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EXTENDING MODERN PORTFOLIO THEORY INTO THE DOMAIN OF CORPORATE DIVERSIFICATION: DOES IT APPLY?

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It is widely held that diversification lowers a firm's unsystematic (business-specific) risk but does not affect its systematic (systemwide) risk. We tested each notion while controlling for other factors that influence risk. The findings show that the relationship between corporate diversification and both forms of stock return risk generates a U-shaped graph. Thus, an important way for corporations to minimize risk is to diversify into similar businesses rather than into identical or very different businesses.

Executives frequently justify a diversification move by claiming that it reduces a firm's exposure to cyclical and secular uncertainties, or risk. The accuracy of that claim is not, however, well documented. In fact, very little is known about the relationship between corporate diversification and risk. Much of what is known is borrowed from modern portfolio theory. Although that theory can provide guidance to a securities manager trying to predict the risk outcomes of stock diversification, it may not be an appropriate guide for predicting the risk outcomes of corporate diversification. This study offers evidence that the evolving theory of strategic management better explains the risk outcomes of corporate diversification.

Some might consider our evidence controversial in that it appears to challenge some fundamental tenets of modern portfolio theory. We disagree. Our findings are intended to challenge the belief, popular among practitioners and academics alike, that modern portfolio theory, which has unquestionable relevance within the domain of securities management, also has relevance within the domain of corporate management.

We begin by highlighting the controversy surrounding the proper definition of corporate stock return risk. Some assert that systematic risk is the sole component of stock return variability, but others argue that unsystematic risk is also important. We suggest that some of the disagreement sur-

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rounding this issue results from inadequate definition of the conceptual boundaries of the two components of risk. The very question as to which component of risk is most relevant is somewhat blurred by the fact that the two have some common determinants and therefore are partially correlated.

WHAT IS STOCK RETURN RISK?

Before specifying a relationship between corporate diversification and risk, it may be useful to first define the risk construct and highlight some of the conceptual confusion surrounding existing definitions. Modern portfolio theory and its empirical analogue, the capital asset pricing model (Brown & Warner, 1985), differentiate between the component of a firm's risk (the variability of its stock returns) that varies with general economic movements and the component that does not. A loss of a major customer as a result of its bankruptcy represents one source of unsystematic, or business-specific, or stakeholder risk. Other sources include the death of a high-ranking executive, a fire at a production facility, and the sudden obsolescence of a critical product technology. Unsystematic risk has been found to be moderately correlated ($r = .32$) with some traditional measures of income stream variability (Miller & Bromiley, 1990). Such sources of risk are specific to a firm—they do not equally affect the returns of all firms.[1]

Some sources of risk, however, do affect the returns of all firms. These sources of risk include changes in monetary and fiscal policies, the cost of energy, tax laws, and the demographics of the marketplace. Finance scholars refer to the variability of a firm's stock returns that moves in unison with these macro economic influences as systematic, or stockholder, risk. Stated differently, the level of a firm's systematic risk is determined by the degree of uncertainty associated with general economic forces and the responsiveness, or sensitivity, of a firm's returns to those forces (Helfat & Teece, 1987).[2] Systematic risk has also been found to be correlated ($r = .40$) with some traditional measures of income stream variability (Miller & Bromiley, 1990).

There is no consensus in the strategy literature as to which component of risk is more relevant for evaluating corporate diversification actions. Proponents for the systematic component argue that it is the only risk that matters to stockholders because stockholders cannot diversify it away, while they can diversify away unsystematic risk (Barton, 1988; Helfat & Teece, 1987; Lubatkin & Rogers, 1989; Montgomery & Singh, 1984). Stockholders will therefore price a stock so that the lower the systematic risk, the higher the price of a firm, all other things being equal (Van Horne, 1980: 68). They

[1] Researchers estimate unsystematic risk by the standard deviation in the error term obtained from regressing the overall returns to the stock market on the returns of a stock. In the estimation process, market returns are a proxy for general movements in the economy.

[2] Empirically, systematic risk is the coefficient obtained for market returns regressed against a stock's returns.

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do so because lower systematic risk means a lower rate of return on an investment is required, so the cost of capital is lower.[3]

The claim that systematic risk is paramount, however, rests on two arguable assumptions from modern portfolio theory: stockholders are fully diversified, and the capital markets operate without such imperfections as transaction costs and taxes. Some stockholders, however, are not fully diversified, particularly corporate managers who have heavily invested, both financially and personally, in a single company (Vancil, 1987). Also, transaction costs, such as brokerage fees, act as a minor impediment, inhibiting other stockholders from completely eliminating unsystematic risk (Constantinides, 1986). Finally, taxes make all stockholders somewhat concerned with unsystematic risk (Amit & Wernerfelt, 1990; Hayn, 1989) because interest on debt financing is tax deductible, thereby allowing firms to pass a portion of the cost of capital from their stockholders to the government. Thus, firms can, within limits, create value for their stockholders by financing investments with debt rather than equity (Kaplan, 1989; Smith, 1990). The limits are determined in part by the amount a firm is allowed to borrow and the terms of such debt, both of which are contingent upon the unsystematic variation in the firm's income streams. Simply put, the debt markets favor firms with low unsystematic risk because they are less likely to default on their loans. In summary, the discussion of partially diversified stockholders, transaction costs, and leverage suggests that some stockholders may be concerned with unsystematic risk and factor it along with systematic risk into their calculations when they determine the value of a firm's stock (Amit & Wernerfelt, 1990; Aron, 1988; Marshall, Yawitz, & Greenberg, 1984).

Support for the importance of unsystematic risk can also be inferred from organization theorists who claim that all stakeholders—stockholders, as well as customers, employees, managers, debt holders, suppliers, and others—have legitimate claims to organizational rewards. To deem the claims of stockholders as paramount will inhibit future cooperative efforts and therefore reduce the total rewards available to all stakeholders, stockholders included (Freeman, 1984; Mintzberg, 1981). Of course, these organization theorists do not explicitly mention unsystematic risk. Nevertheless, the stakeholders of a firm and their influence on its returns generation process is arguably what unsystematic risk is about.

What is particularly interesting about the ongoing debate as to which component of risk is theoretically the most correct one to use to evaluate corporate actions is that even as the debate continues, there is considerable conceptual confusion about exactly what constitutes the sources of unsystematic and systematic risk. Clearly, the death of a high-ranking executive is a source of unsystematic risk, and macro economic forces are sources of

[3] Fama and French (1992) found systematic risk to be a poor predictor of future market returns. This finding does not compromise systematic risk's usefulness for strategy researchers who use it as a criterion variable to measure investors' perceptions of historical strategies, not as a predictor of market returns.

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systematic risk. But what about industry-specific structural factors, such as entry barriers? Industrial organization economists argue that entry barriers are a direct determinant of systematic risk because they can provide firms with the market power necessary to control input costs and output prices, thereby raising the level of a firm's cash flows, thereby lowering the sensitivity of its returns to macro economic disturbances, which by definition lowers the firm's systematic risk. Empirical evidence supports this view (Moyer & Chatfield, 1983; Subrahamanyum & Thomadakis, 1980; Sullivan, 1977). Stated formally, *systematic risk* = f (*cash flows*) and *cash flows* = f (*entry barriers + other influences*).

Entry barriers, however, are partially determined by influences that may be extraneous to systematic economic disturbances. In other words, entry barriers are sensitive to business-specific, or unsystematic, influences (Bettis, 1983; Van Horne, 1980). For example, a new technology might circumvent existing entry barriers in a specific industry, making competitive entry of new firms to that industry more possible. An example is the U.S. television manufacturing industry in the 1970s and the erosion of its substantial entry barriers through the introduction of solid state technology by some Japanese electronics manufacturers (Bhadkamkar, 1980). Alternatively, a firm's actions might raise (or lower) existing entry barriers. Consider the U.S. soft drink industry in the 1980s and the product proliferation tactics used by the two cola giants, which effectively saturated the available distribution channels and thus severely limited the likelihood of future entrants (Porter, Hoff, & Irwin, 1989). It follows, therefore, that *entry barriers* = f (*unsystematic risk influences*), where the unsystematic risk influences on a firm's returns include all structural aspects of the firm's industry that are specific to that industry in that they are not closely linked to macro economic disturbances.

We can infer from the foregoing discussion about entry barriers and from the equations that a firm's unsystematic and systematic risk are linked along some as yet unspecified, simultaneous set of relationships. Complementary arguments come from Michel and Shaked, who stated that corporate actions are "likely to affect the individual earning streams, which in turn nontrivially affect the determination of beta [systematic risk]" (1984: 18). Similarly, Peavy noted that although entry barriers are an unsystematic risk factor, they also affect the level of a firm's systematic risk because "nonsystematic risk affects beta" (1984: 154). Hence, some of the conceptual confusion about exactly what constitutes the two components of stock return risk has come from trying to ascribe independence to the two components, when in fact they may be empirically linked.

The simultaneous modeling of the two components of risk can be similarly applied to other sources of conceptual confusion about exactly what constitutes the two forms of risk. For example, if the loss of a customer due to its bankruptcy is an unsystematic influence on a firm's stock returns, then what about the loss of a customer due to a competitor initiative? It would seem that this type of customer loss is an unsystematic influence (specific to

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a firm); but Lubatkin and O'Neill (1987) argued that it may also be linked to systematic risk. Specifically, firms with competitive advantages, such as differentiation or cost advantages, are better able than other firms to defend their customer bases against macro economic disturbance and competitor attack through offering more complete lines, discounting the prices of complementary products, increasing promotion, and introducing technological breakthroughs. The advantaged firms also possess intangible management know-how advantages, such as dominant logics (Prahalad & Bettis, 1986) and highly specialized control systems (Hoskisson, Hitt, & Hill, 1991), which address the critical success factors of a given market. These advantages provide the firm with the ability to formulate a more effective and timely response to environmental pressures than their less advantaged counterparts.[4]

As with entry barriers, therefore, the relationship between competitive rivalry and risk can be thought of in a simultaneously structured form, in which systematic risk is a function of cash flows and cash flows are a function of, among other things, the degree of firm-specific competitive advantages. Competitive advantages, in turn, are determined by unsystematic risk influences on a firm's returns, such as product differentiation, technology, and cost advantages, which are specific to the firm in that they are not closely linked to macro economic disturbances.

Finally, the simultaneous conceptualization of stock return risk can be applied to resolve the confusion about leverage. On one hand, leverage would seem to be a determinant of systematic risk: a firm with high leverage is committed to higher cash outflows in the form of interest payments, which lowers the firm's cash flows, thereby making it vulnerable to environmental uncertainties, particularly market contractions. Consequently, a firm with high leverage will show high levels of systematic risk, everything else being the same (Barton, 1988; Hamada, 1972).

On the other hand, the level of cash outflows in the form of interest payments varies not only by the amount of leverage that a firm takes on, but also by the cost of the firm's leverage and the size of its cash flows. As was previously discussed, the debt markets favor firms with low unsystematic variation in their returns with better terms, or lower cost. The size of cash flows will also be determined by firm-specific influences, such as the degrees of product differentiation, technological leadership, and cost advantages that characterize a firm. In other words, besides entry barriers and competitive advantage, the cost of leverage and the size of cash flows, both of which are determined by unsystematic risk influences, control cash flows.

In summary, there are reasons to believe that some factors that have traditionally been ascribed to one component of corporate stock return risk

[4] We develop a conceptual link between a firm's competitive advantages and its diversification strategy later in the article. It may be sufficient to state here that an advantaged firm can shift some of the risk of macro economic disturbances onto its weaker competitors, in effect protecting its cash flows (lowering its systematic risk) by exposing the cash flows of the less advantaged.

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also influence the other components, although the form of the influence has yet to be fully specified or tested. The point of the preceding discussion, however, is not to test the posited simultaneous models of risk, but rather to point out that the two components of risk may not be fully independent. Indeed, Miller and Bromiley (1990) provided empirical evidence to suggest that the two measures share a common variance. Also, from a practical standpoint it would be useful to know whether and how various endogenous and exogenous occurrences differentially affect the two. Given the importance different strategy researchers have ascribed to each measure and the conceptual confusion associated with both, in the current study we used both measures of corporate risk as criterion variables.

CONTRASTING PREDICTIONS BASED ON MODERN PORTFOLIO THEORY AND CORPORATE DIVERSIFICATION THEORY

Because corporate managers are risk averse, many try to build corporate portfolios around the "three-legged stool" strategy. Fundamental to this diversification strategy is the assumption that the probability that a firm will "tip over," or approach bankruptcy, declines as it adds "legs," or businesses, to "stand on." The assumption, based on an interpretation of modern portfolio theory, is appealing: reduce your firm's dependence on a single product, market, or technology, reduce your exposure to the hardships and cyclicalities of any single business environment, and you'll reduce your firm's corporate risk. It's little wonder, therefore, that corporations often undertake unrelated business diversification moves to lower corporate risk.

In this section, we argue that corporate diversification moves undertaken to hedge corporate bets often turn out to be self-defeating. Unrelated-diversified firms are associated with high stock return risk, as are their polar opposites, single-business firms. One interpretation of portfolio theory, based on extending the theory beyond the domain of securities management for which it was originally intended, is that the expected variance in the returns of a firm is best minimized by bringing together independent, noninteractive business units by the process called unrelated diversification (Rumelt, 1974)—"putting all one's eggs in different baskets." This claim is based on the view that diversification is nothing more than a combination of two or more income streams, with some risk or variance associated with each. To the extent that the income streams are negatively correlated, the variance of the combined income streams will dramatically decline. Of course, instances of negative correlation are rare. However, when two income streams are weakly correlated, as is expected to occur when two unrelated businesses are combined, portfolio theory predicts a sharp drop in the unsystematic variance in the returns of the diversified firm. This drop in unsystematic risk is the result of an averaging effect. Technically put, the expected variance of the combined returns is a linear extension of past variances and the covariance between the two income streams. Conversely, the more related the businesses of a firm, the more their returns are expected

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to move in unison, and therefore the less the expected reduction in unsystematic risk (Amit & Livnat, 1988; Chang & Thomas, 1989; Mullins, 1981). Proponents of this interpretation of portfolio theory, therefore, predict an inverse relationship between the amount of corporate diversification and risk that roughly approximates, but does not equal, the relationship shareholders face when they diversify their stock portfolios. Any difference between the two relationships may be due to the higher transaction costs that corporations face when diversifying, as well as to possible agency, or employee incentive, problems associated with corporate diversification.

These proponents also predict that there is no statistical relationship between corporate diversification and systematic risk because systematic risk is, by definition, nondiversifiable. Put another way, corporate diversification will not reduce systematic risk, at least not in a manner that differs from what stockholders can do on their own by adjusting their stock portfolios.[5]

Proponents of corporate diversification theory make opposite predictions proposing that unsystematic and systematic risk are both best minimized by "putting all of one's eggs in similar baskets"—by bringing together synergistically interrelated business units so that each business influences the other (Bettis & Hall, 1982; Lubatkin & O'Neill, 1987; Chatterjee & Lubatkin, 1990). These researchers do not claim that portfolio theory is incorrect. Rather, we and they recognize that it was originally intended for securities managers' use when assessing the risk characteristics of a portfolio of stocks, not for corporate managers. When corporations diversify, management's actions can influence the underlying risk profiles of the combining businesses, and thus the expected variance of the combined returns need not be a linear extension of historical variances. Put another way, whereas portfolio theory is based on the premise of passive management, that cash flows can be combined but not altered, corporate diversification theory assumes that managers can actively intervene to lower corporate risk in a manner not available to shareholders.

The process of corporate diversification that has been called constrained diversification, whereby a firm manages a set of noncompeting businesses sharing similar production, marketing, and research technologies (Rumelt, 1974), is demonstrative. A constrained diversifier can use at least three synergistic, firm-specific advantages to defend its chosen market positions better than its rivals can defend theirs. Following the simultaneous conceptualization of risk, these competitive advantages therefore also dampen the sensitivity of the firm's returns to general economic disturbances. First, a constrained diversifier may have more tangible interrelationships, or scope economies, at its disposal than a firm following another diversification strat-

[5] By purchasing a stock that represents a low level of systematic risk, or by selling a high-systematic-risk stock, investors can lower the overall systematic risk of their stock portfolios. Technically speaking, they do not alter the underlying risk profiles of the stocks. Rather, the lower risk comes about through a simple averaging.

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egy. To the extent that a constrained diversifier can spread its production, distribution, proprietary technologies, and administrative overhead (or any one or set of these factors) over two or more products, it can operate those resources at close to minimal cost levels, even during cyclical downturns (Maloney & McCormick, 1983). In addition to this supply-side advantage, resource sharing can also provide demand-side advantages. Specifically, it can enhance a product's differentiation by reducing the cost of differentiation or by enhancing the product's uniqueness. In either case, the resulting differentiation allows the firm "greater buyer loyalty during cyclical or seasonal downturns" (Porter, 1985: 120).

Second, a constrained diversifier may have more intangible interrelationships because its businesses share a common logic (Hill, 1983; Prahalad & Bettis, 1986). "The thread of industrial logic which runs through activities of a concentric [constrained] firm may mean that the central management of such an organization is better able to understand, anticipate, and cope with problems which may be faced by a diversified subsidiary in a slump" (Hill, 1983: 200). Stated differently, the managers of a constrained firm can intervene in positive ways by introducing effective control systems, revising resource allocations, providing incentives to promote long-term investment horizons, and obtaining first-mover advantages over their less constrained rivals. Also, a constrained firm, by virtue of the similarities among its businesses, is more able to develop a companywide culture that can facilitate information flows and thus reduce the cost of formal control systems (Hoskisson et al., 1991).

Third, a constrained diversifier may have more competitor interrelationship advantages. These occur when rival firms compete in more than one industry, thereby linking those industries "because actions towards them in one industry may have implications in another" (Porter, 1985: 325). This multipoint form of competition may force a rival to match an interrelationship or face greater vulnerabilities in its chosen markets. Of course, this is not to say that all constrained diversifiers will realize the full set of synergies that come from the tangible, intangible, and competitor interrelationships because these synergies are administratively difficult to obtain. They require a costly centralized control system that can provide top managers with a strategic understanding of each of the diversified set of businesses, an awareness of opportunities for interbusiness coordination, and a means to ensure that business-level managers actively seek possible interbusiness opportunities (Hoskisson & Hitt, 1988). Put another way, internal transaction costs having to do with writing, monitoring, and executing business exchange agreements are incurred when trying to promote within-firm business exchanges because the parties to the exchange are prone to competitive behavior (Jones & Hill, 1988). On average, these internal transaction costs should mitigate, but not eliminate, the risk-reducing outcomes of constrained diversification.

In contrast, an almost undiversified (single-business) firm lacks the synergistic interrelationships of a constrained firm as well as any portfolio effect

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advantages. Tied to the environmental uncertainties of a single industry and at a competitive disadvantage to its constrained counterparts, a single-business firm is likely to show high sensitivity to business-specific (unsystematic) and macro economic (systematic) disturbances in its returns.

According to corporate diversification theory, each business within an unrelated diversifier may also show high sensitivity to business-specific and macro economic disturbances because, like single-business firms, they lack the internal relationships of a constrained firm. First, the disparity in the technologies of their businesses precludes any opportunity for resource sharing. Second, their managements are forced to rely on highly general financial controls to reduce information processing (Baysinger & Hoskisson, 1989). Organizations use these control systems to help themselves adapt to environmental uncertainties by spreading their risk, but, as Mintzberg (1981) noted, the evidence suggests the opposite. The problem with these controls is that they have little to do with the critical success factors of a given market. They may give the illusion of being efficient, but in fact they are subject to manipulation and biased to the short term (Hoskisson & Turk, 1990). Lacking a common logic (an intangible interrelationship) among disparate sets of businesses, managements of unrelated firms are less able to address the competitive pressures that may simultaneously occur in any of their activities (Williams, Paez, & Saunders, 1988). Collectively, these competitive disadvantages will overwhelm any risk-reducing benefits of diversification, even those argued for by proponents of portfolio theory.

Linked and dominant-vertical diversified firms (henceforth called vertical firms) may show midrange vulnerabilities to business-specific and macro economic disturbances.[6] The businesses in linked diversifiers by definition possess some synergistic interrelationships, not as many as the businesses in constrained diversifiers, but more than those in unrelated diversifiers. Also, vertical diversifiers, like single-business firms, are tied to the environmental uncertainties of a single industry and lack many of the competitive options afforded to constrained firms. However, vertical firms may exercise control over supply and demand uncertainties and the transaction costs associated with each (Chatterjee, Lubatkin, & Schoenecker, 1992; Spiller, 1987). Vertical firms should, therefore, generally show lower levels of risk than single-business firms. Perhaps Helfat and Teece best summarized vertical integration's potential to reduce systematic risk when they stated: "If vertical integration reduces a firm's exposure to uncertainty and the risks investors face in holding its security, then there are theoretical and empirical reasons for believing that its cost of capital and its cost of production will be lower than otherwise" (1987: 49). Fundamental to this argument

[6] A linked firm contains business units that share production, marketing, or research technologies, and a dominant-vertical firm contains businesses that share significant buyer-seller relationships. Put differently, the dominant-vertical category contains only vertically integrated firms; other firms classified as dominant (dominant-constrained and dominant-linked) are categorized by their diversification types.

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is the fact that transaction costs covary with macro economic movements, so firms that can reduce these costs by vertically integrating can lower their sensitivity to the economic disturbances.

In summary, we infer from the literature about corporate diversification that the form of the relationship between corporate diversification and both components of risk may be curvilinear, with the lowest levels of stock return risk associated with the moderate diversification of constrained diversifiers. Other strategy researchers have theorized (Hoskisson & Hitt, 1990) and tested (Markides, 1992) a similar curvilinear relationship between corporate diversification and performance. Following the logic of corporate diversification theory, we made these predictions:

> *Hypothesis 1: The relationship between corporate diversification and unsystematic risk will conform more to predictions based on corporate diversification theory than to those based on portfolio theory. Specifically, (a) the lowest levels of unsystematic risk will be associated with constrained diversifiers, (b) the highest levels of unsystematic risk will be associated with single businesses and unrelated diversifiers, and (c) midrange levels of unsystematic risk will be associated with vertical and linked diversifiers.*
>
> *Hypothesis 2: The relationship between corporate diversification and systematic risk will conform more to predictions based on corporate diversification theory than to those based on portfolio theory. Specifically, (a) the lowest levels of systematic risk will be associated with constrained diversifiers, (b) the highest levels of systematic risk will be associated with single businesses and unrelated diversifiers, and (c) midrange levels of systematic risk will be associated with vertical and linked diversifiers.*

Of course, an assumption of the two hypotheses is that the counter arguments from portfolio theory are less valid predictors of risk, and there is as yet no clear empirical evidence on which to base that case. Researchers who have examined the diversification-risk relationship have arrived at an ambiguous set of findings. Some studies have found support for portfolio theory (Amit & Livnat, 1988; Michel & Shaked, 1984), some have found support for corporate diversification theory (Bettis and Mahajan, 1985; Christensen & Montgomery, 1981; Lubatkin & Chatterjee, 1991), and others have found diversification to be invariant to risk (Bettis & Hall, 1982; Chang & Thomas, 1989). However, it is difficult to draw conclusions from the findings of these studies because the risk construct has been inconsistently defined, and some researchers may have misspecified its relationship with diversification by assuming a linear function rather than a curvilinear one. Also, past studies have tested the diversification-risk relationship over very

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different time frames, and recently we and other researchers have noted that the diversification-performance relationship is not necessarily time-invariant (Lubatkin & Chatterjee, 1991; Lubatkin & O'Neill, 1987; Ramanujam & Varadarajan, 1989). Rather, a number of environmental factors, such as market cycles, may influence that relationship. In the methods section of this article, we describe procedures intended to control for these theoretical and methodological issues.

Market Cycle Influences

Contingent propositions suggesting that the association between diversification strategies and stock return risk may not be stable over time have been advanced, although the theory underlying the propositions is not well developed or well tested. Most of what has been investigated has to do with the relative effectiveness of related and unrelated strategies for managing risk in bear and bull markets (Lubatkin & Chatterjee, 1991; Lubatkin & O'Neill, 1987). Very little has been said about the effectiveness of the other diversification types during those two market cycles.

Although the theory about a possible market cycle influence on the corporate diversification–risk association is not well developed, inferences about the influence can be drawn by exploring the process by which shareholder returns are generated in the capital markets. The sensitivity of a firm's return to market forces is a product of investors' ex ante perceptions, which in turn are based on two distinct influences: the degree of uncertainty associated with potential economic events, and the responses of a stock's return to those events (Helfat & Teece, 1987: 51). The same macro economic factors influence all firms, but the degree of their impact will vary with a firm's exposure to them. Further, a firm can influence its exposure by the strategy that it selects, although strategies are not presumed to be uniformly effective in all market settings. This variation in effectiveness occurs because strategy, by definition, involves a substantial, largely irreversible precommitment of capital based on particular environmental assumptions. As long as those assumptions remain valid, exposure to the environmental uncertainties can be minimized; a firm whose strategy is correctly aligned to its environment can benefit at the expense of its less correctly aligned competitor.

In economic downturns, or bear markets, most companies face some combination of low cash flows, few growth opportunities, and uncertain future cash returns. In this high-risk setting, a constrained-diversified firm may have competitive advantages over its less constrained counterparts by virtue of its synergistic interrelationships. It may be able to mobilize such advantages as low cost, high buyer loyalty, administrative know-how, and multipoint options to push some of the burden of economic decline onto its less constrained counterparts. These actions will reduce the sensitivity of the constrained firm's returns to macro economic conditions while amplifying the return sensitivity of the less advantaged firms. In previous work (Lubatkin & Chatterjee, 1991), we found some empirical evidence supporting this proposition.

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This contrast in stock return risk between constrained firms and all other diversification types may be less evident during periods of economic expansion, or bull markets, when most firms face an attractive set of investment opportunities and tend to meet their performance goals. As Hill (1983) argued, it may be relatively easy to manage a number of unrelated activities during boom periods. To the extent that this is true, market cycle conditions may moderate the curvilinear relationship between corporate diversification and risk predicted by the first two hypotheses. Specifically,

> *Hypothesis 3: The predicted curvilinear relationship between corporate diversification and both unsystematic and systematic risk will be more pronounced during bear market cycles than during bull market cycles.*

Other Influences

So far, we have described the expected relationship between corporate diversification strategies and risk and assumed that other influences on stock return risk will not have a direct bearing on results. This assumption may not, however, be sound because it does not take into account such influences as capital intensity, R&D intensity, corporate size, profitability, and debt.

For example, capital intensity may be positively correlated with risk (Brealey & Myers, 1984; Lev, 1974) because capital intensity represents the proportion of fixed expenses precommitted in a firm's cost structure. Most capital investments are largely irreversible in the short run and therefore limit a firm's ability to adjust its costs to revenues. Conversely, capital intensity may be negatively correlated with risk to the extent that it represents a proxy for a firm's ability to minimize costs and therefore protect its cash flows from environmental uncertainties. Some empirical studies on the subject have found support for the latter view (Barton, 1988; Hurdle, 1974; Miller & Bromiley, 1990).

The relationship between R&D intensity and risk is also somewhat ambiguous. High levels of R&D investments are viewed as barrier builders, or competitor buffers. Two recent studies have shown the expected negative correlation between R&D intensity and risk (Amit & Livnat, 1988; Miller & Bromiley, 1990). However, Amit and Wernerfelt (1990) found no relationship.

The relationship of stock return risk and some of its other correlates is less ambiguous. For example, it is well accepted that risk will be inversely related to corporate size (Hoskisson & Turk, 1990; Winn, 1977) and profitability (Barton, 1988) and positively correlated with debt levels (Hamada, 1972; Shapiro & Titman, 1986). In summary, a number of factors have been associated with risk, although not all have demonstrated a consistent relationship. Rather than speculate, we included each in the research design as control variables to net out those influences on risk that are extraneous to the relationship between corporate diversification and risk.

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METHODS

Sources of Data

We developed our set of firms from the list of firms used by Rumelt (1977) and Hawks (1984). Rumelt's list was based on a random sample of 246 *Fortune* 500 firms, each of which he classified annually between 1962 and 1974 by the degree to which its businesses shared related features. We used Rumelt's 1974 classification of firms to identify the diversification strategy of each firm in Rumelt's list for the 1975–77 period.[7] Finally, we used Hawks's (1984) list, which he constructed by updating, as of 1980, the 1974 classification of firms used by Rumelt, Montgomery (1979), and Bettis and Hall (1982); we identified the diversification strategy of each firm on his list for a three-year period, 1978–80.

The test firms for this study, however, differ from those used by Rumelt and Hawks in that we included only those firms listed on the Center for Research in Security Prices (CRSP) daily returns file, which contains the daily stock price and returns data on all firms listed on the New York and American stock exchanges (NYSE and AMEX). We used an additional sampling criterion, requiring that each firm be listed on the COMPUSTAT data tapes for 1968 through 1988 to establish controls for the financial correlates of risk.

The time frame associated with each market cycle interval was identified by the direction in the movement of the stock market time series presented in *Value Line*, a composite consisting of approximately 1,700 securities. A bear cycle was represented by a general downward movement lasting at least six months; a bull cycle, by a general upward movement of the same duration; and a stable cycle, by at least six months showing no discernible movement. In defining cycles on the basis of turning points (peaks and troughs) in a time series of historical stock market data, we followed the general procedure Gabisch and Lorenz (1987) outlined.[8] We attempted to capture the effect of each cycle by estimating risk with the data contained within each cycle.[9]

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[7] To do this, we had to assume that the diversification profile of each firm remained unchanged for a four-year period (1974–77). This assumption is consistent with Rumelt's original (1974) study, in which he assumed that the diversity of the firms in his sample remained stable throughout three ten-year periods, beginning in 1949, 1959, and 1969. Nevertheless, we might expect less classification precision in our 1975–77 list of firms than in the annually updated 1962–74 list.

[8] The most common means of determining cycles is use of gross national product levels. We deemed this indicator inappropriate for the current study because it measures past economic activity, but our dependent variables were based on investors' expectations of future economic activity. Since, for instance, stock prices often rise during a recession in anticipation of economic growth, it is important that the time frames of the cycle indicator and variables be the same.

[9] Nine market cycles were identified. The dates corresponding to each cycle period are: bear, December 13, 1968–July 2, 1970; bull, July 15, 1970–April 15, 1971; stable, April 16, (continued)

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Dependent, Independent, and Control Variables

We estimated risk over the first 150 trading days (about nine months) of each distinct market cycle for each firm between 1968 and 1980, or up to nine times per firm.[10] We used a market model of the following form: $(R_{it} - R_{ft}) = a_i + b_i (R_{mt} - R_{ft}) + e_{it}$, where R_{it} is a firm's return to common stockholders (appreciation plus dividends) in day t, R_{ft} is a proxy for the risk-free rate of return in day t, and R_{mt} is a proxy for the return of all risky assets in day t and is estimated by returns to an equally weighted CRSP portfolio (Brown & Warner, 1985). We tried to use 150 trading days, in keeping with standard conventions, to ensure reasonably stable estimates of the market model's regression coefficients (Lubatkin & Chatterjee, 1991).

The regression equation yields an estimate of unsystematic risk, defined by the standard deviation of the error term $\sigma[\epsilon_{it}]$ over the estimation period of each market cycle, beginning with the first trading day of each cycle. The equation also yields an estimate of systematic risk, defined as an estimate of β_i, or the covariance of the return to a firm with the return to the market portfolio.

Strategy was measured using Rumelt's five-level diversification-type classification scheme, which we converted into a ranked, ordinal variable, assigning single-business strategies a value of 1 and giving vertical, constrained, linked, and unrelated strategies respective values of 2, 3, 4, and 5. Unfortunately, the data for computing a continuously scaled diversification measure were not available over the time frame of the study. However, although Rumelt's scheme, based on the type of firm's diversification rather than on its level, was not originally intended to be used as a continuous variable, its properties have been shown to closely conform to continuous, product-count scales such as the Herfindahl measure (Montgomery, 1982), the narrow spectrum measure (Lubatkin, Merchant, & Srinivasan, 1993), and the entropy measure (Chatterjee & Blocher, 1992; Hoskisson, Hitt, Johnson, & Moesel, 1993). Further, the first three of the four cited studies tested and found a high level of convergent validity between Rumelt's classification based on type of diversification and level of diversification. More important, a monotonic relationship has generally emerged between Rumelt's ordinal scheme and the different continuous measures in which single-business strategies are associated with the smallest product-count scores, unrelated strategies with the highest, and constrained strategies with midrange values. It is not surprising, therefore, that some researchers, such as Keats and Hitt (1988), have used a continuous Rumelt measure for testing hypothesized

1971–April 13, 1972; bear, April 14, 1972–September 11, 1974; bull, January 1, 1975–June 15, 1975; stable, February 15, 1976–January 15, 1977; bear, January 16, 1977–February 14, 1978; stable, April 15, 1978–February 15, 1980; and bull, April 15, 1980–August 15, 1980.

[10] Two market cycles lasted less than 150 trading days. For those two cycles, we estimated risk over all of their trading days.

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diversification-performance relationships. Those authors pointed out that previous findings "strongly support the validity of the category [Rumelt] system and its treatment as an ordinal variable" (1988: 580) and cited Labovitz's (1970) investigation of the statistical properties of ordinally scaled measures as additional grounds for support.

The control variables used have been shown to influence a firm's systematic and unsystematic risk. To measure *capital intensity*, we used the ratio of the average value of net fixed assets to total book assets for the reporting year in COMPUSTAT that most closely corresponded to the last month of each cycle. For example, if the last month occurred between January and June, we used the preceding year. For *R&D intensity*, we used the ratio of the average value of R&D spending to total sales for the reporting year in COMPUSTAT that, again, most closely corresponded to the last month of each cycle. To measure *leverage*, we used the book value of a firm's long-term debt divided by the book value of its total assets for the reporting year that most closely corresponded to each cycle. We measured *size* as total assets reported for the year that most closely corresponded to each cycle. We then took the natural logarithm of size to correct for skewness in the distribution of this measure across observations. To measure *profitability*, we used the ratio of the average value of net income before taxes to total book assets for the reporting year in COMPUSTAT that most closely corresponded to the last month of each cycle. Barton (1988) used a similarly constructed return on assets (ROA) measure in his analysis of systematic risk to control for market structure. A weighted market share measure is arguably a better proxy, but the data for such a measure were not available for the time frame of this study; moreover, such a market share measure does not imply monopoly power in all situations. Barton noted that "both proxies are imperfect representations of an unobservable construct" (1988: 168). One advantage of using ROA is that it provides an ex post reflection of monopoly power[11] and thus acts as a kind of lagged variable for the ex ante market-based risk measures.

Methods of Analyses

The study's hypotheses predict that the graphically represented relationship between corporate diversification and risk will be curvilinear, or U-shaped. Had the strategy variable been continuously scaled instead of ordinally scaled, a regression model containing linear and curvilinear (squared) strategy terms as separate independent variables would have been the appropriate method of analysis. However, a curvilinear model may lead

[11] Monopoly power refers to the ability of a firm to increase the price of its output above the competitive level without experiencing a corresponding decrease in market share (Montgomery, 1985).

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to biased results when an ordinal measure is used because the squared term is sensitive to the scale used to convert an ordinal measure to a continuous measure.[12]

Since an ordinal variable was preferable, the more precise model was one representing strategy as a four-level dummy variable. This modeling allowed us to infer the form of the diversification-risk relationship by observing the value of each standardized coefficient generated and to statistically compare each of the four strategy groups with the omitted case. However, because of the problem of joint probabilities, it was difficult to show statistically that in fact the inferred form is the true form: whether, as predicted, vertical firms show less risk than single-business firms but more risk than constrained firms, and that linked firms show more risk than constrained firms but less risk then unrelated ones.

We therefore used a kinked, or piecewise, regression model to draw statistical inferences about the form of the diversification-risk function, and we used a dummy variable regression model to better illustrate the form. Following a kinked modeling approach, we computed two regression models for each market cycle period; Pindyck and Rubinfeld (1981: 126–127) provide a good description of this modeling technique. Model 1 contains only single-business, vertical, and constrained firms, with the strategy variable scaled from 1 to 3. Model 2 contains constrained, linked, and unrelated firms, with the strategy variable scaled from 3 to 5.

Two conditions had to be met to show strong support for our first two hypotheses: the strategy variable in model 1 needed to show a negative coefficient statistically different from zero, and the strategy variable in model 2 needed to show a positive coefficient statistically different from zero. We used a dummy variable regression model (model 3) to illustrate the kinked regression results, thus considering all five strategy groups in a single regression model with a four-level dummy variable representing the strategy construct. We omitted the unrelated strategy category to avoid overspecifying the model.

In the three models, we analyzed the data using a pooled time series and cross-sectional data structure. The procedure used, PDLREG (SAS Institute, 1988), employs a two-stage generalized-least-squares method to iteratively correct first for autocorrelation and then for heteroskedasticity and estimates the regression coefficients in unstandardized and standardized form. Specifically, we pooled the data from each of the nine distinct market cycle periods and analyzed them in a kinked regression model of the following form: *risk* = f (*strategy, capital intensity, R&D intensity, leverage, size, profitability*), where the independent variable, risk, is measured first as unsystematic risk and then as systematic risk.

Finally, we pooled the data across the bear and bull markets and used a dichotomous dummy variable regression design to test whether market cycle

[12] We would like to thank a referee for pointing this out.

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moderated the relationship between corporate diversification and risk. The data from the three stable periods were omitted from this analysis. The dummy model (1 = bull market, 0 = bear market) contained seven independent variables: five financial control variables, a strategy variable, and a strategy-by-cycle variable.[13]

RESULTS

Table 1 contains the means, standard deviations, and correlations of the strategy variable, the two risk variables, and the five financial correlates. The data do not suggest large problems with multicollinearity among the independent variables but do reveal some expected patterns. For example, as the diversification strategy tested changes from single-business to unrelated, profitability decreases, as does capital intensity, and leverage increases. Also, each of the two types of risk appears to be correlated in the expected direction with most of the predicted financial correlates. Finally, unsystematic risk is significantly and strongly correlated with systematic risk ($r = .43$, $p < .001$), suggesting that the two components of risk do not necessarily represent fully independent dimensions of the risk construct. Although this correlation might be considered high, it is not without precedent; Miller and Bromiley (1990: 761) reported a correlation of .60 between these two risk measures.

Table 2 displays the kinked regression analysis results for unsystematic risk for 1968–80. Overall, the relationship between corporate diversification strategy and unsystematic risk does not appear to be linear, as modern portfolio theory applied to the corporate management domain would suggest. Rather, the results suggest strong support for the contention, based on corporate diversification theory, that firms can best minimize unsystematic risk by diversifying into similar businesses. The function appears to be U-shaped, with the highest levels of unsystematic risk associated with both the least diversified and the most diversified strategies and the lowest levels of risk associated with midrange, or constrained, strategies.

The strategy term's coefficient, standardized and corrected for autocorrelation and heteroskedasticity over nine periods of pooled time series, cross-sectional data, was negative and significant ($p < .001$) in model 1 and positive and significant ($p < .05$) in model 2. Also, models 1 and 2 explain a high percentage of the variance in unsystematic risk, showing R^2's of .49 and .53, respectively. Finally, each financial correlate appears to have very similar relationships with unsystematic risk in the two models, as was expected. For example, the standardized coefficient for capital intensity is $-.10$ ($p < .01$) in both model 1 and model 2. Similarly, R&D intensity appears to be unrelated to unsystematic risk in both models.

Although the kinked regression design is adequate for drawing statistical inferences about the shape of the diversification-risk function, the shape

[13] Pindyck and Rubinfeld (1981: 111–116) discuss the use of dummy variables.

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TABLE 1
Means, Standard Deviations, and Correlations[a]

Variables	Means	s.d.	1	2	3	4	5	6	7
1. Unsystematic risk	0.02	0.01							
2. Systematic risk	1.02	0.46	.43***						
3. Capital intensity	0.38	0.14	−.21***	−.15***					
4. R&D intensity	0.02	0.02	−.19***	.05	−.18***				
5. Profitability	0.16	0.07	−.41***	−.22***	.09**	.30***			
6. Leverage	0.67	1.33	.42***	.26***	−.03	−.16***	−.35***		
7. Size	6.73	1.18	−.41***	.11***	.24***	.24***	.08**	.01	
8. Strategy	0.22	1.31	.05†	.16***	−.34***	.01	−.20***	.14***	.01

[a] $N = 1,544$.
† $p < .10$
* $p < .05$
** $p < .01$
*** $p < .001$

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TABLE 2
Results of Regression Analyses for Unsystematic Risk[a]

	Kinked		Dummy Variable
Variables	**Model 1**	**Model 2**	**Model 3**
Financial correlates			
Capital intensity	−.10**	−.10***	−.13***
R&D intensity	−.01	−.01	−.01
Profitability	−.30***	−.24***	−.27***
Leverage	.31***	.33***	.32***
Size	−.29***	−.34***	−.30***
Strategy	−.19***	.06*	
Strategy			
Single-business			.10**
Vertical			.07†
Constrained			−.06†
Linked			.00
R^2	.49	.53	.50
df	696	989	1,298

[a] Standardized coefficients, corrected for autocorrelation and heteroskedasticity, are reported.

† $p < .01$
* $p < .05$
** $p < .01$
*** $p < .001$

of the function may be better illustrated by the results of the regression analysis on the same data in which we modeled strategy as a four-level dummy variable. Model 3 in Table 2 presents these coefficients, corrected for autocorrelation and heteroskedasticity. The overall model, including the financial correlates, explained 50 percent of the variance in unsystematic risk. The pattern of the coefficients for the strategy variables suggests general support for the first and second parts of Hypothesis 1: the lowest unsystematic risk is associated with constrained diversifiers, and the highest unsystematic risk is associated with single businesses, with unrelated diversifiers also showing a high level. Results partially support the third prediction of Hypothesis 1: vertical diversifiers show midrange risk, at least when compared to single-business and constrained diversifiers, but somewhat higher levels than unrelated diversifiers. Finally, linked diversifiers show risk levels that are higher than those of constrained diversifiers, but indistinguishable from those of unrelated diversifiers.

Table 3 displays the results of the kinked regression analysis for the same time frame for systematic risk. Overall, the relationship between corporate diversification strategies and systematic risk parallels that found for unsystematic risk. The function again appears to be U-shaped, with the highest levels of systematic risk associated with the least and most diversified strategies and the lowest systematic risk associated with constrained strategies. This pattern is evidence for the nine periods of pooled time series,

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TABLE 3
Results of Regression Analyses for Systematic Risk[a]

Variables	Kinked		Dummy Variable
	Model 1	Model 2	Model 3
Financial correlates			
Capital intensity	−.15***	−.14***	−.16***
R&D intensity	.13**	.05	.07*
Profitability	−.19***	−.15***	−.13***
Leverage	.12**	.15***	.14***
Size	.20***	.18***	−.20***
Strategy	−.19***	.15***	
Strategy			
Single-business			.00
Vertical			−.06
Constrained			−.20***
Linked			−.09*
R^2	.23	.33	.30
df	696	989	1,298

[a] Standardized coefficients, corrected for autocorrelation and heteroskedasticity, are reported.

† $p < .10$
* $p < .05$
** $p < .01$
*** $p < .001$

cross-sectional data, where the strategy term's coefficient is negative and significant ($p < .001$) in model 1 and positive and significant ($p < .001$) in model 2. Also, both models explain a high percentage of the variance in systematic risk, showing R^2's of .23 and .33 for models 1 and 2, respectively. Finally, most of the financial correlates appear to have very similar relationships with systematic risk in both models, as should be expected. R&D intensity is an exception.

Model 3 in Table 3 presents the dummy variable regression analysis results, which further clarify the U-shaped function. The overall model, including the financial correlates, explains 30 percent of the variance in systematic risk. More interesting, the standardized regression coefficients for the strategy dummy variables suggests a near-perfect U shape in a manner fully consistent with Hypothesis 2.

Table 4 displays the results of the kinked regression tests examining market cycles' moderating influence on the form of the relationship between corporate diversification and risk. We first analyzed the data corresponding to the bear markets, after correcting them for autocorrelation and heteroskedasticity. As with the analyses associated with Tables 2 and 3, the first and second regression models used with the bear market data included six independent variables, including five financial control variables and one strategy variable. We then applied the same two models to the bull market data.

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TABLE 4
Results of Regression Analyses Testing the Market Cycle Moderator[a]

Dependent Variables	Bear Market	Bull Market	Strategy by Cycle
Model 1			
Unsystematic risk			
Strategy	−.18**	−.23***	−.17***
R^2	.45	.45	.42
df	201	240	448
Systematic risk			
Strategy	−.21**	−.27***	−.05
R^2	.24	.21	.21
df	201	240	448
Model 2			
Unsystematic risk			
Strategy	.07	.12**	.24***
R^2	.55	.55	.54
df	294	338	639
Systematic risk			
Strategy	.14*	.21***	.08†
R^2	.26	.21	.21
df	294	338	639

[a] Standardized coefficients, corrected for autocorrelation and heteroskedasticity, are reported.

† $p < .10$
* $p < .05$
** $p < .01$
*** $p < .001$

For the sake of clarity, the table only reports the standardized regression coefficient associated with the strategy term. Finally, the set of regression analyses was done, using data from both subgroups and including a strategy-by-cycle term, to test whether strategy coefficients observed across the two market cycles differed statistically.

The interactive term was found to be significant in both unsystematic risk models and in one of the two systematic risk models. This pattern suggests that the form of the relationship between corporate diversification and risk differs across market cycles. The high level of significance for this term in two of the four cases also suggests that the method used to differentiate the two market cycles was reasonably precise. The direction of the market cycle effect can be inferred from the two sets of subgroup analyses.

Contrary to the third hypothesis, the curvilinear relationship is not more pronounced during the bear markets than during the bull markets. Indeed, in the unsystematic risk analysis, the parameter estimate for the strategy-by-cycle dummy term is significant ($p < .001$) and negative in model 1 and significant ($p < .001$) and positive in model 2, suggesting the opposite pattern: the curvilinear relationship appears more pronounced during the bull market cycles. Stated differently, the sensitivity of unsystematic risk to di-

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versification increases during bull markets in such a way that unsystematic risk declines faster as strategy goes from single business to vertical to constrained but increases faster as strategy goes from constrained to linked to unrelated.

The systematic risk analysis reveals results that are somewhat different but are nevertheless inconsistent with the third hypothesis. Specifically, the relationships between strategy and systematic risk in bull and bear markets are statistically indistinguishable in model 1 but differ in model 2 ($p < .10$). Systematic risk increases faster during bull markets than during bear markets as the level of diversification increases from constrained to unrelated.

DISCUSSION AND CONCLUSION

Corporate diversification is often justified on the grounds that it reduces risk, or volatility in rates of return, by reducing a firm's exposure to the hardships and cyclicalities of any single industry. Many managers and academics have recommended that corporate portfolios be planned around the three-legged-stool concept, asserting that the probability of a firm's approaching bankruptcy is low when the firm has several businesses. The theoretical rationale for this concept is borrowed from modern portfolio theory.

Our findings question the accuracy of that rationale. Rather than a linear relationship between corporate diversification and stock return risk, we found a curvilinear relationship, suggesting that there is an optimal level of diversification for firms. Our finding is consistent with the curvilinear relationship between corporate diversification and performance that Hoskisson and Hitt (1990) theorized and Markides (1992) found. It appears that risk, however measured, is best minimized by some midrange level of diversification, such as a constrained strategy, in which opportunities to share tangible and intangible assets are numerous. The practical implication is clear: an important way for a firm to minimize risk is to diversify in such a manner that all of its eggs are in similar baskets—not in the same baskets or in different baskets. Indeed, unrelated firms were consistently found to be associated with high levels of risk, suggesting that diversification intended to spread and thus reduce risk may be accomplishing the opposite. The unsystematic risk findings highlight this point because, everything else being the same, unrelated-diversified firms should show the lowest levels of such risk because they combine businesses whose cash flows are, by definition, weakly correlated. But the unrelated firms analyzed here showed high levels of unsystematic risk, in spite of an offsetting positive portfolio effect.

The systematic risk findings suggest that corporations can achieve a reduction in risk that stockholders cannot achieve on their own. This reduction in systematic risk enhances a firm's future performance, for low systematic risk implies a low cost of capital. Our findings are therefore contrary to the popular portfolio theory–based belief that systematic, or general economic risk, is nondiversifiable: systematic risk has a diversifiable component. Firms that diversify in a constrained manner appear able to realize

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synergies that other diversification types cannot, and these synergies help to protect the firm from macro economic uncertainties.

It is important to reiterate, however, that we are not questioning the validity of modern portfolio theory as it was conceived by the winner of the 1990 Nobel Prize for economics, Harry Markowitz. His ideas were intended for managers of securities, not businesses. Unlike a securities manager, a corporate manager can directly influence the competitive position of a business in its industry, and in so doing affect its risk. Put another way, whereas portfolio theory is based on the premise of passive management, where cash flows may be combined but not altered, corporate diversification theory assumes active management intervention. Our findings, therefore, question the widely held belief that the risk prescriptions from modern portfolio theory apply to the domain of corporate management.

It may also be important to note that although the focus of our study was stock return risk, our findings have implications about income stream variability, because these two risk constructs are significantly correlated. For example, Miller and Bromiley (1990) found income stream variability to be correlated at the .40 level with systematic risk and at the .32 level with unsystematic risk.

Perhaps the most interesting finding of our study is that diversification's relationship with unsystematic risk parallels its relationship with systematic risk. This finding was not unexpected as it is consistent with our contention, made earlier in this article, that the two components of risk are intrinsically linked by some as yet unspecified simultaneous set of relationships. Also, this finding is not without precedent; Miller and Bromiley (1990) found the two risk measures to share a common variance, although they made no link in their study between risk and diversification. In light of their findings, our work raises questions about the widely held agency theory belief that professional managers try to minimize their own risk even at the expense of fully diversified shareholders (Amihud & Lev, 1981; Jensen, 1986). Rather, achieving both goals appears possible when firms diversify into businesses that draw upon some corporate competence, but neither seems possible when new businesses are pursued for the sole purpose of hedging corporate bets.

The market cycle results suggest that constrained diversification helps stockholders when it counts. The need for cheaper capital is greater in a bull market than in a bear market because of the greater availability of attractive investment opportunities in the former. Low systematic risk and low-cost capital allow a constrained diversifier to justify more projects than can more diversified firms. Further, in a bull market the threat of bankruptcies is low, meaning that stakeholders are probably safe, because the overall high stock price provides a cushion against bankruptcies. In other words, our market cycle results suggest that constrained diversifiers are generally better able to aggressively pursue the investment opportunities that present themselves during bull markets and also better able to minimize the downside risks that are present for all stakeholders of existing investments during bear markets.

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Inferences cannot be made as to which financial correlate used here represents a source of unsystematic risk and which a source of systematic risk because each correlate appears to be associated with both risk measures. Consistent with our earlier discussion of entry barriers, leverage, and customer loss, the findings for the correlates support the simultaneous conceptualization of the two components of risk.

Finally, corporate diversification theory may have important research implications for those studying the determinants of market value, for it can be inferred that shareholders will show the highest returns when both components of risk are simultaneously minimized. Partial support for this inference comes from earlier work (Lubatkin & Chatterjee, 1991) in which we found constrained diversifiers to be associated with the lowest levels of systematic risk and the highest levels of excess returns. Partial support also comes from Amit and Wernerfelt (1990), who found an inverse relationship between market value and unsystematic risk. Contrary evidence, however, comes from Fama and French (1992), who found market value not to be associated with systematic risk.

Collectively, these mixed findings point out the need for future research into the mechanism through which stock market risk and returns are linked, and the proposed simultaneous model of risk may represent one such mechanism. The model suggests that systematic and unsystematic risk are both surrogates for other financial and strategic variables, all linked along some yet unspecified set of relationships. As such, the statistical tests of our earlier (1991) study may be incorrectly specified because we did not consider the simultaneous influence of unsystematic risk. Similarly, Amit and Wernerfelt's (1990) findings may be biased because they did not consider systematic risk. Going further along these lines, the results of Fama and French may also be misleading because they did not include a measure of corporate diversification in their model, nor did they consider the simultaneous influence of unsystematic risk on returns. In summary, the fragmented results suggest that it may be premature to conclude, as did Fama and French, that the relationship between systematic risk and market return is flat.

In conclusion, we examined the validity of modern portfolio prescriptions about risk in the domain of corporate diversification. Our results show, with a high level of confidence, that the risk characteristics of different corporate diversification efforts are inconsistent with modern portfolio theory, but they are grounded in the evolving literature of strategic management.

As such, our results have important managerial and pedagogical implications. Most of what practicing managers and business school instructors believe to be true about corporate diversification and risk has been borrowed from modern portfolio theory. It's not surprising, therefore, that many managers and instructors still preach the value of diversification on the grounds that it smooths out cash flows, or reduces dependence on a single product, market, or technology. Our results suggest the opposite: diversifying into new markets for the sole purpose of hedging corporate bets may be self-

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defeating and may actually increase corporate risk. Corporate managers would be better off focusing their attention on building competitive advantages in each market in which they participate, and that is best accomplished through a constrained diversification strategy.

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