A Theory of Corporate Scope and Financial Structure
Author(s): David D. Li and Shan Li
Source: *The Journal of Finance*, Vol. 51, No. 2 (Jun., 1996), pp. 691-709
Published by: Blackwell Publishing for the American Finance Association
Stable URL: http://www.jstor.org/stable/2329376
Accessed: 25/11/2009 10:17

THE JOURNAL OF FINANCE • VOL. LI, NO. 2 • JUNE 1996

# A Theory of Corporate Scope and Financial Structure

DAVID D. LI and SHAN LI*

**ABSTRACT**

We simultaneously address three basic issues regarding the corporation: the optimal scope of operation, the optimal financial structure, and the relationship between these two. The starting point is that financial structure serves as a bonding device on the managers' self-interest behavior. The effectiveness of this bonding depends on the distribution of the firm's future cash flow, which in turn depends on the firm's scope. Our theory also links the firm's investment decisions to its operation scope. As empirical implications, the theory reconciles the failure of the 1960s U.S. conglomerates with the success of the Japanese *Keiretsu*.

THIS ARTICLE ADDRESSES THREE basic questions regarding the corporation in a coherent theoretical framework. First, what determines its optimal scope of operations, i.e., corporate scope? Second, what determines its optimal financial structure? Finally, what is the relationship between optimal corporate scope and financial structure? These questions are among the most important in modern theoretical economics and finance. The first one is associated with the contributions of Coase, Williamson, and Grossman and Hart.[1] The second one is associated with the contributions of Modigliani and Miller, and others.[2] While each has been studied separately, in this article we view them as being closely related and study them together.

By addressing these three issues together, our theory sheds new lights on two important empirical issues. The first is the two postwar U.S. merger waves. The dominant view among financial economists is that conglomerate mergers in the 1960s were a mistake and that the return to specialization in the 1980s restored the efficiency of U.S. corporations (Shleifer and Vishny (1991)). According to this view, conglomerates without obvious operating synergy should never have been formed. Our theory points out that diversification can be efficient; however, debt should be increased at the same time, a condition that the 60s wave missed and the 80s wave made up. The second issue is

* D. D. Li is from the University of Michigan. S. Li is from Goldman Sachs & Co. We are grateful for the guidance of Oliver Hart and David Scharfstein. We also thank Andrew Alford, Patrick Bolton, Chyi-Mei Chen, Judy Chevalier, Ludwig Chinearini, Drew Fudenberg, Peter Klibanoff, John Moore, Walter Novaes, Klaus Schmidt, Jeremy Stein, Chris Snyder, Lakshmi Shyam-Sunder, Jean Tirole, and Jean-Luc Vila for helpful comments and discussions. We are also grateful for comments and suggestions by the editor, René Stulz, and an anonymous referee.

[1] See Hart (1989) for an insightful account of the development of theory of the firm.

[2] See Harris and Raviv (1991) for a review of both theoretical and empirical literature on financial structure.

the Japanese *keiretsu* (industrial groups).[3] Our theory explains why they are both highly leveraged and successful.

The core idea of this article is a two-step argument. First, the separation of ownership and control in a public corporation gives a manager considerable room to pursue his own interest instead of investors'. Incentive schemes may often be insufficient to curb this tendency, since "a very large incentive payment may be required to induce the manager to give up these control rents" (Hart (1991)). Instead, as Grossman and Hart (1982) and Jensen (1986) point out, adjusting financial structure can be cheaper in "curbing his empire-building tendencies" (Hart (1991)). Outside shareholding implies a potential risk of takeover, while corporate debt forces management to pay out free cash flows of the firm due to the potential bankruptcy cost. Our theory emphasizes the role of debt and can be enlarged to include equity with active shareholders.

Second, corporate scope affects capital structure and therefore can be adjusted to help discipline managers. We define the scope of a firm as the collection of physical assets over which a single manager has been granted exclusive right of control by shareholders.[4] An appropriate corporate scope, achieved by mergers or spinoffs, can reduce the volatility of the cash flow and therefore increase the optimal leverage of the firm. The increased leverage forces managers to pay out free cash flows without foregoing profitable investment projects.[5]

Based on this idea, we simultaneously derive a firm's optimal scope and its corresponding optimal financial structure. There are five basic conclusions. First, business lines should be merged only if their cash flows are strongly negatively correlated. Second, highly risky businesses should be separated from relatively safe ones. Third, firms with either poor growth opportunities (as measured by Tobin's $q$) or volatile future profitability should diversify. Fourth, conglomerates in general should have higher leverage than their undiversified counterparts. Fifth, investment is less sensitive to liquidity for conglomerates than for their undiversified counterparts.

[3] Similar industrial groups are also popular in many other countries, including both very successful, newly-industrialized ones (such as South Korea) and highly developed ones (such as Germany, France and Sweden). See Steers, Shin, and Ungson (1989), Ito (1992), Dyas and Thanheiser (1976), and Essen (1984) for detailed description of industrial structure in these countries.

[4] Due to the separation of ownership and control, our approach is more accurate than the dominant one, which defines the scope as a collection of assets that the owner owns and controls (Grossman and Hart (1986)).

[5] A natural question arises in this context: are financing policies, such as risk hedging, cheap substitutes for mergers and spinoffs? Our answer is no. First of all, financing policies are subject to external capital market fluctuations, while mergers directly combine firms' cash flows. They are not equivalent. Thus, mergers cannot be replaced by financing policies. Secondly, mergers and spinoffs are much stronger commitments for managers than financing policies, which can be easily and frequently changed by managers. Finally, given the large size of a public firm relative to individual investors, risk hedging of a firm often requires holding significant amount of securities of other firms, which provide rights to control the other firms. According to our concept of corporate scope, this in essence can be regarded as merger (the Japanese *Keiretsu* are very similar to this case).

Many authors have explored the idea that diversification can be helpful in controlling managerial agency problems but none of them linked diversification with financial structure. In the context of financial intermediary services, Diamond (1984) points out that diversification can reduce the cost of delegated monitoring. Aron (1988) views diversification as a device for the owner to obtain better information about managers' effort. But neither of them are directly concerned with the relationship between corporate scope and financial structure. The theory closest to ours is that of Stulz (1990), who develops a model of financial structure based on the desire to curb management empire building. However, his theory does not directly analyze corporate scope. As an implication, he writes that "[T]his suggests that diversification across projects reduces the agency costs of managerial discretion because it makes cash flow more predictable."

In the next section, we model a single firm's optimal financial structure. Section II analyzes the optimal scope and financial structure of the firm. Section III applies the results to explain the empirical facts mentioned above and summarizes the main conclusions of the article.

## I. Optimal Capital Structure

For the moment, we model a firm with a single line of business.[6] Suppose the firm exists for three dates, 0, 1, and 2. The firm's assets in place at date 0 yield a random date-2 cash flow of $R \sim N(\mu, \sigma^2)$, with density function $f(R)$. At date 1, a new investment project with a deterministic cost of $I$ appears and, if it is undertaken at date 1, yields a random cash flow of $Y$ at date 2. Therefore, the difference $Y - I \equiv S$ is the net present value (NPV) of the project. Suppose that $S \sim N(\mu_s, \sigma_s^2)$, with density function, $g(S)$. The joint cumulative distribution function of $R$ and $S$ is $F(S, R)$. For simplicity, assume that the date-0 assets in place yield no cash flow at date 1, and $R$ and $S$ are independently distributed. At date 1, all uncertainty about $R$, $I$, and $Y$ disappears. We also assume the interest rate is zero over the whole horizon from date 0 to date 2. Figure 1 illustrates the basic set-up of the model.

The firm's manager maximizes his control rents through building a corporate empire (and no incentive scheme can prevent this). This assumption implies that he prefers to carry out all projects inside the firm unless it is either infeasible or it endangers his control position. Thus, he would not voluntarily set up a fully independent firm outside his control scope, since this would not give control benefits to him.

The only way to stop the manager from investing inside the firm is to prevent the necessary funds from being made available to him at date 1. This goal can be achieved through the choice of financial structure at date 0. For simplicity, assume that a simple debt/equity financial structure is optimal,[7] so

[6] Our basic model is similar to Hart and Moore (1990).

[7] See Hart and Moore (1990) for sufficient conditions under which a simple debt/equity structure is optimal.

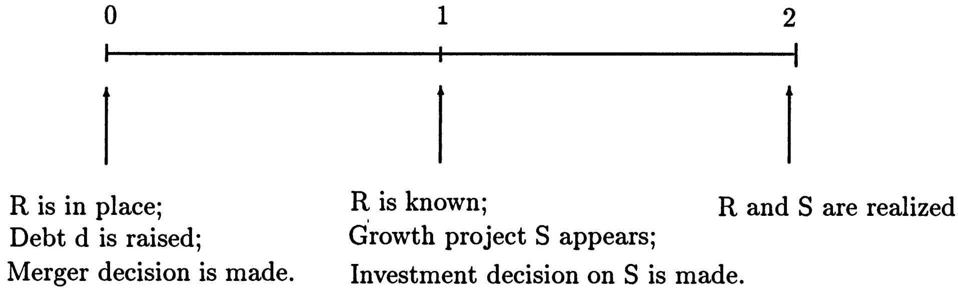


**Figure 1. The Timing of the Model.** $R$ is the existing project's uncertain cash flow. $S$ is the uncertain cash flow of a growth project that the merged firm has the option to undertake. The merger combines $R$ with another project's cash flow. $d$ is the amount of debt to be raised.

that the manager can only raise funds through issuing junior debt and/or equity at date 1.

We assume throughout this article that contracts conditioned on the total cash flow of a firm are legally enforceable, but contracts conditioned on *part* of the cash flow are not. In particular, one cannot write a contract contingent on $Y$ and $R$ separately. Although this assumption is extreme, it captures the idea that, in practice, management has considerable leeway in manipulating the allocation of cash flows through transfer prices, etc. We assume that date-1 renegotiation is impossible. This is a reasonable assumption if investors are widely dispersed and hold-out and free-rider problems are severe.

At the beginning, the firm has no debt.[8] The manager increases its long-term senior debt level to $d$ through an equity-for-debt swap at date 0. At date 1, the manager needs to raise $I$ dollars from the capital market to invest. He is able to do so if and only if $R + Y - d \geq I$ since $d$ has already been promised to date-0 creditors.[9] Since the condition $R + Y - d \geq I$ can be rewritten as $R + S \geq d$, the firm's date-0 expected value is $\mathrm{E}[R] + \int_{S+R\geq d} S \, \mathrm{d}F(S, R)$.

We assume that the debt level, $d$ is chosen at date 0 to maximize the firm's expected value.[10] In this model, debt is used to balance two competing objectives. On the one hand, if $d$ is low, the manager will have wide scope for raising funds at date 1, and hence may make an unprofitable investment. We call this the *overinvestment problem.* On the other hand, if $d$ is too big, the manager will have narrow scope for raising funds. New investors will be reluctant to provide

[8] Actually, to make the argument of this article, we only need to assume that the firm's initial debt level is lower than the optimal level we specify later.

[9] Notice the difference between the inability to raise new capital here and the famous debt-overhang problem in Myers (1977). Here, "the cost of debt is not that management passes up profitable projects because they are not in the interest of shareholders, but rather that management cannot finance profitable projects that are in the collective interest of shareholders and creditors" (Hart and Moore (1990)).

[10] One justification is that the firm is subject to a hostile takeover at date 0 and the manager is forced to maximize the firm's market value in order to stay in control. Throughout the article we assume there is not takeover at date 1, although all results still hold qualitatively if a takeover is possible at date 1 with probability less than 1.

new financing because some of the proceeds first go to pay the existing senior debt. Thus, the firm may be forced to forego a profitable investment. We call this the *underinvestment problem.*

The optimal debt level, $d^*$, is the solution to the following problem:

$$V = \mathrm{E}[R] + \max_{d} \int_{S+R \geq d} S \; \mathrm{d}F(S, R). \tag{1}$$

where $V$ is the maximized value of the firm at date 0.

We can express the first-order condition for an interior optimum as:

$$\mathrm{E}[S | S + R = d] = 0 \tag{2}$$

or, equivalently,

$$\mu_s + \frac{\sigma_s^2}{\sigma_s^2 + \sigma^2} (d - \mu - \mu_s) = 0. \tag{3}$$

Solving equation (3), the optimal debt level is:

$$d^* = \mu - \frac{\sigma^2}{\sigma_s^2} \mu_s. \tag{4}$$

Corresponding to the optimal debt level, the maximal firm value $V$ becomes:

$$V = \mu + \int_{S+R \geq d^*} S \; \mathrm{d}F(S, R) \tag{5}$$

$$= \mu + \mu_s \left[ 1 - \int_{-\infty}^{+\infty} N(\phi(t)) n(t) \; \mathrm{d}t \right] + \sigma_s \int_{-\infty}^{+\infty} n(\phi(t)) n(t) \; \mathrm{d}t$$

where

$$\phi(t) = -\frac{(1 + k^2)\mu_s}{\sigma_s} - kt, \qquad k = \frac{\sigma}{\sigma_s}. \tag{6}$$

$N(t)$ and $n(t)$ are, respectively, the cumulative distribution function and density function of a standard normal distribution. A detailed derivation of this value function is presented in the Appendix of this article. To summarize, we have the following lemma.

LEMMA 1. *The optimal debt level is* $d^* = \mu - (\sigma^2/\sigma_s^2)\mu_s$. *The value of the firm, V, decreases in the volatility of the existing cash flow and increases in the volatility of the growth project, i.e.,* $\partial V / \partial \sigma < 0$, *and* $\partial V / \partial \sigma_s > 0$.

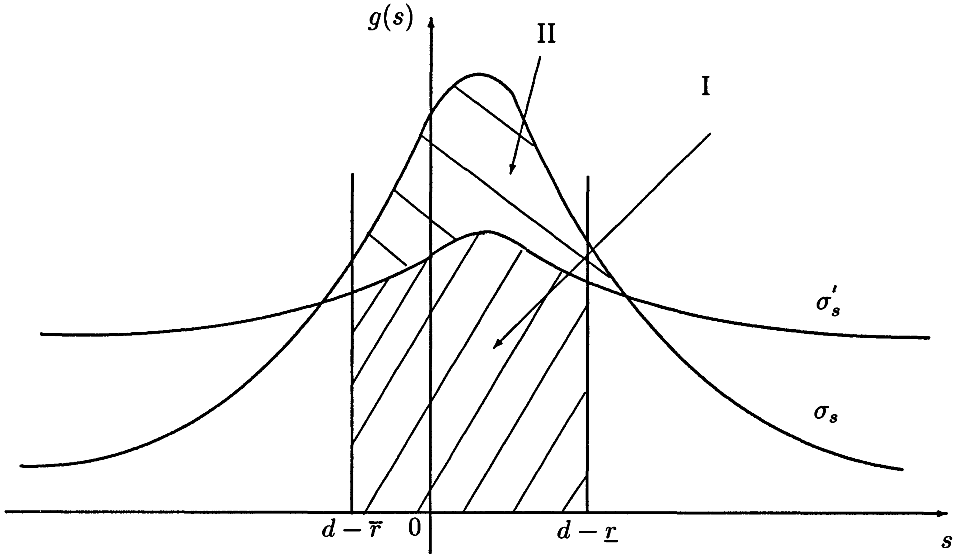


**Figure 2. Less over- or under-investment when the growth project $S$ is more volatile.** $R$ is the existing project's uncertain cash flow. $S$ is the uncertain cash flow of a growth project that the firm has the option to undertake. The distribution density function of $S$ is $g(.)$. $d$ is the amount of debt. $\sigma_s' > \sigma_s$ are two alternative levels of the variance of $S$. $\bar{r}$ and $\underline{r}$ are a pair of likely high and low realizations of $R$, say the upper and lower quartiles. Area I + Area II = Prob (overinvestment $| R = \underline{r}$) + Prob (underinvestment $|R = \underline{r}$) with variance $\sigma_s$. When the variance of $S$ increases to $\sigma_s' > \sigma_s$, Area I = Prob (overinvestment $|R = \bar{r}$) + Prob (underinvestment $|R = \underline{r}$).

Let us first explore the intuition behind the expression of the optimal debt level $d^*$.[11] First, an increase in $\mu$ causes the optimal debt level to increase. This is simply because more cash needs to be drained out of the firm before it is wasted by the managers in negative NPV projects. Second, an increase in $\mu_s$ causes the optimal debt level to drop, in order to give the manager more freedom to invest in the more promising growth project. Third, when $\mu_s$ is positive (negative), then an increase in $\sigma$ or a decrease in $\sigma_s$ will reduce (enhance) the debt level. The reason is that given $\mu_s > 0$ ($\mu_s < 0$), underinvestment (overinvestment) is the main concern. Underinvestment is likely to arise when the existing cash flow is very volatile ($\sigma$ increases). Also, when $\sigma_s$ increases, more probability mass is pushed to the right-hand-side tail, which means underinvestment is less likely (see Figure 2).

The comparative static results on $V$ can also be intuitively explained. The effect of $\sigma$ on $V$ is a driving force behind many of the subsequent results on corporate scope. When $\sigma$ increases, there are more chances that the manager either has too much or too little cash to invest in $S$. Clearly at any given debt

[11] Although our model allows $d^* < 0$, which means that the firm should issue new shares at date 0 to build a cash reserve ($-d^*$), from now on we will focus our discussion exclusively on the more interesting cases where $d^* > 0$.

level $d$, both overinvestment and underinvestment are more likely to arise. Thus, the value of the firm decreases. As for the relation between $V$ and $\sigma_s$, the intuition is more subtle. Looking at Figure 2, we can see that underinvestment corresponds to an area under $0 < S < d - \underline{r}$, where $\underline{r}$ is a likely low realization of $R$. Overinvestment corresponds to an area under $d - \bar{r} < S < 0$, where $\bar{r}$ is a likely high realization of $R$. Given any $d$, $\underline{r}$, and $\bar{r}$, $\sigma_s$ increases (i.e., the distribution is thicker-tailed), both areas are smaller, since more mass is moved out to outside areas. Thus, over- and underinvestment are less damaging when the volatility of $S$ goes up. Another way to view this result is that given $d$ and $r$, the value of $S$ to the firm is analogous to that of an option to buy $S$ at the price of $d - r$ plus an option to sell $S$ at the price $r - d$. In general, the higher the volatility of $S$, the more valuable are the options.

A few remarks on the robustness of Lemma 1 is necessary here. Apparently, the expression of $d^*$ depends crucially on the normality assumption on the distributions. However, the basic message conveyed by the expression of $d^*$ is very general and should be independent of the distributional assumptions on $R$ and $S$. Similarly, the conclusion that $V$ decreases in $\sigma$ is a very general result, as was demonstrated by the intuitive discussion above. The same result is also obtained in previous works, such as Stulz (1990) and Froot, Scharfstein, and Stein (1992).

The result that $V$ increases in $\sigma_s$ is less robust than the other ones. A careful look at Figure 2 reveals that this result depends on the thickness of the tails of the $S$ distribution. In general, so long as the $S$ distribution has thicker tails than the normal distribution (which is known to be thin-tailed), then an increase in $\sigma_s$ spreads out a lot of probability mass to both tails and reduces the over- and underinvestment problem. Thus, the value of the firm $V$ still increases. The bottom line is that we expect the $V$ and $\sigma_s$ relation to survive many common distributional assumptions.

## II. Optimal Corporate Scope

We now consider the issue of optimal corporate scope. We model a firm with two business lines in place at date 0, with date 2 cash flows $R_1$ and $R_2$, respectively. From now on, we use $R_1$ and $R_2$ to represent both the cash flows and the physical assets that yield them. Since the theory is motivated to address issues concerning conglomerates, we assume that there is no operating synergy between $R_1$ and $R_2$.

Now we assume that at date 1 an asset-specific growth project may appear. If $R_1$ and $R_2$ are merged, the growth project appears with probability 1. If $R_1$ and $R_2$ are separated, then the growth project appears in only one of the two firms at date 1, with equal probability ½.[12] This new project is associated with both the intangible assets of the firm (e.g., the human capital of its key

[12] This is a purely technical assumption to simplify the calculation without sacrificing too much realism. It can be seen that the intuition behind the resulting propositions are beyond this assumption.

employees) and the physical assets in place. Suppose that at date 0 the firm is facing a hostile takeover and therefore the manager is forced to maximize the firm's market value by making a choice between keeping both $R_1$ and $R_2$ inside the firm and spinning-off one of them.[13] Since at date 1 there will be no takeover threat, as we explained in the last section, $S$ will either be carried out inside the firm or be given up.[14]

We assume that investors cannot make enforceable contracts with a multi-project firm with respect to the cash flow of a subset of its projects. For example, when $R_1$ and $R_2$ are bundled in the same firm, the firm can only issue debt against the joint cash flow of $R_1$ and $R_2$ rather than each of them.

We first solve for the optimal financial structure and the expected value of these two business lines if they are separated and then if they are merged. When the two lines are separated, the growth project does not appear in a given firm with certainty; however, each firm's optimal debt level will be the same as in the case where the growth project appears with certainty. This is true since the given firm's financial structure is fully determined by the situation when the growth project does appear. When the project does not appear in the firm, according to the Modigliani and Miller theorem, its financial structure is irrelevant.

As in the previous section, assume $S \sim N(\mu_s, \sigma_s^2)$ is independent of both $R_1$ and $R_2$. $R_1$ and $R_2$ follow a joint normal distribution with:

$$R_1 \sim N(\mu_1, \sigma_1), \qquad R_2 \sim N(\mu_2, \sigma_2), \qquad \mathrm{COV}(R_1, R_2) = \rho\sigma_1\sigma_2.$$

Without loss of generality, we will assume that $R_1$ is more volatile than $R_2$, that is, $\sigma_1 \geq \sigma_2$.

Before proceeding with the general analysis, it is interesting to study a special case. Assume for a moment that the growth project $S$ can be bundled with (or "sold to") one of the business lines, even after the two firms are separated. For instance, if $S$ is bundled with $R_1$, then in period 1 when $S$ appears in $R_2$, $S$ will still be given to $R_1$. To which business line should the project be combined? The following proposition gives a straightforward answer.

PROPOSITION 1: *Suppose that at date 0, the future growth project $S$ can be preassigned to one of the two business lines after the two are separated. If the two business lines should be separated, then the more volatile one should not obtain the growth project.*

[13] We exclude the option to sell off both $R_1$ and $R_2$, which would eliminate the date-1 growth project completely, by assuming $\mu_s$ is sufficiently high such that $V^s > \mu_1 + \mu_2$, where $V^s$ is defined by equation (8) below.

[14] When the manager can raise $I$ at date 1 from the capital market, he will always carry out the project within the firm. On the other hand, when he cannot raise $I$, he gains no benefit from the project's being run outside the firm— only internal projects give him control benefits. In this case, he will not allow $S$ to be carried out outside the firm; instead he will simply give up $S$.

There is a clear intuition behind this result. When the growth project is bundled with a highly risky business, the chance of having either an underinvestment or an overinvestment problem at date 1 is high. Therefore it is better to bundle the growth project with a less risky business.

From now on, we go back to the basic assumption, i.e., the growth project will randomly appear in either of the two business lines at date 1, and it is impossible to prebundle it to one of the business lines. Suppose first that the two business lines are separated. Then, by equation (4), business i's optimal debt level is

$$d_i^* = \mu_i - \frac{\sigma_i^2}{\sigma_s^2}\mu_s, \qquad i = 1, 2. \tag{7}$$

The combined value of the two separate firms $V^s$ is

$$V^s = V_1(\sigma_1, \sigma_s) + V_2(\sigma_2, \sigma_s) \tag{8}$$

where $V_i$ is the value of firm $i$ and can be obtained from equation (5).

When the two lines are merged, by equation (4), the optimal amount of debt is

$$d_m^* = \mu_1 + \mu_2 - \frac{\sigma_1^2 + \sigma_2^2 + 2\rho\sigma_1\sigma_2}{\sigma_s^2}\mu_s \tag{9}$$

and the expected value of the merged firm is

$$V^m = V^m(\sigma_m, \sigma)$$

where the functional form of $V^m$ is the same as that in equation (5) and the variance of the combined cash flow now becomes

$$\sigma_m = \sqrt{\sigma_1^2 + \sigma_2^2 + 2\rho_1\sigma_1\sigma_2}. \tag{10}$$

From Lemma 1, we know that if $\sigma_m$ is smaller than both $\sigma_1$ and $\sigma_2$, then the merger is efficient. This corresponds to a condition that $\rho < -\sigma_1/2\sigma_2$. Likewise, when $\rho > -\sigma_2/2\sigma_1$, then $\sigma_m$ is larger than both $\sigma_1$ and $\sigma_2$, and separation is efficient. These results are intuitive and robust to the distributional assumptions of the model. However, the tricky situation arises when $\rho$ is between there two cases. We have:

PROPOSITION 2. *(1) When $\rho < -\sigma_1/2\sigma_2$, the two business lines should be merged. (2) When $-\sigma_1/2\sigma_2 < \rho < \rho^* \in (-\sigma_1/2\sigma_2, -\sigma_2/2\sigma_1)$, the two business lines should also be merged, if in addition, $\sigma_1/\sigma_s$, $\sigma_2/\sigma_s < k^*$, where $\rho^*$ increases in $\sigma_2/\sigma_1$ and $k^*$ increases in $(\sigma_s/\mu_s)^2$.*

PROPOSITION 3. *(1) When $\rho > -\sigma_2/2\sigma_1$, the two business lines should be separated. (2) When $-\sigma_2/2\sigma_1 > \rho > \rho^* \in (-\sigma_1/2\sigma_2, -\sigma_2/2\sigma_1)$, the two business lines should*

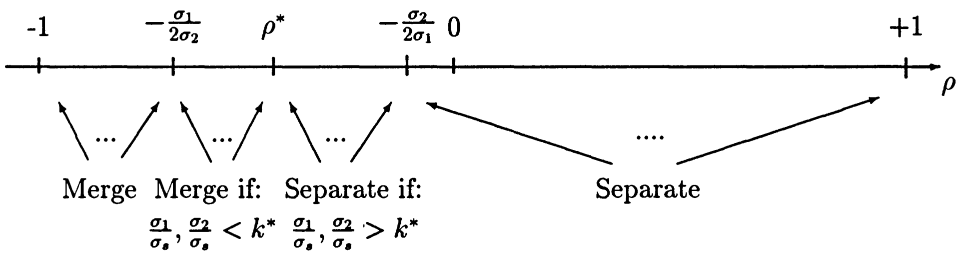


**Figure 3. An illustration of Proposition 2 and Proposition 3.** $\rho$ is the correlation coefficient between the two existing cash flows, $R_1$ and $R_2$. $\sigma_1$ and $\sigma_2$ are the variance of the two cash flows, respectively. $\rho^*$ and $k^*$ are constants defined in Proposition 2 and depend on the variance of the growth project $\sigma_s$. When $\rho$ is below $-\sigma_1/2\sigma_2$, the merger is optimal; when $\rho$ is higher than $-\sigma_2/2\sigma_1$, separation is optimal. When $\rho$ is between $-\sigma_1/2\sigma_2$, and $\rho^*$, the merger is optimal if $\sigma_1/\sigma_2$ and $\sigma_2/\sigma_s$ are smaller than $k^*$. Likewise, when $\rho$ is between $\rho^*$ and $-\sigma_2/2\sigma_2$, separation is optimal if $\sigma_1/\sigma_s$ and $\sigma_2/\sigma_s$ are bigger than $k^*$.

*also be separated, if in addition, $\sigma_1/\sigma_s$, $\sigma_2/\sigma_s > k^*$, where $\rho^*$ and $k^*$ are defined in Proposition 2.*

Figure 3 illustrates these two sets of conditions.

An intuitive explanation of the second parts of these two propositions can be obtained in Figure 4, where $\sigma_m$ is between $\sigma_2$ and $\sigma_1$. The benefit of the merger appears at date 1 when $S$ shows up in $R_1$, which is more volatile than the merged firm. Areas I and IV in Figure 4 show this marginal benefit, i.e., the reduction in chances of over- and underinvestments. However, if $S$ appears in $R_2$, then the merger proves to be a bad move (from an ex post point of view), since $R_2$ is less volatile than the merged firm. Areas II and III show this marginal cost. From the graph, it is clear that, as $\sigma_s$ goes up, I and IV will generally grow faster than II and III, since more probability mass is pushed toward outside areas. At the same time, the above effect is likely to arise when $\mu_s$ is closer to 0 so that I/II and III/IV are likely to be on two sides of the mean of the S distribution. Similar to Figure 2, we can see that when the distribution of $S$ has thick tails (relative to normal distribution), these results will likely remain.

There are four empirical implications from the above analyses of merger/separation conditions. First, given that $\rho > -\sigma_2/2\sigma_1$ (a negative number) implies separation, many mergers in reality might have been value decreasing (barring operational synergy). This prediction is broadly consistent with latest empirical findings such as Lang and Stulz (1994). They find "strong evidence that highly diversified firms are consistently valued less than specialized firms." Second, it is rarely efficient to merge two business lines of very different volatility. (i.e., $\sigma_1 \gg \sigma_2$), since the condition $\rho < -\sigma_1/2\sigma_2$ can never be satisfied. Furthermore, in this case $\rho^*$ becomes very small (see Appendix). The simple intuition is that $\sigma_m$ in this case is almost the same as $\sigma_1$. Third, a very volatile growth project $S$ argues for the merger (as illustrated in Figure 4). Finally and most importantly, firms with lower Tobin's $q$, as reflected in small

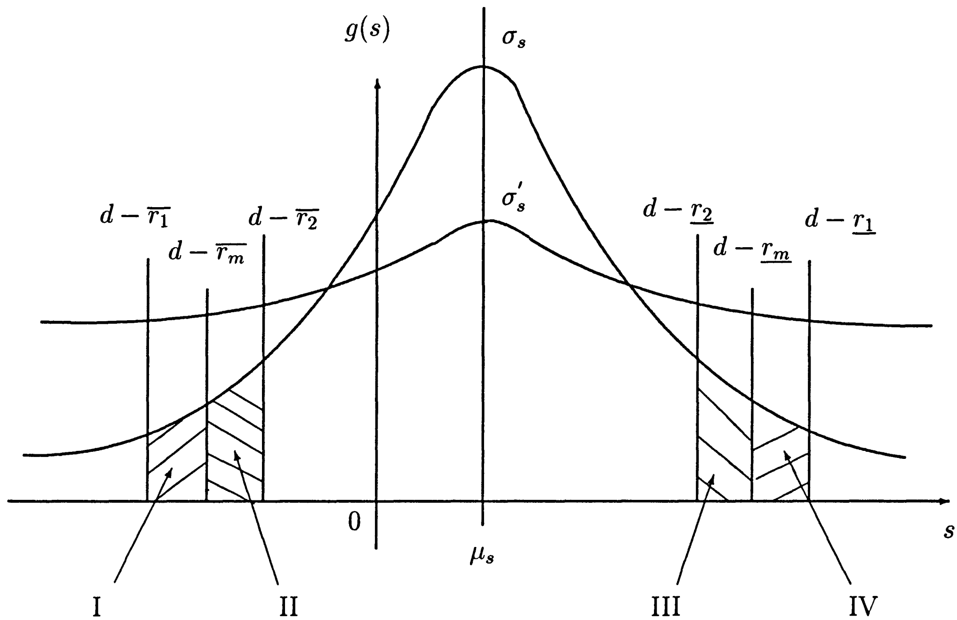


**Figure 4. The merger is more likely to be efficient when the growth project S is more volatile.** $R_1$ and $R_2$ are the two existing projects' uncertain cash flows. $S$ is the uncertain cash flow of a growth project that the firm has the option to undertake. $s$ is a realization of $S$. The distribution density function of $S$ is $g(.)$. $d$ is the amount of debt. $\sigma_s' > \sigma_s$ are two alternative levels of variance of S. $\mu_s$ is the mean of $S$. $\bar{r}_1$ and $\underline{r}_1$ are a pair of likely high and low realizations $R_1$, say the upper and lower quartiles. $\bar{r}_2$ and $\underline{r}_2$ are those of $R_2$. Notice that $R_1$ is more volatile than $R_2$ by assumption and thus $\bar{r}_2$ and $\underline{r}_2$ are inside $\bar{r}_1$ and $\underline{r}_1$. When $\rho$ is between $-\sigma_1/2\sigma_2$ and $-\sigma_2/2\sigma_1$, merging $R_1$ and $R_2$ creates a cash flow with volatility between $R_1$ and $R_2$. Thus, the merged cash flow's $\bar{r}_m$ and $\underline{r}_m$ should be between the other two pairs. The rest of Figure 4 is similar to Figure 2. A) The benefit of the merger arises when the growth project $S$ turns out to be in $R_1$. I + IV = likely reductions in under- and overinvestment through merger. B) The cost of the merger arises if $S$ appears in $R_2$. II + III = likely increases in under- and overinvestment through merger. C) An increase in the variance of $S$ from $\sigma_s$ to $\sigma_s'$ makes areas I and IV increase faster than II and III, respectively, and therefore makes merger more likely to be efficient.

$\mu_s$, are likely to merge.[15] We have seen the intuition for this from Figure 4. In other words, on average, merged firms should have lower Tobin's $q$. This result gives an additional explanation to Lang and Stulz (1994) who find that firms that become more diversified appear to perform poorly before becoming more diversified.

After the question of when to merge, the next issue regards the financial structure of a merged firm. Should it have higher leverage or lower leverage? Notice that from Proposition 3, we know that for mergers, it must be that $\rho < 0$, which gives the following result when combined with equations (7) and (9).

[15] To be exact, we mean a small but positive $\mu_s$. As Abel and Blanchard (1986) have found, in a growing economy, growth projects should have positive returns on average.

PROPOSITION 4. *(Higher leverage of merged firms) Assume that the future business line has positive profitability* ($\mu_s > 0$), *then efficient conglomerates should have higher leverage than each of the independent firms. Specifically,* $d_m^* > d_1^* + d_2^*$.

This prediction is consistent with a recent study by Comment and Jarrell (1995), who find that debt level does increase with the extent of diversification. The leverage ratio increases from 33–34 percent to 38–40 percent when the firm diversifies. As a result, debt services as a percentage of total outstanding security increase from 8.9 percent to around 10 percent. The intuition for this result is directly linked to the benefit of the merger. Before the merger, each firm is mostly concerned with underinvestment, since $\mu_s > 0$, so that the debt level is low. After the merger, cash flow is smoother and this is a lesser concern. Thus, the merged firm's debt level should be increased.[16]

After the conditions of the merger and the financial structure, the next issue we analyze is the merged firm's investment decisions. As Fazzari, Hubbard, and Petersen (1988) and Hoshi, Kashyap, and Scharfstein (1991), we link the firm's investment decision to its scope. Define the following index:

$$\beta^l = \frac{\mathrm{COV}(I \cdot 1_{\{R_l+S \geq d_l^*\}}, R_l)}{\mathrm{VAR}(R_l)}$$

where $l$ is $m$ for the merged firm and 1 for the separated firm 1. The indicator function $1_{\{R_l+S \geq d_l^*\}}$ equals 1 when the growth project is carried out, and equals 0 when it is given up. Recall that $I$, the amount of investment needed for the growth project, is simply a positive constant. Therefore, $\beta^l$ is a measure of the sensitivity of the amount of investment to liquidity.[17] We compare $\beta^m$ with $\beta^i$.[18]

PROPOSITION 5. *In general, investment is less sensitive to liquidity for the merged firm than for its undiversified counterpart. More specifically, for a merged firm, when* $\rho < -\sigma_1/2\sigma_2$, $\beta^m < \beta^2 < \beta^1$; *when* $-\sigma_1/2\sigma_2 \leq \rho$, $\beta^m < \beta^1$.

The driving force of this result is also the benefit of the merger, i.e., smoother cash flow. With smoother cash flow, the investment decision on the growth project is more directly dependent on the sign of its own NPV, rather than the existing cash flow, since existing cash flow in a merged firm is likely to be exactly committed out to debt holders and will not affect the next investment

[16] Notice here the difference between our theory and Lewellen (1971). Our theory says that a conglomerate should have higher leverage if $\mu_s > 0$, but lower leverage if $\mu_s < 0$. Lewellen says that a conglomerate should always have higher leverage. Our theory implies that, on average, conglomerates have higher leverage, while Lewellen implies that conglomerates always have higher leverage.

[17] Notice that $\beta^l$ is simply the ordinary least square estimator of the linear relationship $I \cdot 1_{\{R_l+S \geq d_l^*\}} = R_l^* \beta$.

[18] More precisely, what we are comparing here are two pairs of business units, $(R_1, R_2)$ and $(R_1', R_2')$, where $R_1 = R_1'$ and $R_2 = R_2'$, where the correlation between $R_1$ and $R_2$ satisfies the merging condition, and where the correlation between $R_1'$ and $R_2'$ satisfies the separating condition (as being specified in Proposition 2 and Proposition 3, respectively).

project. Notice that the logic of Proposition 5 is exactly the opposite of Williamson's (1975) internal capital market story. He argues that conglomerates have greater internal cash flow available to invest and therefore have less reliance on the external capital market, while here conglomerates have more reliance on the external capital market.

## III. Further Empirical Implications and Conclusions

There are two major empirical implications of our theory: the Japanese *keiretsu* and the U.S. merger waves.

Our theory offers an explanation for the prominent industrial structure in Japan, the *keiretsu,* or enterprise group. First, we would argue that each *keiretsu* can be regarded as corporate with a larger operation scope, as defined in our theory, since there is a close relationship among the managers of member firms, with their "Presidents' Club" as a strategic decision-making unit to exercise a certain level of control over their member firms. Moreover, we do observe member firms helping one another in the form of financial and/or real resource transfers in times of financial distress or business hardship. Therefore, for our purpose, the *keiretsu* are not fundamentally different from conglomerates. This point is also made by Milgrom and Roberts (1992)[19] and Ito (1992).[20]

Second, just like our theory predicts, these firms also have a higher leverage than non-group firms. Nakatani (1984) and Hoshi, Kashyap, and Scharfstein (1991) do find that group-affiliated firms, in comparison with nongroup firms, have higher debt/equity ratios. Furthermore, Hoshi, Kashyap, and Scharfstein (1991) show that investment is more sensitive to liquidity for independent firms than for *keiretsu* member firms. They also find that *keiretsu* member firms have lower Tobin's $q$ than independent firms. This is consistent with our prediction that firms with low Tobin's $q$ should diversify.

Moreover, according to our theory, highly leveraged group firms should have fewer chances of making either over-investments or under-investments. Therefore, their performance should be more stable than their undiversified counterparts. This prediction is also confirmed by Nakatani (1984), who finds that group firms have less variability in performance.

Next, consider the evolution of U.S. corporate structure. The merger waves in the late 1960s featured inter-industry mergers and the formation of conglomerate firms. A dominant view is that that "unrelated diversification was a mistake from the start" (Shleifer and Vishny (1991)), and that the 1980s wave reversed this trend and led to a return to specialization. Our

[19] They write: ". . . although the *keiretsu* do not have the same central structure as a multidivisional firm, there remain some important similarities. Just as the GM central office had to direct its divisions not to compete among themselves in the product market, the trading company may play a similar role in the *keiretsu*. . . ."

[20] He writes: "Each group represents a cross-section of the Japanese economy . . . In principle, each group tries to maintain one and only one company in any type of business (this is known as the "one set principle')."

theory offers an alternative explanation of the failure of the first merger wave. The poor performance of some U.S. conglomerate firms could have been partly due to their low leverage in combination with diversification.[21] According to our theory, the combination of diversification with low leverage leads to overinvestment. An indirect empirical evidence for this is Kaplan and Weisbach (1992). They find that among a sample of large acquisitions completed between 1971 and 1982, acquirers in successful acquisitions have less free cash flow and higher leverage. Since the leverage of the merged firms is likely to be positively correlated with that of the acquirers, this finding implies that a merged firm is more likely to succeed if it has higher leverage. The merger wave in the 1980s was a good move, according to our theory, since it did force firms to increase their debt level. Indeed, recent empirical findings of the 1980s merger wave are consistent with what our theory predicts.[22]

To summarize, this paper develops a theory to determine corporate scope and corporate financial structure simultaneously. It views mergers and spinoffs as a means to enhance efficiency of corporate control, since corporate scope directly affects the efficacy of the financial structure in disciplining management. As an implication of our theory, we argue that diversification alone can be a bad corporate strategy since, depending on the firm's growth prospects, it may give the manager either too little or too much freedom to make new investments. Therefore, with diversification the firm's leverage should adjust accordingly in order to maximize firm value.

Our theory does not consider many explicit costs associated with mergers. Other factors should be taken into account in the future, such as the effect of mergers on large shareholders' diminished position in the firm, increased organizational costs (Williamson (1975)), and diminishing returns to information processing (Rotemberg and Saloner (1990)).[23]

## Appendix

*A. Proof of equation (2).* Differentiate (1) with respect to $d$ and get, by Leibnitz rule, $-\int_{-\infty}^{+\infty} Sh(S, d)\, dS$, where $h(\cdot, \cdot)$ is the joint density function of $S$ and $R + S$. Then note that the conditional density $h(S|R + S = d)$ is simply $h(S, d)/\int_{-\infty}^{+\infty} h(S, d)\, dS$. Thus the first derivative of $V$ is indeed $-E(S|R + S = d)\int_{-\infty}^{+\infty} h(S, d)\, dS$. Since the integral is positive (the marginal density of $S + R$ at $d$), to satisfy the first order condition, it is

[21] Brown, Soybel, and Stickney (1992) find that Japanese companies, both in the aggregate and in most industries, have significantly higher leverage than U.S. companies.

[22] For example, firms with volatile growth projects tend to merge (Liebeskind and Opler (1992)); merged firms have lower Tobin's $q$ and higher leverage (Lang and Stulz (1994) and Comment and Jarrell (1995)).

[23] Rotemberg and Saloner (1990) argue that narrow strategies enable the firm to motivate its employees to search for valuable profit enhancing innovations.

necessary that

$$\mathrm{E}(S|R + S = d) = 0.$$

*B. Proof of equations (5) and (6):* By definition

$$V = \mu + \int_{-\infty}^{+\infty} f(R)\left[\int_{d^*-R}^{+\infty} Sg(S)\,\mathrm{d}S\right]\mathrm{d}R.$$

Let $A(R) = \int_{d^*-R}^{+\infty} Sg(S)\,\mathrm{d}S$ then

$$A(R) = \int_{(d^*-R-\mu_s)/\sigma_s}^{+\infty} (\mu_s + \sigma_s t)n(t)\,\mathrm{d}t$$

$$= \mu_s\left[1 - N\left(\frac{d^* - R - \mu_s}{\sigma_s}\right)\right] + \sigma_s n\left(\frac{d^* - R - \mu_s}{\sigma_s}\right).$$

Therefore, $V = \mu + \int_{-\infty}^{+\infty} A(\mu + \sigma t)n(t)\,\mathrm{d}t$. By the above formula for $A(R)$, (4), and the formula for $d^*$, we get

$$A(\mu + \sigma t) = \mu_s\left[1 - N\left(-\frac{(1 + k^2)\mu_s}{\sigma_s} - kt\right)\right] + \sigma_s n\left(-\frac{(1 + k^2)\mu_s}{\sigma_s} - kt\right).$$

Therefore, $V = \mu + \mu_s[1 - \int_{-\infty}^{+\infty} N(\phi(t))n(t)\,\mathrm{d}t] + \sigma_s \int_{-\infty}^{+\infty} n(\phi(t))n(t)\,\mathrm{d}t$, where $\phi(t)$ and $k$ are defined in (6).

*C. Proof of Lemma 1:* Define $\delta = \int_{-\infty}^{+\infty} n(\phi(t))n(t)\,\mathrm{d}t$. Notice that $\delta > 0$. It can be easily verified:

$$\int_{-\infty}^{+\infty} n(\phi(t))n(t)t\,\mathrm{d}t = -\frac{k\mu_s}{\sigma_s}\delta \tag{11}$$

and

$$\int_{-\infty}^{+\infty} n(\phi(t))n(t)t^2\,\mathrm{d}t = \left[\frac{k^2\mu_s^2}{\sigma_s^2} + \frac{1}{1 + k^2}\right]\delta. \tag{12}$$

Now, we are ready to prove the lemma. First,

$$\frac{\partial V}{\partial \sigma_s} = -\mu_s \int_{-\infty}^{+\infty} n(\phi(t)) \left[ \frac{\sigma_s^2 + 3\sigma^2}{\sigma_s^4} \mu_s + \frac{\sigma}{\sigma_s^2} t \right] n(t)\ dt + \delta$$

$$+ \sigma_s \int_{-\infty}^{+\infty} n(\phi(t)) \left[ \frac{\sigma_s^2 + 3\sigma^2}{\sigma_s^4} \mu_s + \frac{\sigma}{\sigma_s^2} t \right] \left[ \frac{\sigma_s^2 + \sigma^2}{\sigma_s^3} \mu_s + \frac{\sigma}{\sigma_s} t \right] n(t)\ dt$$

$$= \frac{1 + 2k^2}{1 + k^2} \delta > 0.$$

The last equation is by (11) and (12). Second,

$$\frac{\partial V}{\partial k} = -\mu_s \int_{-\infty}^{+\infty} n(\phi(t)) \left[ -\frac{2k\mu_s}{\sigma_s} - t \right] n(t)\ dt$$

$$+ \sigma_s \int_{-\infty}^{+\infty} n(\phi(t)) \left[ \frac{(1 + k^2)\mu_s}{\sigma_s} + kt \right] \left[ -\frac{2k\mu_s}{\sigma_s} - t \right] n(t)\ dt$$

$$= -\frac{k\sigma_s}{1 + k^2} \int_{-\infty}^{+\infty} n(\phi(t)) n(t)\ dt < 0. \tag{13}$$

*D. Proof of Proposition 1:* When project $i$ ($i = 1, 2$) is kept inside the firm, the total expected value of the two business lines is:

$$V^i = \mu_1 + \mu_2 + \mu_s \left[ 1 - \int_{-\infty}^{+\infty} N(\phi_i(t)) n(t)\ dt \right] + \sigma_s \int_{-\infty}^{+\infty} n(\phi_i(t)) n(t)\ dt,$$

where $\phi_i(t) = -(1 + k_i^2)\mu_s/\sigma_s - k_i t$, $k_i = \sigma_i/\sigma_s$. By (13), we know $\partial V^i/\partial k_i < 0$, therefore $V^1 \geq V^2 \Leftrightarrow k_1 \leq k_2$, i.e., $V^1 \geq V^2 \Leftrightarrow \sigma_1 \leq \sigma_2$.

*E. Proof of Proposition 2 and Proposition 3:* Notice that

$$V^s = \sum_{i=1}^{2} \left\{ \mu_i + \frac{1}{2} \mu_s \left[ 1 - \int_{-\infty}^{+\infty} N(\phi_i(t)) n(t)\ dt \right] + \frac{1}{2} \sigma_s \int_{-\infty}^{+\infty} n(\phi_i(t)) n(t)\ dt \right\};$$

$$V^m = \mu_1 + \mu_2 + \mu_s [1 - \int_{-\infty}^{+\infty} N(\phi_m(t)) n(t)\ dt] + \sigma_s \int_{-\infty}^{+\infty} n(\phi_m(t)) n(t)\ dt$$

where $\phi_m(t) = -(1 + k_m^2)\mu_s/\sigma_s - k_m t$, $k_m = \sqrt{(\sigma_1^2 + \sigma_2^2 + 2\rho_1\sigma_1\sigma_2)}/\sigma_s$. Define generically $U = V - \mu$, then $U^s = \frac{1}{2}U(k_1) + \frac{1}{2}U(k_2)$ and the issue becomes how to compare $U^s$ with $U^m$.

By (11) and (12), we have

$$\frac{\partial^2 U}{\partial k^2} = -\frac{(1 - k^2)\sigma_s}{(1 + k^2)^2}\,\delta - \frac{k\sigma_s}{1 + k^2}$$

$$\times \int_{-\infty}^{+\infty} n(\phi(t))\left[\frac{(1 + k^2)\mu_s}{\sigma_s} + kt\right]\left[-\frac{2k\mu_s}{\sigma_s} - t\right] n(t)\ \mathrm{d}t$$

$$= \frac{k^2(1 + k^2)\mu_s^2 + (2k^2 - 1)\sigma_s^2}{(1 + k^2)^2\sigma_s} \int_{-\infty}^{+\infty} n(\phi(t))n(t)\ \mathrm{d}t.$$

Thus, there exists $k^*$, such that if $k \geq k^*$ then $\partial^2 U/\partial k^2 \geq 0$ and if $k \leq k^*$ then $\partial^2 U/\partial k^2 \leq 0$, where critical value $k^*$ is the unique positive root of $k^2(1 + k^2)\mu_s^2 + (2k^2 - 1)\sigma_s^2 = 0$. Solve this equation, we get

$$k^* = \sqrt{-\frac{\sigma_s^2}{\mu_s^2} + \frac{1}{2}\left(\sqrt{\left(1 + \frac{2\sigma_s^2}{\mu_s^2}\right)^2 + \frac{4\sigma_s^2}{\mu_s^2}} - 1\right)}$$

It is easy to verify that $\partial k^*/\partial(\sigma_s^2/\mu_s^2) > 0$, i.e. $k^*$ increases in $\sigma_s^2/\mu_s^2$. Now, we are ready to proceed with our proof of Propositions 2 and 3.

*Case 1: $\rho < -\sigma_1/2\sigma_2$. In this case,* $k_m = \sqrt{k_1^2 + k_2^2 + 2\rho k_1 k_2} < \sqrt{k_1^2 + k_2^2 - k_1^2} = k_2 \leq k_1$ since by our set-up $\sigma_1 \geq \sigma_2$ or $k_1 \geq k_2$. Therefore, $U^m = U(k_m) > U(k_2) \geq U(k_1)$ and $U^m \geq \frac{1}{2}U(k_1) + \frac{1}{2}U(k_2) = U^s$.

*Case 2: $\rho > -\sigma_2/2\sigma_1$.* This case is the opposite to the previous one. It is easy to show that now $k_m$ is larger than both $k_1$ and $k_2$.

*Case 3: All Other Cases.* From the characterization of $U(\cdot)$, we know that $\forall k_1, k_2 <(>) k^*, \Rightarrow \frac{1}{2}U(k_1) + \frac{1}{2}U(k_2) <(>) U(\frac{1}{2}k_1 + \frac{1}{2}k_2)$ and that $\partial U^m/\partial k_m < 0$.

Therefore $U^m >(<) U^s$ if $\frac{1}{2}k_1 + \frac{1}{2}k_2 \geq(\leq) k_m$, under the condition $k_1, k_2 <(>) k^*$. Next, let's find $\rho^*$, such that $k_m(\rho^*) = \frac{1}{2}k_1 + \frac{1}{2}k_2$. We have: $k_1^2 + k_2^2 + 2\rho^* k_1 k_2 = (\frac{1}{2}k_1 + \frac{1}{2}k_2)^2$. Thus, we have $\rho^* = \frac{1}{4} - \frac{3}{8}(\sigma_1/\sigma_2 + \sigma_2/\sigma_1) = \rho^*(\sigma_2/\sigma_1)$. It is easy to show that $\rho^*$ increases in $\sigma_2/\sigma_1$ (given that $\sigma_1 \geq \sigma_2$.)

In fact, $\rho^*(0) = -\infty$, $\rho^*(1) = -\frac{1}{2}$. Therefore, the conclusions quickly follow the definitions of $k^*$ and $\rho^*$.

*F. Proof of Proposition 4:* This is a quick extension of part (1) of Proposition 3 and equations (7) and (9).

*G. Proof of Proposition 5:*

$$\beta = \frac{\mathrm{COV}_{(I \cdot 1_{\{R+S \geq d^*\}},\, R)}}{\mathrm{VAR}(R)} = I\,\frac{\mathrm{COV}_{1_{\{R+S \geq d^*\}},\, R)}}{\mathrm{VAR}(R)} = I\bar{\beta}.$$

Note that $\mathrm{COV}(1_{\{R+S \geq d^*\}}, R) = \mathrm{E}(1_{\{R+S \geq d^*\}}R) - \mathrm{E}(1_{\{R+S \geq d^*\}})\mathrm{E}(R)$.

$$\mathrm{E}(1_{\{R+S \geq d^*\}}) = \int_{-\infty}^{+\infty} f(R) \int_{d^*-R}^{+\infty} g(S)\ \mathrm{d}S\ \mathrm{d}R = 1 - \int_{-\infty}^{+\infty} N(\gamma(t))n(t)\ \mathrm{d}t,$$

where $\gamma(t) = -[(1+\sigma^2/\sigma_s^2)\mu_s + \sigma t]/\sigma_s$ and $N(\cdot)$ and $n(\cdot)$ are the c.d.f. and density function of a standard normal distribution, respectively.

We can write

$$\mathrm{E}(1_{\{R+S \geq d^*\}}R) = \int_{-\infty}^{+\infty} Rf(R) \int_{d^*-R}^{+\infty} g(S)\ \mathrm{d}S\ \mathrm{d}R$$

$$= \mathrm{E}(R)\mathrm{E}(1_{\{R+S \geq d^*\}}) - \frac{\sigma^2}{\sigma_s} \int_{-\infty}^{+\infty} n(\gamma(t))n(t)\ \mathrm{d}t.$$

Therefore $\mathrm{COV}(1_{\{R+S \geq d^*\}}, R) = -(\sigma^2/\sigma_s) \int_{-\infty}^{+\infty} n(\gamma(t))n(t)\ \mathrm{d}t$ and $\bar{\beta} = -(1/\sigma_s) \int_{-\infty}^{+\infty} n(\gamma(t))n(t)\ \mathrm{d}t$. Differentiating $\bar{\beta}$ with respect to $\sigma$, we get $\partial\bar{\beta}/\partial\sigma = \{[\sigma\mu_s^2(\sigma_s^2+\sigma^2) + \sigma\sigma_s^4]/\sigma_s^5(\sigma_s^2+\sigma^2)\} \int_{-\infty}^{+\infty} n(\gamma(t))n(t)\ \mathrm{d}t > 0$.

With this inequality, the rest of the proof can be readily obtained by using the conditions in Proposition 2.

## REFERENCES

Abel, Andrew, and Oliver Blanchard, 1986, The present value of profits and cyclical movements in investment, *Econometrica* 54, 249–273.

Aron, Debra J., 1988, Ability, moral hazard, firm size, and diversification, *Rand Journal of Economics* 19, 72–87.

Brown, Paul R., Virginia E. Soybel, and Clyde P. Stickney, 1992, Assessing U.S. and Japanese corporate-level strategies using financial statement data, Working paper, New York University.

Comment, Robert and Gregg A. Jarrell, 1995, Corporate focus and stock returns, *Journal of Financial Economics* 37, 67–87.

Diamond, Douglas, 1984, Financial intermediation and delegated monitoring, *Review of Economic Studies* 51, 393–414.

Dyas, Gareth P., and Heinz T. Thanheiser, 1976, *The Emerging European Enterprise: Strategy and Structure in French and German Industry* (Westview Press, New York, N.Y.).

Essen, Reinhold von, 1984, *The Seven Swedes* (Almguist and Wiksell International, Stockholm).

Fazzari, Steven M., R. Glenn Hubbard, and Bruce Petersen, 1988, Financing constraints and corporate investment, *Brookings Papers on Economic Activity,* 141–195.

Froot, Kenneth, David Scharfstein, and Jeremy Stein, 1992, Risk management: Coordinating corporate investment and financing policies, NBER Working Paper No. 4084.

Grossman, Sanford, and Oliver D. Hart, 1982, Corporate financial structure and managerial incentives, in John J. McCall, ed.: *The Economics of Information and Uncertainty* (University of Chicago Press, Chicago, Ill.).

Grossman, Sanford and Oliver D. Hart, 1986, The costs and benefits of ownership: A theory of vertical and lateral integration, *Journal of Political Economy* 94, 691–719.

Harris, Milton, and Artur Raviv, 1991, The theory of capital structure, *Journal of Finance* 46, 297–355.

Hart, Oliver D., 1989, An economist's perspective on the theory of the firm, *Columbia Law Review* 89, 1757–1774.

Hart, Oliver D., 1991, Theories of optimal capital structure: A prinicpal agent approach, *Brookings Discussion Paper* 91–2.

Hart, Oliver, and John Moore, 1990, A theory of corporate financial structure based on the seniority of claims, Department of Economics Working Paper No. 560, MIT.

Hoshi, Takeo, Anil Kashyap, and David Scharfstein, 1991, Corporate structure, liquidity, and investment: Evidence from Japanese industrial group, *Quarterly Journal of Economics* 106, 33–60.

Ito, Takatoshi, 1992, *The Japanese Economy* (MIT Press, Cambridge, Mass.).

Jensen, Michael, 1986, Agency costs of free cash flow, corporate finance, and takeovers, *American Economic Review* 76, 323–329.

Kaplan, Steven N., and Michael S. Weisbach, 1992, The success of acquisitions: Evidence from divestitures, *Journal of Finance* 47, 107–138.

Lang, Larry, and René Stulz, 1994, Tobin's q, corporate diversification, and firm performance, *Journal of Political Economy* 102, 1248–1280.

Lewellen, Wilbur G., 1971, A pure financial rationale for the conglomerate merger, *Journal of Finance* 26, 521–537.

Liebeskind, Julia, and Tim Opler, 1992, The causes of corporate refocusing, Working paper, University of Southern California.

Milgrom, Paul, and John Roberts, 1992, *Economics, Organization and Management* (Prentice Hall, Englewood Cliffs, N.J.).

Myers, Stewart C., 1977, Determinants of corporate borrowing, *Journal of Financial Economics* 5, 147–175.

Nakatani, Iwao, 1984, The economic role of financial corporate grouping, in Masahiko Aoki, ed.: *The Economic Analysis of the Japanese Firm* (North-Holland, Amsterdam).

Rotemberg, J., and G. Saloner, 1990, Benefits of narrow business strategies, Sloan School of Management, Working paper, MIT.

Shleifer, Andrei, and Robert Vishny, 1991, Takeovers in the '60s and the '80s: Evidence and implications, *Strategic Management Journal* 12, 51–60.

Steers, Richard M., Yu-Gun Shin, and Geraldo R. Ungson, 1989, *The Chaebol: Korea's new industrial might* (Harper and Row, New York, N.Y.).

Stulz, René, 1990, Managerial discretion and optimal financing policies, *Journal of Financial Economics* 26, 3–27.

Williamson, Oliver, 1975, *Markets and Hierarchies* (Free Press, New York, N.Y.).