CORPORATE MERGERS, STOCKHOLDER DIVERSIFICATION, AND CHANGES IN SYSTEMATIC RISK

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Strategic management literature suggests a relationship between systematic risk and the relatedness of merging firms. This is tested for a sample of 120 large mergers by controlling for the systematic risk of the target firm, correcting for possible problems of heteroskedasticity, and estimating shifts in risk over daily as well as monthly time horizons. Finally, the influence of leverage is considered. The findings highlight a performance distinction between corporate diversification and stockholder diversification in instances of related and unrelated mergers.

INTRODUCTION

The goal of this paper is to demonstrate empirically how the underlying paradigms of strategic management in the context of corporate mergers can make an important contribution toward building a unified theory of systematic risk. To date, much of what is known about risk as a determinant of stockholder value comes from the finance literature. Finance researchers have observed that the systematic risk of bidder firms may shift during merger-related events (Jensen and Ruback, 1983), but they lack a theory to explain the shift. In contrast, strategic management researchers predict that the magnitude and direction of the shift is determined by the degree to which the merging businesses are related: the more each business has the opportunity to draw on common corporate skills and activities, the better each business can defend its chosen market position against market fluctuations, and therefore the greater the likelihood that the merger will reduce the bidding firm's systematic risk (Salter and Weinhold, 1979; Lubatkin and O'Neill, 1987).

The only published study that tested the relatedness prediction found strong statistical evidence to support it (Lubatkin and O'Neill, 1987). However, this study did not control the systematic risk of the target firm, did not correct for possible problems of heteroskedasticity in the testing of the beta coefficient, and estimated shifts in risk over long time horizons, thereby possibly introducing bias by corporate events other than the merger. The results of their study, therefore, do not rule out the possibility that investors could duplicate the same shift in systematic risk through altering their stock portfolio.

The present study reexamines the relatedness
prediction. A conceptual framework to predict changes in systematic risk is developed which incorporates arguments from the strategic management literature and a relaxed set of capital asset pricing assumptions. The prediction is then empirically examined by first replicating the Lubatkin and O'Neill study using a sample of mergers selected over a different time period and monthly stock returns data (long horizons) to estimate shifts in risk. The examination is then extended by using daily stock returns data (short horizons), and by accounting for any possible heteroskedastic and stockholder diversification influences. Finally, the influence of leverage is considered. The results highlight a performance distinction between corporate diversification and stockholder diversification in instances of related and unrelated mergers. Further, the results have important implications for traditional event study methodology and for the conclusions of merger studies that employ this methodology.

**STRATEGIC MODEL OF SYSTEMATIC RISK**

Financial models of asset returns show that stockholders are only compensated for risk that they cannot avoid by diversifying their wealth into other securities, i.e. systematic or market risk. Systematic risk represents the sensitivity (covariability) of a firm's returns to the aggregate returns of the marketplace, and accounts for 20-30 percent of a security's total risk. Sources of systematic risk include monetary and fiscal policies, cost of energy, and demographics of the marketplace. If all other things are the same, the lower the systematic risk, the lower the required rate of return on an investment, the higher the value of the firm (Van Horne, 1980: 68). Corporate managers, therefore, can increase the wealth of their stockholders by pursuing actions that lower the firm's systematic risk.

Empirical evidence on the relationship between corporate actions and systematic risk, however, is ambiguous. A case in point is the act of merger. While executives frequently justify a merger by claiming that it reduces a firm's exposure to environmental uncertainties, finance theory suggests that the consolidated firm will exhibit the same risk attributes as the market-value weighted portfolio of the acquiring and acquired firms' stocks. In other words, a merger produces nothing that investors could not achieve on their own. Of course, this general prediction does not imply that the risk outcomes of all mergers conform to a 'portfolio effect'. A number of finance researchers have observed shifts in systematic risk for individual mergers in their sample, but they conclude that the direction of change is not predictable (Dodd, 1980; Langetieg, Haugen, and Wischern, 1980; Mandelker, 1974).

In contrast, strategic management researchers hold a different view, one that provides a rationale for merger. Summarized below are three points worth reviewing.

**Related mergers are more synergistic**

A widely held belief in the strategic management literature to explain the risk outcome of mergers is that related mergers offer several options to improve the specialization and/or market power of their resources which are not available to less related mergers. The synergy created by related mergers, therefore, 'is likely to affect the individual earnings streams, which in turn non-trivially affect the determination of beta' (Michel and Shaked, 1984: 18). First, related mergers provide opportunities to reduce cost and/or enhance differentiation through exploiting scale and scope economies in such tangible areas as manufacturing, research, and distribution (Salter and Weinhold, 1979; Lubatkin, 1983), and in such intangible areas as administrative 'know-how' (Bettis and Hall, 1982; Porter, 1985) and brand extension (Singh and Montgomery, 1987). Second, related mergers provide the potential for collusive gains (monopoly power) if by becoming larger, the merged firm can influence the price of its output or the cost of its inputs (Chatterjee, 1986). Economic studies have shown that as market power increases systematic risk decreases (Moyer and Chatfield, 1983). Third, related mergers provide the opportunity to exploit multi-point competition. Multi-point competition occurs when rival firms compete in more than one industry. 'These multi-point competition necessarily link industries together because actions toward them in one industry may have implications in another' (Porter, 1985: 325). Multi-point competition may force a firm to match its rivals' interrelationship or face a competitive disadvantage. Finally, related mergers may pro-
vide financial synergies through what Williamson (1975) calls the internalization of the capital market. According to this notion, top managers of diverse firms are in a better position to allocate resources than are external suppliers of capital, because their information flows are more certain and timely than that available to the capital markets.

Unrelated mergers offer far fewer options to make their business positions more defendable. By definition, unrelated mergers involve the combination of non-competing products that involve different product and market technologies. Therefore, while they may provide financial economies, they will be less able than related mergers to provide tangible and intangible efficiencies, collusive gains, and multi-point advantages.

This is not to say that related mergers in all cases will enhance the competitive position of the combined businesses more than unrelated mergers, because all non-financial mechanisms are not necessarily available through related mergers. In addition, many non-financial benefits are administratively difficult to exploit because they require the actual consolidation of specific business functions (Haspeslagh and Jemison, 1987). Nevertheless, the financial synergies available in unrelated mergers also should be available in related mergers, while the non-financial benefits potentially available in related mergers are not expected to be as available in unrelated mergers.

Related buyers are able to exploit market imperfections

A second point to explain the risk outcomes of mergers is that related buyers are more able than unrelated buyers to exploit capital market imperfections. Of course, under a strict interpretation of CAPM, there are no imperfections to exploit because the market for information is fully efficient and the market for companies is fully competitive. Put another way, CAPM predicts that the markets will assess any expected value associated with a merger and then bid up the price of the target firm such that all the value created by the merger is distributed to the shareholders of the target firm (Barney, 1988). Consistent with the CAPM view, therefore, the systematic risk of a bidder is not affected, even in the case of a synergistic merger.

Recently, however, the CAPM assumptions about market perfection have been questioned by, among others, Porter (1980: 352), Barney (1988), and Yao (1988). Regarding the assumption about informational efficiency, most mergers are highly complex and therefore likely to contain unanticipated outcomes, even with relatively efficient information flows. However, a related buyer is in a better position to judge the future performance from mergers than an unrelated buyer, because a related buyer should be more familiar with the technologies, trends, and industry structure of the target firm's businesses. A related buyer, therefore, should be able to set its ceiling price for a target firm at some level short of eliminating all above-average returns.

Regarding the CAPM assumption about acquisition market competitiveness, the market may be less than perfectly competitive if one buyer has distinctive assets or know how to improve the competitive position of the target firm's businesses. In other words, 'competitive bidding dynamics cannot unfold when the source of a more valuable synergistic cash flow is inimitable' (Barney, 1988: 76). Barney cites a firm's culture, history, and product reputation as sources of inimitable organizational assets and skills. Given the complexity of mergers, the many sources of inimitable tangible and intangible commonalities that can exist between a bidder and target firms' businesses, it is reasonable that no two bidders will value a target at the same level. Stated differently, a buyer's gains need not be priced out, even when other related firms are present in the bidding arena. Given an acquisition market where bidders set their ceiling price based on expectations of some reasonable return, the bidder who shares the most valuable relationships with a target clearly is in a better position to outbid its less related counterparts while still retaining some of the merger's economic value.

Related buyers can buffer market movements

A third point to explain the risk outcomes of mergers is that buyers who can exploit the competitive options that come from managing related businesses, can lower the sensitivity (covariability) of their returns to market conditions. Whereas the first argument dealt with
competitive options and discounted cash flows, the third argument deals with the same options and the variability of the cash flows.

Consider Procter and Gamble, a related, multiproduct firm that produces a number of soap products, including Tide, Cheer, and Oxydol. Maloney and McCormick (1983) assert that P&G produces several soaps to exploit production interrelationships: the three soaps are produced at the same production facility because they use similar input factors. This allows P&G to approximate a continuous production flow at close to a minimum efficient scale, irrespective of macroeconomic business cycles, by varying the period of production of each soap. Maloney and McCormick developed and then empirically tested a general theory of a multiproduct firm that has the option to share the same production process, and conclude that production sharing helps to insulate a firm’s production costs from the adverse influences of business cycles.

Maloney and McCormick’s findings can easily be extended beyond production to include other supply-side factors. For example, it logically follows that firms with options to spread distribution or administrative resources over two or more products also have the opportunity to operate those resources at close to some cost-minimizing rate regardless of demand conditions. Many recent ‘brand name’ mergers among consumer goods companies may have been motivated in part to exploit these options.

Finally, the ability of a related, multiproduct firm to defend itself against market forces can be extended to demand-side factors. For example, Porter (1985, Chapter 4) asserts that sharing can enhance a product’s differentiation by reducing the cost of its differentiation, and/or by enhancing its uniqueness. In either case, differentiation allows the firm ‘greater buyer loyalty during cyclical or seasonal downturns’ (p. 120). In other words, differentiation enables the firm to push the burden of market decline on its less competitive counterparts.

In contrast, unrelated, multiproduct firms are not expected to have the same supply-side and demand-side benefits as related firms. In the words of Montgomery and Singh, ‘Firms pursuing unrelated diversification rely largely on highly general financial or managerial/control competencies which are not directed specifically to critical success factors of a given market’ (1984: 183). Indeed, Porter (1985) argues that the inevitable cost of being part of a diversified company will increase a firm’s exposure to market forces. For unrelated mergers, therefore, market sensitivity may increase.

In summary, the three strategic management arguments suggest that mergers which are undertaken to increase shareholder value can achieve this end in two ways: by increasing the level of cashflows or by decreasing their systematic risk. Given weak assumptions about the substitutability of these two effects, the average related merger should decrease systematic risk. The best way to dampen the sensitivity of a firm’s cash flows to market fluctuations is to diversify in a related manner so that ‘all of one’s eggs are in similar baskets’. This prescription, however, is opposite to the one suggested by portfolio theory, which asserts that the influence of market fluctuations is best minimized by unrelated diversification, i.e. putting ‘all of one’s eggs in different baskets’. Of course, portfolio theory is primarily concerned about the total and operating variability of cash flows while the strategic management arguments are concerned about the systematic component. However, because operating risk has been shown to be positively correlated with systematic risk (Amit and Livnat, 1988a; Lev, 1974), portfolio theory suggests an indirect effect on systematic risk. For example, Amit and Livnat (1988a) demonstrated that unrelated diversification tends to reduce operating risk, which in turn has a negative influence on systematic risk. They found an opposite pattern for related diversification, i.e. operating risk increases and therefore so does systematic risk.

The question as to which of the two offsetting effects—portfolio or strategic management—dominates in explaining merger-induced changes in systematic risk is an empirical one, and one made more complex by the influence of financial risk, or leverage (see the next section). Rather than speculate, this study will follow the logic of the three strategic management arguments for the development of its research hypotheses. However, the portfolio effect is implicitly recognized in the testing of the hypotheses because the effect promotes a conservative test: it biases the results against findings that differ in a statistical sense from their expected level.

The foregoing arguments, therefore, suggest the following hypotheses:
H1: Related mergers will lower the systematic risk of the bidding firm, i.e. the post-merger beta of a bidding firm involved in a related merger will be lower than its pre-merger beta.

H2: Unrelated mergers will not change the systematic risk of the bidding firm.

FINANCIAL LEVERAGE EFFECTS

To this point, the paper has described the expected relationship between merger strategies and systematic risk, and assumed that leverage will not have a direct bearing on the results. This assumption may not, however, be sound. As Lubatkin and O'Neill (1987) point out, past studies have shown that mergers are often associated with increased debt levels (Melicher and Rush, 1974), or even motivated by increased debt (Lewellen, 1971). In addition, there is a positive relationship between a firm's debt level and its systematic risk (Hamada, 1972). Finally, Amit and Livnat (1988a) found that 'firms trade off the reduction in operating risk due to diversification with increased financial leverage, and thus the systematic risk remains the same' (p. 19). Therefore, to the extent that a merger act is associated with a change in financial leverage, leverage could be a factor in explaining any observed variance in systematic risk. The preceding arguments suggest the importance of establishing a control for any leverage effect.

METHODOLOGY

Data

An exhaustive list of mergers was taken from the 1962–79 FTC large merger series (i.e. mergers of at least $10 million in asset value). This series contains 1468 mergers. By limiting the population to large mergers the present study focuses only on mergers that were likely to have a noticeable impact on market valuations. In addition, all partial mergers (i.e. ownership in the target firm less than 50 percent) were excluded, as were those mergers where the first public announcement could not be clearly identified in the Wall Street Journal. Also, all bidding firms had to be merger inactive, having not participated in another merger in a 6-year period surrounding the date of the merger of interest. This helps to ensure that the reported changes in risk are the result of a single merger event. Finally, only those mergers classified by the FTC as concentric and conglomerate were selected. Concentric mergers, involving firms that produce similar products in different geographical regions (i.e. market concentric) or non-competing products that share similar production and/or marketing technologies (i.e. product concentric), are strategically analogous to related mergers. Similarly, conglomerate mergers involve firms that have dissimilar products and markets, and therefore are strategically analogous to unrelated mergers. (Very few market concentric mergers passed through the sample screens; as a result they were deleted from the related merger category.)

Three samples were developed from the above list. One sample, henceforth referred to as 'monthly mergers', contains 85 mergers where both the bidding and target firms are listed on the NYSE for a full 60 months before the month of the first public announcement of the merger, and the consolidated firm for a full 60 months following the month that the merger was legally transacted. (Stock returns data on these and other NYSE traded firms were contained on the CRSP Monthly Price and Returns File.) Trade-offs are made, however, when monthly returns data are used to estimate merger-induced shifts in risk because the longer the time horizon, the more likely that the estimated shifts in risk will be biased by events other than the merger. Shorter horizons, possible when daily returns data are used, are less likely to suffer this bias (Brown and Warner, 1985).

However, short time horizons may not capture the full series of merger event-related returns that may begin years before the first public announcement of the merger and end years after the merger deal is legally consummated (Lubatkin and Shrieves, 1986). Rather, short time horizons may better capture investors' short-term reaction to the unanticipated information contained in one particular event such as the first public announcement.

Given the limitations of both horizons, a second sample, 'daily mergers', was developed. This sample is made up of 120 mergers (including the 85 mergers in the monthly sample) where both the bidder and corresponding target firms are listed on the CRSP Daily Returns File for a full 200 trading days (henceforth, days) before the
merger announcement day, and the consolidated firm for a full 200 days after the legal transaction day. (The CRSP Daily Returns File contains daily stock price and returns data on all firms listed on the NYSE and AMEX exchanges. Therefore, the daily merger sample is larger than the monthly merger sample because the latter contains only NYSE listed firms.)

Finally, two additional sets of ‘daily leverage merger’ samples were developed. One is made up of the 116 mergers from the 120 ‘daily mergers’ where the bidders are listed on the COMPUSTAT data files for the accounting year before the merger year, and the consolidated firm for the accounting year following the merger year. COMPUSTAT contains data of a firm’s leverage, defined as the book value of a firm’s long-term debt divided by the book value of its total assets. A second sample of 65 mergers is developed for those ‘daily mergers’ where both the bidder and the corresponding target firms are listed on COMPUSTAT for the accounting year before the merger year.

Methodology

Systematic risk was estimated by the market model in the following form: 

\[ R_{it} = a_i + \beta_i R_{mt} + \epsilon_{it}, \]

where \( R_{it} \) is the individual firm’s return to common stockholders (appreciation plus dividends) in period \( t \), and \( R_{mt} \) is a proxy for the return of all risky assets in period \( t \) and is estimated by a value-weighted CRSP portfolio. The regression equation yields an estimate of \( \beta_i \), or the systematic risk of firm \( i \), since this beta coefficient is the covariance of the return to a firm with the return to the market portfolio.

Merger event-induced changes in systematic risk using monthly (daily) returns data were computed for the sample of monthly mergers (daily mergers) by subtracting each bidding firm’s pre-merger estimate of beta from its post-merger estimate. The research design should ensure that the estimates are relatively stationary and not biased by short-term uncertainties caused by the announcement of, and negotiations for, the merger. This was done for the pre-merger period by defining the period with the month (day) of the first public announcement, and then estimating the pre-merger betas for the bidders over a 60-month (150-day) period beginning 3 months (150 days) before the announcement month (day). This was also done for the post-merger period by defining the period with the month (day) of the legal transaction, and then estimating the post-merger betas for the consolidated firms over a 60-month (150-day) period beginning 3 months (50 days) after the legal transaction month (day). Each bidder firm’s systematic risk difference score that results from subtracting its pre-merger beta from its post-merger beta is intended to represent the change in the bidder’s systematic risk characteristics due to merging. Each difference score was then averaged with those computed for other bidder firms of the same merger type. As constructed, only the average monthly merger difference scores are directly comparable to the systematic risk difference scores employed by Lubatkin and O'Neill (1987), although their scores were computed from a sample of mergers that involved different selection criteria, different event dates, and a different time period (1954–73). The average monthly difference score, therefore, will be used to try to replicate the findings of the only published study to test for an association between merger relatedness and systematic risk. The average daily difference score will then be used to extend the findings of that study.

A limitation with both the monthly and daily risk difference scores, however, is that they do not control for the systematic risk characteristics of the target firm, and therefore, for the shift in risk that investors through altering their stock portfolios could achieve on their own. For example, investors can ‘merge’ the securities of the two firms by taking a stock position in each. The systematic risk of this ‘investor-made’ merger is the average beta of the two securities. In other words, investors on their own can lower the systematic risk of their stock portfolios by averaging in low beta securities. To the extent that the research objective is to test for the possibility that corporate mergers can achieve a reduction in risk that investors could not achieve on their own, it is important to explicitly control for the target firm’s risk.

Merger event-induced changes in systematic risk using monthly (daily) returns data were therefore computed a second way, by subtracting a hypothesized systematic risk level from the
bidder's post-merger measure. The hypothesized level was determined by forming a market value weighted portfolio of the bidder and target firm's common stock for the monthly (daily) merger samples. The market value weights were computed on a monthly (daily) basis and were determined by the value of the total outstanding common stock of the merging firms at the end of each trading month (day) during the pre-announcement estimation period. The hypothesized risk level, therefore, represents the risk that investors would face from an 'investor-made' merger of the two firms' securities; the post-merger risk represents the risk of the two firms following a legal merging of the two firms' assets. The difference score that results from subtracting the hypothesized beta from the respective post-merger consolidated beta is intended to represent the change in each bidder's systematic risk characteristics due to a corporate merger that cannot be duplicated by investors. As was done with the bidder's systematic risk difference score, each bidder plus target difference score is averaged with those computed for other merging firms of the same merger type.

Two leverage difference scores were computed, one for each bidding firm in the 'daily leverage merger' sample by subtracting its pre-merger estimate of leverage from its post-merger estimate. As constructed, this leverage difference score is comparable to the one computed by Lubatkin and O'Neill (1987). A second leverage difference score was then computed which accounted for the leverage of the target firm. A hypothesized estimate of leverage was determined by forming a market value weighted portfolio of the bidder and target firm's leverage. This estimate was subtracted from its corresponding post-merger estimate. For both constructions, each leverage difference score was averaged with those computed for other merging firms of the same type.

Statistical tests

The key test statistic is the difference score. Four variants are computed, one for each combination of returns data (monthly and daily) and pre-merger risk estimates (bidder alone, and bidder plus target). Two different tests are then used to examine the merger's impact on risk:

**Parametric tests (the magnitude of the standardized difference)**

If the merger event alters the variance of the error term, i.e. if the event causes the error term to be heteroskedastic across time, the $t$-statistics on the coefficients are biased. To control for this bias, pre- and post-merger beta coefficients ($\beta_b^{\text{post}}$ and $\beta_b^{\text{pre}}$) are first standardized by their respective standard error ($SE_b^{\text{post}}$ and $SE_b^{\text{pre}}$) before computing a difference score. ($\beta$ and its standard error term are derived from the calculation of the market model.) In other words, the appropriate test statistic for 'bidder alone' is:

$$Z_b = \frac{\beta_b^{\text{post}}}{SE_b^{\text{post}}} - \frac{\beta_b^{\text{pre}}}{SE_b^{\text{pre}}}.$$  

Each standardized difference score ($Z_b$) is then averaged with those computed for other merging firms of the same merger type, i.e. related or unrelated. If a certain merger type causes a shift in the bidding firms' systematic risk, then their standardized difference score should have a mean different from zero.

The appropriate test statistic for 'bidder plus target' ($Z_{b,t}$) is developed similarly, except ($\beta_b^{\text{pre}}/SE_b^{\text{pre}}$) in the equation is replaced by the standardized, pre-merger, hypothesized beta, or $B_{\text{hyp},b,t}$ which is computed as:

$$B_{\text{hyp},b,t} = \frac{1}{N} \sum_{j=1}^{N} \left[ \frac{V_{b,j} \left( \beta_{b,t}^{\text{pre}}/SE_{b,t}^{\text{pre}} \right)}{V_{t,j} + V_{b,j}} \right]$$

where

- $V_{b,j} = \text{market value of bidding firm } b \text{ on month (day) } j.$
- $V_{t,j} = \text{market value of target firm } t \text{ on month (day) } j.$
- $N = 60 \text{ months (150 days)}.$

**Non-parametric tests (the percentage of negative risk shifts)**

The parametric tests focused on group means, and therefore may not reveal a complete pattern of performance differences. If certain merger
types (related or unrelated) tend to cause a shift in the bidding firms' systematic risk, then the distribution of their difference scores ($Z_b$ and $Z_b')$ will be skewed. Otherwise, the difference scores will be symmetrically distributed.

RESULTS AND DISCUSSION

The systematic risk difference scores for each of the two merger types (related and unrelated), for each of the two merger samples (monthly and daily) are summarized in Table 1, as are the results of the corresponding two statistical tests (magnitude and distribution).

Table 1. Changes in systematic risk

<table>
<thead>
<tr>
<th>Sample</th>
<th>Statistical tests</th>
<th>(1) Parametric</th>
<th>(2) Non-parametric</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Average difference</td>
<td>Standard deviation</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Monthly mergers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Consolidated minus bidder</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Related</td>
<td>57</td>
<td>-0.2426***</td>
<td>0.4087</td>
</tr>
<tr>
<td>Unrelated</td>
<td>28</td>
<td>-0.0444</td>
<td>0.2851</td>
</tr>
<tr>
<td>$t$-statistic of mean difference</td>
<td></td>
<td>2.30**</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$\chi^2$ of distribution difference</td>
<td>7.26**</td>
</tr>
<tr>
<td>B. Consolidated minus hypothesized</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Related</td>
<td>57</td>
<td>-0.1681**</td>
<td>0.5464</td>
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<tr>
<td>Unrelated</td>
<td>28</td>
<td>-0.1046*</td>
<td>0.3286</td>
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<tr>
<td>$t$-statistic of mean difference</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>$\chi^2$ of distribution difference</td>
<td>0.32</td>
</tr>
<tr>
<td>2. Daily mergers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Consolidated minus bidder</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Related</td>
<td>69</td>
<td>-0.2016***</td>
<td>0.4917</td>
</tr>
<tr>
<td>Unrelated</td>
<td>51</td>
<td>-0.0779</td>
<td>0.3304</td>
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<tr>
<td>$t$-statistic of mean difference</td>
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<td>1.55</td>
<td></td>
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<td></td>
<td></td>
<td>$\chi^2$ of distribution difference</td>
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<tr>
<td>B. Consolidated minus hypothesized</td>
<td></td>
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</tr>
<tr>
<td>Related</td>
<td>69</td>
<td>-0.2072***</td>
<td>0.4011</td>
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<tr>
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<td>51</td>
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<td>0.3482</td>
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<tr>
<td>$t$-statistic of mean difference</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>$\chi^2$ of distribution difference</td>
<td>3.79</td>
</tr>
</tbody>
</table>

*The average difference score and its corresponding standard deviation should be interpreted as descriptive statistics. Hypotheses are tested using standardized statistics (not shown) and two-tailed $t$-tests. The test results are shown with asterisks.

Hypotheses are tested with a chi-square one-sample test. The results of a two-sample chi-square test are also presented, which tests for differences in the distribution of negative difference scores between the two merger types.

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

The results clearly indicate support for the first hypothesis. As expected, bidding firms that merge in a related manner show on average post-merger betas that are less than their pre-merger equivalents ($p < 0.01$), and less than that which investors could achieve on their own ($p < 0.05$ to $p < 0.01$). Moreover, the distribution of these firms' systematic risk difference scores is highly skewed in the direction of a downward shifting beta ($p < 0.01$). A striking feature of the findings from these parametric (magnitude) and non-parametric (distribution) tests is that they are observed whether monthly (long horizons) or daily (short horizons) returns data are employed, and whether or not a control is established for
the systematic risk of the target firm. In addition, the findings are observed despite any offsetting portfolio effect, suggesting that for related mergers the strategic management arguments are a more powerful predictor of systematic risk than portfolio theory. Finally, the findings from the magnitude test are consistent with that reported by Lubatkin and O'Neill (1987). Using only monthly returns data and establishing no control for the risk characteristics of the target firm, they observed a merger-induced, downward shift in systematic risk for related bidders of between 0.14 and 0.22, depending upon market conditions ($p < 0.10$ to $p < 0.01$).

The results are less supportive of the second hypothesis. When the risk difference score is defined solely by the systematic risk of the pre-merger bidder firm and its respective post-merger equivalent, the small and insignificant change in risk observed for unrelated mergers is consistent with expectations and consistent in magnitude and significance level with that reported for unrelated mergers by Lubatkin and O'Neill (1987). Further, in the case of the monthly sample this finding is reinforced by a two-tailed $t$-test of mean differences and a chi-square two-sample test which reveals that the ability of unrelated mergers to reduce systematic risk is inferior to that of related mergers ($p < 0.05$). However, when the systematic risk of the target firm is controlled for in the construction of the difference score, a very different conclusion emerges: unrelated mergers appear to be effective at reducing stockholder risk. While this conclusion is unexpected, the evidence presented by the parametric and non-parametric tests for monthly and daily samples in all cases show that these merger types are associated with a decline in systematic risk that is large and statistically indistinguishable from that observed for related mergers. It may be important to reiterate that the latter results are not caused by a simple risk pooling effect where high beta bidders seek out low beta targets, since the difference score accounts for such averaging effects by employing the hypothesized risk level as a control.

The contrast in the results for unrelated mergers depending upon whether the risk characteristics of the target firm is controlled for presents an interesting puzzle, and one which cannot be adequately explained with the risk difference scores. However, some insight can be obtained by considering leverage and by breaking the difference scores into their pre- and post-merger components. Table 2 presents the average leverage difference scores by merger type for the ‘daily leverage bidder’ and ‘daily leverage bidder plus target’ samples. Also presented for comparison purposes are the average systematic risk difference scores for the same sets of mergers. The pattern of leverage results for the ‘bidder only’ sample is consistent with the pattern found

<table>
<thead>
<tr>
<th>Sample</th>
<th>Changes in leverage$^b$</th>
<th>Changes in systematic risk$^c$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Average difference</td>
</tr>
<tr>
<td>Consolidated minus bidder</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Related</td>
<td>69</td>
<td>0.096**</td>
</tr>
<tr>
<td>Unrelated</td>
<td>47</td>
<td>0.136*</td>
</tr>
<tr>
<td>$t$-test of mean difference</td>
<td></td>
<td>0.37</td>
</tr>
<tr>
<td>Consolidated minus hypothesized</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Related</td>
<td>27</td>
<td>0.075</td>
</tr>
<tr>
<td>Unrelated</td>
<td>38</td>
<td>0.049</td>
</tr>
<tr>
<td>$t$-test of mean difference</td>
<td></td>
<td>0.20</td>
</tr>
</tbody>
</table>

$^a$Data are for the ‘daily leverage bidder’ and ‘daily leverage bidder plus target’ samples, and are developed from the full sample of 120 daily mergers that are listed on COMPUSTAT data files for 1 year before and after the year of the merger.

$^b$Leverage is defined as the book value of a firm's long-term debt divided by the book value of its total assets.

$^c$Risk statistics for the 'consolidated minus bidder' sample are taken from Table 1 and presented in Table 3 for comparison purposes.

$^* p < 0.10; ** p < 0.05; *** p < 0.01.$
by Lubatkin and O'Neill (1987). In general, mergers are associated with an increase in the bidding firm's leverage. However, when the leverage of the target firm is accounted for, mergers appear to be leverage neutral in a statistical sense. In either case, leverage does not explain the pattern of risk results observed for related and unrelated mergers. Indeed, a decline in systematic risk is observed for both merger types despite no corresponding decrease in leverage.

Finally, this finding has implications about any bias introduced by a portfolio effect. Recall that unrelated diversification is associated with a reduction in operating risk, and that firms are motivated to exploit tax benefits that come with lower operating risk by increasing their financial leverage (Amit and Livnat, 1988a). Perhaps the leverage findings reported in Table 2 imply that unrelated acquirers do not increase their leverage because their operating risk is not reduced. This explanation argues that the portfolio effect for mergers is small. Conversely, the leverage findings may imply that firms do not necessarily trade off any reduction in operating risk with an increase in leverage, despite the tax advantages. The latter explanation suggests a conservative test of the research hypotheses.

Table 3 presents the systematic risk of the pre-merger bidder and target firms, the hypothesized risk from a stockholder 'merger' of the two firms' securities, and the systematic risk of the post-merger, consolidated firm. A number of interesting patterns are revealed in the table, perhaps the most noteworthy being the difference in risk that distinguishes related and unrelated bidders. Related bidders have mean betas that approximate the market portfolio. (Brown and Warner, 1980, found that the unweighted average NYSE beta computed from the value weighted index is 1.13, and discussed that finding on pages 239–241.) In contrast, unrelated bidders have mean betas that are low compared to the market portfolio and therefore low compared to related bidders (a t-test of mean betas reveals a difference that is significant to 0.05 level with monthly estimates, and significant to 0.01 level with daily estimates). Also noteworthy is that unrelated targets have mean betas that are comparable to related targets, but high compared to unrelated bidders. (In the case of monthly estimates, the difference in mean betas between unrelated target and bidder is significant to 0.05 level.) In spite of taking on higher-risk firms, however, unrelated bidders do not appear to take on additional risk, as the mean beta of the merger firm and the difference scores reported earlier seem to testify.

Since the results for unrelated mergers departed from expectations, some reconciliation with prevailing theory is in order. Fundamental to the second hypothesis is the idea that unrelated mergers represent nonsynergistic combinations, lacking all but possible financial economies that come with improved efficiencies in capital allocations. Therefore, unrelated mergers were not viewed as an effective means to reduce stockholder risk.

An equally plausible argument, however, comes from Williamson (1975), who asserts that unrelated mergers can be defended solely on the

<table>
<thead>
<tr>
<th>Table 3. Systematic risk of bidder, target, and consolidated firms</th>
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<tbody>
<tr>
<td>Related mergers</td>
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<tr>
<td>-----------------</td>
</tr>
<tr>
<td><strong>1. Monthly measures</strong></td>
</tr>
<tr>
<td>Bidder firm</td>
</tr>
<tr>
<td>Target firm</td>
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<tr>
<td>Hypothesized merger</td>
</tr>
<tr>
<td>Merged firm</td>
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<tr>
<td><strong>2. Daily measures</strong></td>
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<tr>
<td>Bidder firm</td>
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<tr>
<td>Target firm</td>
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<td>Hypothesized merger</td>
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<td>Merged firm</td>
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</table>
basis of financial economies: the bidder firm can create stockholder value if it can transfer financial resources to the target firm at terms more favorable than the target could receive on its own. The results of the current study appear more consistent with Williamson's contention. Unrelated bidders had mean betas that were low compared to related bidders and unrelated targets, implying that unrelated bidders have access to lower cost of capital (Table 3). In addition unrelated bidders seemed to be able to exploit their cost of capital advantage. Their post-merger betas were lower than their pre-merger components would indicate (Table 1), and they apparently accomplished this without the aid of any obvious manufacturing and distribution economies which are believed possible when products are related.

A third argument comes from the obvious observation that mergers, particularly large mergers such as those included in this study, are incredibly complex and involve bidders and targets that are each involved with a multitude of products, markets, and technologies, some related and some unrelated. Also, synergistic cash flows may stem from sources of relatedness that are difficult to describe, such as a firm's culture, its unique history, and its production reputation (Barney, 1988). These sources may be equally accessible in either of the two, broad relatedness merger categories used in this study. The foregoing argument, therefore, suggests that future research adopt more precise measure of the relatedness construct in order to better study the linkage between relatedness and risk.

Finally, perhaps the higher mean betas observed for related bidders suggest that these bidders had less opportunity or inclination to exploit financial economies, and instead were motivated to seek targets that were operationally related. However, while operational economies in theory offer greater potential to reduce stockholder risk than financial economies, the difference score for related bidders relative to those observed for unrelated bidders (Table 1) provides at best mixed evidence in support of this contention. The weak findings may be attributed to the fact that operational economies are more difficult to implement, since they involve considerable interaction among business units. If in reality the implementation difficulty of related mergers reduces its theoretical opportunities for value creation the results of this study would not be unexpected. The evidence from the strategic management literature is decidedly ambiguous whether related mergers truly create more value than unrelated mergers. Finally, since target firms are usually small they are not likely to be widely held. In that case the managers of the target firm may be able to extract a high enough premium to make the net value for related and unrelated mergers comparable.

Overall, evidence was found to suggest that both merger strategies are effective at mitigating general environmental risk. Very different outcomes would be expected by modern finance theory, which asserts that the systematic risk of a security is the proportion of total risk that cannot be avoided regardless of the level of diversification. The finding for both strategies therefore underscores the distinction between managing a portfolio of securities and managing a portfolio of businesses. In the latter case the systematic variance of the combined returns of each business need not be a linear extension of historical variances. Rather, management actions may alter the underlying risk profiles of the combining businesses. In instances of corporate diversification, therefore, general market risk appears to have an uncontrollable and a controllable component. Further, the findings suggest that while the management of unsystematic risk 'lies at the very heart of strategic management' (Bettis, 1983: 408), so does the management of systematic risk.

The findings also have practical suggestions for improving the effectiveness of a firm through merger. First, the set of possible merger targets need not be limited solely by the criterion of operational relatedness. Rather, a wider investment opportunity set may be recommended, particularly for bidders with surplus capital. This recommendation, however, should not be interpreted as a rationale for the existence of conglomerates. Conglomerate diversification strategies connote firms whose businesses are essentially unrelated, while a conglomerate acquisition strategy represents only a single act of corporate diversification into unrelated areas. This act may be followed by a series of moves intended to fortify the firm's competitive position in its newly selected businesses. In addition, the findings suggest that a well-designed merger strategy may enhance a firm's future effectiveness,
for lower systematic risk implies a lower cost of capital and a lower cost of capital enables a firm to participate in a wider set of investment opportunities. These investments might allow the firm to solidify its position in its current domains and/or expand to new domains.

Finally, the findings have important implications for traditional event study methodology and for the conclusions of merger studies that employ the methodology. The standard methodology assumes that a firm’s systematic risk is either unaffected by the event, or affected in a manner such that the direction of the risk shift is random. The impact of the event is then estimated by a measure of abnormal returns; i.e. the deviation of a firm’s realized return from its risk (systematic) adjusted return. Most event studies conclude that mergers do not create value for stockholders of bidding firms.

In light of the findings of the current study, however, any conclusion from these studies must be tentative because the assumption of beta stationarity may not be well based. Since time-series data are used to estimate systematic risk, the true systematic risk on any day during some event window (the period immediately surrounding the event) is unknown, and must be proxied by an estimate of the average systematic risk calculated over some estimation period (the period assumed to be free of any event influence). However, the proxy becomes a biased predictor if investors alter their beta-risk estimates as information concerning the impending event becomes known. In other words, if as was observed in Table 1, a merger causes a large, permanent downward shift in the bidder’s risk, the true abnormal returns measure associated with the merger event will be understated and may go undetected by standard event test procedures.

The standard event test procedures may also understate the impact of a merger announcement because the procedure assumes that a merger announcement can be precisely dated. Recent evidence, however, suggests that merger announcements are partially anticipated because they are often preceded by a series of related events where each provides information about the impending announcement (Lubatkin and Shries, 1986; Malatesta and Thompson, 1985). While the informational impact of the full series of events might be captured by lengthening the period surrounding the announcement date over which abnormal returns are cumulated, the power of the resulting statistic will fall because of the high unexplained variance in stock returns (Brown and Warner, 1985). In contrast, estimates of changes in systematic risk are not as affected by problems of partial anticipation because they are estimated with a long time-series containing large amounts of data (Kupiec and Mathias, 1987). As a result, these estimates can provide a more powerful test of the impact of a merger on the wealth position of stockholders of bidder firms.

CONCLUSION

This paper has reported the results of a study that examined changes in systematic risk associated with bidding firms, grouped by the degree of relatedness of their mergers. By controlling for the systematic risk of the target firm, correcting for possible problems of heteroskedasticity, and estimating shifts in risk over daily as well as monthly time horizons, this study extended the work of the only other published study to test for linkages between merger strategies and stockholder risk.

As expected, bidding firms which combine through merger non-competing products that share core technologies are able to reduce the systematic variability in the returns to their securities. However, evidence was also presented which suggests that unrelated mergers may be as effective at mitigating general environmental risks. While this latter result is surprising, it may be explained by the different risk characteristics depicted by related and unrelated bidders prior to merging. In general, robust evidence was presented by parametric and nonparametric tests to suggest that, on average, mergers may be value creating events because they can reduce systematic risk in a manner which stockholders cannot achieve on their own.

The study has, however, several limitations. For example, the study assumed central limits and therefore did not explicitly control for other influences on the coefficients such as operating risk (Amit and Livnat, 1988a; Lev, 1974), labor–capital ratio (Subrahmanyan and Thoma- dakis, 1980), organizational structure (Bettis and Chen, 1986), the structural characteristics of the merging firms’ selected industries (Brealey and
Myers, 1981; Moyer and Chatfield, 1983), environmental influences such as regulatory changes (Armour and Teece, 1978), and market conditions (Amit and Livnat, 1988b; Lubatkin and O'Neill, 1987).

Clearly, no study is both generalizable and totally accurate; trade-offs must be recognized between the representativeness of the results and confidence in them. Any shortcomings in the study highlight opportunities for further study.

ACKNOWLEDGEMENTS

We would like to thank Birger Wernerfelt, Arnold Cooper, Carolyn Woo and Anju Seth for comments on previous drafts; Filip Caeldries for assistance. This research was made possible by grants from the Krannert School of Management, Purdue University and the School of Business of the University of Connecticut.

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