other specializes in sales activity, and the former decides (p_1, p_2) and the latter decides (s_1, s_2) . The first manager is called a production manager, and the second manager a sales manager. Without loss of generality, I assume manager A becomes production manager and manager B sales manager. On the other hand, if the M-form is chosen, then one (the other) of the managers becomes division 1 (division 2) manager and chooses (p_1, s_1) (respectively (p_2, s_2)). I assume that manager A specializes in business 1 and manager B in business 2.

In either structure, two managers engage in information acquiring. At the information acquiring stage, each manager spends time for acquiring information concerning uncertainties θ_1 and θ_2 , and manager j receives signals $\theta_1^j = \theta_1 + \epsilon_1^j$ and $\theta_2^j = \theta_2 + \epsilon_2^j$ where ϵ_1^j and ϵ_2^j are noise terms and are Normally distributed with mean zero and precision h_1^j and h_2^j , respectively ($j = A, B$). All four noise terms are assumed to be independent.

Precisions h_1^j and h_2^j represent manager j 's capacity to process information concerning businesses 1 and 2, respectively. I assume that h_i^A is determined by manager A 's inherent

¹³Rotemberg (1999) uses the same functional form to capture complementarity between two functional activities.

ability as well as time allocation as follows: $h_1^A = a_1 t^A$ and $h_2^A = a_2(1 - t^A)$, where $a_i \geq 0$ represents manager A 's ability at business i , and t^A is the time used by manager A for gathering and processing information about θ_1 . The total time available for information gathering is limited and is assumed to be one, and hence $1 - t^A$ is used for information gathering about θ_2 . Similarly, I define $h_1^B = b_1 t^B$ and $h_2^B = b_2(1 - t^B)$. Assume that abler managers are more costly either because of training costs or search costs: The firm choosing a manager with ability $a = (a_1, a_2)$ incurs cost $c(a)$, which I assume is linear and increasing in a . Similarly, manager with ability $b = (b_1, b_2)$ costs $c(b)$.

After gathering information, the managers make decisions for their assigned activities based on their information. For example, under the U-form, manager A chooses (p_1, p_2) based on (θ_1^A, θ_2^A) and manager B chooses (s_1, s_2) based on (θ_1^B, θ_2^B) . What each manager chooses is thus a function of his information, and hence I write, with abuse of notations, $p_i = p_i(\theta_1^A, \theta_2^A)$ and $s_i = s_i(\theta_1^B, \theta_2^B)$ for $i = 1, 2$. Similarly, under the M-form, manager A chooses (p_1, s_1) based on information (θ_1^A, θ_2^A) and hence I write $p_1 = p_1(\theta_1^A, \theta_2^A)$ and $s_1 = s_1(\theta_1^A, \theta_2^A)$. Manager B 's decisions are given by $p_2 = p_2(\theta_1^B, \theta_2^B)$ and $s_2 = s_2(\theta_1^B, \theta_2^B)$.

Consider the M-form structure. Under this structure, it is clearly optimal for production manager A to choose, as an overall decision, $d_1 = d_1(\theta_1^A, \theta_2^A)$ for each information (θ_1^A, θ_2^A) to minimize $E[(d_1(\theta_1^A, \theta_2^A) - \theta_1)^2 | \theta_1^A, \theta_2^A]$, and to set $p_1 = s_1 = d_1/2$. By this way, manager A can coordinate between two functional activities within division 1 perfectly. The similar argument holds for manager B specializing in division 2. Note that the coordination problem is resolved only by the division managers, and hence the headquarters is freed from “day-to-day operations” on intra-divisional coordination: If one introduces a need for strategic decision making into the model, under the M-form it is separated from operational decision making and the headquarters can concentrate on the former decisions. On the other hand, under the U-form structure, two managers cannot resolve the coordination problem: The coordination terms become zero if and only if two managers ignore their information and choose (p_1, p_2, s_1, s_2) independent of (θ_1^A, θ_2^A) and (θ_1^B, θ_2^B) almost everywhere.

Based on this argument, one can show that the U-form structure is no better than the M-form structure. To give the greatest advantage to the U-form, suppose tentatively $D_1 = D_2 = 0$ and hence no coordination is necessary. I first show that the performance of the U-form cannot exceed that of the M-form when the same two managers with information processing capacities (h_1^A, h_2^A) and (h_1^B, h_2^B) are hired and they can share information completely with no communication cost. Under the U-form structure it is optimal for the managers to make decisions to satisfy, for almost all information $(\theta_1^A, \theta_2^A, \theta_1^B, \theta_2^B)$,

$$\begin{aligned} p_1(\theta_1^A, \theta_1^B) + s_1(\theta_1^A, \theta_1^B) &= E[\theta_1 | \theta_1^A, \theta_1^B] \\ p_2(\theta_2^A, \theta_2^B) + s_2(\theta_2^A, \theta_2^B) &= E[\theta_2 | \theta_2^A, \theta_2^B] \end{aligned}$$

Then the expected loss $E[L|\theta_1^A, \theta_2^A, \theta_1^B, \theta_2^B]$ is equal to $\text{Var}(\theta_1|\theta_1^A, \theta_1^B) + \text{Var}(\theta_2|\theta_2^A, \theta_2^B)$. However, under the M-form, the same expected loss can be attained irrespective of the values of D_1 and D_2 . Given (h_1^A, h_2^A) and (h_1^B, h_2^B) , the U-form structure is hence no better (is generally worse) than the M-form structure, because of imperfect coordination.

Now consider the headquarters' choice of abilities a and b and time allocation under the M-form structure. One can show that it is optimal for the headquarters to make manager A (B) specialize in θ_1 (θ_2) in the sense of $a_2 = 0$ and $t^A = 1$ ($b_1 = 0$ and $t^B = 0$, respectively), even though the communication costs were zero. Note that communication is of no value under these optimal abilities. The M-form structure is therefore better than the U-form structure, taking into consideration the headquarters' choice of the abilities, for any communication cost.

In the analysis so far, the headquarters plays no coordination role. I now consider the possibility of hierarchical coordination via the headquarters. Suppose that two managers send their information to the headquarters and then the headquarters decides (p_1, s_1, p_2, s_2) . Under this hierarchical mode, the firm can zero out the coordination terms, by ordering the functional managers to take actions satisfying $p_1 = s_1$ and $p_2 = s_2$ for almost all messages communicated to the headquarters. However, it is likely that communication to the headquarters costs the firm, due to delay in decision making, imperfect understanding of the messages, and so on. Depending on parameter values (including the communication cost), under the U-form the headquarters may optimally engage in "day-to-day operations" (coordination tasks): strategic decisions and operational decisions may not be separated under the U-form in contrast to the M-form. And the introduction of the hierarchical coordination does not alter the optimality of the M-form because of the additional communication cost of the hierarchical coordination.

3.2 Improved Incentives

The second advantage of the M-form structure is that it improves measurement and information for incentives and control purposes. Under the U-form, it is difficult to measure the performance of each functional manager: Adequate performance measures are rarely available, and the performance for each product is jointly determined by several functional managers and hence the well known team production problem is likely to arise (Alchian and Demsetz 1972, Holmstrom 1982). Under the M-form structure, divisions are assigned to clear-cut "profit centers" and are held accountable for the divisional performance. The measurement problem is hence likely to be mitigated.

This advantage is relevant to but distinct from the coordination advantage discussed first. The latter advantage realizes even if all the members of the firm share the same corporate

goal, while the former presumes the existence of an incentive problem due to opportunistic behavior by division managers. Williamson thus argues that it is important for the top management to be supported by an elite staff who has the capacity to evaluate divisional performance.

The improved incentive effect of the M-form can be analyzed in a multitask principal-multiagent framework (Holmstrom and Milgrom 1991, Itoh 1992). Suppose as above that the firm engages in two lines of business $i = 1, 2$ and performance of business i depends on production activity p_i and sales activity s_i as well as noise. Let x_i be the profit from business i , and for simplicity I assume the following production function: $x_i = p_i + s_i + \epsilon_i$ where ϵ_i is the noise term, Normally distributed with mean zero and variance σ^2 . To simplify the analysis I assume ϵ_1 and ϵ_2 have the identical variance and are stochastically independent.

As before, the firm consists of the headquarters, who chooses between the U-form and M-form structures, and two managers A and B . Under the U-form, manager A (production manager) chooses (p_1, p_2) and manager B (sales manager) chooses (s_1, s_2) , while under the M-form, manager A heads division 1, being assigned with (p_1, s_1) , and manager B chooses (p_2, s_2) . I assume that the choice of activities is not observable to the headquarters, which feature leads to a moral hazard problem. Manager who chooses two activities (y, z) incurs private monetary cost $c(y, z) = (y^2 + z^2 + 2\delta yz)/2$ where δ is a constant satisfying $\delta \in [0, 1)$. Activities y and z thus exhibit cost substitutes. When $\delta = 0$, two activities are independent in the sense that increasing y does not incur any opportunity cost to choosing z . When $\delta > 0$, increasing y raises the marginal cost of z .

Two managers are risk averse with the common constant coefficient of absolute risk aversion r : If a manager is assigned with activities (y, z) and his pay is a random variable w , his preference is represented by the certainty equivalent $E[w] - c(y, z) - (r/2)\text{Var}(w)$. Note that the last term is the risk premium.

The headquarters is risk neutral and chooses a performance-based compensation scheme for each manager.¹⁴ I assume that x_1 and x_2 are contractible,¹⁵ and the schemes are linear in x_1 and x_2 : Let $w_j(x_1, x_2)$ be the compensation scheme for manager $j = A, B$. Then linearity

¹⁴Aghion and Tirole (1995) assume that explicit incentive schemes are infeasible, and instead focus on implicit incentives (career concern). They show that the M-form offers better implicit incentives than the U-form structure, and complement my analysis of explicit incentives.

¹⁵If functional performances, such as $y_p = p_1 + p_2 + \epsilon_p$ and $y_s = s_1 + s_2 + \epsilon_s$, are measurable and contractible as well, then comparison between the M-form and the U-form is reduced to comparison of conditional variances of the noise terms. See Maskin, Qian, and Xu (2000).

implies that they are of the following form:

$$w_A(x_1, x_2) = \alpha_0 + \alpha_1 x_1 + \alpha_2 x_2,$$

$$w_B(x_1, x_2) = \beta_0 + \beta_1 x_1 + \beta_2 x_2.$$

Define $\alpha = (\alpha_0, \alpha_1, \alpha_2)$ and $\beta = (\beta_0, \beta_1, \beta_2)$ which are chosen by the headquarters. I call $\alpha_1, \alpha_2, \beta_1, \beta_2$ incentive coefficients or share rates interchangeably.

First consider the M-form structure. Given compensation scheme α , manager A chooses (p_1, s_1) to maximize $\alpha_1(p_1 + s_1) + \alpha_2(p_2 + s_2) - c(p_1, s_1) - R(\alpha_1, \alpha_2)$ where the risk premium $R(\alpha_1, \alpha_2)$ is given by

$$R(\alpha_1, \alpha_2) = \frac{1}{2} r \sigma^2 (\alpha_1^2 + \alpha_2^2).$$

Manager A 's optimal choice is hence $p_1 = s_1 = \alpha_1 / (1 + \delta)$. Manager B 's optimal choice is similarly given by $p_2 = s_2 = \beta_2 / (1 + \delta)$. The headquarters' schemes must satisfy these incentive compatibility constraints. Note that only α_1 and β_2 matter for incentives. The remaining coefficients α_2 and β_1 do not affect the incentive compatibility constraints, and are determined so as to minimize the total risk premium $R(\alpha_1, \alpha_2) + R(\beta_1, \beta_2)$, which leads to $\alpha_2 = \beta_1 = 0$.¹⁶

The headquarters chooses α and β , as well as (p_1, s_1, p_2, s_2) , to maximize $E[x_1 + x_2 - w_1 - w_2]$ subject to the incentive compatibility constraints and the participation constraints which imply that each manager obtain at least some exogenously given income. Since α_0 and β_0 can be chosen to satisfy the participation constraints without affecting the headquarters' problem, the problem can be reformulated, by substituting all the constraints into the objective function, as choosing (α_1, α_2) and (β_1, β_2) to maximize the total certainty equivalent

$$\frac{2\alpha_1}{1+\delta} + \frac{2\beta_2}{1+\delta} - (1+\delta) \left(\frac{\alpha_1}{1+\delta} \right)^2 - (1+\delta) \left(\frac{\beta_2}{1+\delta} \right)^2 - R(\alpha_1, 0) - R(0, \beta_2).$$

The optimal share rates α_1^M and β_2^M are then calculated as

$$\alpha_1^M = \beta_2^M = \frac{2}{2 + (1 + \delta)r\sigma^2}. \quad (2)$$

Next under the U-form organization, manager A chooses (p_1, p_2) to maximize $\alpha_1(p_1 + s_1) + \alpha_2(p_2 + s_2) - c(p_1, p_2) - R(\alpha_1, \alpha_2)$. The first-order conditions yield $p_1 = (\alpha_1 - \delta\alpha_2) / (1 - \delta^2)$ and $p_2 = (-\delta\alpha_1 + \alpha_2) / (1 - \delta^2)$. Similarly, the first-order conditions for (s_1, s_2) yield $s_1 = (\beta_1 - \delta\beta_2) / (1 - \delta^2)$ and $s_2 = (-\delta\beta_1 + \beta_2) / (1 - \delta^2)$. These four equations constitute the incentive compatibility constraints. Note that under the U-form structure, all the

¹⁶ If ϵ_1 and ϵ_2 are positively correlated because of systemic effects (economy-wide factors, brand name effects, and so on), then $\alpha_2 = -\rho\alpha_1 \leq 0$ and $\beta_1 = -\rho\beta_2 \leq 0$ where $\rho \in (0, 1]$ is the correlation coefficient.

incentive coefficients affect the managers' choice of activities, and they must be nonnegative for the headquarters to implement positive activity levels. This difference turns out to be crucial for the comparison between the M-form and the U-form. The optimal share rates $(\alpha_1^U, \alpha_2^U, \beta_1^U, \beta_2^U)$ are obtained as follows:

$$\alpha_1^U = \alpha_2^U = \beta_1^U = \beta_2^U = \frac{1}{1 + (1 + \delta)r\sigma^2} \quad (3)$$

Comparing α_1^M with α_1^U yields $\alpha_1^M > \alpha_1^U$: Under the M-form the optimal share rates are larger, and hence the managers can be provided with higher-powered incentives and higher levels of operational activities can be implemented.

To understand this result, suppose that the headquarters wishes to implement activity $p > 0$ for all the functions at both divisions. Under the U-form this can be done by setting $\alpha_1 = \alpha_2 = \beta_1 = \beta_2 = (1 + \delta)p$. The M-form can implement the same activity by $\alpha_1 = \beta_2 = (1 + \delta)p$. Under the M-form structure, the remaining coefficients α_2 and β_1 are set to zero to minimize the risk premium, and hence the M-form can implement the same activity with smaller risk premium (and hence less costs) than the U-form.

3.3 Internal Capital Markets: Efficient or Inefficient?

Third, the corporate headquarters of the M-form organization can engage in reallocation of capital across divisions from less to more productive uses. In other words, the M-form creates an *internal capital market* in which the divisions compete for scarce resources and the headquarters picks up the winners and the losers. Williamson (1975) argues that "this assignment of cash flows to high yield uses is the most fundamental attribute of the M-form enterprise..." (p. 148). He ascribes the advantage of internal capital markets over external markets to better monitoring and control by the competent headquarters. However, this argument does not explain why centralized financing through banks cannot do as well. More recently, Gertner, Scharfstein, and Stein (1994), following the framework of the property rights approach to the firm boundaries (Grossman and Hart 1986, Hart and Moore 1990, Hart 1995), distinguish between two markets in that in an internal capital market the corporate headquarters "owns" the divisions and hence possesses the residual control rights over the use of their assets while a bank does not own them. This distinction and a direct application of the property rights approach lead them to argue that an internal capital market enjoys increased monitoring incentives and better asset redeployability while it suffers from diminished managerial incentives at divisions.

Stein (1997) argues that self-interested top executives do not necessarily imply inefficient capital allocation because, although they, along with empire-building preferences, tend to overinvest on average in all the projects, limited funds provide them with an incentive to

depend on relative merits (“winner-picking”) and to channel capital toward more productive projects and away from less productive ones. He then argues that the internal capital market is more likely to be value-increasing as the firm operates in more related lines of business, in the sense that their profits are more correlated. This logic can be confirmed in a variant of the model of the previous subsection 3.2: Suppose ϵ_1 and ϵ_2 are correlated with correlation coefficient $\rho > 0$. As in footnote 16, under the M-form the optimal share rates satisfy $\alpha_2 < 0$ and $\beta_1 < 0$ because such a “relative performance” regime can filter out common uncertainty effects behind the positive correlation and reduce the risk premium further. Such an arrangement is not available under the U-form (if the headquarters wishes to keep all the activities positive), and hence the advantage of the M-form is magnified as the correlation coefficient ρ increases.

However, the decline of the conglomerate firms and the ample empirical evidence suggesting value-reducing capital misallocation within diversified firms in the U.S.¹⁷ lead researchers to doubt the efficiency of internal capital markets. The recently emerging theoretical literature that attempts to explain value-reducing internal capital markets turns to political influence of division managers on investment decisions. In what follows I illustrate the problem of internal capital markets, by analyzing a modified version of the model of Rajan, Servaes, and Zingales (2000).

There are two divisions $i = 1, 2$, and each division manager chooses either project E or D . Project E is technologically efficient and the headquarters prefers both divisions to implement project E . However, the surplus generated from this project is subject to power struggle between the managers, and each division’s surplus may be poached by the other division. For example, project E of a division may need cooperation from the other division to realize the surplus. Project D is an inefficient but defensive project in the sense that it is a specialized, less interdependent investment protecting the surplus from being grabbed by the other division.

Let u_{jk}^i be the private payoff to division i manager when division 1 implements project j and division 2 project k , $j, k \in \{E, D\}$. When both divisions choose D , then there is no room for power struggle and the payoffs are given as follows: $u_{DD}^1 = \lambda b m_1$ and $u^2 = \lambda m_2$ where m_i is the fund of division i that can be invested. It is determined by the initial endowment of resources e_i and reallocation by the headquarters as follows: $m_1 = e_1 - t$ and $m_2 = e_2 + t$, where t is the transfer of funds from division 1 to 2 by the headquarters. For simplicity, I normalize $e_1 + e_2 = m_1 + m_2 = 1$. By investing m_i in the defensive project, division i generates return $b_i m_i$, and I assume $b_1 = b \in (0, 1)$ and $b_2 = 1$. It implies division 2 has better opportunities or is more productive than division 1. Each division manager obtains

¹⁷See Stein (2001) for a survey.

fraction $\lambda \in (0, 1)$ of the returns as a private benefit.

If division 1 chooses D and division 2 chooses E , then part of division 2's private benefit is seized by division 1, and hence $u_{DE}^2 < u_{DD}^2$. Division 1 manager has to incur a cost of poaching which is equal to the surplus he receives, and hence $u_{DE}^1 = u_{DD}^1$. Similarly, $u_{ED}^2 = u_{DD}^2$ and $u_{ED}^1 < u_{DD}^1$.

Finally, if both choose E , then the managers split fraction λ of the total returns equally. Since project E is efficient, I assume project E generates $(b+\pi)m_1$ at division 1 and $(1+\pi)m_2$ at division 2, where π is a constant satisfying $\pi \in (0, 1)$. The payoffs are thus given as follows: $u_{EE}^1 = u_{EE}^2 = (\lambda/2)(bm_1 + m_2 + \pi)$. The payoff matrix is given in Table 2.

Table 2: Payoff Matrix

	E	D
E	$\frac{\lambda}{2}(bm_1 + m_2 + \pi), \frac{\lambda}{2}(bm_1 + m_2 + \pi)$	$u_{ED}^1, \lambda m_2$
D	$\lambda b m_1, u_{DE}^2$	$\lambda b m_1, \lambda m_2$

Row player is division 1 and column player is division 2.

For the headquarters to implement project E at both divisions, (E, E) must be a Nash equilibrium.¹⁸ The necessary and sufficient conditions are $u_{EE}^1 \geq u_{DE}^1$ and $u_{EE}^2 \geq u_{ED}^2$, or

$$\max\{bm_1 - m_2, m_2 - bm_1\} \leq \pi. \quad (4)$$

The condition implies that the ex post surplus cannot be too diverse across divisions. For example, if $bm_1 - m_2 > \pi$, then division 1 does not want to choose E because project E from division 2 does not contribute enough surplus.

The headquarters chooses to reallocate funds so as to satisfy (4). Note that the first-best transfer is $t = e_1$, that is, all the funds should be transferred to the most productive division 2. However, this does not happen in equilibrium. If $t = e_1$, then $m_2 - bm_1 = 1 > \pi$ and hence (4) is violated and the headquarters cannot induce division 2 manager to choose E . It is easy to show that in my setting, division 2's incentive compatibility constraint always binds, and hence solving $(e_2 + t) - b(e_1 - t) = \pi$ yields

$$t = \frac{\pi + be_1 - e_2}{1 + b}. \quad (5)$$

First note that $t > 0$ if $\pi > e_2 - be_1$, that is, either division 1's resource-weighted initial opportunities are better than division 2's, or division 2 has better initial opportunities but

¹⁸Note that (D, D) is always a Nash equilibrium. I do not discuss issues of multiple equilibria.

the difference is not large. The capital reallocation is in the “right” direction, from the less productive division 1 to the more productive division 2, although the efficient transfer does not arise. Second, if division 2’s resource-weighted initial opportunities are so large that $\pi < e_2 - be_1$, then the reallocation is in the “wrong” direction ($t < 0$). In either case, the conclusion is that capital reallocation in the internal capital market ends up leaving excessive funds to the “weak” division.¹⁹ The inefficiency is more likely to arise as the investment opportunities are more diverse across divisions, and the empirical part of Rajan, Servaes, and Zingales (2000) confirms this theoretical hypothesis.

3.4 Summary

Let me summarize where we stand. The M-form structure has several advantages over the U-form structure. The main feature underlying these advantages is, as Williamson (1975, pp. 149) puts it, that “[t]he M-form structure is one that *combines* the divisionalization concept with an internal control and strategic decision-making capability.” As the firm grows both in scale and scope, the M-form organization is likely to be a better choice, and hence “structure follows strategy.”

The M-form organization is not without a problem. In particular, it is evident in the U.S. data that diversification into unrelated businesses is value-reducing. Part of the merger wave during the 1980s can be explained by a negative response to the conglomerates and a return to specialization. The major explanation for value-decreasing corporate diversification at this point is by the inefficiency of internal capital markets.

Turn to Japan, we know that conglomerates have been far less prevailing than in the U.S. One of the stylized facts is that the Japanese firm tends to diversify into more related businesses than the U.S. firm. Claessens, Djankov, Fan, and Lang (1999) report that during the 1990s, vertical relatedness and complementarity increase firm value in Japan (as well as in the U.S. for complementarity). Then why does the Japanese firm need organizational

¹⁹Rajan, Servaes, and Zingales (2000) assume away an agency problem between the shareholders and the headquarters, and they assume that investment cannot be contracted upon. Scharfstein and Stein (2000) apply the work on rent-seeking or influence activities within organizations (Milgrom 1988, Milgrom and Roberts 1988, Meyer, Milgrom, and Roberts 1992) to the intra-firm capital allocation problem. In their model, division managers may spend time to improve their outside options so as to elicit more compensation or more resources at a later bargaining with the headquarters, at the sacrifice of current production activity. The possibility of influence activity does not necessarily result in misallocation of funds, however, because the headquarters can simply increase compensation, keeping the efficient capital allocation intact. In their model, potential influence activity may lead to internal misallocation, because the headquarters herself is an agent of shareholders, and it is less costly for her to use allocation of funds across divisions responding to possible influence activity than to pay cash compensation. The result is similar to that of the main text: excessive funds are reallocated from “strong” businesses, in the sense of more investment opportunities, to “weak” businesses.

restructuring? I address this question in the next section.

4 Related Businesses and the M-Form in Japan

In this section, I argue that exactly because it diversifies into related businesses, the multi-business Japanese firm faces problems of organizing its lines of businesses internally, in particular, managing diverse businesses differently. I first extend the analysis in the previous section by introducing interdependence across divisions, and argue that the more related the businesses are, the more likely it is that the advantage of the M-form over the U-form is lost or the M-form organization is modified so as to incorporate those distinct features of the M-form in Japan that were pointed out in subsection 2.2. I then return to strategic decision making, in particular, the headquarters' role of capital reallocation in the internal capital market, and argue that the more related the businesses are, the more likely too many funds are to be reallocated to the weaker divisions.

4.1 How Does Relatedness Affect the Advantages of the M-Form?

The analyses in the previous section essentially assume that two businesses $i = 1, 2$ are unrelated. The information processing model in subsection 3.1 only considers the intra-business coordination need, and hence if the M-form structure is adopted, it is optimal for each manager to specialize in his business in terms of information processing capacity and time allocation, and to make a decision independently of the other division. Instead, suppose that two businesses are related in the sense that the overall activity at division 1 and 2 exhibit complementarity: I model this by adding $G(d_1 - d_2)^2$ to the loss function (1), where $d_i = p_i + s_i$, $i = 1, 2$, and G is a positive constant, representing a "relatedness" measure. The new term means that increasing the overall activity at one division raises the return to increasing the activity at the other division.

The M-form organization cannot zero out this inter-business coordination term. To do this, the managers must choose their decisions such that they satisfy

$$p_1(\theta_1^A, \theta_2^A) + s_1(\theta_1^A, \theta_2^A) = p_2(\theta_1^B, \theta_2^B) + s_2(\theta_1^B, \theta_2^B)$$

for almost all possible values of the signals observed by the managers. This is possible only when they set $p_1(\cdot) + s_1(\cdot)$ and $p_2(\cdot) + s_2(\cdot)$ to some identical constant level almost everywhere. Of course, such decisions are costly in light of the direct effect. Therefore, the performance of the M-form declines as the relatedness of two businesses increases.²⁰

²⁰The result does not change if the managers can communicate with each other, as long as communication

On the other hand, the performance of the U-form organization and that of the hierarchical coordination are not hurt by the related businesses as much as that of the M-form. Under the U-form, each functional manager can restrict the negative effect of inter-business coordination failure by keeping two activities within each functional area close. And under the hierarchical system the headquarters can decide all the activities to mitigate the coordination problem. It is therefore more likely that the headquarters intervenes into coordination even under the M-form, or that the M-form is replaced by the U-form, as the businesses are more related.

In the principal-multiagent model in subsection 3.2, two divisions are unrelated, either, in the sense that x_1 and x_2 are stochastically independent and no externality exists across the divisions. As I explained in subsection 3.3, positive correlation between the noise terms makes the M-form structure even more attractive due to relative performance evaluation. This logic is the basis for Stein (1997) arguing that related diversification favors internal capital markets.

However, divisional performances can be correlated for reasons other than relatedness, such as economy-wide conditions or the brand name effect of the firm. Alternatively, I can introduce technological externality or complementarity across divisions into the model. A simple way to introduce externality is to modify x_1 and x_2 as follows.

$$\begin{aligned}x_1 &= (p_1 + s_1) + \eta(p_2 + s_2) + \epsilon_1, \\x_2 &= (p_2 + s_2) + \eta(p_1 + s_1) + \epsilon_2,\end{aligned}$$

where $\eta \in [0, 1]$ measures relatedness between divisions 1 and 2. The model in subsection 3.2 corresponds to $\eta = 0$. One can show that the relative performance of the M-form organization to the U-form decreases as η increases. If $\eta = 0$ as in the original model, the headquarters of the M-form organization can separate the incentive purpose from the risk bearing purpose by using (α_1, β_2) for incentives and (α_2, β_1) for risk sharing. However, as η increases, (α_2, β_1) affect the managers' choice of activities more and hence the headquarters faces the tradeoff between increasing (α_2, β_1) for the incentive purpose and decreasing them for risk bearing. This tradeoff is less stringent under the U-form structure. Furthermore, even if the M-form structure is adopted, each manager's compensation depends less on his division's performance and more on the overall performance of the firm as the businesses are more related: Performance-based control becomes less strict, as mentioned as a feature

is imperfect. And the headquarters of the M-form organization with related diversification may abandon specialization and instead make the managers multiskilled and share information in order to facilitate coordination, provided that the more information the managers share, the lower the communication cost is. This conforms to a feature of the M-form structure of the Japanese firm discussed in subsection 2.2.

of the M-form organization of the Japanese firm in subsection 2.2. This change brings an additional effect of eliciting cooperation across divisions.²¹

How about another stylized fact on the Japanese M-form organization that the divisions are less self-contained? The centralized personnel function is easy to understand given long-term employment relationships in Japan. I thus focus here on the separation of production and sales.

I use the principal-multiagent model in subsection 3.2. To simplify the analysis I assume $\delta = 1$ and hence two activities are perfect cost substitutes. This assumption captures the idea that a manager responsible for production of a particular product can avoid costs of multiple tasks and concentrate on his narrow activity (Kagano 1993). I further assume that if sales functions of two businesses are separated, each sales division incurs a fixed cost F , while an integrated sales division incurs $(2 - \Delta)F$ where Δ is a constant satisfying $\Delta \in [0, 1]$: Δ is a measure of “relatedness” of two businesses in the sense that higher Δ implies more overlap of customers and hence the firm can economize on the setup costs of sales activities. I further allows the variance of ϵ_1 (denoted by σ_1^2) to be different from that of ϵ_2 (σ_2). I assume $\sigma_1^2 < \sigma_2^2$: The performance of business 1 is easier to measure.²² Finally, to simplify the analysis, I assume $\eta = 0$: there is no externality across divisions.

In this setting, if the M-form structure is adopted, manager A chooses (p_1, s_1) to satisfy $p_1 + s_1 = \alpha_1$, and manager B chooses (p_2, s_2) satisfying $p_2 + s_2 = \beta_2$. The exact values of p_i and s_i are indeterminate. The optimal share rates are given by $\alpha_1^M = (1 + r\sigma_1^2)^{-1}$, $\beta_2^M = (1 + r\sigma_2^2)^{-1}$, and $\alpha_2^M = \beta_1^M = 0$. Under the U-form organization, the optimal share rates are given by $\alpha_1^U = \beta_1^U = (1 + r\sigma_1^2)^{-1}$ and $\alpha_2^U = \beta_2^U = 0$. And the managers choose $p_1 = s_1 = \alpha_1^U = \beta_1^U$ and $p_2 = s_2 = 0$. In other words, the managers are motivated to chooses positive activity levels only at the easier-to-measure business 1. Since $\alpha_1^U = \alpha_1^M$ and $\beta_1^U > \beta_2^M$, the performance of the U-form is better than that of the M-form.²³

I now introduce the third organizational form called the DM-form (divisional M-form) in which three managers are hired. Manager A is assigned with production at business 1 and selects p_1 , manager B chooses p_2 , and manager C takes charge of the sales division and selects (s_1, s_2) . Manager C 's compensation scheme is $w_C(x_1, x_2) = \gamma_0 + \gamma_1 x_1 + \gamma_2 x_2$. Under this organizational form, the incentive compatibility conditions are given by $\alpha_1 - p_1 = 0$, $\beta_2 - p_2 = 0$, $\gamma_1 - s_1 = 0$, and $s_2 = 0$. The optimal share rates are given by $\alpha_1^D = \gamma_1^D = (1 + r\sigma_1^2)^{-1}$ and $\beta_2^D = (1 + r\sigma_2^2)^{-1}$, and all the other share rates are zero. The performance of the DM-form dominates that of the U-form because the production activity p_2 at business 2 can be induced to be positive. Note that further separating sales activity s_1 and s_2 is not

²¹ See Itoh (1992) for an analysis of cooperation within organizations in the similar framework.

²² This assumption is not necessary for the result that follows.

²³ If $\sigma_1^2 = \sigma_2^2$, then the M-form and the U-form would be indifferent.

optimal if F and Δ are large enough.

In summary, the divisional M-form has two advantages over the M-form. First, each manager can specialize in a narrow functional task of a particular business, which feature reduces the overload cost. Second, since the sales function is integrated, the fixed, set-up costs of sales are saved as the businesses are related.

4.2 Relatedness and Internal Capital Markets

What I show in the previous subsection is that the first two advantages of the M-form structure discussed in section 3 may be lost as the businesses are sufficiently related. However, according to the stylized facts on organizational form, the Japanese firm appears to respond optimally to related diversification by either refraining from adopting the M-form or implementing several distinct features of the M-form that are consistent to the theoretical predictions.

Then what is the problem? I submit that the problem is in corporate strategy. The comments of two large Japanese electronics companies' presidents are surprising (Itami 1999): "It is true that 10–15 years ago, there was no discussion concerning whether this corporation was too big, and how it had to be managed as a whole." "I think that this company does not had any corporate strategy...We did not have to emphasize corporate strategy when things were going well with business strategies of the divisions only."

Remember that the first advantage of the M-form in section 3 refers to the separation of strategic decision making and operational decision making. However, the theoretical analysis of related businesses in the previous subsection does not consider strategic decisions by the headquarters other than decisions concerning organizational form and compensation schemes. One possible implication is that as the businesses are more related, the headquarters is more likely to be involved in operational decisions under either organizational form, and hence to face the problem of overload even if the M-form structure is adopted.

I want to argue that the problem is more amplified as the internal capital market function of the M-form structure is introduced. Capital reallocation is certainly an important strategic decision. However, the president of one of the electronics companies mentioned above confesses in an interview as follows: "In the past intensive allocation of resources to high-growth businesses was not fully attained. The result was equal allocation of funds largely among the existing businesses." (Itami 1999, p. 157). This sounds like the problem of the internal capital market in subsection 3.3 to which the researchers ascribe the decline of conglomerates in the U.S. However, the analysis there does not necessarily fit to the problem in Japan. First, although the efficient investment E in the model may imply that two businesses are related, the problem of inefficient allocation is likely to be more severe as

the businesses are *unrelated*. To see this, note that the additional return π from investment E captures a degree of relatedness: If two businesses are more related, they will enjoy a larger return from coordinated project choice. However, the analysis shows that the most serious problem (reallocation in the wrong direction) occurs when the businesses are sufficiently unrelated ($\pi < e_2 - be_1$). And in the case of $\pi > e_2 - be_1$, reallocation t in (5) is increasing in π , and hence capital allocation moves toward the efficient allocation as the businesses are more related. Second, the source of the problem there is in the more productive division 2's incentive to choose the defensive project. The incentive compatibility constraint for the less productive, existing business does not bind. This feature does not appear to capture the problem of the Japanese firm.

Therefore, I analyze a different model that focuses on influence behavior by the existing large division on capital allocation by the headquarters. I assume that division 1 takes charge of the established main business of the firm. The return to investment in this business is certain, and is normalized to one. In other words, Investment of m_1 generates profit m_1 . On the other hand, division 2's business is new and uncertain. If m_2 is invested, it generates profit $(1 + v)m_1$. I assume that $v = h > 0$ with probability q , and $v = -\ell < 0$ with probability $1 - q$. As before, m_1 and m_2 are determined by the initial endowments (e_1, e_2) and the transfer t from division 1 to 2 as $m_1 = e_1 - t$ and $m_2 = e_2 + t$. The efficient transfer is thus $t = e_1$ if $v = h$ and $t = -e_2$ if $v = -\ell$. I assume that the total resources are constant and equal to one ($e_1 + e_2 = m_1 + m_2 = 1$).

The headquarters attempts to collect information concerning the profitability of division 2's business. The signal observed by the headquarters is either good or bad. I assume that if the new business is not profitable ($v = -\ell$), then the headquarters certainly observes a bad signal. However, if the new business is profitable ($v = h$), the headquarters may observe an incorrect signal, depending on division 1 manager's influence activity $a \in \{0, 1\}$. If $a = 0$, which means no influence, then the probability that the signal is good given division 2's business is profitable is equal to one, and hence the signal reveals the profit from division 2's business perfectly. On the other hand, if division 1 manager engages in an influencing activity ($a = 1$), then the headquarters observes a bad (incorrect) signal with probability z and a good signal with probability $1 - z$. The conditional probability distribution is summarized in table 3.

Table 3: Conditional Probability $\Pr\{\text{good}|v\}$

	$v = h$	$v = -\ell$
$a = 0$	1	0
$a = 1$	$1 - z$	0

Note that higher z implies more effective influencing by division 1. This parameter is likely to be higher as the businesses are more related, and hence it measures relatedness across divisions. Alternatively, it may represent the dependence of the headquarters on division 1's information or advice, and hence higher z may imply more bottom-up management and/or less capable headquarters.

I assume that division 1 manager has “empire-building” preferences and wishes to maximize $m_1 - ca$ where c is a positive constant representing the cost of influence behavior. I assume that the signal is contractible and the headquarters chooses a transfer scheme (t_b, t_g) where t_b is the transfer from division 1 to 2 when a bad signal is observed, while t_g is the transfer when the signal is good. It is equivalent for the headquarters to choose the resulting resource allocation scheme (m_b, m_g) where m_b (m_g) is the final resource of division 2 when the signal is bad (good). The final resource of division 1 is $1 - m_i$, $i \in \{b, g\}$. The headquarters wishes to maximize the expected total profits from two divisions.

Given (m_b, m_g) , if division 1 manager chooses $a = 0$, his expected payoff is

$$q(1 - m_g) + (1 - q)(1 - m_b),$$

while his expected payoff under $a = 1$ is

$$q(1 - z)(1 - m_g) + (1 - q(1 - z))(1 - m_b) - c.$$

He chooses $a = 0$ if the former is equal to or larger than the latter (assuming that if he is indifferent, he will choose $a = 0$), or

$$qz(m_g - m_b) \leq c. \tag{6}$$

To exclude a trivial situation, I assume that the efficient allocation $(m_b, m_g) = (0, 1)$ does not satisfy (6), that is, $1 > c/(qz)$.

I analyze two cases separately. First, suppose that the headquarters allows division 1 manager to engage in influencing ($a = 1$). In this case, the headquarters' objective function is

$$q(1 - z)(1 + hm_g) + qz(1 + hm_b) + (1 - q)(1 - \ell m_b).$$

The headquarters' problem is thus to maximize this function subject to $qz(m_g - m_b) > c$ and $0 \leq m_i \leq 1$, $i \in \{b, g\}$. By assumption, the first-best allocation $(m_b, m_g) = (0, 1)$ satisfies all the constraints, and hence it is the solution. The headquarters' payoff is hence

$$V_1 = 1 + q(1 - z)h.$$

Next, suppose that the headquarters prevents division 1 manager from influencing the signal ($a = 0$). The headquarters' problem is to maximize $q(1 + hm_g) + (1 - q)(1 - \ell m_b)$

subject to (6) and $0 \leq m_i \leq 1$, $i \in \{b, g\}$. It is easy to show that the solution depends on q , the probability of the new business being productive. I only consider the case where this probability is low, $q < \tau/(1 + \tau)$, where $\tau = \ell/h$. The optimal allocation is then given by $(m_b, m_g) = (0, c/(qz))$: When the signal is bad, the efficient allocation is attained. However, when a good signal is observed, the final allocation to the new business is lower than the efficient level ($c/(qz) < 1$). This occurs because otherwise the manager of the established division would engage in wasteful influence activity. The headquarters' payoff is given by

$$V_0 = 1 + \frac{hc}{z}.$$

Whether the headquarters prefers to implement $a = 0$ or $a = 1$ depends on parameter values. However, for my purpose, it is enough to point out that in both cases the inefficiency is amplified as z increases. First, both V_1 and V_0 are decreasing in z . Second and more importantly, when the influence activity is allowed, the probability that the new business receives no resource despite its profitability increases. Similarly, when the influence activity is restricted, the capital allocation to the new, profitable business $c/(qz)$ decreases: The misallocation problem is more pronounced as the businesses are more related.²⁴

5 Concluding Remarks

The subtitle of this paper is “Can M-form organization manage diverse businesses?” The answer I offer is that there are some factors that make in-house management of *related* multiple businesses difficult. In particular, I argue that the headquarters of the multi-business organization cannot differentiate the divisions as much as efficiency requires her to do. The internal allocation of funds tends to favor less profitable but established businesses in sacrifice of more profitable ones, and this misallocation problem is likely to be serious in firms that are diversified into related businesses, or the headquarters of which rely on bottom-up information or are simply incompetent.

Recently many large Japanese companies shift their organization structure from the M-form to what is called in-house “company” form, in which each division is treated as if it were an independent company, by delegating more authority to the division and separating day-to-day operations from the strategic decision making. This shift can be understood as an attempt to move to the traditional M-form adopted by the U.S. firms. However, my analysis implies that such a shift bring several negative effects on the Japanese firms with related

²⁴If $q > \tau/(1 + \tau)$, the optimal allocation is $(1 - c/(qz), 1)$: The allocation is efficient when the signal is good, while too much capital is allocated to the new business 2 when it is bad. Again, the larger z is, the more severe the misallocation problem is.

diversification or weak headquarters. Furthermore, our analysis suggests that the inefficient capital market in the M-form be a common problem in the U.S. and Japan, but the source of the problem may be different: The inefficiency identified by Rajan, Servaes, and Zingales (2000) and Scharfstein and Stein (2000) is likely to be more severe for the U.S. firm, while the inefficiency obtained from my analysis probably applies more to the Japanese firm.

There are at least two other possible reasons that make it difficult for the firm to treat its in-house businesses distinctively, although neither of them seems to have a direct bearing on related diversification. First, two prominent institutional features of the Japanese firm, that is, the centralized personnel department and the enterprise union, demand less variety of business units. Since the personnel department of the Japanese firm engages in complicated tasks of administering pay and status of lifetime employees in a comprehensive, career-oriented manner, it has a strong incentive to standardize and equalize pay, status, and working conditions. And under the Japanese legal framework separate unions can represent distinct interest groups of employees within a firm, in contrast with the American framework in which representing the median voter's preference secures the status of the industrial union. "Therefore the leadership of the enterprise-based union takes great pains to strike a balance between the interests of different groups" (Aoki 1988, p. 92) and hence resists restructuring that increases diversity. I do not know any formal modeling of this informal story.

Second, in contrast to the first story which emphasizes formal aspects of organizational features, implicit agreement among the members of the firm may demand for uniform treatment across divisions, because the headquarters makes a company-wide commitment to delegating decision authority to the divisions and hence if the headquarters attempts to upset the decision made by one particular division, she will lose trust not only from that division but also from all the other divisions. Itoh and Shishido (2001) attempt to formalize this idea.

In this paper I fix the scope of the firm and focus on the internal structure. The recent shift of the Japanese M-form structure to the in-house "company" structure can be understood as an attempt to move to the traditional M-form, in particular, separation between strategic decisions and operational decisions, and introduction of performance-based control of divisions. However, the analysis of this paper implies that such a shift may be value-reducing for firms with related diversification. Even if the businesses are unrelated, such an organizational restructuring must be complemented by use of market signals in order to remedy the dark side of the internal capital market.

If the businesses are related and some of them are treated inefficiently within the horizontal boundaries of the firm, it may be optimal to transform them into separate corporations. Here the firm faces many alternatives: subsidiaries (wholly owned, joint venture, or going

public), spinoffs, divestitures, and so on. These alternatives not only determine the portfolio of the firm but also that of the business group. Part of the today's corporate restructuring wave is more relevant to portfolio than structure. Based on the results of this paper, the sequel (Part II) to the paper will study portfolio restructuring.

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