

THE CAPITAL STRUCTURE IMPLICATIONS OF PURSUING A STRATEGY OF INNOVATION

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In this paper, we argue that consideration of firm strategy can help illuminate the choices managers make between debt and equity financing. Within an industry, the form of competition that each firm chooses will determine the strategic value to the firm of maintaining financial slack. Our empirical analysis yields strong support for the proposition that financial slack should be a particularly critical strategic imperative for firms pursuing a competitive strategy premised on innovation. We also demonstrate that firms pursuing such a strategy that fail to recognize the value of financial slack are likely to perform poorly. Copyright © 2003 John Wiley & Sons, Ltd.

INTRODUCTION

It would be a considerable understatement to say that the study of capital structure has inspired a prodigious amount of research within the field of finance. Yet, despite all this research, much is still unknown about how managers choose between debt and equity financing (Harris and Raviv, 1991). Early work on this subject, guided by Modigliani and Miller's (1958) argument that the financing and investment decisions are separate processes, dismissed the potential for strategy to shed light on the 'capital structure puzzle.' However, ever since Jensen and Meckling (1976) acknowledged the potential for the investment and financing decisions to interact, the door has been opened for researchers to explore how competitive strategy influences capital structure.

Consistent with Balakrishnan and Fox (1993), we argue that the application of strategy may be

most helpful in understanding intraindustry variation in capital structure. A critical assumption underlying many of the theories in strategic management is that, in any given industry, the potential consumers are heterogeneous with respect to their tastes and preferences. These different segments of consumers are best served by firms that operate under different strategies, as a firm that tries to serve all segments will serve all of them poorly (Porter, 1980). Therefore, within an industry we are likely to observe variation in the strategies pursued by the industry incumbents. If competitive strategy guides the firm's investment decisions (Chandler, 1962), and the choice of investments can influence the choice of financing (Williamson, 1988), then we should expect that different capital structures best serve the needs of different strategies. Furthermore, this would suggest that we should expect to observe substantial variation in capital structures across firms within the same industry. Herein lies the potential for strategy to help clarify the capital structure puzzle. The most promising application of strategy to the topic of capital structure is not explaining interindustry variations (as suggested by Harris and Raviv, 1991), but in explaining why we should expect

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to see as much variation within an industry as between industries.

In this paper, we focus on how a competitive strategy based on being an industry innovator will impact the capital structure decision. Previous research has pointed out that intense investment in R&D is associated with lower leverage because these investments create primarily intangible assets, which cannot serve as good collateral (Long and Malitz, 1985; Simerly and Li, 2000; Vicente-Lorente, 2001). This perspective suggests that the firm's intensity of investment in R&D will influence capital structure. We take this argument a step further by proposing that financial slack (i.e., low leverage) should be a strategic priority for firms that are competing on the basis of innovation. Financial slack can help sustain the competitive position of firms competing on the basis of innovation by helping to ensure: (a) continuous, uninterrupted investments in R&D; (b) that the funds necessary to launch new products are available when needed; and (c) that firms can expand their knowledge base through acquisitions when it is potentially beneficial to do so. Furthermore, we propose that the appropriate proxy for the strategic importance of innovativeness to the firm is not the intensity of investment in R&D (i.e., R&D expenditures scaled by total sales), but rather the firm's *relative* intensity of investment in R&D (i.e., relative to other firms competing in the same industry).

Overall, we find strong support for our proposition that firms competing on the basis of innovation make financial slack a strategic priority. An implication of this result is that if capital structure *should* follow strategy, then we expect to observe significant performance penalties accruing to those firms that display misalignment between these two factors. Our empirical tests confirm this expectation, implying that failing to maintain sufficient financial slack can seriously inhibit a firm's ability to successfully implement a strategy premised on innovation.

THE EVOLUTION OF A STRATEGIC PERSPECTIVE ON CAPITAL STRUCTURE

Traditional explanations of capital structure

Modigliani and Miller (1958) ignited interest in the study of capital structure when they proposed that, given certain simplifying assumptions, the value

of a firm is independent of its capital structure. This famous Proposition I violated the prevailing popular wisdom of the time, and thus generated a tremendous amount of controversy. However, the authors had never intended to suggest that capital structure is irrelevant in real-world applications (Miller, 1988). Rather, the authors simply wanted to investigate whether there could be any set of conditions, even in a frictionless world, where capital structure did not impact the value of the firm. Nevertheless, several years later Modigliani and Miller (1963) once again added fuel to the debate when they 'corrected' their stance by relaxing the assumption of a tax-free world. Once the tax deductibility of interest payments is factored in, the value of the firm increases with leverage. Clearly, there had to be more to the story to explain why all firms weren't levered to capacity.

The next piece of the puzzle came in the form of the costs of debt financing, which act to offset the tax benefits of interest payments. The costs of financial distress are one such pitfall to debt financing. If the firm fails to meet its debt obligations, it does not simply pass seamlessly into the hands of creditors. Instead, going through bankruptcy causes the firm to lose somewhere between 1 percent (Warner, 1977) and 20 percent (Andrade and Kaplan, 1998) of its value, with the magnitude of the loss potentially depending on the type of assets held by the firm (Long and Malitz, 1985). Furthermore, Jensen and Meckling (1976) point out that there are also costs of debt that arise from the incentives that equity holders have to expropriate wealth from the bondholders. This induces the bondholders to demand protection via monitoring and bonding mechanisms, which themselves have costs that serve to offset the benefits of debt.

Although there are agency costs associated with debt, Jensen (1986) noted that by virtue of reducing the amount of free cash flow managers have discretion over, increased leverage may actually reduce the total agency costs within a firm. The potential agency and tax benefits of debt stimulated researchers to try to determine if there is some optimal capital structure that balances the costs and benefits of debt (Jalilvand and Harris, 1984). However, the empirical evidence has been conflicting (Shyam-Sunder and Myers, 1999), and others have suggested that there might be no 'optimum target' because there may actually be no tax benefits to debt (Miller, 1977), or because there

may be other tax shields that can serve as substitutes for debt (DeAngelo and Masulis, 1980).

A slightly different perspective on capital structure came from Myers and Majluf (1984), who presented a 'pecking order' model to explain corporate financing decisions. According to this model, there is no optimum debt level for a firm. Instead, information asymmetries drive firms to prefer internal sources of financing (i.e., retained earnings) over external sources. According to this perspective, the firm generally uses internally generated cash flows to fund new projects. If retained earnings are not sufficient to cover the firm's financing needs, the firm will prefer to issue the least risky securities (i.e., debt) first, and the most risky securities (i.e., equity) only as a last resort. Thus, when profitability is low, debt levels may climb as the firm borrows money to fund projects. Conversely, when profitability is high, managers use excess cash flows to pay down debt.

Early linkages of strategy to capital structure

The notion that there might be some relationship between a firm's 'strategic' decisions and its capital structure first came to light with Jensen and Meckling's (1976) seminal paper on agency costs. The authors presented a simple model in which the owner-manager of a firm first issues debt, and then decides on which investments to make. Due to the fact that the owner-manager has limited liability, the downside risk of the investment decisions will be borne more heavily by the bondholders than by the equity holders (i.e., the owner-manager). Thus, if investment decisions can be made after debt is issued, the equity holders are motivated to pursue riskier output strategies that will raise returns in the good states and lower returns in the bad states. As firms increase their debt load, the incentive to engage in riskier strategies also grows, since equity holders ignore any reduction in returns in the bankrupt states (Jensen and Meckling, 1976).

The next major work to link strategy with capital structure reversed the causal inference, suggesting that the firm's leverage might be influenced by its strategy. Titman's (1984) analysis of the effect of capital structure on a firm's liquidation decision revealed that a firm's capital structure might be a source of strategic value. If high debt levels are indeed associated with riskier strategies, then customers who care about whether the firm exists tomorrow (e.g., due to warranties or the ongoing

servicing of durable goods) will evaluate high leverage negatively and prefer a producer with low leverage, *ceteris paribus*.

Brander and Lewis's (1986) examination of capital structure from a game theoretic perspective gave strong credence to the role of strategy in determining capital structure. The authors presented a two-stage sequential duopoly game, where firms select a capital structure in the first stage and set their output level in the second stage. If high debt levels increase the incentives to pursue riskier output strategies, then both firms will adopt positive debt levels in the first stage in order to signal to their competitor that they are going to produce at a high level in the second stage (i.e., pursue a 'riskier' strategy).¹ The resultant sequentially rational Nash equilibrium has both firms producing at a higher (i.e., riskier) output level than they would have selected in an all-equity world. Unfortunately, the strategic uses of financial structure in this model are purely predatory, since the net effect when both firms use them is that both firms are worse off. However, the explicit consideration of strategy did help spark a growing acceptance of the concept of 'strategy' in financial theory. For example, in their model for selecting the degree of financial leverage, Sandberg, Lewellen, and Stanley (1987) claimed that leverage should be increased as long as it continues to have positive consequences and does not 'impede the firm's ability to develop effective business strategy.'

Modern strategic perspectives on capital structure

Barton and Gordon (1987) were among the first strategy researchers to explore whether this perspective might be able to fill in some of the gaps that existed in the financial literature regarding capital structure. As the authors pointed out, extensive theoretical and empirical work in the field of finance had failed to yield a consensus on not only which factors influenced capital structure, but also whether capital structure really has any effect on the value of the firm. Although the authors' primary interest was in linking capital structure to the characteristics and desires of the firm's top managers, its most important contribution may

¹ In Cournot oligopoly models, firms have an incentive to commit to producing large outputs, since this will induce their rivals to produce less.

have been focusing attention on the fact that both leverage and strategy affect the whole organization. If the firm exhibits strategic coherence (Porter, 1996), then we would expect these two factors to be related. Furthermore, the paper called for studying strategy at a richer level than mere decisions about output quantity or price, a call later reiterated by Harris and Raviv (1991). In a subsequent empirical investigation (Barton and Gordon, 1988), these authors found evidence that different 'strategic orientations' (as defined by diversification strategy) did indeed tend to have different levels of debt. Furthermore, they also found multiple significant interactions between strategy and the financial contextual variables, suggesting that the relationship between traditional financial variables and capital structure might be contingent upon the firm's strategy.

The potential for strategy to serve as an effective predictor of capital structure accelerated after the strategy literature shifted away from industry structure and towards firm heterogeneity. Theories that emphasized firm heterogeneity, such as Penrose's (1959) antecedents to the resource-based view of the firm, did not gain widespread popularity until the 1980s (Schendel, 1994). These theories stressed that factor markets imperfections give rise to heterogeneously distributed resources across firms (Barney, 1991), which in turn allow some firms to achieve a competitive advantage over others (Hunt, 1997).

The heterogeneity perspective on capital structure was exemplified in Williamson's (1988) application of the transaction costs economics framework to the capital structure puzzle. This perspective emphasized that the type of governance opted for by the firm will also be influenced by the characteristics of the assets that are deployed within the firm. Although firms will generally prefer debt financing because it has lower governance costs, highly specialized assets will make debt financing costly because these assets are less redeployable and hence not able to serve as collateral. Thus, although unique or highly specialized assets may be the most likely to serve as a source of competitive advantage (Balakrishnan and Fox, 1993; Barney, 1991), they are also largely nontradeable and nonredeployable (Long and Malitz, 1985). This 'asset specificity' problem results in high bankruptcy costs for firms with highly unique assets.

Building on the transaction costs literature, Balakrishnan and Fox (1993) investigate whether measures of intangible capital contribute significantly to variations in leverage. If such a relationship were found, it would indicate that strategy, which can have an effect on the level of intangible assets in a firm, might help determine the capital structure. Using panel data and a variance components regression model, the authors demonstrated that industry and time effects were of little importance in determining capital structure in comparison to firm heterogeneity.

Subsequent research in the field of strategic management that addressed the issue of capital structure also tended to emphasize the transaction costs economics framework. Kochhar (1996) argued that LBOs tend to occur in firms that have nonunique assets and low investment opportunities because the lack of specialized assets in these firms makes the low governance costs of debt the preferred form of financing. Also employing a transaction costs economics perspective, Kochhar and Hitt (1998) were able to show that the relationship between the firm's financial strategy and its corporate diversification strategy is a reciprocal, dynamic one in which each influences the other.

Another interesting extension of the transaction costs perspective was developed by Simerly and Li (2000), who incorporated elements of agency theory and environmental dynamism to propose that a firm's capital structure should be matched to its environment. The authors propose that obligations to creditors may constrain the firm's ability to make strategic investments in areas such as research and development. Furthermore, since lenders are generally risk averse, the strategic costs of debt financing will increase with the level of uncertainty in the firm's environment, making equity financing more appropriate in highly dynamic environments. The authors found strong support for their proposition that a mismatch between the firm's leverage and its environment will encumber performance.

INNOVATION AND CAPITAL STRUCTURE

Recent empirical work has extended the range of strategies linked to leverage and implicated a strategy of innovativeness as a determinant of leverage. Jordan, Lowe, and Taylor (1998) investigated the relationship between capital structure and

strategy using a variant of Porter's (1980) generic strategy typology and found that a strategy based on innovation was associated with the lowest level of debt, while firms pursuing a cost-leadership strategy had the highest levels of debt. Similarly, Vicente-Lorente (2001) found that R&D investments that are characterized by a high degree of specificity or opaqueness are associated with lower leverage. The negative relationship between R&D spending and leverage was not surprising, since Long and Malitz (1985) had previously argued that investments in R&D create intangible assets that will likely suffer from market failure (i.e., they cannot be efficiently traded on the open market) and hence they cannot serve as effective collateral and support a high level of debt. The interesting finding to emerge from the Vicente-Lorente (2001) study was that some R&D investments are less specific than others, and thus more capable of supporting debt.

The linkage between R&D intensity and leverage raises an interesting, yet apparently unexplored, question. If R&D is negatively related to leverage simply because those investments create intangible assets that are incapable of supporting much debt, then why does R&D intensity remain a significant predictor of leverage even after the firm's tangible assets ratio has been controlled for (e.g., Hovakimian, Opler, and Titman, 2000)? Furthermore, as an ongoing expense, R&D tends to be a minor line item for all but a few outliers. Across all business segments in the sample tested in this paper, annual R&D expenditures averaged less than 2 percent of sales. Thus, it seems quite possible that a firm's intensity of investment in R&D serves as more than just a proxy for the 'stock of strategic resources such as innovative capabilities' (Vicente-Lorente, 2001: 162).

We propose that R&D intensity, when appropriately modeled, taps into a dimension of strategy that goes beyond the mere creation of intangible assets. The R&D intensity of a firm, relative to its industry rivals, indicates the strategic importance of innovation to a firm. Certainly, large expenditures on R&D do not guarantee that a firm will be an effective innovator. However, firms that invest in R&D at a much higher rate than their competitors are most likely *trying* to compete on the basis of innovativeness. To illustrate this point, consider two firms competing in different industries that have the same R&D intensity (i.e., ratio of R&D expenditures to sales). If one of those firms has the

highest R&D intensity relative to its industry peers, while the other has the lowest, it seems likely that the firm with the greater *relative* R&D intensity is attempting to compete within its industry on the basis of innovation, while the other firm is not.

If a large R&D intensity relative to one's industry peers indicates that the firm is trying to be an innovator, then there is good reason to predict that it will also want to maintain low leverage. Although scholars have only recently begun to examine explicitly how a strategy based on innovation might impact capital structure, the linkage between these two factors has deep theoretical antecedents. A lack of empirical support for the theory that innovation occurs largely as a response to adversity (Mansfield, 1961) prompted Cyert and March (1963) to propose that organizational slack, rather than 'necessity,' breeds innovation. According to these authors, 'the difference between the payments required to maintain the organization and the resources obtained from the environment by the coalition [i.e., slack] ... provides a source of funds for innovations that would not be approved in the face of scarcity' (Cyert and March, 1963: 278–279). This definition of organizational slack is heavily premised on the firm's financial cushion, and thus has prompted numerous researchers to use or propose financial proxies for slack (Singh, 1986; Zajac, Golden, and Shortell, 1991), including measures of leverage (Bourgeois, 1981; Bromiley, 1991; Davis and Stout, 1992). If slack is a critical facilitator of innovation (Bourgeois, 1981; Damanpour, 1991; Nohria and Gulati, 1996; Singh, 1986; Zajac *et al.*, 1991), and the need for financial slack manifests itself in a relatively low leverage ratio (Brealey and Myers, 1996: 501), then a low leverage ratio (i.e., high financial slack) should enhance a firm's ability to be an innovator.

Obviously, a firm that is trying to compete on the basis of innovation must continue to innovate in order to stay alive in the marketplace. This need to continue innovating makes financial slack an essential complement to the effective implementation of a strategy based on innovativeness for three primary reasons. First, as Froot, Scharfstein, and Stein (1993) point out, cash flow volatility can potentially jeopardize the investments in R&D that the firm must continue to make in order to maintain its competitive position. Maintaining a smooth continuous rate of R&D investment is critical to innovators because 'maintaining a given rate of R&D spending over a given time interval produces

a larger increment to the stock of R&D know-how than maintaining twice this rate of R&D spending over half the time interval' (Dierickx and Cool, 1989: 1507). Thus, R&D expenditures cannot be allowed to fluctuate with the firm's potentially volatile cash flows, and financial slack helps to provide insulation against cash flow volatility and ensures that investments in R&D are maintained even during bad times.

A second reason why financial slack is an essential component to competing on the basis of innovation concerns product launches. Being an *effective* innovator requires more than just developing new products: it requires getting those products to market. Financial slack can help ensure that the firm has the financial resources required to launch new products as soon as they are ready, because 'Without slack, any reductions in cash flow will result in immediate shortages of funds . . . and cancellation of capital investments' (Bromiley, 1991: 43). Finally, some strategy researchers have suggested that firms may use acquisitions to expand their stock of knowledge (Huber, 1991; Karim and Mitchell, 2000; Kogut and Zander, 1992). Thus, firms competing on the basis of innovation may sometimes enhance their competitive position through acquisitions. Obviously, sufficient financial slack can assist the firm in making the acquisitions that it deems necessary in a timely fashion.

Fundamentally, we agree with previous research that has argued that firms with a large stock of intangible assets will not be *able* to borrow as much. Moreover, we accept simple firm-level R&D intensity as a valid proxy for the stock of intangible assets (although we believe there may be better proxies for this construct). However, we add to this argument by positing that firms attempting to compete on the basis of innovation will make financial slack a strategic imperative, and hence the firm will not *want* to borrow as much. The strategic importance of innovativeness to the firm will manifest itself not in absolute R&D intensity of the firm, but rather in the R&D intensity of the firm relative to others in its industry. Thus, while absolute R&D intensity may proxy for the stock of some intangible assets, relative R&D intensity will proxy for the strategic importance of innovativeness to the firm. The strategic importance of innovativeness to the firm will vary within an industry depending on whether each firm is attempting to be an innovator, a fast follower, or a low-cost mass producer. Firms

that choose to compete on innovation should generally select capital structures that yield adequate financial slack. On the basis of these arguments, we propose the following hypothesis.

Hypothesis 1: The more heavily a firm's strategy emphasizes innovation, the lower its leverage ratio will be.

It is worth pointing out that there are strong empirical precedents to lead us to believe that Hypothesis 1 will be supported. Although R&D intensity is usually computed as a simple firm-level ratio, some studies have computed it as deviation from industry average and found a strong negative relationship between R&D and leverage (e.g., Hovakimian *et al.*, 2000). However, to the best of our knowledge, no published study has ever included both measures of R&D intensity while introducing more precise controls for the present stock of intangible assets. Under such circumstances, we believe that the best interpretation for a strong relationship between the relative measure of R&D and leverage relates to the strategic importance of financial slack to the firm.

Our proposition that some firms make financial slack a strategic imperative has implications for the previously discussed 'pecking order' model that is currently very popular in the finance literature. This model predicts a negative relationship between profitability and leverage, since firms pay down debt when profits are high and borrow when profits are low. While firms for whom financial slack isn't a strategic imperative might mechanistically follow the pecking order, we predict that the relationship will not be as strong for firms pursuing a strategy of innovation. An increase in profitability will not necessarily induce the innovators to reduce leverage. If the company has been true to its strategic orientation and has maintained comfortable financial slack, it may be more likely to divert the cash received from increased profitability to other uses.² Shyam-Sunder and Myers (1999) recognized the potential for such interactions with strategy when they acknowledged that 'we doubt the pecking order would do as well for a sample of growth companies investing heavily in intangible assets.' Thus, we expect the pecking order

² In fact, if there are tangible benefits to debt, we may actually see some innovator firms increase their debt load in response to increased profitability if they are confident that the increase is sustainable.

model to more accurately characterize firms for whom innovation is not a strategic priority, and hence we predict an interaction between relative R&D intensity and profitability in their effect on leverage.³

Hypothesis 2: The more important innovation is to the firm's strategy, the weaker the relationship between profitability and leverage will be.

Simerly and Li (2000) found that a mismatch between capital structure and the level of environmental dynamism can negatively impact the value of the firm. Similarly, we predict that there will be performance implications for firms that are trying to be innovative and yet fail to appreciate the strategic value of financial slack. The preceding arguments have posited that firms that are trying to compete on the basis of innovation maintain financial slack because failing to do so may hinder the effectiveness of their strategy. Therefore, we predict a negative interaction between strategy and leverage with regard to their impact on firm performance, indicating that firms that pursue innovation while maintaining high leverage will pay a price for this misalignment.

Hypothesis 3: There will be a negative interaction between leverage and the importance of innovation to the firm's strategy with respect to their impact on firm performance.

RESEARCH METHODS

Data sources

All of the variables used in this study were derived from the Compustat industrial and business segments databases, commonly referred to as Compustat I and II. Compustat contains detailed financial information for all companies who file reports with the Securities and Exchange Commission (SEC). This population primarily encompasses public companies in the United States, although it also includes some nonpublic firms as well as some foreign ones.

³ The pecking order model is primarily concerned with changes in leverage induced by profitability. Thus, in testing this hypothesis, we make an implicit assumption that profitability differences across firms are at least somewhat persistent.

Our initial sample included all firms listed in Compustat with assets of at least one million dollars.⁴ However, since the computation of some of the variables required a figure for the market value of the firm, we restricted our sample to those firms that had public equity (approximately 80% of all observations). Furthermore, since all models required a lagged dependent variable, we also excluded any firms that were listed for only 1 year. Thus, our initial sample included all 16,358 firms that were listed in both Compustat I and II for at least 2 years between 1980 and 1999 (the years for which segment data were available), and encompassed 110,117 firm/year observations. Occasional missing variables and our requirement that the independent variables be lagged 1 year resulted in approximately 91,000 observations in the final analyses.⁵ Thus, our data represent a large sample of firms operating in many different industries over a significant period of time. Our primary concern with using Compustat for this study was the potential variability in SIC coding at the 4-digit level from year to year (see Davis and Duhaime, 1992). Therefore, for all variables and analyses described in this paper, we aggregate industries up to the 3-digit SIC code level in order to attenuate any potential variability in year-to-year coding.

Dependent variables

Two different dependent variables were used in the analysis. The dependent variable used to test Hypotheses 1 and 2 was firm-level *Leverage*, which is computed by dividing the book value of debt by the total market value of the firm.⁶ The total market value of the firm was calculated as the book value of debt plus the market value of equity plus the carrying value of preferred stock. The dependent variable used to test Hypothesis 3, which examines the performance implications of a mismatch between strategy and capital structure, was the firm's market-to-book

⁴ Results are virtually unchanged if we also include firms with assets of <\$1million.

⁵ The precise number fluctuated from model to model in accordance with sporadic missing data items. Also, two observations were deleted from the performance model because they had a statistically significant influence (as measured by Cook's *D*) on the fitted regression. Results change very little, however, if those outliers are included in the analysis.

⁶ Results are qualitatively identical if we use the total book value of assets in the denominator.

ratio.⁷ The primary strength of this proxy for performance, which corresponds very closely to Tobin's q (Chung and Pruitt, 1994), is that it incorporates future expectations regarding firm performance. The variable *Market:Book* was calculated by dividing the market value of the firm by the book value of total assets. Since we were concerned about potential nonlinearities in the relationships between the dependent variables and the independent variables, a Box-Cox procedure was employed in order to determine whether a nonlinear transformation of the dependent variables might be appropriate. For both variables, a transformation approximately equivalent to the natural log was found to maximize model fit. Thus, Leverage and *Market:Book* were all transformed by taking the natural log.⁸

Independent variables

The primary independent variable of theoretical interest is our proxy for the importance of innovation to the firm's strategy. As discussed above, we believe that the importance of innovativeness to a firm's strategy will manifest itself not in the absolute magnitude of R&D intensity, but rather in the firm's R&D intensity relative to industry rivals. The variable *Innovation* serves as our proxy for the relative R&D intensity of the firm. First, we compute R&D intensity for every business segment listed in Compustat II from 1980 to 1999 by dividing total segment level R&D spending by total segment sales.⁹ Next, we compare the R&D intensity of each segment to all business segments competing in the same industry (as

defined by the segment's primary SIC code). All business segments competing in an industry are then assigned a percentile score based on their R&D intensity. For single-segment firms, this percentile score represents the firm-level value for the variable *Innovation*. For firms operating in multiple industries, the firm-level value for *Innovation* was computed by taking the weighted average (by segment assets) of the percentile scores assigned to each segment.¹⁰ Higher scores on this variable indicate that a firm invests more heavily in R&D than its industry rivals, and thus is more likely to be attempting to compete in the basis of innovativeness.

The models tested also included a number of firm-level control variables that previous research had linked to either or both of the dependent variables. The variable *R&D Intensity*, as measured by firm-level expenditures on R&D divided by sales, provides a traditional proxy for the intensity of investment in R&D. Similarly, *Advertising Intensity* represents the firm-level investment in advertising scaled by total firm sales. We control for the *Size* of the firm by including the natural log of total book value of firm assets. The variable *Profitability* controls for firm-level accounting profitability, as measured by return on assets (i.e., operating income before depreciation divided by the book value of assets). The firm's *Capital Intensity* is calculated by dividing the book value of total firm assets by total firm sales. Finally, the variable *Tangible Assets* controls for the firm's ratio of tangible assets to total assets by dividing total property, plant, and equipment by the total book value of assets.

In addition to the firm-level control variables described above, we also controlled for some industry-level factors that might impact either financial slack or firm performance. *Industry-M:B* controls for the overall performance of the firm's primary industry. For each firm, this variable is calculated by summing the total market values of all firms in the industry, excluding the focal firm, and dividing by the total book value of assets for all those firms included in the numerator. Firms competing in higher market-to-book industries may have more growth opportunities available to them, even if they have thus far failed to capitalize on

⁷ Firm-level market-to-book ratio has also sometimes been used as a proxy for the firm's growth opportunities. However, only those growth opportunities that the firm is expected to be able to take advantage of will be impounded into the firm's current market-to-book ratio. Thus, we feel firm-level market-to-book is best considered a holistic proxy for performance.

⁸ Results are qualitatively identical if untransformed variables are used, although the R^2 values tended to be lower. Also, before the transformation, a small constant (i.e., 0.1) was added to Leverage in order to make all values positive (as recommended by Neter *et al.*, 1996: 132).

⁹ If R&D was missing, it was assumed to be equal to zero. This is consistent with common practice in financial research (e.g., Opler *et al.*, 1999; Minton and Schrand, 1999) and theoretically justifiable. Since 1975, firms have been required to expense and disclose virtually all R&D expenditures (White, Sondhi, and Fried, 1994: 397). Thus, missing values for R&D are likely the result of negligible expenditures. Furthermore, as Himmelberg, Hubbard, and Palia (1999) report, excluding firms from the analysis that do not report R&D expenditures biases the sample towards firms which make intensive investments in R&D.

¹⁰ Ideally, we would prefer to conduct all analysis at the level of the segment. However, since debt resides at the level of the firm, and not the business segment, it was necessary to aggregate up to the firm level.

them. *Industry-ROA* controls for the current level of profitability in the firm's primary industry. This variable is computed by summing total operating income before depreciation for all firms in the industry (excluding the focal firm) and dividing by the total book value of assets for all those firms included in the numerator.

All variables described above were calculated on an annual basis. As described below, all models also included the lag of the dependent variable. The variable *Leverage* was also included as an independent variable in the performance models. Furthermore, tolerance statistics were computed on the data in order to determine whether any of the relationships between the independent variables were strong enough to necessitate excluding any variables from the model. The analysis revealed that all tolerances were well above the most conservative commonly used cut-off of 0.01 (Neter *et al.*, 1996: 388). Descriptive statistics for the dataset are given in Table 1.

Analysis

Since our dataset contains multiple observations per firm, the potential confounding influence of unobserved heterogeneity due to firm-level effects is a concern. Three of the most common approaches for modeling this type of panel data are: (a) random-effects models; (b) fixed-effects models; and (c) including lagged dependent variables as predictor variables. Random-effects models are most appropriate when the sample contains observations that are a random draw from a specified population (Johnson, 1995). Such is not the case here, as the sample includes all members of a given population (i.e., all public firms). Moreover, random-effects models are highly susceptible to the biases that can result from failing to include in the model all explanatory variables that influence the dependent variable, which is very likely to occur in any nonexperimental study (Allison, 1994; Johnson, 1995). Although a fixed-effects model would be preferable to a random-effects design, it also has a critical shortcoming with regard to the present study. Because the firm fixed effects capture all factors that are constant within a firm over time, these models cannot produce stable estimates for variables that are either invariant or display little change within a firm over time (Allison, 1994; Johnson, 1995). If firms show a fair degree of

stability over time with respect to their strategy, then variables attempting to measure strategy should not be included in the model. Therefore, it was determined that the best approach for modeling the panel data, in this context, would be the inclusion of lagged dependent variables as predictor variables in OLS regression models. This technique is particularly appropriate for the current study because all dependent variables are essentially stock variables, rather than flow variables. Thus, the past levels of these variables are likely to have a causal influence on the present levels, which makes the use of lagged dependent variables the preferred approach for the modeling of panel data (Finkel, 1995).

Specifying the proper lag structure for the effects of the independent variables on the dependent variables is one of the most important issues in panel data analysis. As Finkel (1995: 13) suggests, the selection of the proper lag structure should be guided primarily by theory. Target adjustment models (Jalilvand and Harris, 1984) suggest leverage changes very slowly, and it may take some time for actual leverage ratios to approach their 'optimum' level in response to shift in that optimum. Therefore all independent variables were lagged 1 year for the leverage models. The proper interpretation of this model is that a change in an independent variable at time $t - 1$ will be associated with a change in leverage between time $t - 1$ and time t . In contrast to leverage, theory suggests that the market value of the firm should adjust to changes in firm- or industry-level factors very rapidly (Brealey and Myers, 1996: ch. 13). Therefore, contemporaneous values for the independent variables were used for the performance model. The use of contemporaneous measures does not require that the dependent variable adjust instantly to changes in the independent variable, but rather that the causal lag for the independent variables to influence the dependent variable is short relative to the time elapsed between measurements (Finkel, 1995: 12). Thus, the following three models were analyzed:¹¹

¹¹ The results are qualitatively identical if contemporaneous measures are used for the leverage model or if lagged values are used for the performance model.

Table 1. Descriptive statistics and Pearson correlation coefficients.

	Mean	S.D.	Min.	Max.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) Leverage	-1.42	0.72	-2.30	0.10										
(2) Market:Book	0.07	0.83	-9.44	5.75	-0.440									
(3) Innovation	0.53	0.18	0.07	0.99	-0.156	0.172								
(4) R&D Intensity	0.47	18.00	-0.03	3309	-0.028	0.047	0.063							
(5) Advertising Intensity	0.03	1.69	0.00	378	-0.010	0.023	0.010	0.366						
(6) Size	4.44	2.20	0.00	13.1	0.310	-0.201	-0.122	-0.025	-0.012					
(7) Profitability	0.07	0.26	-8.56	8.71	0.073	-0.046	-0.212	-0.093	-0.032	0.276				
(8) Capital Intensity	5.77	107.20	0.01	12270	-0.030	0.026	0.027	0.412	0.159	-0.031	-0.054			
(9) Tangible Assets	0.32	0.25	0.00	1.0	0.335	-0.058	-0.069	-0.014	-0.005	0.203	0.089	0.001		
(10) Industry M:B	1.05	0.63	0.00	16.93	-0.251	0.331	0.039	0.046	0.004	-0.143	-0.133	0.025	-0.143	
(11) Industry Profitability	0.13	0.05	-2.05	0.98	-0.082	0.183	0.038	0.014	0.002	-0.077	0.020	0.000	0.082	0.426

All correlations with absolute value of $r > 0.007$ are significant at $p < 0.05$.

Leverage = $\text{nolog}[(\text{total long term debt})/(\text{market value of the firm})]$; *Market:Book* = $\text{nolog}[(\text{market value of the firm})/(\text{book value of assets})]$; *Innovation* = percentile rank of the firm's R&D/Sales ratio relative to industry peers; *R&D Intensity* = $\text{R\&D}/\text{Sales}$; *Advertising Intensity* = $\text{Advertising}/\text{Sales}$; *Size* = $\text{nolog}(\text{book value of assets})$; *Profitability* = (operating income before depreciation)/(book value of assets); *Capital Intensity* = (book value of assets)/(total sales); *Tangible Assets* = (property plant and equipment)/(book value of assets); *Industry M:B* = (total industry market value)/(total industry book value of assets); *Industry Profitability* = (total industry operating income before depreciation)/(total industry book value of assets).

$$(1) \text{ Leverage}_t = \beta_0 + \beta_1 \text{Leverage}_{t-1} + \beta_2 \text{Innovation}_{t-1} + \beta_3 \text{R\&D Intensity}_{t-1} + \beta_4 \text{Advertising Intensity}_{t-1} + \beta_5 \text{Size}_{t-1} + \beta_6 \text{Profitability}_{t-1} + \beta_7 \text{Capital Intensity}_{t-1} + \beta_8 \text{Tangible Assets}_{t-1} + \beta_9 \text{Industry M:B}_{t-1} + \beta_{10} \text{Industry Profitability}_{t-1}$$

$$(2) \text{ Leverage}_t = \beta_0 + \beta_1 \text{Leverage}_{t-1} + \beta_2 \text{Innovation}_{t-1} + \beta_3 \text{Innovation}_{t-1} \times \text{Profitability}_{t-1} + \beta_4 \text{R\&D Intensity}_{t-1} + \beta_5 \text{Advertising Intensity}_{t-1} + \beta_6 \text{Size}_{t-1} + \beta_7 \text{Profitability}_{t-1} + \beta_8 \text{Capital Intensity}_{t-1} + \beta_9 \text{Tangible Assets}_{t-1} + \beta_{10} \text{Industry M:B}_{t-1} + \beta_{11} \text{Industry Profitability}_{t-1}$$

$$(3) \text{ Market: Book}_t = \beta_0 + \beta_1 \text{Market:Book}_{t-1} + \beta_2 \text{Innovation}_t + \beta_3 \text{Innovation}_t \times \text{Leverage}_t + \beta_4 \text{R\&D Intensity}_t + \beta_5 \text{Advertising Intensity}_t + \beta_6 \text{Size}_t + \beta_7 \text{Profitability}_t + \beta_8 \text{Capital Intensity}_t + \beta_9 \text{Tangible Assets}_t + \beta_{10} \text{Industry M:B}_t + \beta_{11} \text{Industry Profitability}_t$$

RESULTS

Leverage models

The results of the OLS regressions that were used to test Hypotheses 1 and 2 are reported in Models 1 and 2 of Table 2. Hypothesis 1 predicts that firms that are attempting to compete on the basis of innovation will make financial slack a strategic priority, and hence maintain lower leverage than firms that are not pursuing a strategy of innovation. The significant negative coefficient ($p < 0.001$) on Innovation in Model 1 supports this hypothesis, thus indicating that more intense investment in R&D, relative to industry peers, induces firms to maintain lower leverage.

Hypothesis 2 predicts that as innovation becomes more important to the firm's strategy, the firm will be less inclined to follow the mechanistic pecking order model of corporate finance, and hence the negative relationship between profitability and leverage will be weakened. Model 2 tests this hypothesis by adding an interaction between

Innovation and Profitability.¹² The positive and significant coefficient ($p < 0.001$) on the interaction term supports this hypothesis. It would appear that firms competing on innovation make financial slack a strategic priority, and thus have a greater tendency to depart from relatively autonomous pecking-order model.

The results for the control variables were virtually identical across Models 1 and 2, and most had the expected effect. The positive effects of Size and Tangible Assets and the negative effects of Profitability and Industry M:B were consistent with previous research (e.g., Berger, Ofek, and Yermack, 1997; Harris and Raviv, 1991; Hovakimian *et al.*, 2000; Rajan and Zingales, 1995). Based on previous research, it was difficult to predict the effects of Capital Intensity and Industry ROA. Both of these variables were found to have an insignificant effect on Leverage in the current study. Similarly, it was difficult to predict the effect Advertising Intensity would have on leverage, since some studies had found a negative effect (Berger *et al.*, 1997; Hovakimian *et al.*, 2000), while others had found either no effect or a positive effect (Vincente-Lorente, 2001). Our results are more consistent with the latter, since Advertising Intensity did not have a significant effect on leverage. Probably the most interesting result among the control variables, however, was the lack of a significant impact of R&D Intensity on Leverage. Most of the previously cited research on capital structure had found a negative relationship between R&D intensity and leverage. However, given the current study's inclusion of a variable that explicitly proxies for the importance of innovativeness, as well as controls for the tangibility of assets, the lack of significance for R&D intensity is not surprising.¹³

In longitudinal models such as those used in Models 1 and 2, interpreting the economic significance of the results requires some adjustment to the regression coefficients. Since our theoretical model suggests that leverage adapts slowly to changes in the independent variables, it is necessary to adjust the coefficients from the regression equation in order to determine what the equilibrium leverage level will be for any given

¹² The increase in R^2 between Models 1 and 2 was statistically significant ($F = 24.6$, $p < 0.001$).

¹³ R&D Intensity did have a significant negative effect on Leverage when Innovation, Tangible Assets, and the two industry-level controls were omitted from the model.

Table 2. Regression results

All models are longitudinal models that were estimated by OLS regression with lagged dependent variables. The dependent variable for Models 1 and 2 was Leverage, and all independent variables were lagged one year. The dependent variable for Model 3 was firm Market:Book, and all independent variables other than the lagged dependent variable were contemporaneous measures.

Dependent variable:	<i>Leverage models</i>		<i>Performance model</i>
	Model 1 Leverage	Model 2 Leverage	Model 3 Market:Book
Intercept	-0.244*** (0.007)	-0.243*** (0.007)	-0.291*** (0.014)
Lagged Dep. Var.	0.818*** (0.002)	0.817*** (0.002)	0.730*** (0.002)
Innovation	-0.091*** (0.008)	-0.093*** (0.008)	-0.141*** (0.02)
Innovation × Profit.	-	0.102*** (0.021)	-
Innovation × Leverage	-	-	-0.172*** (0.01)
R&D Intensity	0.000 (0.000)	0.000 (0.000)	0.001*** (0.0002)
Advertising Intensity	0.001 (0.001)	0.000 (0.001)	0.031*** (0.007)
Size	0.011*** (0.001)	0.011*** (0.001)	0.004*** (0.001)
Profitability	-0.028*** (0.005)	-0.096*** (0.015)	0.119*** (0.006)
Capital Intensity	0.000 (0.000)	0.000 (0.000)	-7.4E-05*** (1.46E-05)
Tangible Assets	0.102*** (0.006)	0.102*** (0.006)	0.117*** (0.007)
Industry M:B	-0.022*** (0.002)	-0.022*** (0.002)	0.106*** (0.002)
Industry-ROA	0.024 (0.03%)	0.027 (0.03%)	-0.140*** (0.034)
Leverage	-	-	-0.026*** (0.008)
<i>n</i>	91,442	91,442	91,080
<i>R</i> ²	0.708	0.709	0.659
<i>F</i>	22,247***	20,231***	14,672***

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$ (all tests are two-tailed); standard errors for coefficients are in parentheses

Leverage = $\text{nlog}[(\text{total long term debt})/(\text{market value of the firm})]$; *Market:Book* = $\text{nlog}[(\text{market value of the firm})/(\text{book value of the assets})]$; *Innovation* = percentile rank of the firm's R&D/Sales ratio relative to industry peers; *R&D Intensity* = R&D/Sales; *Advertising Intensity* = Advertising/Sales; *Size* = $\text{nlog}(\text{book value of assets})$; *Profitability* = (operating income before depreciation)/(book value of assets); *Capital Intensity* = (book value of assets)/(total sales); *Tangible Assets* = (Property plant & equipment)/(book value of assets); *Industry M:B* = (total industry market value)/(total industry book value of assets); *Industry Profitability* = (total industry operating income before depreciation)/(total industry book value of assets)

level of the independent variables. This can be accomplished by dividing the coefficients from the regression by the negative of $(\beta_1 - 1)$, where β_1 is the coefficient for the lagged dependent variable (see Finkel, 1995: ch. 2). Accounting for this adjustment, Figure 1 illustrates the long-run optimal leverage levels as implied by Model 2.

The x -axis of this figure plots profitability from two standard deviations below the mean to two standard deviations above the mean. The y -axis displays the predicted 'optimal' leverage (i.e., the exponentiated value for the dependent variable Leverage) for firms competing at three different levels of Innovation: high (Innovation = 0.9),

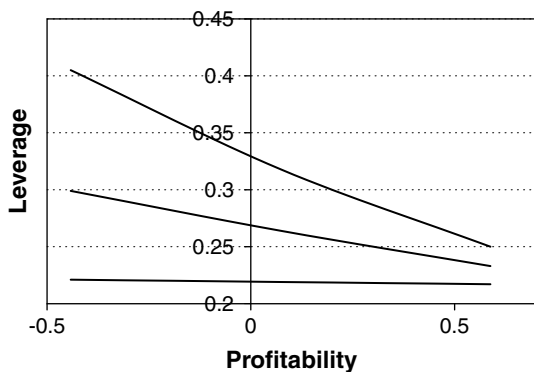


Figure 1. The joint influence of strategy and profitability on leverage. The x -axis of this figure plots Profitability from 2 standard deviations below the mean to 2 standard deviations above the mean. The y -axis displays the predicted long-run leverage, which is the exponent of the predicted value of the variable *Leverage* from Model 2. Three series are plotted here, corresponding to firms at three different levels of Innovation: high (Innovation = 0.9), median (Innovation = 0.5), and low (Innovation = 0.1). All other variables were held constant at their mean

median (Innovation = 0.5), and low (Innovation = 0.1). All other variables were held constant at their mean. This graph indicates that firms that compete on the basis of innovation (i.e., R&D intensity at the 90th percentile relative to industry peers) apparently maintain low leverage, regardless of their level of profitability. Firms for whom financial slack is of less strategic importance appear to follow the pecking order model of corporate finance. Furthermore, at the mean level of profitability (0.07) leverage is almost 50 percent greater for a firm at the 10th percentile of relative R&D intensity than it is for a firm at the 90th percentile (i.e., leverage of 0.32 vs. 0.22). These results indicate that firm strategy is an influential determinant of capital structure.

Performance model

The potential negative impact of a misalignment between firm strategy and capital structure is tested in Model 3 of Table 2. As predicted by Hypothesis 2, the interaction between Innovation and leverage is negative and significant ($p < 0.001$). Apparently, firms that maintain high leverage while attempting to pursue a strategy based on innovation incur a significant performance penalty. The interpretation of the main effect of Innovation on performance is complicated by the presence of an

interaction; thus we will reserve discussion of this subject for the section below, which considers the economic significance of the model.

In terms of the control variables, the positive effects of R&D Intensity, Profitability, and Tangible Assets on performance were all consistent with other large-sample multi-industry studies that used either Market-to-Book or Tobin's q as their dependent variable (Himmelberg *et al.*, 1999; Morck, Shleifer, and Vishny, 1988; Yermack, 1996),¹⁴ as was the negative effect of leverage. However, the effect of Advertising Intensity, Size, and Capital Intensity on performance could not be predicted because previous studies have found conflicting results for these variables. In our analysis, we found Size and Advertising Intensity to be positively related to performance, and Capital Intensity to have a negative influence on performance. Although we were unsure how the industry-level controls would influence performance, the positive effect of Industry M:B is not very surprising. More curiously, however, Industry ROA had a negative influence on firm performance. Speculatively, it may be that holding everything else constant, a higher average industry ROA indicates that the firm is performing poorly relative to its industry rivals, and thus is not expected to be able to capture future growth opportunities in the industry. Alternatively, a high average industry ROA may be indicative of a mature industry, suggesting few future growth opportunities for the firm.

Since our theoretical model assumed that the dependent variable can adjust quickly to changes in the independent variables, no adjustment to the coefficients is necessary in order to interpret the economic significance of Model 3. The moderating impact of leverage on the relationship between Innovation and Market:Book is depicted in Figure 2. The x -axis of this figure plots Innovation from low (0.1) to high (0.9), while the y -axis displays the predicted market-to-book ratio (i.e., the exponent of the dependent variable Market:Book). Three series are plotted, representing firms with low (5th percentile), median, and high (95th percentile) leverage. All other variables are held constant at their mean. The negative slope of the high leverage line indicates that if a firm maintains high leverage, attempting to compete on the

¹⁴ Not all of the studies included all of the control variables, and some used slightly different specifications.

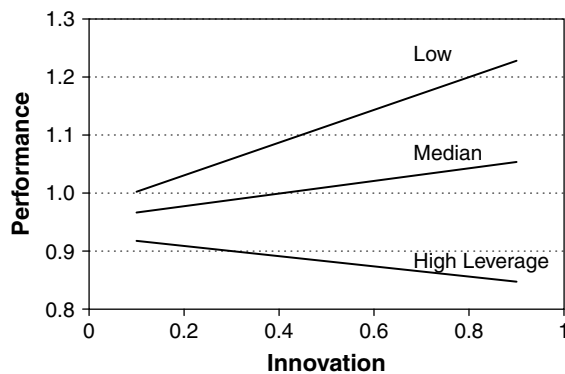


Figure 2. The joint influence of strategy and leverage on performance. The *x*-axis of this figure plots Innovation from low (0.1) to high (0.9), while the *y*-axis displays the predicted market-to-book ratio, which is the exponent of the dependent variable *Market:Book* from Model 3. Three series are plotted, representing firms with low (5th percentile), median, and high (95th percentile) leverage. All other variables are held constant at their mean

basis of innovation will result in diminished performance. For firms at median and low leverage levels, however, pursuing a strategy of innovation is associated with improved performance. Perhaps most telling, a firm at the 90th percentile of relative R&D intensity that maintains low leverage (i.e., at the 5th percentile of leverage) will have a market-to-book ratio almost 50 percent greater (i.e., a ratio of 1.23 vs. 0.85) than a firm with a similar strategy but high leverage (i.e., the 95th percentile of leverage).

DISCUSSION AND CONCLUSIONS

The results of this study have implications, both theoretical and practical, for the field of strategic management. First, our findings help to substantiate the view that capital structure is not just a function of exogenous industry, regulatory and product market factors, but also of a firm's strategy and its basis for competition within an industry. This suggests that capital structure cannot be treated as either exogenous or irrelevant to strategy. Managers who fail to realize that an inappropriate capital structure can hamper the effectiveness of a firm's strategy, and thus hinder a firm's ability to compete, may suffer significant performance consequences. Furthermore, the results also suggest that when researchers include R&D expenditures

in their models, they should give careful consideration to exactly what construct they are attempting to model. Depending upon whether the intention is to assess strategy or the stock of some intangible assets, different specifications may be required. Finally, although the model used here was a rather crude test of the pecking order theory, it does have implications for research in that area. The relevance of the pecking order may be underestimated if researchers don't account for the fact that whether or not a firm follows the pecking order may depend on its business strategy.

Our research also complements existing work on organizational slack. Previous research (Bourgeois, 1981; Damanpour, 1991; Nohria and Gulati, 1996; Singh, 1986; Zajac *et al.*, 1991) has implicated financial slack in *success* at innovating (i.e., slack influences performance). The contribution here is in providing empirical evidence that intended strategy (i.e., *attempting* to compete on the basis of innovation) impacts financial slack, and that the interaction between intended strategy and slack, in turn, influences performance.

In their extensive review of the literature on capital structure, Harris and Raviv (1991) probably underestimated the potential contributions of strategy when they suggested that the consideration of strategic variables might 'help in explaining inter-industry variations in capital structure.' However, using concepts such as firm and resource heterogeneity, some researchers have made significant progress in helping to explain variation in capital structure within an industry (e.g., Balakrishnan and Fox, 1993; Barton and Gordon, 1998; Ginn, Young, and Beekun, 1995; Jordan *et al.*, 1998). The theory presented in this paper suggests that we *should expect to see* as much variation in capital structure within an industry as between industries. Competitive priorities must be determined in relation to those firms that are perceived as competitors (i.e., other firms in the same industry). If strategy really does impact capital structure, then its usefulness lies in explaining the variation we observe within an industry. The results of this study lend support to this argument by demonstrating that a firm's gross expenditures on R&D may not be as important in determining capital structure as the strategic importance of innovation to the firm.

Although the arguments presented here have suggested that a firm's choice of competitive strategy will affect its subsequent capital structure, it

may also be the case that a firm's current financial structure limits the range of viable strategies open to the firm. A highly levered firm with factories geared towards large-scale, low-cost output would be faced with quite a challenge if it decided that it needed to become an innovator. Thus, it is highly likely that there is a dynamic relationship between strategy and capital structure, such that each affects the other. As previously discussed, Kochhar and Hitt (1998) did find evidence of such a reciprocal relationship. Future research examining the causal structure of this relationship in more detail may provide case studies demonstrating that a managerial decision to shift competitive strategy is followed by the predicted change in capital structure. Similar to the work of Rajagopalan and Finkelstein (1992), recently deregulated industries might serve as a fertile context for such investigations.

Future research may also try extending the scope of strategies considered beyond innovativeness. For example, most of the arguments presented could logically be extended to encompass firms that attempt to differentiate through brand image or advertising. Another promising avenue of research concerns the potential interactions between strategy, capital structure, and environmental dynamism. Although we did not model environmental dynamism, other studies have found it to be a significant predictor of leverage (Simerly and Li, 2000). A logical extension of this paper would be to propose that financial slack will be particularly important to firms that are attempting to be innovators in highly dynamic environments.

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REFERENCES

- Allison PD. 1994. Using panel data to estimate the effects of events. *Sociological Methods and Research* **23**: 174–199.
- Andrade G, Kaplan SN. 1998. How costly is financial (not economic) distress? Evidence from highly leveraged transactions that became distressed. *Journal of Finance* **53**: 1443–1493.
- Balakrishnan S, Fox I. 1993. Asset specificity, firm heterogeneity and capital structure. *Strategic Management Journal* **14**(1): 3–16.
- Barney JB. 1991. Firm resources and sustained competitive advantage. *Journal of Management* **17**: 99–120.
- Barton SL, Gordon PJ. 1987. Corporate strategy: useful perspective for the study of capital structure? *Academy of Management Review* **12**: 67–75.
- Barton SL, Gordon PJ. 1988. Corporate strategy and capital structure. *Strategic Management Journal* **9**(6): 623–632.
- Berger P, Ofek E, Yermack D. 1997. Managerial entrenchment and capital structure decisions. *Journal of Finance* **52**: 1411–1438.
- Bourgeois LJ. 1981. On the measurement of organizational slack. *Academy of Management Review* **6**: 29–39.
- Brander JA, Lewis TR. 1986. Oligopoly and financial structure: the limited liability effect. *American Economic Review* **76**: 956–970.
- Brealey RA, Myers SC. 1996. *Principles of Corporate Finance*. McGraw-Hill: New York.
- Bromiley P. 1991. Testing a causal model of corporate risk taking and performance. *Academy of Management Journal* **34**: 37–59.
- Chandler A. 1962. *Strategy and Structure: Chapters in the History of the American Industrial Enterprise*. MIT Press: Cambridge, MA.
- Chung KH, Pruitt SW. 1994. A simple approximation of Tobin's q. *Financial Management* **23**: 70–74.
- Cyert RM, March JG. 1963. *A Behavioral Theory of the Firm*. Prentice-Hall: Englewood Cliffs, NJ.
- Damanpour F. 1991. Organizational innovation: a meta-analysis of effects of determinants. *Academy of Management Journal* **34**: 555–590.
- Davis GF, Stout SK. 1992. Organization theory and the market for corporate control: a dynamic analysis of the characteristics of large takeover targets, 1980–1990. *Administrative Science Quarterly* **37**: 605–633.
- Davis R, Duhaime IM. 1992. Diversification, vertical integration, and industry analysis: new perspectives and measurement. *Strategic Management Journal* **13**(7): 511–524.
- DeAngelo H, Masulis R. 1980. Optimal capital structure under corporate and personal taxation. *Journal of Financial Economics* **8**: 3–29.
- Dierickx I, Cool K. 1989. Asset stock accumulation and sustainability of competitive advantage. *Management Science* **35**: 1504–1511.
- Finkel SE. 1995. *Causal Analysis with Panel Data*. Sage: Newbury Park CA.
- Froot KA, Scharfstein DS, Stein JC. 1993. Risk management: coordinating corporate investment and financing policies. *Journal of Finance* **48**: 1629–1658.
- Ginn GO, Young GJ, Beekun RI. 1995. Business strategy and financial structure: an empirical analysis of acute care hospitals. *Hospital and Health Services Administration* **40**: 191–200.
- Harris M, Raviv A. 1991. The theory of capital structure. *Journal of Finance* **46**: 297–355.

- Himmelberg CP, Hubbard G, Palia D. 1999. Understanding the determinants of managerial ownership and the link between ownership and performance. *Journal of Financial Economics* **53**: 353–384.
- Hovakimian A, Opler T, Titman S. 2000. The debt–equity choice. *Journal of Financial and Quantitative Analysis* **36**: 1–24.
- Huber GP. 1991. Organizational learning: the contributing processes and the literatures. *Organization Science* **2**: 88–115.
- Hunt SD. 1997. Resource-advantage theory: an evolutionary theory of competitive firm behavior. *Journal of Economic Issues* **31**: 59–77.
- Jalilvand A, Harris R. 1984. Corporate behavior in adjusting to capital structure and dividend targets: an econometric study. *Journal of Finance* **39**: 127–145.
- Jensen MC. 1986. Agency costs of free cash flow, corporate finance, and takeovers. *American Economic Review* **76**: 323–329.
- Jensen MC, Meckling WH. 1976. Theory of the firm: managerial behavior, agency costs and ownership structure. *Journal of Financial Economics* **3**: 305–360.
- Johnson DR. 1995. Alternative methods for the quantitative analysis of panel data in family research: pooled time-series models. *Journal of Marriage and the Family* **57**: 1065–1085.
- Jordan J, Lowe J, Taylor P. 1998. Strategy and financial policy in UK small firms. *Journal of Business Finance and Accounting* **25**: 1–27.
- Karim S, Mitchell W. 2000. Path-dependent and path-breaking change: reconfiguring business resources following acquisitions in the U.S. medical sector, 1978–1995. *Strategic Management Journal*, Special Issue **21**(10–11): 1061–1081.
- Kochhar R. 1996. Explaining firm capital structure: the role of agency theory vs. transaction cost economics. *Strategic Management Journal* **17**(9): 713–728.
- Kochhar R, Hitt MA. 1998. Linking corporate strategy to capital structure: diversification strategy, type and source of financing. *Strategic Management Journal* **19**(6): 601–610.
- Kogut B, Zander U. 1992. Knowledge of the firm, combinative capabilities, and the replication of technology. *Organization Science* **3**: 383–397.
- Long M, Malitz I. 1985. The investment-financing nexus: some empirical evidence. *Midland Corporate Finance Journal* **3**: 53–59.
- Mansfield E. 1961. Technical change and the rate of imitation. *Econometrica* **29**: 741–766.
- Miller MH. 1977. Debt and taxes. *Journal of Finance* **32**: 261–275.
- Miller MH. 1988. The Modigliani–Miller propositions after thirty years. *Journal of Economic Perspectives* **2**: 99–120.
- Minton BA, Schrand C. 1999. The impact of cash flow volatility on discretionary investment and the costs of debt and equity financing. *Journal of Financial Economics* **54**: 423–460.
- Modigliani F, Miller M. 1958. The cost of capital, corporation finance and the theory of investment. *American Economic Review* **48**: 261–297.
- Modigliani F, Miller M. 1963. Corporate income taxes and the cost of capital: a correction. *American Economic Review* **53**: 433–443.
- Morck R, Shleifer A, Vishny RW. 1988. Management ownership and market valuation: an empirical analysis. *Journal of Financial Economics* **20**: 293–315.
- Myers SC, Majluf NS. 1984. Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics* **13**: 187–221.
- Neter J, Kutner MH, Nachtsheim CJ, Wasserman W. 1996. *Applied Linear Statistical Models*. Irwin: Chicago, IL.
- Nohria N, Gulati R. 1996. Is slack good or bad for innovations? *Academy of Management Journal* **39**: 1245–1264.
- Opler TC, Pinkowitz L, Stulz R, Williamson R. 1999. The determinants and implications of corporate cash holdings. *Journal of Financial Economics* **52**: 3–46.
- Penrose ET. 1959. *The Theory of Growth of the Firm*. Blackwell: Oxford, U.K.
- Porter ME. 1980. *Competitive Strategy*. Free Press: New York.
- Porter ME. 1996. What is strategy? *Harvard Business Review* **74**(6): 3–20.
- Rajagopalan N, Finkelstein S. 1992. Effects of strategic orientation and environmental change on senior management reward systems. *Strategic Management Journal*, Summer Special Issue **13**: 127–142.
- Rajan RG, Zingales L. 1995. What do we know about capital structure? Some evidence from international data. *Journal of Finance* **50**: 1421–1460.
- Sandberg CM, Lewellen WG, Stanley KL. 1987. Financial strategy: planning and managing the corporate leverage position. *Strategic Management Journal* **8**(1): 15–24.
- Schendel D. 1994. Introduction to 'Competitive organizational behavior: toward an organizationally-based theory of competitive advantage'. *Strategic Management Journal*, Winter Special Issue **15**: 1–4.
- Shyam-Sunder L, Myers SC. 1999. Testing static tradeoff against pecking order models of capital structure. *Journal of Financial Economics* **51**: 219–244.
- Simerly RL, Li M. 2000. Environmental dynamism, capital structure and performance: a theoretical integration and an empirical test. *Strategic Management Journal* **21**(1): 31–49.
- Singh JV. 1986. Performance, slack and risk taking in organizational decision making. *Academy of Management Journal* **29**: 562–585.
- Titman S. 1984. The effect of capital structure on a firm's liquidation decision. *Journal of Financial Economics* **13**: 137–151.
- Vincente-Lorente JD. 2001. Specificity and opacity as resource-based determinants of capital structure: evidence for Spanish manufacturing firms. *Strategic Management Journal* **22**(2): 157–177.
- Warner JB. 1977. Bankruptcy costs: some evidence. *Journal of Finance* **32**: 337–348.
- White GI, Sondhi AC, Fried D. 1994. *The Analysis and Use of Financial Statements*. Wiley: New York.

- Williamson O. 1988. Corporate finance and corporate governance. *Journal of Finance* **43**: 567–591.
- Yermack D. 1996. Higher market valuation of companies with a small board of directors. *Journal of Financial Economics* **40**: 185–211.
- Zajac EJ, Golden BR, Shortell SM. 1991. New organizational forms for enhancing innovation: the case of internal corporate joint ventures. *Management Science* **37**: 170–184.