

ENVIRONMENTAL DYNAMISM, CAPITAL STRUCTURE AND PERFORMANCE: A THEORETICAL INTEGRATION AND AN EMPIRICAL TEST

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An ongoing argument in financial management has been how to craft a capital structure which maximizes shareholder wealth. This question has gained prominence within the strategic management field because of the apparent link between capital structure and the ability of firms to compete. By integrating models from organizational economics with the strategic management literature, we are able to theorize that a firm's capital structure is influenced by environmental dynamism, and that the match between environmental dynamism and capital structure is associated with superior economic performance. Our large-scale empirical analyses provide supportive evidence for the proposition that competitive environments moderate the relationship between capital structure and economic performance. From a theoretical standpoint, these findings provide another link between capital structure and corporate strategy. More importantly, we are able to move the discussion beyond the limitations of financial risk and incorporate the strategy concept of decision making under uncertainty. For practical application, these findings offer informed advice for managers on how to craft a capital structure. Copyright © 2000 John Wiley & Sons, Ltd.

INTRODUCTION

A relatively new and important area of strategy research has been examining the relationship between a firm's capital structure and factors related to the ability of firms to compete (e.g., Balakrishnan and Fox, 1993; Barton and Gordon, 1988; Bromiley, 1990; Kochhar, 1996; Kochhar and Hitt, 1998; Porter, 1992). Capital structure has long been an important issue from a financial economics standpoint since it is linked with a firm's ability to meet the demands of various stakeholders (e.g., Modigliani and Miller, 1958, 1963). It is an equally important concept for

strategic management research. From strategy research, we know that external factors may influence the development of a firm's capital structure, and that the choices a firm makes will have a direct influence on that firm's governance structure (Hitt, Hoskisson, and Harrison, 1991) and competitive capabilities (Balakrishnan and Fox, 1993; De Long and Summers, 1991; Kester and Luehrman, 1992; Kochhar and Hitt, 1998; Porter, 1992; Scherer and Ross, 1990).

The creation of a capital structure can influence the governance structure of a firm which, in turn, can influence the ability of a firm to make strategic choices (Jensen, 1986). Several links between capital structure and firm strategy have been reported in the literature. Kochhar and Hitt (1998) reported that the nature of diversification strategy was related to capital structure. Balakrishnan and Fox (1993) found that R&D intensity was negatively related to capital structure. Along the same line, Titman and Wessels (1988)

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found that product uniqueness was negatively related to leverage. These findings shed important light on the relationship between capital structure and firm strategy. However, there is limited research examining the joint effect of competitive environments and capital structure on economic performance. Strategic management should be able to provide a prescriptive theory to suggest the strategy implications of the choice between debt and equity.

The relationship between the capital structure choice and the competitive capabilities of firms has gained in importance in recent years as the global competitiveness of U.S. firms has declined (Hill, Hitt, and Hoskisson, 1988; Porter, 1992). As a result, there are competing, and sometimes dichotomous, theories of what constitutes appropriate managerial action. For example, firms can improve bottom-line performance and discipline managers to run more efficient operations by increasing debt. Since debt financing is tax deductible a portion of the cost of capital is passed from the stockholders to the government (Lubatkin and Chatterjee, 1994). However, studies have shown that increased debt increases risk aversion, and reduces the willingness of firms to invest in research and development critical to maintaining competitiveness. While the tax advantages of increased debt are recognized, by increasing debt a firm introduces a stakeholder group—lenders—who, by definition, have a short-term orientation. This group is potentially able to limit the freedom of choice available to managers in the selection of strategies to contend with competitive threats or opportunities, especially when firms need and depend on creative and innovative strategic choices to thrive and succeed. One benefit of these contradictory issues has been to stimulate research beyond the confines of finance and economics into the broader sphere of strategic management.

Most strategic management studies that have examined the capital structure question have focused either on systematic (firm-specific) risk, or on unsystematic (market) risk with respect to the use of debt in relation to strategic choice (Allen, 1993; Balakrishnan and Fox, 1993). An interesting proposition that has emerged from this research is an argument that the components of capital structure should vary across industries. Allen (1993) argued that the type of financial system which is suited to traditional industries

where there is consensus is very different from dynamic industries where there is no widely agreed upon basis of managerial action. Addressing this question would seem to provide an opportunity to expand our understanding of the relationship between capital structure and competitive environments.

The purpose of this study was, therefore, to offer theoretical rationale and empirical assessment for an argument that decisions concerning the choice of capital structure need to be linked with a firm's competitive environment, more specifically to environmental dynamism, the degree and the instability of changes in a firm's competitive environment (Child, 1972; Dess and Beard, 1984). An argument based on insights from organizational economics and strategic management was developed which suggests that a firm's capital structure is an organizational element which must be aligned with the degree of dynamism in a firm's competitive environment, and that this alignment or match has performance implications. Empirical testing provided support for the performance implications of the alignment between environmental dynamism and capital structure.

LITERATURE REVIEW

An appropriate capital structure is a critical decision for any business organization. The decision is important not only because of the need to maximize returns to various organizational constituencies, but also because of the impact such a decision has on an organization's ability to deal with its competitive environment. The prevailing argument, originally developed by Modigliani and Miller (1958, 1963), is that an optimal capital structure exists which balances the risk of bankruptcy with the tax savings of debt. Once established, this capital structure should provide greater returns to stockholders than they would receive from an all-equity firm. However, empirical studies that have tried to probe this theoretical relationship have produced results which raise as many questions as they provide answers (Ghosh, 1992; Myers, 1984). Further, despite the apparent benefits of leverage, there are many firms that avoid significant levels of debt altogether (Gardner and Trzcinka, 1992). Finding an explanation for this difference between

theory and practice has proven to be a major challenge (Chung, 1993). Below we review studies from finance and strategic management which suggest the importance of environmental factors that could affect the capital structure decision.

Bradley, Jarrell, and Kim (1984) hypothesized that there were three firm-specific factors which would influence a firm's optimal capital structure: the variability of firm value, the potential impact of financial distress, and the level of nondebt tax shields. They found that both the volatility of firm earnings and the potential impact of financial distress had the predicted inverse relationship with firm leverage. They also examined the cross-sectional behavior of average firm leverage ratios for firms in 25 industries. One finding counter to theory was that there was a direct, rather than inverse, relationship between firm leverage and the relative amount of nondebt tax shields. Their definition of nondebt tax shields included firm-specific assets derived as a result of activities such as advertising and research and development. Further, they found that industry effects had a significant impact on capital structures. More specifically, they found that over 54 percent of the cross-sectional variance in firm leverage could be explained by industry classification.

Thies and Klock (1992) extended this line of research with their longitudinal study of manufacturing firms. They examined several elements of capital structure, including types of convertible debt, preferred equity, and common equity. Changes in these elements of capital structure were examined with respect to changes in the variance of sales growth (a proxy measure for environmental change). They found that as the variance in sales growth increased (environmental change increased) the creation of long-term debt decreased. Their findings supported an argument that contextual variables affect capital structure. Specifically, they concluded that tax incentives encouraged the use of debt, bankruptcy and agency costs limited the use of debt, and asymmetric information encouraged restraint in debt creation.

Chung's (1993) study of capital structure examined the relationship between operating risk and asset characteristics. This study found that output market uncertainty (the volatility of demand) was negatively related to leverage. That is, firms which faced relatively low levels of market uncertainty, such as firms in the utility

industry, will have a higher level of debt in their capital structure. It was also found that firms with greater growth opportunities, as measured by industry trends, tended to use less debt.

In summary, the research into capital structure from a financial management perspective provides support for an argument that environmental factors could have an impact on the capital structure decision.

Most research within the strategic management area has focused on the relationship between firm-specific factors and capital structure. For example, Barton and Gordon (1987, 1988) suggested a 'strategy-capital structure' relationship which built on the strategy perspective that functional-level decisions incorporate a managerial choice element. Their study operationalized firm strategy according to the methodology suggested by Rumelt (1974). Their empirical results suggested that there was a relationship between financial contextual variables and capital structure which was dependent upon the firm's choice of strategy. Additionally they found that profit was negatively related to debt for all strategy classifications. Their contention was that managerial choice was a factor in the capital structure decision.

In one of the few studies that included external environmental factors, Balakrishnan and Fox (1993) approached the question of capital structure from a transaction cost economics perspective. They examined the relationship between firm-specific characteristics and industry characteristics as they affected capital structure. Their finding was that firm-specific factors (R&D, advertising, depreciation, growth opportunities, and risk) accounted for over 52 percent of the variance in capital structure. This would seem to support Barton and Gordon's (1988) contention of the relevance of managerial choice as a determinant of a firm's capital structure.

The finding that firm-specific variables are a significant factor in explaining capital structure has also been supported by Taylor and Lowe (1995). Their study examined the capital structure relationship across firms following different strategies. The authors concluded that for firms following single, dominant and related diversification strategies the financial markets were able to value firms' debt and equity based on the future prospects of expected cash flows. However, they concluded that financial markets were less able to determine the value of debt and equity

for more diversified firms. In other words, the markets lacked adequate knowledge of matters internal to the firms which limited their ability to correctly price the firms' assets.

Kochhar and Hitt (1998) extended this line of research by examining the relationship between the degree of diversification and financial strategy. They found equity financing to be preferable for firms following a related diversification strategy, and debt financing to be more appropriate for unrelated diversification. These findings supported those of Seth (1990) and Mann and Sicherman (1991). Their study did include exogenous variables, specifically the risk of bankruptcy (Altman's Z), and firm risk. Of particular importance, they were able to demonstrate that the choice of capital structure influenced the choice of strategy.

From these studies we can see the establishment of links between capital structure and strategy. In the aggregate, however, the studies in strategic management have not directly addressed the question of the relationship between external environmental factors, the capital structure decision and economic performance in a manner that would allow a prescription for managers from a strategic management perspective.

THEORETICAL BASES AND HYPOTHESES

The results of the studies reviewed provide a foundation for arguments that factors beyond simple rational-actor behavior contribute to the creation of a firm's capital structure. Scholars from both management and finance disciplines are beginning to appreciate that the problems of practicing managers go beyond the singular objective of maximizing the market value of the firm. A number of studies have shown that individual managers must balance competing demands from stockholders, debt-holders and other stakeholder groups while maintaining a degree of control over the firm's ability to respond to environmental demands (e.g., Donaldson and Lorsch, 1983; Freeman, 1984; Stahl, 1989).

Despite these findings from various research fields, very little work has been done to integrate environmental considerations with the theory of capital structure. Our objective in this section

was to explain theoretically why environmental considerations should be important by examining perspectives from organizational economics, and integrating these with perspectives from strategic management. We then derive testable hypotheses based on the theoretical work.

Agency theory (Fama and Jensen, 1983) and transaction cost economics (Williamson, 1985), the two central elements of organizational economics, represent two schools of thought that deal specifically with the capital structure decision. We agree with Kochhar (1996) and Rumelt, Schendel, and Teece (1994) that agency theory and transaction cost economics are two distinct theoretical arguments. However, both deal with the capital structure decision and its impact on corporate governance. Further, Oviatt (1984) has suggested that these two perspectives offer an avenue for the integration of the financial management and strategic management disciplines. Thus, rather than emphasizing the differences, we integrate complementary elements from these two theoretical perspectives with elements of strategic management in an effort to provide a more holistic view of the capital structure decision as it relates to the nature of the firm's competitive environment. This integration provides an opportunity to examine the linkage among environment, capital structure, and organizational performance. Specifically, we argue that decisions concerning the choice of capital structure need to be appropriate for the competitive environment of the firm.

Agency theory

The classical agency theory concept was developed by Berle and Means (1932). They observed that ownership and control had become separated in larger corporations as a result of the dilution in equity positions. This situation provided an opportunity for professional managers, as those in control, to act in their own best interest (Walsh and Seward, 1990). Today, the central issue for agency theory is how to resolve the conflict between owners and managers over the control of corporate resources (Jensen, 1986, 1989) through the use of contracts which seek to allocate decision rights and incentives (Rumelt *et al.*, 1994).

Managers have a number of incentives to pursue growth-oriented strategic options. The larger the organization, the greater the economic and

political power of the top management teams, and the greater the ability of the organization to marshal resources necessary to deal effectively with its competitive and social environment (Morck, Shleifer, and Vishny, 1989). Also, larger organizations are seen as being able to maintain their freedom from the discipline of the capital markets. As a generalization, it can be said that growth does lead to increasing the wealth of shareholders. However, the concern is that too many of the activities associated with increasing the size of organizations are motivated not by a desire for maximizing shareholder wealth, but by opportunities for the self-aggrandizement of management (Jensen and Ruback, 1983).

From industrial economics we know that market competition works to drive down the price of both products and factors of production to a minimum average cost. This gives managers an incentive to improve organizational efficiencies in order to improve cash flow. The problem, according to Jensen (1986), is how to control managers contractually so that they will return excess cash flow to investors rather than invest funds in projects with returns below the cost of capital. Excess cash flow is defined as cash flow in excess of that needed to fund projects with a positive net present value discounted at the firm's cost of capital.

The contractual device suggested by agency theory to accomplish the transfer of wealth from the organization to the investors is debt creation (Jensen, 1989). Debt provides a means of bonding managers' promises to pay out future cash flows. It also provides the means for controlling opportunistic behavior by reducing the cash flow available for discretionary spending. Top managers' attention is then clearly focused on those activities necessary to ensure that debt payments are made. Managers unwilling to perform within such a restrictive environment can easily and quickly be replaced. Companies failing to make interest and principal payments can be declared insolvent and can be dissolved. This use of debt as a disciplinary tool makes survival the central issue for all concerned. For firms that adopt debt as a control mechanism, lenders become the key constituents in the corporate governance structure.

Agency theory also has important implications for the relationship between stockholders and debt-holders. Stockholders are interested in the return over and above that amount which is

required to repay debt. Debt-holders are only interested in the debt payment specified in the contract. Stockholders are seen as sometimes being interested in pursuing riskier business activities than debt-holders would prefer. When this occurs debt-holders may charge higher prices for debt capital and institute greater control measures to prevent top managers from investing capital in riskier undertakings. Furthermore, since it is impossible to completely eliminate the agency cost in this situation (Jensen and Meckling, 1976), debt-holders may prefer not to invest in firms pursuing riskier business activities.

From a firm's perspective, a higher cost of debt capital can decrease its attractiveness to various stakeholders, and greater external control by debt-holders may interfere with the firm's ability to navigate effectively within its competitive environment. This would indicate that for firms desiring to engage in riskier business activities, either because of an agent's opportunistic behavior, or because the firm must respond to changing competitive pressures, the use of debt financing would be an impediment subjecting managers to both the discipline and constraints of the capital markets. In other words, agency theory does not take into consideration competitive environments, or the necessity for managers to make choices beyond a stockholder wealth-maximizing perspective.

Transaction cost economics

Transaction cost economics (TCE) stems from the work of Commons (1925), Coase (1937), Barnard (1938), and others, culminating in the seminal work of Williamson (1975). Coase argued that transaction cost differences (inefficiencies) between external factor markets and internal organizational hierarchies were key determinants in the make-or-buy decision. That is, when should firms vertically integrate to produce their own goods, and when should they buy from the markets? Today, TCE is concerned with the contractual relations between firms and each of their (internal and external) constituencies with respect to economizing transaction costs (Rumelt *et al.*, 1994).

Markets and organizations are both instruments for conducting transactions. The choice of which instrument to use will be a product of the efficiencies that can be gained from either. These

efficiencies are moderated by the characteristics of the individual decision-makers; that is, their propensity for opportunistic behavior, and bounded rationality in decision making (Williamson, 1975). However, Williamson (1988) argues that when market forces are insufficient to reduce transaction costs or to control managerial opportunistic behavior, the board of directors is responsible for protecting the interests of the stockholders. Hierarchical control is seen as a substitute for market efficiencies.

The most important dimension of the transaction is the specificity of the assets germane to the contract (Williamson, 1991). Specificity refers to the redeployability of the assets: the higher the redeployability of the asset, the lower the specificity. That is, assets such as bricks and mortar can be redeployed to a number of tasks and do not necessarily lose their intrinsic value once their original purpose has been fulfilled. On the other hand, assets with a high degree of specificity can not be easily redeployed. Examples would include Titan rockets, 80 × 88 microprocessors, and highly specialized human knowledge (e.g., aerospace engineers).

For highly redeployable assets, such as nuts and bolts, there will be complete knowledge within the factor market concerning their present and future value, and their degree of redeployability. This low specificity reduces the risk associated with any given transaction, and theoretically, it should lead to more efficient transactions. The most appropriate instrument for financing transactions for assets with a low degree of specificity would be debt. This is because the value of the preemptive claims of the debt-holder should be known with reasonable certainty, and the cost of the transaction would be minimized.

For assets with low redeployability, such as highly specialized production equipment, or highly skilled workers, or investments in R&D and marketing, the knowledge within the factor markets concerning the present and future value of the assets will be very limited, thus increasing the cost of the transaction. This makes debt an unattractive alternative because the value of the preemptive claim of debt-holders declines in relation to the increase in asset specificity. It is the lack of knowledge about the future value of an asset that increases the risk for debt-holders, and increases the cost of using debt for project financing.

The use of equity shifts responsibility for governance from external capital markets to internal boards of directors. External debt-holders normally have an arm's-length arrangement with a firm, becoming intrusive only when the firm fails to meet its debt covenants. The board of directors, as representatives of the residual claimants, has the responsibility and capacity for maintaining a continuous administrative and governance role (Williamson, 1988). This would indicate that under certain circumstances the board of directors and corporate managers should have relatively more complete knowledge about the future value of highly specialized assets. Therefore, debt and equity are less financial instruments and more a means of corporate governance. More importantly, from a strategic management perspective, there is a clear indication that external factors can influence the efficacy of the capital structure decision with respect to the ability of the firm to make critical choices in response to competitive pressures. However, as with agency theory, transaction cost economics does not take into consideration the competitive environment such that it can provide adequate prescriptive advice as to how to create a capital structure that will ensure the long-term survival of the firm.

From the review above, we see that agency theory highlights the relationship between greater risk related to company activities and equity financing, while TCE stresses the link between asset specificity and equity financing. We now turn to strategic management to develop the theoretical linkage between these elements of organizational economics and the ability of firms to compete.

Strategic management

Bettis (1983) and Bromiley (1990) suggested that strategic management researchers should retain a strategic perspective when examining elements from finance and strategic management. Bromiley argued that there 'should be a search for criteria for strategic choice from an explicitly strategic base' (Bromiley, 1990: 92). Bromiley (1990) pointed out that a major limitation to the integration of finance theory with strategic management has been the differing paradigms of the two disciplines. Finance assumes that firms behave efficiently and are oriented toward the objective of maximizing shareholder wealth. As

a branch of microeconomics, the focus of finance is on the behavior of markets using a rather simplistic model of the firm.

Strategic management, on the other hand, recognizes that the firm has multiple constituencies and objectives, and accepts that it may be impossible to maximize the returns to all constituencies, or to achieve all objectives. More importantly, strategy is concerned with the long-term survival of the organization within its environment. This requires a more complex model of the firm. Bromiley (1990) also points out that finance assumes away cognitive limits in its assumption of complete information and efficient markets. Strategic management accepts the argument that managers are limited in their ability to gather and process information. Therefore, we can say that the choice of capital structure is less a matter of predefined alternatives and more a search for alternatives in a complex and uncertain environment.

A significant limitation to prior studies of capital structure has been the researcher's orientation toward risk. The most common approach has been to take the financial management perspective that risk is measured as the variance in returns about an expected mean. The greater the variance, the greater the probability of bankruptcy. Again, the assumptions are that managers have complete information, a clear set of alternatives, and known outcomes and consequences. Strategic management takes a different view of risk. Baird and Thomas define risk as

corporate strategic moves that cause returns to vary, that involve venturing into the unknown, and that may result in corporate ruin—moves for which the outcomes and probabilities may be only partially known and where hard-to-define goals may not be met. (Baird and Thomas, 1985: 231–232)

In other words, the focus for strategic management is on uncertainty, and decision making given limited information. Therefore, the capital structure decision needs to be evaluated from this perspective.

Firms can choose to exercise a number of strategic choices or actions depending on their external environments and resource positions. First, Porter's (1980) classical prescription of differentiation and cost leadership strategies aimed at earning Ricardian rents (superior long-term

profit based on unique firm resources) as each strategy assumed that firms possess unique resources (Grimm and Smith, 1997; Peteraf, 1993; Porter, 1980, 1985). As such these strategic actions and choices are consistent with the resource-based view of the firm in that unique firm resources form the bases of success. For firms to achieve such resource advantage they need to invest in specialized and hard-to-imitate assets. Furthermore, firms may actively try to create competitive uncertainty in order to delay responses from competitors (Grimm and Smith, 1997). For firms with limited resource advantage, top managers may wish to pursue entrepreneurial actions such as new product introduction, product improvement, and segment transfer. For these entrepreneurial actions to succeed firms must create competitive uncertainty and utilize blind spots or else risk immediate response from more powerful competitors (Grimm and Smith, 1997). Such actions are novel and risky, and those firms which adopt these strategies would also deliberately conceal their strategic effectiveness in order to achieve and maintain first-mover advantage. Even for firms with dominant market share, strong reputation, and experience, it is important to pursue strategic actions such as product proliferation, aggressive innovation, and information manipulation in order to maintain their advantageous position (Grimm and Smith, 1997). Product proliferation and aggressive innovations entail greater investment in specialized assets. Information manipulation such as aggregate cost reporting from multiple divisions render it difficult not only for competitors but also for other outside groups to probe a firm's operation.¹

Furthermore, drastic changes are taking place on the competitive landscape (Bettis and Hitt, 1995). Industry boundaries are changing and blurring. For example, witness the dismantling of boundaries around the computer, telecommuni-

¹This section benefited substantially from the strategy as actions perspective (see Grimm and Smith, 1997, for a summary). We, however, excluded in our discussion of co-optive actions as they seem to be more relevant for those firms in relatively stable environments. Co-optive actions were prescribed for firms that are experiencing stable industry demands, but lack unique advantage, and resource and market share disparity. These actions, including signaling, base pricing, cost information disclosing, and merger, may further prolong industry stability. Based on the same reasoning we also excluded deterrent actions such as limit pricing, predatory pricing, and price leadership.

cation, publishing, and entertainment industries, and the formation of the digital media industry. The concept of a global village demands globally oriented strategic actions. Firms that have adopted traditional globally oriented strategies have had to cope with multifaceted challenges (Bartlett and Ghoshal, 1989). Advanced technologies are beginning to alter the effectiveness of traditional competitive approaches, and to introduce a new array of competitive weapons. Computer-aided manufacturing, mass customization, and rapid product development (Anderson, 1997; Brown and Eisenhardt, 1997; Eisenhardt and Tabrizi, 1995; Kotha, 1995; Pine, 1993) are enabling firms to compete effectively by combining cost and differentiation advantage without sacrificing customer focus. Information technology is ushering in a new network economy (Applegate, McFarlan, and McKenney, 1996; Kelly, 1998).

In light of these changes, scholars are constantly urging researchers to expand and reconceive the notion of strategy. For example, Porter (1996) urges the identification of unique customer needs and the creation of a coherent activity system to deliver products or services that meet those needs. Serving those unique customer needs requires novel strategies. The development and maintenance of such an activity system clearly require investment in specialized assets. Hamel (1996, 1998) argues that strategy must be innovative and revolutionary in order to be effective. Bartlett and Ghoshal (1989) proposed a translational strategic approach, a hybrid of international, multidomestic and global strategies, as an effective globally oriented strategy. Furthermore, competitive approaches have expanded to include collaborative actions. Moore (1996) emphasizes the importance of ecosystem. Porter (1998) proposes the notion of clusters, a critical mass of linked industries and supporting institutions, as an important condition for competitive success. While a complete enumeration of future strategic actions is impossible, it is clear that firms will have more and novel choices at their disposal as we enter a new age of competition.

In summary, whether firms adopt some of the more traditional strategic actions or emerging actions, these actions seem to be associated with greater risk, novelty, the need for investment in specialized assets, and more importantly, may be more difficult to value by outside groups. In the following section we provide an integration of

these theoretical perspectives leading to our hypotheses.

Environmental dynamism

A distinguishing characteristic of the strategic management discipline is the emphasis it places on the firm's competitive environment (e.g., Chandler, 1962; Child, 1972; D'Aveni, 1994; Porter, 1980). An organization must find a match or fit between the demands of its competitive environment and its internal management systems in order to survive and succeed (Venkatraman, 1990). The management system and organizational structure most appropriate for any given firm will be a product of the specific set of environmental contingencies being faced (Drazin and Van de Ven, 1985).

While every firm will be unique in the totality of its design (Andrews, 1971), there are limited sets of equally effective designs that can match a configuration of contingencies facing organizations in a given environmental context (Hambrick, 1984). At the industry level, this means that a particular environmental characteristic is expected to affect all organizations within that industry in a similar manner. Within industries, success for any firm will depend on its adoption of appropriate response mechanisms sufficient to deal with relevant environmental factors.

Across industries there are significant differences in the environmental characteristics impacting firms. Most relevant among these characteristics is environmental dynamism, defined as the rate and the instability of environmental change (Child, 1972; Dess and Beard, 1984). Environmental dynamism is the product of several forces operating at one time. These include an increase in the size and number of organizations within an industry, and an increase in the rate of technological change and its diffusion throughout that industry.

There is a rich set of empirical studies which demonstrates that greater environmental uncertainty is associated with greater environmental dynamism (e.g., Duncan, 1972; Milliken, 1987, 1990; Tung, 1979). For all parties involved (including top managers, stockholders, debtholders and others), as environmental dynamism increases it will result in actors' increased inability to assess accurately both the present and future state of the environment. This limits their

ability to determine the potential impact of decision making on current and future business activities, and to determine viable alternatives which managers can pursue (Milliken, 1987). This means that an effect of increasing levels of environmental dynamism is to reduce access to knowledge needed to make critical decisions. This, in turn, reduces the stability and predictability of relations among firms and their constituents within an industry. It is then a logical inference that varying degrees of environmental dynamism can have a differential impact on similar activities occurring across industries. That is, as the degree of environmental dynamism varies across industries, it is reasonable to expect that there should be significant differences in the adaptive capabilities required for survival, and that these differences should have performance implications.

For firms within industries exhibiting greater environmental dynamism top managers must develop creative and innovative strategies to deal effectively with this major challenge (D'Aveni, 1994; Thompson, 1967). The current strategy literature suggests that firms must invest in firm-specific assets that help build temporary competitive advantages (D'Aveni, 1994). Investing in firm-specific assets to build temporary competitive advantage and to eliminate the static competitive advantages of other firms (D'Aveni, 1994; Grimm and Smith, 1997) also entails greater risk, and requires the buildup of more firm-specific assets. There is strong evidence that some firms are indeed pursuing new types of competitive approaches which transcend traditional strategies (Hamel, 1996, 1998; Moore, 1996; Porter, 1998).

According to the agency theory argument, firms pursuing riskier business activities, such as those associated with more dynamic environments, may find it difficult and undesirable to use a greater amount of debt. Debt may be more expensive, reflecting the increased risk of uncertain outcomes. Debt-holders may impose greater control, thereby limiting top managers' ability to exercise managerial discretion in charting their firms' future in an uncertain business domain. Furthermore, debt-holders may simply refuse to invest in such firms since the agency cost problem can not be effectively eliminated (Jensen and Meckling, 1976).

According to TCE, a primary purpose of economic organizations is to 'craft governance struc-

tures that economize on bounded rationality while simultaneously safeguarding the transactions in question against the hazards of opportunism' (Williamson, 1988: 569). As environmental dynamism increases, the knowledge available for decision making is reduced (Milliken, 1987). Firms may tend to use those novel and creative strategies, and may also engage in activities to create more competitive uncertainty in order to build and enhance barriers to imitation (Hamel, 1996, 1998; Grimm and Smith, 1997). For firms operating in such environments the lack of certain knowledge would make it more difficult for the factor markets to value accurately the assets being employed, and for stakeholder groups to accurately evaluate the appropriateness of managerial decisions. This argues for the increased need for equity financing in more dynamic environments to reduce transaction costs.

The theory provided indicates that the degree of environmental dynamism should be a significant determinant in the management of a firm's capital structure. Consonant with prior theoretical work in this area, we view environmental dynamism as existing on a continuum ranging from stable to dynamic. Firms operating in environments that could be classified as relatively low on a measure of environmental dynamism should consider the use of debt financing over equity financing. The overriding consideration would be the availability of lower-cost debt financing, and the ability of debt-holders to appreciate the competitive moves initiated by top managers and to control agency problems. As the rate of environmental dynamism increases, equity financing should be used to reduce transaction costs arising from increased risk. The use of equity financing also has the advantage of removing capital market constraints associated with the inability of managers to convey complete information concerning competitive moves. This would allow managers to pursue a variety of strategies that are deemed necessary for survival and success in highly dynamic environments.

The ability of firms to adapt to changes within the environment either through responding to market signals or changes in governance structures produces organizational efficiencies that improve the economic performance of the firm (Williamson, 1996). If the theory is correct, it should be possible to demonstrate that across a continuum of environmental contexts there would

be differences in capital structures, and these differences would have performance implications. For this we hypothesized:

Hypothesis 1: For firms in a stable environment, greater leverage (greater debt financing) would be related to better firm economic performance.

Hypothesis 2: For firms in a dynamic environment, lower leverage (lower debt financing) would be related to better firm economic performance.

METHODS

Setting

The current study used a sample of 700 large U.S. firms in a variety of industry contexts. The need for generalizing our research findings led us to use firms listed in the Stern Steward Market Performance 1000 as the initial data set. The primary research question being examined dealt with how the performance impact of capital structure or leverage differs at different levels of environmental dynamism. To examine this topic data were collected from a variety of sources to form our study data base. The *U.S. Industrial Outlook* (U.S. Department of Commerce, 1994) provided information on 46 industries through 1992, the base year for this study. Financial information was collected from COMPUSTAT and the Stern Steward Market Performance 1000 report. Complete information was available for 700 firms. Firms were selected from the Stern Steward report based on our ability to align them with the U.S. Industrial Outlook data.

Variables

Performance

Measuring firm performance has been a major challenge for scholars and practitioners as well. Performance is a multidimensional construct (cf. Chakravathy, 1986), thus any single index may not be able to provide a comprehensive understanding of the performance relationship relative to the constructs of interests. Therefore it is important to look at multiple indicators. At the same time it is important to understand stable

relations over time. Thus, instead of using a short-term indicator of performance it is desirable to study how our variables of interest will influence performance over a period of time. Given these considerations, we selected return on assets (ROA) and return on investments (ROI) as the performance measures, and averaged the data over a 5-year time period from 1989 to 1993. ROA is operationalized as income before extraordinary items, divided by total assets (which includes current assets, net property, plant and equipment, and other noncurrent assets as identified by the firms). ROI is operationalized as income before extraordinary items, divided by total invested capital (which includes total long-term debt, preferred stock, minority interest, and total common equity).

The exclusion of the return on equity measure (ROE) is as important as the inclusion of ROA and ROI. While many argue that maximizing return on equity is an important performance criterion, we must point out that the ROE ignores the impact of other forms of resource investment. Further, the ROE measure would be confounded with our basic theoretical question of the performance impact of the capital structure decision in as much as a high ROE could indicate an overly leveraged firm, and low ROE could indicate a conservatively financed firm. We therefore concluded that ROA and ROI were return measures that captured a firm's contribution to the overall investment of resources and therefore were more appropriate measures of performance for this study.

Environmental dynamism

Researchers have over the years used a number of variation-based indexes in industrial-level activities to measure the environmental dynamism construct. For example, Tosi, Aldag, and Storey (1973) and Bourgeois (1985) used variations in net sales, ROE, and technological volatility as their measures of environmental dynamism. Dess and Beard (1984) conducted a large-scale study measuring multiple dimensions of competitive environments. In this study the authors built on Aldrich's (1979) conception of environmental dimensions, and used a variety of industry-level measures to construct indicators of dynamism, complexity, and munificence. They found a high degree of convergence on multiple indicators used

to measure the same construct. Furthermore, Rasheed and Prescott (1992) were able to replicate this result using a confirmatory factor analysis approach. Keats and Hitt (1988) observed convergence between the instability (dynamism) measure derived from sales and operating income and content analysis of annual reports. This set of empirical evidence became the basis of using variations in industry revenue as the key indicator when assessing environmental dynamism (Boyd, 1995).

In this study, we used industry-level objective information to derive an index of environmental dynamism. The approach used has been adopted in a number of studies (e.g., Boyd, 1995; Dess and Beard, 1984; Keats and Hitt, 1988; Rasheed and Prescott, 1992; Wholey and Brittain, 1989) and is viewed as the appropriate level of analysis for studying phenomena related to the task environment. Specifically we regressed industry values of shipment over 5 years against time (1988–92), and used the standard error of the regression coefficient related to a time dummy variable divided by the average value of industry's shipments to produce a standardized index of environmental dynamism. The industry-level archival-based data captured common environmental characteristics faced by participants within a given industry (Bourgeois, 1980; Boyd, Dess, and Rasheed, 1993).

Leverage

The key argument in financial management literature is that there is an optimal capital structure which balances the benefits of leverage (tax deductibility and increased ROE) with the costs of servicing the debt and the increased risk of bankruptcy. An optimal capital structure would be one in which the marginal costs are equal to marginal benefits. Since the pivotal point is the degree of leverage, we use financial leverage to examine the capital structure. Financial leverage is defined as the ratio of debt to equity. As firms increase their use of fixed-charge financing as a substitute for common stock they increase the required rate of return on leveraged shares, and thereby increase the firm's systematic risk. Our measure of leverage includes the use of fixed charge securities in the form of fixed-charge debt and preferred stock. The financial leverage measure for each firm in the data set was averaged

over a 4-year period to control for spurious events (1989–92).

Controls

The extant literature suggests that the size of a firm may influence its structure, decision-making capabilities, and, ultimately, its performance (Bluedorn, 1993). Thus size may capture the impact of several important aspects of a firm. For example, Smith, Guthrie, and Chen (1989) found that size moderated the relationship between strategy and economic performance. We therefore included size as measured by the log of the full-time employees as one important control variable.

A second control variable was created to reflect the extent to which firms had solved their agency and transaction costs problems. A central concern for agency theory is how to insure that agents return excess cash flows rather than invest in projects with returns below the cost of capital (Jensen, 1986). One possible measure of the existence of an agency problem would be firms that experience a growth in size due to capital investments, but without returns on those investments representative of the cost of the invested capital (Ezzamel and Watson, 1993; Fox and Hamilton, 1994). Several studies have used some measure of return on invested capital to support a relationship between agency theory and economic performance (e.g., Morck and Yeung, 1992; Oswald and Jahera, 1991; Reuer and Miller, 1997).

The primary view of TCE is that as asset specificity increases, the cost of transactions will increase (Williamson, 1985). However, Dyer (1997) showed that this is not necessarily the case. His study of the automotive industry indicated that firms can establish controls over transactions which will have a positive economic impact. Other studies have argued that firms which had reduced their transactions costs have achieved a higher level of economic efficiency (e.g., Balakrishnan and Wernerfelt, 1986; DeCanio and Frech, 1993; Joskow, 1990). When achieved, these efficiencies should be reflected in returns greater than the cost of the invested capital.

The theoretical support for using an economic performance measure to test for agency and transaction costs has been developed by Godfrey and

Hill (1995), Granovetter (1985), and Hill (1990). Therefore, the surrogate measure used was derived from a return on invested capital classification system developed by Stern Steward and Company. The data for this measure were provided by the Stern Steward Market Performance 1000 report for 1993, which provided 10 years of data through 1992. This data set has been used in prior empirical research. Baliga, Moyer, and Rao (1996) noted that the basic concept of the data base, market value added, can be thought of as an approximation of Tobin's Q , the ratio of market value of a firm's shares to the replacement costs of the assets. Higher Q ratios are indicators of higher economic performance (Copeland and Weston, 1988). We found the market value-added measure to be too highly correlated with our performance variables; therefore we used a classificatory system derived from the market value-added measure.

Return on capital was calculated by dividing net operating profits after taxes by the capital outstanding at the beginning of the year. The firm's cost of capital was then subtracted from the return on capital to arrive at a classification system with four categories. Firms in the first category were able to achieve return on capital above 2.5 percent of cost of capital and capital growth rate over 25 percent per year over the 5-year period (1988–92). Firms in the second category were able to achieve return on capital above 2.5 percent of cost of capital and capital growth rate below 25 percent per year over the same 5-year period. These two categories of firms are creating more economic value than they consume. We therefore assume that they have managed to significantly reduce both agency problems and transaction costs. Firms in these two categories form our base group.

Firms in the next category were able to achieve return on capital within ± 2.5 percent of cost of capital but with capital growth rates below 25 percent per year during the same period. For firms in this group, we created a dummy variable *Firm Dummy 1* (for firms in this group their Firm Dummy 1 value will be one, and for all others this value will be zero). Firms in the last category were only able to achieve a return on capital below 2.5 percent of their cost of capital, and a capital growth rate below 25 percent per year. We created another dummy variable *Firm Dummy 2* to capture their overall weakness (for

firms in this group their Firm Dummy 2 value will be one, and all others will be zero). Firms in these two categories consume rather than create economic value, and are assumed to exhibit either agency problems or transaction costs problems.

In summary, the study sample can be divided into three groups. The first group, consisting of firms in the first two categories described above, is assumed to be relatively free from either agency problems or transaction problems or both. This group forms our base group. The second and third groups, consisting of firms in the third and fourth categories respectively, are believed to be suffering from those problems. We therefore created two dummy variables, *Firm Dummy 1* and *Firm Dummy 2*, to capture respectively the degrees to which firms in the second and third groups experience agency and transaction problems.

Analytical approach

Our basic hypotheses posit that firm economic performance will be a function of leverage and the moderating effects of environmental dynamism. More specifically, we hypothesize that under stable environments higher leverage will lead to better performance, and under dynamic environments higher leverage will lead to poorer performance. To test these two relationships we employed a multiple regression model with an interaction term. The interactive multiple regression modeling approach has been proposed as an effective method for studying interactive relationships (cf. Aiken and West, 1991; Blalock, 1965; Cohen and Cohen, 1983; Jaccard, Turrisi, and Wan, 1990; Pedhazur, 1982).

With the interactive multiple regression model, we created a series of simple regressions by entering selected values of the moderating variable. Then, by testing the simple slopes, we were able to assess the impact of leverage on performance under different levels of environmental dynamism and therefore provide statistical evidence related to our Hypotheses 1 and 2.

RESULTS

Statistical analysis provided support for our argument that environments moderate the relationship between capital structure and economic perform-

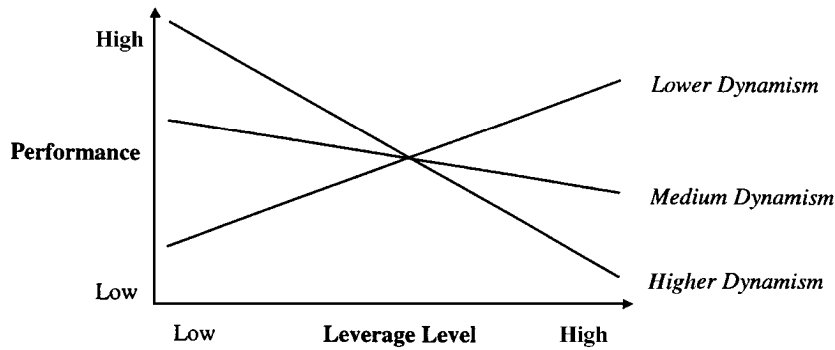


Figure 1. An illustration of simple regression models at different dynamism levels

ance. Our overall findings are best represented by Figure 1, which illustrates the changes in the impact of leverage on performance at three possible points on the environmental dynamism continuum. The three points on the vertical axis represent three different levels of dynamism. For firms experiencing stable environments (lower dynamism), leverage is positively linked to performance, and for firms experiencing relatively to very dynamic environments (medium to higher dynamism), leverage is negatively related to performance.

Table 1 presents both descriptive statistics and the correlation matrix for our study sample. To remove the multicollinearity threat caused by the product term of two variables, we centered the dynamism and leverage variables by taking away the respective mean from each value (see Aiken and West, 1991).

The empirical tests consisted of two multiple

regression equations as summarized in Table 2. We used 5-year average ROA and ROI as dependent variables. For independent variables, we entered dynamism, leverage, and the product term of dynamism and leverage. In addition, we entered firm size (log of number of employees), and the two dummy variables *Firm Dummy 1* and *Firm Dummy 2*. With the introduction of the dynamism and leverage interactive term, the standardized beta weights are difficult to interpret so we reported both regular regression coefficients and beta weights in Table 2, and used regular regression coefficients in the construction of simple regressions later.

The results from both models indicate a statistically significant negative impact of the dynamism and leverage interactive term on firm performance (as measured by both average ROA and ROI). To illustrate the moderating impact of environmental dynamism on the leverage-

Table 1. Descriptive statistics and correlation matrix^a

Variables	Mean	S.D.	Correlation coefficients								
			1	2	3	4	5	6	7	8	
1. Average 5-year ROA	5.346	7.246	1.00								
2. Average 5-year ROI	8.337	11.595	0.87	1.00							
3. Firm Dummy 1	0.327	0.470	-0.13	-0.08	1.00						
4. Firm Dummy 2	0.419	0.494	-0.34	-0.33	-0.59	1.00					
5. Dynamism	0.000	0.006	-0.07	-0.09	-0.12	0.25	1.00				
6. Average leverage	0.000	3.927	-0.20	-0.11	-0.00	0.12	-0.01	1.00			
7. Dynamism*leverage	0.000	0.011	-0.10	-0.11	0.02	0.02	-0.08	-0.09	1.00		
8. Size (log employees)	0.915	0.605	-0.00	0.00	-0.04	0.18	-0.08	0.06	0.08	1.00	

^aN = 700; for absolute value of $r > 0.08$, $p < 0.05$, for absolute value of $r > 0.10$, $p < 0.01$



Table 2. Regression results^a

Independent variables	Regression models					
	5-year average ROA			5-year average ROI		
	<i>B</i>	β	<i>t</i>	<i>B</i>	β	<i>t</i>
Leverage	-0.252	-0.137	-4.269***	-0.168	-0.057	-1.699+
Dynamism	35.236	0.030	0.919	20.310	0.011	0.317
Dynamism by leverage	-66.154	-0.096	-3.016**	-112.756	-0.102	-3.075**
Firm Dummy 1	-7.657	-0.496	-12.575***	-10.579	-0.428	-10.392***
Firm Dummy 2	-9.398	-0.640	-15.358***	-14.041	-0.598	-13.726***
Size (log of employees)	1.387	0.116	3.562***	2.140	0.112	3.288**
Constant	10.394		19.008***	15.624		17.091***
<i>R</i> ²	0.313			0.250		
Adjusted <i>R</i> ²	0.307			0.244		
<i>F</i>	52.693***	(d.f. = 6,693)		38.599***	(d.f. = 6,693)	

+*p* < 0.10; ***p* < 0.01; ****p* < 0.001

^a *N* = 700

performance relationship, we created a series of simple regression models by entering different values for the moderating variable, environmental dynamism, into the interactive multiple regression models. Methodologists suggest that three values—low, mean, and high—be used in the simple regression models (Aiken and West, 1991; Cohen and Cohen, 1983; Jaccard *et al.*, 1990). Cohen and Cohen (1983) offered a guideline that one standard deviation above and below the mean value be used as the high and low values. We felt that since our model involved changes in the sign of simple slopes (from positive to negative) we should probe the relationship between leverage and performance under a number of environmental dynamism levels.

We therefore used six values ranging from stable to dynamic as follows (note that our centered variable dynamism has a mean of 0.000 and a standard deviation of 0.006), two standard deviations below the mean (-0.012), one and a half standard deviations below the mean (-0.009), one standard deviation below the mean (-0.006), mean (0.000), one standard deviation above the mean (0.006), and one and a half standard deviations above the mean (0.009).

The simple regression slopes related to the impact of leverage on performance (average ROA and ROI respectively) under different values of environmental dynamism using these six values are presented in Table 3. The standard error of the regression coefficient of leverage in the simple

regressions can be obtained from the variance and covariance matrix of regression coefficients (see Aiken and West, 1991; Jaccard *et al.*, 1990). As identified in Table 3, we see that the impact of leverage on performance changes as the degree of environmental dynamism changes. More specifically, as the degree of environmental dynamism changes from lower to higher, the performance impact of leverage changes from positive to negative.

For the Average ROA measure, the leverage and performance relationship is *positive* and statistically significant when environmental dynamism is low (-0.012, and -0.009), is nonsignificant when environmental dynamism reached a moderately low level (-0.006 or one standard deviation below the mean), and is *negative* and statistically significant when environmental dynamism reached mean value and above (0.000, 0.006 and 0.009 respectively). On the other hand, for the Average ROI measure, leverage has a statistically significant *positive* impact on performance when the environment is relatively stable (below average dynamism), but has a statistically significant *negative* impact on performance when the environment is dynamic (from mean value and above).

In addition to the above key findings, it is important to note the impact of the size control variable. We found that firm size as measured by the log of number of employees had a positive impact on performance. Note that our sample was

Table 3. Simple regressions at different levels of dynamism^a

Levels of dynamism	Simple slopes					
	5-year average ROA			5-year average ROI		
	<i>b'</i>	<i>S_b'</i>	<i>t^a</i>	<i>b'</i>	<i>S_b'</i>	<i>t^a</i>
-0.012	0.5414	0.2638	2.0524*	1.1851	0.4409	2.6874**
-0.009	0.3429	0.2001	1.7132*	0.8468	0.3346	2.5306**
-0.006	0.1445	0.1386	1.0422	0.5085	0.2317	2.1944*
0.000	-0.2524	0.0592	-4.2673***	-0.1680	0.0989	-1.6988*
0.006	-0.6494	0.1497	-4.3358***	-0.8445	0.2503	-3.3730***
0.009	-0.8478	0.2119	-4.0017***	-1.1828	0.3542	-3.3394***

p* < 0.05; *p* < 0.01; ****p* < 0.001; *p* values are one-tailed
^aWith degree of freedom of 693

comprised of the largest firms in the U.S. economy. For these firms there might indeed be a size advantage, or some truth to the claim that ‘big is beautiful.’

As we suspected, firms with average to relatively poor solution to their agency and transaction costs problems may suffer in terms of firm performance. Our regression models indicate that, compared to firms with stronger standing (our base group), firms in average overall position (for those that *Firm Dummy 1* is one) and poorer position (for those that *Firm Dummy 2* is one) achieve lower performance as a consequence of an inappropriate capital structure relative to their competitive environments.

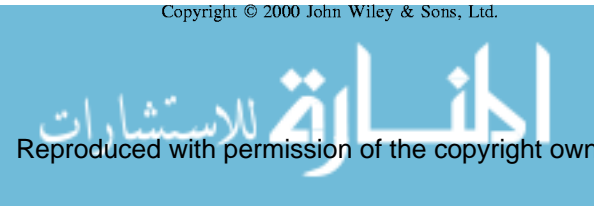
CONCLUSIONS

The purpose of this study was to offer both a theoretical rationale and empirical support for an argument that decisions concerning the choice of capital structure need to be linked with a firm’s competitive environment. Our study integrated elements from agency theory and TCE with strategic management to hypothesize the differing impact of leverage on performance under varying degrees of environmental dynamism. As our integration of multiple theoretical frameworks demonstrates, while each theoretical framework contributes to our understanding, combining these perspectives yields a greater understanding. The theoretical proposition advanced and empirical evidence presented reveal important insights related to the performance impact of leverage

under differing environmental conditions. Departing from the relatively simple suggestion that leverage is inconsequential in a perfect world (Modigliani and Miller, 1958), and that higher leverage leads to better performance due to the tax benefit (Modigliani and Miller, 1963), we proposed that leverage produces either positive or negative impact on performance depending on whether the firms are in stable or dynamic environments. The relationship between capital structure and the ability of firms to compete is that the use of debt introduces an external constituency which has a short-term orientation. This orientation can impose covenants that limit the strategic choice of managers, thus affecting their ability to carry out critical strategic decisions.

These findings are important for both theory development and practice. Agency theory and TCE have been criticized for failing to consider both risk and profitability explicitly in their theory of the firm (Chiles and McMackin, 1996; Seth and Thomas, 1994). While most studies have focused on either firm- or market-related risk, our research suggests that environmental dynamism moderates the relationship between leverage and performance. We also provide some support for the theory that there could be an optimal capital structure. Extending the present work to include other risk variables within other research contexts would move this area of research forward.

With a large sample size we feel that our study is generalizable to a broader population of firms. These findings also tie in with, and extend, several earlier research studies which found a negative impact of leverage on performance (e.g.,



Barton and Gordon, 1988). According to the findings of this study, greater leverage has a positive impact on performance for firms in stable environments, and a negative impact on performance for firms in dynamic environments.

For practitioners we must caution against the apparent benefits of greater leverage simply as a device for controlling managerial opportunistic behavior. First, debt and equity represent different constituencies with their own competing, and often mutually exclusive, goals. Second, as the level of debt increases, the corporate governance structure can change from one of internal control to one of external control. This can have a significant impact on both managerial discretion (Hambrick and Finkelstein, 1987) and the ability of an organization to deal effectively with its competitive environment. Further, as our analysis points out, there will be a positive relationship between leverage and performance only for firms in relatively stable environments. These findings also support Allen's (1993) argument that in stable environments banks may be a better source of financing for risky projects, and the stock market a better source of financing in turbulent environments. This admonishment is especially worth noting as many more industry environments are becoming increasingly dynamic (D'Aveni, 1994; Grimm and Smith, 1997).

Strategy researchers have long gained insights from economic theories (e.g., Porter, 1980; Seth and Thomas, 1994). We feel that a fruitful way to realize the full potential contribution of economic theory within strategic management is continued integration of the basic theoretical premises with these theoretical frameworks. Our current study shows some preliminary evidence of this prospect. Both agency theory (Fama and Jensen, 1983) and TCE (Williamson, 1975, 1985) provide powerful lenses for strategic management researchers to probe how a key pattern of resource investment, leverage, might influence firm performance. In attempting to probe this relation we have integrated environmental dynamism as a critical variable.

A critical adaptive capability is the firm's governance structure, which is determined in large part by the firm's capital structure. According to Williamson (1988), the greater use of equity requires a more administrative type of governance structure in order to reduce the possibility of opportunistic behavior. A fruitful avenue for

future research would be to examine the types of management and control systems used by better-performing firms as they deal with specific agency and transaction cost problems.

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