

Mergers, Executive Risk Reduction, and Stockholder Wealth

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Abstract

Among the possible consequences of agency problems between corporate owners and managers is a tendency by managers to make investment decisions for their firms that are deliberately aimed at reducing firm risk, as a means to control managers' personal wealth risk. The literature has suggested that such behavior may occur to the detriment of shareholder wealth, and that mergers may be a particular class of investment decisions for which the behavior would be observable. We test these hypotheses empirically, but find no evidence from our merger sample that risk reduction for the acquiring firm is the typical outcome nor that, when it occurs, it is differentially costly for shareholders.

I. Introduction

Various researchers have argued that senior corporate executives may deliberately make decisions for their firms that are aimed at reducing their personal risk. Mergers, in particular, have been pointed to as decisions that might reflect such behavior, since mergers can lead quickly to significant changes in the distributional characteristics of a firm's income and stock returns. Treynor and Black ((1976), p. 311) put the argument succinctly:

“The managers, however, do not have a portfolio of employers. If the corporation does badly because the new venture fails, they do not have any risks except the others taken by the same corporation to balance against it. They are hurt by a failure more than the stockholders, who also hold stock in other corporations, are hurt. Thus, the managers may be interested in an acquisition because it will give their company more stability.”

The failure to find evidence that acquiring firms' shareholders consistently benefit from mergers (e.g., Dodd (1983), Jensen and Ruback (1983), Langetieg (1978)) could, therefore, be explained in part by a tendency for many of those transactions to be initiated because of senior management's risk preferences rather than shareholders' best interests. We examine that possibility here empiri-

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cally, by seeking to determine whether corporate acquisitions do appear to be motivated by risk-reduction efforts and, if so, whether such actions are costly to shareholders.

The view that personal portfolio considerations will affect managerial decisions requires some assumptions about the asset mix in managers' portfolios. In general, there will be three components: (1) human capital, (2) holdings of company common shares, and (3) other investment holdings. A large proportionate weight of either of the first two could provide the manager with an incentive to use changes in the composition of the firm's operations as a vehicle to rebalance his or her personal portfolio. Amihud and Lev (1981) and Treynor and Black (1976) emphasize the importance of the human capital portion of that portfolio, while Agrawal and Mandelker (1987) and Brealey and Myers (1988) emphasize the employer-company stockholding portion. A possible causal link between mergers and managers' risk preferences is also considered by Amihud, Dodd, and Weinstein (1986), Larcker and Balkcom (1983), Marshall, Yawitz, and Greenberg (1980), Mikkelson and Ruback (1985), Reagan and Stulz (1983), Ross (1977), and Smith and Watts (1982).

On a priori grounds, however, the notion that risk reduction is likely to be a serious managerial motive for mergers has several difficulties. For one thing, a risk-increasing acquisition may well improve managers' personal utility, by raising the expected returns of their portfolios by more than enough to offset the extra risk incurred. Moreover, depending on the terms of the transaction and on opportunities to raise the earning power of the combined enterprise, an acquisition that increases risk may simultaneously increase managers' personal wealth—through an enhanced market value of their own-company stockholdings. Executives with such large shareholdings should be especially sensitive to mergers that reduce risk at the sacrifice of share values.

The capital markets also provide managers with access to other risk-reduction possibilities, albeit with some costs. If firm income is used to invest in the securities of other companies, there may be elements of double taxation involved or penalties on the improper accumulation of surplus (Kalay (1982)). If diversification is undertaken on personal account, managers may face sizeable capital gains taxes in liquidating own-company shareholdings (Brealey and Myers (1988) and Lewellen (1971)) and there may be adverse signalling implications from such liquidations (Leland and Pyle (1977)). Alternatively, it is possible that the structure of the executive compensation package will impede actions motivated by managers' personal portfolio considerations (Lambert and Larcker (1985) and Lewellen, Loderer, and Martin (1987)). Direct monitoring by the board of directors and competition among managers should be further impediments. Ultimately, however, whether or not managers use mergers—or any other changes in firm's investment and financing—for risk-reduction purposes is an empirical question.

Existing empirical support for the risk-reduction motive is limited, in the case of mergers. Amihud and Lev (1981), for example, find that corporations in which ownership is not concentrated engage in conglomerate mergers more often than do other corporations. This happens, the authors argue, because the managers of the former firms are not closely monitored and, therefore, can more easily

pursue risk-reduction activities for their personal benefit. Agrawal and Mandelker (1987), on the other hand, report that large own-company stock ownership positions by the managers of acquiring firms are typically associated with risk increases rather than risk decreases from merger.¹ More importantly, there is no direct evidence in the literature that managerial attempts to reduce risk through mergers, if these occur, are actually *costly* to shareholders.

We examine here both the incidence and the possible resulting costs of such attempts. We use a sample of completed mergers to test first for the occurrence of changes in the acquiring firms' equity risk characteristics following the mergers. We then consider whether risk-reduction outcomes are more frequent when the acquiring firms' senior executives' personal portfolios contain large investments in their companies' common shares. Finally, we test whether the stock returns to the shareholders of the acquiring firms in the period surrounding the merger decision are related to the risk changes associated with the merger.

We find evidence that risk-reduction outcomes are in the minority, and only very weak cross-sectional evidence that risk reduction occurs more often when acquiring firms' senior executives have large own-company shareholdings. Taken together, these findings provide little support for the notion that managers' risk preferences significantly affect their attitudes toward mergers. We also find no evidence that risk reduction, when it does occur, is associated with a differentially unfavorable impact on shareholder wealth.

II. The Methodology and the Data

A. Measuring Merger-Related Stock Returns

To determine the consequences of a merger for an acquiring firm's shareholders, we assume that the market model describes the normal underlying daily stock-return-generating process. Specifically, we assume that

$$(1) \quad R_{jt} = a_j + B_j R_{mt} + e_{jt},$$

where R_{jt} = the continuously-compounded rate of return on security j on day t ;

R_{mt} = the continuously-compounded rate of return on the CRSP value-weighted market index on day t ;

e_{jt} = a disturbance term assumed to have the usual ordinary-least-squares properties; and

a, B = the market model intercept and slope coefficients, respectively.

The effect of a given merger is assessed by measuring the abnormal (excess) return on the common shares of the acquiring company over the time period immediately preceding the announcement of the merger offer, through the announcement of target-firm shareholder approval of the merger. We use the estimated parameters of the market model to calculate the deviations of realized

¹ While they did not examine a possible relationship to senior executive stock ownership levels, Langetieg, Haugen, and Wichern (1980) also found for the merger sample they studied that the mergers generally resulted in an increase in both systematic and unsystematic risk for the combining firms.

acquiring-company stock returns from the predictions of the model. Thus, the excess return on security j (the return prediction error for j) on day t (defined in event time) is computed as

$$(2) \quad PE_{jt} = R_{jt} - (\hat{a}_j + \hat{B}_j R_{mt}) .$$

The coefficients \hat{a}_j and \hat{B}_j are estimated using ordinary least squares, with 200 daily observations starting 300 trading days prior to the merger offer announcement. Daily return prediction errors are calculated for each acquiring firm starting 5 days prior to the offer announcement date (day t_1) through each of two subsequent dates (day t_2): the announcement date, and the date target-firm stockholder approval of the merger is obtained.

To measure the abnormal stock return performance of acquiring firm j , the indicated prediction errors are summed over the interval t_1, t_2 to form the cumulative prediction error

$$(3) \quad CPE_{t_1, t_2}^j = \sum_{t=t_1}^{t=t_2} PE_{jt} .$$

The average of these cumulative prediction errors across a sample of M acquiring-firm securities yields the average cumulative prediction error $ACPE_{t_1, t_2}$, which is a proxy for the abnormal performance of a portfolio of the M securities over the event-time interval bounded by t_1 and t_2 . The statistical significance of both CPE_{t_1, t_2}^j and $ACPE_{t_1, t_2}$ is then assessed, using standard methodology (see Dodd and Warner (1983) and Lewellen, Loderer, and Rosenfeld (1985)).²

B. The Merger Sample

The sample examined consists of 203 NYSE-listed firms that announced and completed mergers during the years 1963 through 1984. To generate the sample, all companies whose common stock return histories were deleted from the CRSP daily tape within the period studied were identified and, from the *Wall Street Journal Index*, those for which the deletion occurred because of a merger with an NYSE-listed company were separated.³ If stock return data for the ac-

² Each prediction error is divided by its estimated standard error over the event-time interval to form the standardized prediction error SPE_{jt} , which will be unit-normally distributed under the assumptions of the market model. The SPE_{jt} are then summed for a given security to form the standardized cumulative prediction error,

$$w_j = \sum_{t=t_1}^{t=t_2} SPE_{jt} / \sqrt{t_2 - t_1 + 1} ,$$

which will also be unit-normally distributed. For a portfolio of M securities, the test statistic is $Z = \bar{W} / \sqrt{M}$ where

$$\bar{W} = (1/M) \sum_{j=1}^M w_j ,$$

and Z will be unit normal if the w_j are independent across firms.

³ The authors acknowledge, with gratitude, Peter Dodd's help in assembling this sample.

quiring company were available on the daily CRSP tapes, the company became part of our preliminary sample. There were 257 mergers that satisfied these criteria.

Information on senior executives' own-company shareholdings is contained in the proxy statements corporations issue in connection with their annual shareholder meetings. Those statements, for the annual meetings just prior to the announcements of each of the 257 mergers in question, were requested from the acquiring firms. From the responses, from the corporate records collection at Purdue University, and from commercial corporate data sources, we were able to obtain the necessary proxy statements in 203 cases. These constitute our final sample.

C. Variable Definitions

We include in our measurement of executives' ownership positions in their companies' common shares: (i) stock held directly by the executive and his or her immediate family as of the proxy statement date, (ii) the shares due to be received by the executive under stock-deferred compensation awards made up to that date, and (iii) the shares that can be purchased by exercising any then-outstanding stock option grants.⁴ These positions are identified for the single highest-paid executive in each acquiring company and for all the company's officers and directors as a group, as reported in the proxy statements. The corresponding *percentage* ownership positions—denoted ALPHA1 and ALPHALL, respectively—are calculated by dividing by the total number of outstanding common shares of each employer company on the proxy statement dates. The dollar amounts thereof (denoted VA1 for the top executive and VALL for the combined officer and director group) are computed by multiplying the number of shares held (and to be received) by the per-share market price on the statement date. After deflating those figures by the Consumer Price Index (with 1963 = 1.00), because the sample period spans more than two decades, we obtain the respective log transforms VS1 and VSALL.

Merger-related changes in firm risk, as reflected in changes in the variability of the acquiring company's stock returns, are measured by computing two ratios. The first (DVR) is the ratio of the estimated total variance of stock return after the merger to the estimated total variance before. The second (DVRR) is the ratio of the estimated after-merger to before-merger *residual* variances of acquiring-firm stock return, from the Market Model. The intent of the latter is to control for possible concurrent changes in the variance of the returns on the over-all market between the pre-merger and post-merger intervals. For both measures, the variance estimates are derived from observed daily rates of return on the market and the acquiring firm's stock for the (before) period, beginning 300 trading days prior to the merger announcement date through the 101st day prior, and for the (after) period, starting 101 trading days after the announcement through the 300th day after.⁵

⁴ The first two categories—current holdings and deferred stock awards—account for the dominant portion of the measured ownership positions. Omitting the third does not change any of the empirical results reported below.

⁵ We focus specifically on possible changes in *equity* return variances in order to attempt to

D. Distributions of the Variables

Table 1 provides summary descriptive statistics on the distributions of the variables. There are substantial cross-sectional variations in each within the sample. The dollar amounts of own-company stock ownership positions observed range from zero to nearly \$2 billion for the acquiring firms' respective highest-paid executives, and from approximately \$400 thousand to over \$2 billion for their officers and directors as a group. As a percentage of the firms' outstanding common shares, the corresponding ranges are from zero to just under 80 percent. The standard deviation in each instance is well in excess of the mean. While the distributions of DVR and DVRR are somewhat more compact, there is considerable cross-sectional variation present for them as well.

TABLE 1
Descriptive Statistics for the Sample of Acquiring Firms in 203 Mergers during the Years 1963–1984

	Variables					
	ALPHA1	ALPHALL	VA1 (\$ MIL.)	VAALL (\$ MIL.)	DVR	DVRR
Minimum	0.000	0.001	0.0	0.2	0.220	0.265
Maximum	0.720	0.787	1901.2	2067.4	7.942	8.121
Mean	0.042	0.096	30.7	69.3	1.376	1.349
Median	0.006	0.049	2.4	16.6	1.065	1.074
Standard Deviation	0.105	0.134	150.8	226.5	1.138	1.076

Variable Definitions:

ALPHA1, ALPHALL = percentage of own-company common stock owned by the highest-paid executive and all officers and directors as a group, respectively.

VA1, VAALL = dollar value of own-company common stock owned by the highest-paid executive and by all officers and directors as a group, respectively.

DVR = ratio of daily stock return variance after merger to daily stock return variance before merger; and

DVRR = ratio of daily residual stock return variance after merger, to daily residual stock return variance before merger. Residual variances computed using market model estimates.

III. Empirical Findings

A. Mergers and Risk Changes

From Table 1, the median value of the risk change measure DVR is greater than 1.0, indicating that the mergers in the sample more often resulted in an increase than a decrease in the total stock return variability of the acquiring firm. In particular, there are 115 instances of risk-increasing ($DVR > 1$) mergers in the group. The probability that this number of observations could occur by chance in a sample of 203 drawn from an underlying population that is actually evenly divided between variance-increasing and variance-decreasing mergers is less than 5 percent.

relate these to the magnitude of senior executives' own-company stockholdings. If such changes do occur, they may, of course, originate either in changes in the variance of the acquiring firms' asset returns or changes in firm leverage in the process of merging.

Not all the estimated variance changes for the individual firms in the sample are themselves statistically significant, however. A two-tailed F test at the 95-percent confidence level applied to each merger reveals just 63 instances in which the increase in total stock return variance, and 53 instances in which the decrease in variance, is statistically significant.⁶ If we confine our attention only to these 116 cases, the hypothesis that the observed split between variance-increasing and variance-decreasing events could have arisen by chance cannot be rejected, at the 95-percent level.

The mean DVR value of 1.376 can be interpreted as the average change in total return variance that would have been experienced by an investor who held equal amounts of the common stock of each acquiring company during the respective estimation periods prior to and following the full sample of merger announcements examined. The representative merger, therefore, was a return-variance-increasing event, and the composite DVR ratio would be statistically significant at the 95-percent level, using either a one or two-tailed F test.

When the same set of events is judged relative to changes in the market as a whole, a similar picture emerges. The median value of the residual variance risk-change measure DVRR is also greater than 1.0, and the likelihood that the observed number of residual-risk-increasing mergers ($DVRR > 1$ in 116 cases) in the sample could have occurred by chance is again less than 5 percent. For 66 of the firms, the observed increase in estimated residual stock return variance is statistically significant, and for 50, the decrease is significant. Finally, the mean DVRR ratio of 1.349 for an equally-weighted portfolio of the merging companies would also satisfy either a one or two-tailed F test of significance. Taken as a whole, therefore, the evidence clearly does not indicate that variance-decreasing mergers predominate in the sample.⁷

⁶ The variables DVR and DVRR, both as ratios of variances, should have sample distributions that conform to the F distribution. For variance estimates derived from 200 daily observations prior to and following the merger announcement dates, the critical values for F to reject the null hypothesis of variance equality are 0.75 and 1.33, for a two-tailed test at the 95-percent confidence level.

⁷ These findings are not sensitive to differences across mergers in the relative sizes of the acquired and acquiring firms. For example, if we consider only the subset of the sample for which the acquired firm was at least one-tenth the size (measured by total assets) of the acquiring firm, the characteristics of the distributions of DVR and DVRR within that subset are virtual duplicates of those of the distributions for the full sample. Thus, we have

		DVR	DVRR
Mean:	Full Sample	1.376	1.349
	Subsample	1.324	1.299
Median:	Full Sample	1.065	1.074
	Subsample	1.011	1.043
Standard Deviation:	Full Sample	1.138	1.076
	Subsample	1.105	1.089

and, in addition, statistical tests on the subsample yield findings similar to those on the full sample. As judged by DVR, there are 39 cases of statistically significant variance increases, and 34 cases of significant variance decreases, in the subsample, out of 127 observations. With DVRR as the risk-change measure, the split is 37 increases and 33 decreases that are statistically significant. We, therefore, employ the full sample of 203 mergers in our subsequent analyses, while reporting representative parallel findings for the subsample.

B. Executive Stock Ownership and Risk Changes

For the sample firms, however, the extent of own-company common stock investments by senior executives varies widely. It is possible then that those executives' risk-reduction incentives also may vary in intensity across the sample. As a test of this possibility, we computed both the Pearson product-moment and Spearman rank correlation coefficients between the two merger-related risk-change measures DVR and DVRR, and our various measures of the level of management's ownership of the acquiring firms' shares. The results are reported in Table 2.

As can be seen, the majority of correlations are negative, but they also are quite weak. Only one of the coefficients is statistically significant at the 95-percent confidence level.⁸ Supplemental regression analyses with the risk-change measures DVR and DVRR as the dependent variables, and quadratic terms of the stock ownership measures as the independent variables, were undertaken on the chance that the relationships at issue, if they are present, may be nonlinear. No statistically significant results were obtained.

TABLE 2
Correlation Coefficients between Changes in Stock Return Variance and Executive Stock Ownership:
Acquiring Firms in 203 Mergers during 1963–1984

<i>A. Pearson Product-Moment Correlation Coefficients</i>	ALPHA1	ALPHALL	VS1	VSALL
DVR	0.0797	-0.0482	-0.0055	0.0329
DVRR	-0.0848	-0.0617	0.0001	0.0230
<i>B. Spearman Rank Correlation Coefficients</i>				
DVR	-0.1335	-0.0921	-0.0700	0.0225
DVRR	-0.1394*	-0.1205	-0.0613	0.0269

Variable Definitions:

DVR, DVRR, ALPHA1, ALPHALL are as listed in Table 1; and

VS1, VSALL = log transform of the CPI-deflated dollar value of own-company stock owned by the highest-paid executive and by all officers and directors as a group, respectively.

* Statistically significant at the 95-percent confidence level

As an alternative test, the acquiring-firm sample is divided into the subgroup for which stock return risk is estimated to have increased following a merger (DVR or DVRR greater than one), and the subgroup for which the risk is estimated to have decreased (DVR or DVRR less than one). Mean comparison tests are then made between the own-company stock ownership measures for the senior executives of the firms in the two subgroups. The results, including *t*-statistics, are shown in Table 3. While it is consistently the case that the managers of firms whose equity return variability decreased following merger have slightly larger levels of own-company stock ownership, just one of the differences between the ownership measures for the risk-increasing and risk-decreasing subgroups is statistically significant. There is, therefore, little in these results

⁸ Each pair of rank and product-moment coefficients is, of course, not independent. When these correlation analyses were replicated using only the subset of the merger sample for which the acquired firm was at least one-tenth the size of the acquiring firm, 11 of the 18 computed correlations corresponding to those shown in Table 2 were again negative, but none were statistically significant.

to suggest that larger managerial shareholdings noticeably intensify risk-reduction incentives.⁹

TABLE 3
Tests of the Differences in Mean Executive Stock Ownership Positions for Stock-Return-Variance-Increasing and Stock-Return-Variance-Decreasing Mergers: Acquiring Firms in 203 Mergers during 1963–1984

Executive Stock Ownership Measure	Stock Return Variance Changes (DVR)			Residual Stock Return Variance Changes (DVRR)		
	Mean for Mergers with Variance Increases (N = 115)	Mean for Mergers with Variance Decreases (N = 88)	t-Statistics for the Difference in Means	Mean for Mergers with Residual Variance Increases (N = 116)	Mean for Mergers with Residual Variance Decreases (N = 87)	t-Statistics for the Differences in Means
ALPHA1	0.0305	0.0582	-1.71*	0.0363	0.0508	-0.94
ALPHALL	0.0849	0.1112	-1.35	0.0884	0.1009	-0.98
VS1	14.2555	14.6003	-1.22	14.2523	14.6085	-1.27
VSALL	16.1916	16.2284	-0.16	16.1890	16.2323	-0.19

Notes: The mean comparison tests allow for different variances in the two subsamples. Variable definitions are listed in Tables 1 and 2.

* Statistically significant at the 95-percent confidence level.

A similar conclusion emerges from examining the relative *frequencies* with which risk-reducing mergers are observed for acquiring firms when those firms are categorized according to the relative degree of senior management's own-company shareholdings. The evidence is contained in Table 4, where the 203 firms in the sample are arrayed into deciles on the basis of the ownership measures ALPHALL and VSALL for their officers and directors as a group. The patterns for deciles created using the ownership positions of just the single highest-paid executive in each company as the criteria are virtually identical and are not reported.

In the top (highest ownership) decile of percentage own-company stockholdings (ALPHALL), 48 percent of the mergers sampled resulted in a reduction in the acquiring company's estimated stock-return variance after the merger ($DVR < 1$); in the lowest decile, only 30 percent did. In the top three deciles combined, 55 percent of the mergers were risk-reducing, as compared with 38 percent in the bottom three deciles. A comparison between the top five and bottom five deciles shows the frequencies to be 48 percent and 39 percent, respec-

⁹ And again, restricting the analysis only to the merger subsample for which the acquired firm was at least one-tenth the size of the acquiring firm does not change the findings. For example, the profile of the means for ALPHA1 and ALPHALL in the subsample is

	Mergers where $DVR > 1$	Mergers where $DVR < 1$	Mergers where $DVRR > 1$	Mergers where $DVRR < 1$
ALPHA1	0.0368	0.0689	0.0465	0.0590
ALPHALL	0.1008	0.1234	0.1047	0.1199

which is like that in Table 3, but none of the differences in means is statistically significant.

TABLE 4

Incidence of Stock Return Variance and Residual Stock Return Variance Decreases following Merger, for Deciles of the Distributions of Officers' and Directors' Percentage and Dollar Holdings of Employer-Company Common Shares: Sample of Acquiring Firms in 203 Mergers during 1963-1984

ALPHALL Deciles	Decile Limits	Number of Firms	Stock Return Variance		Residual Stock Return Variance	
			Number of Cases where DVR < 1	Relative Frequency	Number of Cases where DVRR < 1	Relative Frequency
1	0.250-0.787	21	10	48%	9	43%
2	0.142-0.237	20	12	60%	12	60%
3	0.093-0.142	21	12	57%	15	71%
4	0.071-0.092	20	10	50%	10	50%
5	0.048-0.071	20	5	25%	6	30%
6	0.031-0.048	20	8	40%	8	40%
7	0.022-0.031	20	8	40%	6	30%
8	0.012-0.022	21	8	38%	8	38%
9	0.007-0.012	20	9	45%	7	35%
10	0.001-0.007	20	6	30%	6	30%
VSALL Deciles						
1	18.26-20.85	21	10	48%	11	52%
2	17.53-18.16	20	9	45%	8	40%
3	16.96-17.43	20	9	45%	9	45%
4	16.61-16.96	21	10	48%	10	48%
5	16.22-16.60	20	5	25%	4	20%
6	15.70-16.21	20	7	35%	8	40%
7	15.34-15.70	20	11	55%	11	55%
8	14.82-15.33	21	10	48%	10	48%
9	14.26-14.79	20	9	45%	8	40%
10	11.51-14.24	20	8	40%	8	40%

Variable definitions are listed in Tables 1 and 2.

tively. Thus, there *is* a mild suggestion that the incidence of mergers that result in a reduction in the acquiring firm's stock return variance is somewhat higher among firms whose managers have larger proportionate holdings of their companies' common shares. A corresponding set of comparisons among the tabulated decile subgroupings created using the dollar-value shareholding measure VSALL, and using the residual stock return variance change estimate DVRR, reveals a similar profile. None of the observed differences in relative frequencies across the indicated subgroupings, however, turn out to be statistically significant, for *any* of the arrays.

While we cannot absolutely reject the notion, therefore, it is difficult to find much support in the data for the hypothesis that the objective of diminishing their personal-wealth risk exposure motivates senior managers to have their firms engage systematically in risk-reducing acquisitions. Both the total and residual stock return variances of the acquiring firms studied more frequently increased rather than decreased subsequent to the mergers they undertook, and the mean outcome was an increase of approximately 35 percent. Similarly, the evidence that differences in the levels of own-company stock ownership by managers lead to differential risk-reduction incentives is weak or nonexistent. Only scattered indications of a negative relationship between merger-related changes in stock return variances and the magnitude of own-company managerial stockholdings can be discerned in the data, in any of the tests employed.¹⁰

¹⁰ Agrawal and Mandelker (1987), in fact, report the opposite relationship.

Among the possible explanations is that risk-reduction incentives, if they exist for senior management, are offset by those associated with the likely positive effect on managers' wealth—through an increase in the value of their employer company shareholdings—of risk-increasing mergers, due to the call option properties of the equity in a levered firm. Another is that managers may have already pre-selected their firms' equity risk levels to coincide with their personal appetites for risk bearing. When a merger is undertaken, therefore, some attention is paid to attempting to preserve those risk levels.

C. Risk Changes and Stockholder Wealth

A key question is whether risk-reducing acquisitions, to the extent they occur, have an unfavorable impact on shareholder wealth. Of the 203 mergers in our sample, there are 111 instances of negative cumulative prediction errors (CPE) over the period five days prior to the announcement of the merger through the date of shareholder approval, implying negative abnormal stock returns in 55 percent of the cases. The average CPE for the full sample is -2.9 percent over this period, and it is statistically significant at the 95-percent confidence level ($Z = -2.02$). Similar qualitative findings, of course, have been reported in other studies of the merger-related stock return performance of acquiring companies (e.g., Asquith (1983), Dodd (1980), and Langetieg (1978); see, however, Loderer and Mauer (1988)).¹¹

To attempt to determine whether unfavorable stock return outcomes are associated primarily with equity-risk-reducing mergers, we divide the sample again into the subsets for which acquiring-firm stock return variance is estimated to have increased ($DVR > 1$) and decreased ($DVR < 1$) following merger. The difference between the mean CPEs for the two subsets is not statistically significant, either for the interval five days prior to announcement through announcement, or five days prior through shareholder approval. Similarly, correlation analyses between the measured CPEs, for the sampled mergers (for either period) and the corresponding estimated stock return variance changes DVR provide no indication that risk-reducing acquisitions are differentially harmful. Neither the Pearson product-moment nor Spearman rank correlation coefficients are statistically significant. The results using DVRR as the measure of stock return variance changes are the same.

The incentive trade-offs for management when one considers how merger decisions might affect stock prices as well as risk exposure, on the other hand, are complex. Because risk-increasing mergers may enhance levered-firm share values through a wealth transfer from bondholders to stockholders, merger-related CPEs and return variance changes should be positively correlated. All else equal, then, managers should prefer risk-increasing acquisitions since, as stockholders themselves, *their* wealth will be enhanced.

What may not be equal, of course, are managers' possible desires to reduce their personal wealth risk exposures. The larger their investments in own-company shares, the more sensitive they may be to achieving a reduction in risk.

¹¹ When measured over the shorter period, five days prior to announcement through announcement date only, the mean CPE is just -0.3 percent and is not statistically significant.

Simultaneously, however, the *cost* to those managers of acquisitions that would reduce risk by reducing share prices also increases. Thus, while all managers should be attentive, managers with large own-company stockholdings who seek risk reduction should be *especially* attentive, to finding acquisitions that not only reduce firm risk, but are inherently positive net present value investments as well, in order to offset any wealth transfer consequences. If they behave in this manner, risk reduction and poorer merger-related stock return performance will not inevitably coincide.

As an effort to separate and identify the influence of these various possible incentives and effects, we estimate the regression

$$(4) \quad \text{CPE}_i = a_0 + (a_1)(\text{DVR}_i) + (a_2)(\text{ALPHALL}_i) + (a_3)(K_i) + e_i$$

for the 203 mergers in the sample (indexed by i), where $K_i = \text{ALPHALL}_i$ if $\text{DVR} < 1$ and $K_i = 0$ otherwise, and where e_i is an error term assumed to have the usual OLS properties. In this regression, the coefficient a_1 should capture any wealth transfers from bondholders to stockholders that are occasioned by (unanticipated) increases in firm risk. The variable ALPHALL, which measures the level of acquiring-firm stock ownership by senior management, is included because of evidence that larger managerial investments in own-company shares are, in general, associated with better acquisitions for shareholders (Lewellen, Loderer, and Rosenfield (1985)). The variable K is designed to identify the *differential* effect, if any, of mergers that reduce acquiring-firm equity risk. If managers with relatively large shareholdings are more likely to have their firms undertake stock return variance-decreasing mergers to reduce their personal wealth risk and if, in doing so, they impose costs on shareholders (and on themselves), the coefficient a_3 will be negative. Thus, *ceteris paribus*, large stockholdings would be associated more frequently with lower CPEs when return variance decreases than when it increases.

The regression estimate is reported in Table 5, along with that for the counterpart of Equation (4) wherein the percentage of own-company common shares held by the single highest-paid executives in the acquiring firms (ALPHA1), rather than the percentage held by all officers and directors, is used as the managerial ownership measure. Estimates for regressions in which the residual risk-change measure DVRR is employed instead of DVR as the indicator of risk-reducing acquisitions, are also reported. As can be seen, the results do not support the hypothesis that risk reduction, when it occurs, is accomplished to the (incremental) detriment of shareholder wealth. Indeed, the reverse conclusion could be drawn. The coefficient a_3 is positive and statistically significant (one-sided test at the 95-percent confidence level) in all regressions. This finding would buttress the Amihud, Dodd, and Weinstein (1986) argument that optimal contracting between stockholders and managers under conditions of incomplete information and costly monitoring could cause risk-reducing mergers to benefit both parties to the contract. Regressions with the merging firms' cumulative stock return prediction errors over the period five days prior to the merger offer announcement through the announcement date as the dependent variable, and employing the (CPI-deflated) market values of the firms' senior executives' own-

company shareholdings (VSI and VSALL) to measure relative ownership levels, confirm the results reported in Table 5. In no instance is the coefficient a_3 negative and statistically significant.

TABLE 5
Regression Estimates of the Relationship between Abnormal Merger-Related Stock Returns, Relative Levels of Acquiring-Firm Stock Ownership by Senior Management, and Changes in Acquiring-Firm Stock Return Variance: Sample of 203 Mergers during 1963–1984

<i>A. Estimated Regression:</i>		$CPE_i = a_0 + a_1DVR_i + a_2X_i + a_3K_i \quad (i = 1, 2, \dots, 203)$				<i>F</i> Statistic	Adjusted <i>R</i> ²
		Estimates of					
		a_0	a_1	a_2	a_3		
		$K_i = X_i$ if $DVR < 1$; $K_i = 0$ otherwise.					
For $X =$ ALPHALL		-0.065 (-2.356)*	0.019 (1.319)	-0.150 (-0.936)	0.504 (2.537)*	2.669*	0.024
For $X =$ ALPHA1		-0.055 (-2.204)*	0.017 (1.247)	-0.565 (-1.911)*	1.063 (3.252)*	4.773*	0.053
<i>B. Estimated Regression:</i>		$CPE_i = a_0 + a_1DVRR_i + a_2X_i + a_3K_i \quad (i = 1, 2, \dots, 203)$				<i>F</i> Statistic	Adjusted <i>R</i> ²
		Estimates of					
		a_0	a_1	a_2	a_3		
		$K_i = X_i$ if $DVRR < 1$; $K_i = 0$ otherwise.					
For $X =$ ALPHALL		-0.055 (-1.963)*	0.012 (0.804)	-0.131 (-0.818)	0.467 (2.367)*	2.293*	0.019
For $X =$ ALPHA1		-0.046 (-1.785)*	0.010 (0.717)	-0.539 (-1.826)*	1.024 (3.140)*	4.404*	0.048

Notes: Figures in parentheses are *t*-values.

Variables DVR, DVRR, ALPHALL, and ALPHA1 are as defined in Tables 1 and 2.

CPE = Cumulative stock return prediction error over the period five days prior to the merger offer announcement through the date of shareholder approval of the merger.

* Statistically significant at the 95-percent confidence level.

IV. Summary and Conclusions

Conjectures have been made frequently in the financial economics literature that corporate managers have incentives to make investment decisions for their firms that will reduce firm risk, because such decisions also will reduce the risks of the managers' personal wealth portfolios. It has been suggested that incentives of this sort will be particularly strong when managers hold large ownership positions in their companies' common shares and, further, that risk-reducing actions may at times be taken even if the associated consequence is to depress share prices. Corporate mergers are often cited as examples of investment decisions in which these phenomena might be observable. We have sought to provide evidence that bears on those issues, from a sample of 203 mergers by NYSE-listed firms over the period 1963 through 1984.

Contrary to the indicated hypotheses, we find that acquisitions that *increase* total and residual stock return risk are in the majority in the sample. In addition, there is, at best, only very scattered evidence that risk-reducing acquisitions are more frequent when senior managers have especially large own-company shareholdings. Finally, from examining estimates of the stock return performance of the acquiring companies on and around the dates of merger offer announcements and approvals, we find no indication that the risk-reducing mergers in the sample tended to occur at the differential expense of shareholder wealth.

Our results would suggest that the potential owner-manager agency prob-

lems that might lead to risk-reduction actions that would impose costs on shareholders are either not inherently very serious or are redressed in other ways—by competition in the external managerial labor market, by competition in the market for corporate control, by the design of executive compensation contracts, or by competition internally among a firm's managers. The costs managers would impose on themselves, in the form of reductions in the value of their own-company stockholdings if they make poor merger decisions for their firms to lower firm risk, should be a further deterrent to such decisions.

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