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This article investigates leverage influence on project selection. First, we examine 428 mergers (1962–82) and then 389 acquisitions of all types (1982–86). Announcement-period acquirer returns are greater the higher the leverage of the acquirer. A third data set contains 173 acquisitions undertaken during 1978–90 for firms that underwent major increases in leverage, often forced by hostile takeover. Acquisition performance increases after restructuring. The evidence is invariant with respect to methodology—beta-adjusted abnormal returns, numeraire portfolio approach, and three-factor regression model residuals produce identical results. Overall, the data support the hypothesis that debt improves managerial decision making.

I. Introduction

Modigliani and Miller (1958) show that leverage has no impact on firm value in perfect capital markets. Since their original work, researchers have relaxed various assumptions of the theorem in search of a role for debt. Recently, the debate has centered on managerial incentives. Some charge that leverage hobbles management, making them less able to compete effectively because of their narrow focus on meeting interest payments.[1] The recent wave of bankruptcy filings by firms that previously had undergone leverage-increasing restructurings would seem to support this view. Other researchers focus on the benefits. Grossman and Hart (1982) show that managers commit themselves to work hard by issuing debt. Jensen popularized this idea, that is, that debt controls managerial discretion: "Debt

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1. See Harris and Raviv (1991) for a survey of this literature.

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creation . . . enables managers to effectively bond their promise to pay out future cash flows'' (1986, p. 324). Harris and Raviv (1990) and Stulz (1990) formalize similar arguments.[2] The consensus of this theoretical research is that, while leverage has costs, the necessity of making periodic, legally mandated, unalterable payments to bondholders forces managers to take extra care in decision making.

This article explores the argument that leverage enhances decision making. We examine three data sets of major decisions in light of the leverage position of the firm. The first data set contains large mergers that happened during 1962–82. A second data set consists of 389 acquisitions of all types, ranging from mergers to acquisitions of divisions, assets, and stock in other firms over the period 1982–86. For both data sets, we document a positive relation between the price reaction to the acquiring firm at project announcement and its preannouncement leverage position.

We assemble a third data set in light of the recent wave of increased-leverage restructurings. This data set contains 173 acquisitions over the period 1978–90 for firms that underwent major increases in their capital structure sometime during that period. Hostile takeovers or their threat motivated a large number of these restructurings. For this sample, we find that stock price performance of the firm's acquisitions is negative before and positive after restructuring. Moreover, across the sample, acquisition returns are higher the greater the increase in leverage. The increase in leverage appears to reduce the number and size of acquisitions, a result that is also consistent with the debt-monitoring hypothesis because the acquisition-period stock price performance for the acquiring firms prior to restructuring was negative.

II. The Debt-monitoring Hypothesis

Jensen and Meckling (1976), Grossman and Hart (1982), Jensen (1986, 1989), Harris and Raviv (1990), and Stulz (1990) theorize that debt can mitigate the agency problems between stockholders and managers. Harris and Raviv (1991) compare and contrast the research; the models differ primarily in defining the costs of debt rather than its benefits. All agree that the benefit of debt is that it causes the decisions that managers make to be more aligned with the interests of stockholders. Jensen (1986, 1989) and Stulz (1990) argue that debt reduces free cash. In doing so, highly levered companies have less resources to waste on unprofitable mergers and acquisitions. Grossman and Hart (1982) assert that managers in highly levered firms work harder because of the

2. See also Easterbrook (1984) and Rozeff (1982), who argue that high dividend-payout firms must incur capital market monitoring if they are to raise new project funds, thereby reducing managerial discretion over resources.

threat of bankruptcy. Harris and Raviv (1990) use default as a monitoring device, but it is a natural extension to say that managers will work harder when they are monitored more closely. Jensen and Meckling (1976) argue that debt, by allowing larger managerial residual claims, increases managerial work effort.

We examine managerial decisions in search of evidence that more debt leads to better decisions. Specifically, we examine the managerial decision to expand externally. All of these theories say that acquisition performance should be positively linked to leverage. In acquisitions, the costs of debt from the perspective of the stockholders do not change. Hence, the stock market reaction to the announcement reflects the gross benefits of the predicted, agency-cost-reducing power of debt.

While the models differ in how debt produces the desired result, they all reflect the idea that debtholders have different legal powers from stockholders. In the event of default, debtholders have the legal standing to review managerial decisions and to have management replaced through the courts. Stockholders do not share this power. The predicament faced by stockholders is that the court views management as the legally appointed voice of the stockholders. The court has held that stockholders must remove managers the same way that they appointed them.[3] In practice, corporate takeovers and proxy fights are the means by which shareholders acting alone can remove management. However, by levering the firm, the legal powers of debt are invoked to remove management in certain states of the world, that is, when the firm fails to achieve some minimum performance criterion. In addition, high leverage limits managerial discretion by forcing firms to seek external funding for new projects.

Anecdotal evidence supports these arguments. Firms often issue debt to finance special dividends. A debt-financed special dividend pays future cash flows to the stockholders and imposes high costs on management if the firm fails to achieve those income goals. In this way managers bond themselves to a future course of action. Similarly, hostile takeover attempts often result in the target company restructuring as a smaller operation with a substantial increase in debt. Successful takeovers are often accomplished with a leverage-increasing re-

3. The "business judgment rule" was recently reiterated in the case of Paramount Communications and Time Inc. shareholders' suit against the management of Time Inc. when management spurned the $200-per-share offer of Paramount Communications so that it could go forward with the acquisition of Warner Communications (*Paramount Communications, Inc., v. Time Inc.*). Upon the announcement of the court's judgment in favor of Time Inc. management, Time's stock price plunged and has remained far below Paramount's offer price. According to Chancellor Allen of the Delaware court, "The corporation law does not operate on the theory that directors, in exercising their powers to manage the firm, are obligated to follow the wishes of a majority of shares" (Hilder 1989, p. A10).

structuring. But more interestingly, even unsuccessful takeover attempts are typically associated with leverage increases by the target firm. The theories mentioned above argue that increases in debt reduce managerial abilities to waste the assets of the firm and predict that increased leverage is the expected market equilibrium when agency costs dominate the formula.

Goodyear Tire & Rubber Co. is an example. In 1983 Goodyear diversified into the petroleum industry, a move that the stock market judged harshly (Mitchell and Lehn 1990). Three years later, Sir James Goldsmith attempted to purchase Goodyear with the expressed intention of selling off Goodyear's assets unrelated to its main line of business. Goodyear successfully fought off Goldsmith's bid, but it did so largely by incurring a substantial amount of debt in the process. The debt obligations forced Goodyear to sell its nontire and rubber operations. Even after reducing debt with proceeds from these sales, the company was left as a much more highly levered company than before Goldsmith's takeover attempt. Whereas Goodyear's debt-equity ratio before the takeover attempt averaged .35, it jumped to roughly 1.00 and has not fallen below that level since the restructuring took place. At issue is what impact this heavy debt burden has on Goodyear management. The debt-monitoring theories say that it makes managers work harder to maximize the cash flows of the existing capital and to find new positive net present value (NPV) projects. Casual evidence concerning Goodyear supports this view.

In contrast to the agency cost approach, some asymmetric models of capital structure illustrate the benefits of low leverage. Specifically, Myers and Majluf (1984) argue that financial slack benefits firms (managers, by assumption, only engage in positive NPV projects). In their model, managers have more information about the firm's investment opportunities and the value of assets in place than outside investors. Without financial slack or access to the risk-free debt market, firms will sometimes pass up positive NPV projects. The debt-monitoring hypothesis and the financial slack theory are not mutually exclusive, and thus evidence in support of debt monitoring is not necessarily inconsistent with Myers and Majluf. However, one aspect of their argument is important in framing our examination of the debt-monitoring hypothesis. We use acquisition announcement returns as the measure of managerial performance. In the Myers and Majluf framework, the announcement of an acquisition financed with stock or risky debt may be a signal that the existing assets are priced too high. In this situation, the announcement returns may be negative even though the managers have acted to maximize shareholder wealth, that is, have made a positive NPV investment. Thus, we control for the type of financing when using acquisition returns as a measure of managerial performance.

III. Empirical Analysis: Mergers, 1962–82

We examine the market response to acquisition announcements and its relation to the acquirer's level of debt. We start with all mergers by New York Stock Exchange (NYSE) firms from 1958 to 1982 (Maloney and McCormick 1988). We restrict the sample to acquirer firms with returns reported on the Center for Research in Security Prices (CRSP) Daily Returns File (1962–82). We delete all railroad and utility mergers and a few mergers where it is not clear which firm was the acquirer. The sample contains 428 mergers with 310 buying firms.[4] The announcement date of the merger is the first mention of the merger in the *Wall Street Journal*. The sample is evenly split between the periods 1962–71 and 1972–82, with both periods characterized by merger waves at the end of the decades.

We use records on the 1984 Value Line Data Base-II files and various Moody's manuals to obtain the amount of long-term debt for the buying firm in the fiscal year prior to the merger announcement. To facilitate data collection, the comparison of the effect of long-term versus total debt is examined in the acquisition data set discussed in the next section. We examine the equity value for the buyer and the target in the year prior to the announcement to identify capital structure and the relative size of the merging partners. Table 1 shows some summary statistics on the debt-equity ratios for the buyers and the ratio of target-to-buyer market value of equity. Many firms over this period had no long-term debt. Indeed, 18 of the buyers had a debt equity equal to zero in the year before their merger. The highest ratio is 12.5, which was LTV Corp. in 1973, the year before it bought Jones & Laughlin Steel. The ratio of target to buyer size ranges from .006 to 4.2, with nearly 10% of the sample greater than one. To control for the form of financing, we create a dummy variable with a value of one for all cash or debt purchases; the variable takes the value of zero whenever any amount of stock (common or preferred) provided financing.[5] Only 25% of the sample is all cash. Higher leverage is associated with use of cash to finance the mergers in this sample. The correlation between the cash dummy variable and the debt-equity ratio is .13, significant at the .01 level.

4. This sample is different from the one reported in earlier versions of this research on two counts. Previously, we used monthly data and deleted all buying firms that were no longer on the exchange as of 1984. Here, we use daily data for consistency across the samples analyzed in this article and include all firms satisfying the requirements, even those that have left the exchange, to eliminate any survivorship bias.

5. Recent studies have found that the form of payment influences merger returns. Asquith, Bruner, and Mullins (1990) and Travlos (1987) show that the returns to acquiring firms are greater for cash mergers than for stock mergers. This result is consistent with prior studies that have documented negative stock price reactions around equity issuances (see Asquith and Mullins 1986; Masulis and Kowar 1986; and Mikkelson and Partch 1986).

TABLE 1 Sample Statistics for 428 Mergers, 1962–82

Variable	Mean	Median	Standard Deviation	Minimum Value	Maximum Value
Long-term debt-equity ratio	.566	.293	1.075	0	12.482
Ratio of target to buyer equity	.377	.210	.503	.006	4.205
Percentage of cash vs. stock transactions	.248	0	.432	0	1
3-day abnormal acquirer returns at announcement (in %)	.000	−.040	4.571	−14.582	19.329

NOTE.—Number of observations = 428. Equity is measured at market value; debt is measured at book value.

We calculate the excess returns contemporaneous with merger. The announcement period is the 3 days ending with the day of the *Wall Street Journal* announcement. One year of returns ending 50 days prior to that date is used to estimate the market model to forecast abnormal performance. Table 1 reports statistics on these returns. They are approximately normal and are centered on zero. Alternative estimation procedures, such as different estimation periods and the non-risk-adjusted, numeraire-portfolio approach (Long 1990), produce similar estimates and do not affect the results reported throughout the article.

Regression estimates of the buyer's abnormal returns on its long-term debt-equity ratio in the year before the merger announcement, the method of financing, and the announcement year are shown in table 2. Previous studies have found that returns to acquirers decline over the period we study.[6] Announcement year is included as a trend variable to account for this pattern. As an alternative to a trend variable, we break the sample into four equally sized groups based on announcement year and include a dummy for each group. There is a strong negative trend in the data shown by the coefficient estimates on the linear trend variable as well as the individual estimates on the quartile class variables. Over the sample period, acquirer returns declined .2% per year, about the same as shown in previous work. The all-cash variable is positive and significant at the .001 level. The return on all cash transactions is 2 percentage points above stock transactions, also consistent with prior research.

In reference to the debt-monitoring hypothesis, there is a positive relation between long-term debt-equity ratio and abnormal performance at the announcement of merger. The coefficient estimates are significant at the .02 and .01 levels, respectively. In magnitude the

6. Jarrell and Bradley (1980), Bradley, Desai, and Kim (1988), Jarrell and Poulsen (1989), Nathan and O'Keefe (1989), and Loderer and Martin (1990) account in various ways for the changing legal and economic environment over the period of our analysis. We estimated different specifications including 0,1 dummy variables for these effects, but these do not alter the results we report here.

TABLE 2 **Regression Estimates of the Relation between 3-Day Acquirer Announcement Returns for 428 Mergers during 1962–82 and Long-Term Debt-Equity Ratios in the Year Prior to Announcement**
Dependent Variable: Acquirer's 3-Day Abnormal Returns (in %)

	Specification	
Independent Variable	Time Trend	Chronological Quartiles
Long-term debt-equity ratio	.467	.536
	(2.354)	(2.65)
Cash vs. stock transaction	2.514	2.492
	(4.985)	(4.97)
Announcement year	−.212	. . .
	(−5.859)	
Quartile:*		
1	. . .	2.686
2	. . .	2.917
3	. . .	.167
Intercept	14.453	−2.358
	(5.591)	(12.92)†
F-ratio	17.373	11.33
R^2	.1095	.1183
Sample size	428	428

NOTE.—*t*-statistics are in parentheses.
* Chronological quartiles of mergers are indicated; the fourth quartile is subsumed into the intercept.
† Indicates *F*-statistic testing the significance of the quartile class variable.

estimates say that an increase in debt equity from one to two increases abnormal acquisition performance around .5 percentage points. The evidence is consistent with the argument that leverage influences managerial decision making; firms with higher leverage, in the period preceding the decision to acquire, outperform their peers in the acquisition market. We estimated the model in quadratic form to investigate whether debt monitoring works over all ranges of leverage. The data reveal no evidence of declining marginal impact of leverage on performance.[7] However, this does not mean that more debt is always better, because acquisition performance is only a measure of benefits and does not account for the costs of increased leverage. What the results do suggest is that the monitoring value of debt is a positive marginal consideration over all ranges in the benefit-cost decision to increase leverage.

7. We examined buyer returns in event time for the merger sample broken into groups based on stock versus cash acquisitions and broken into three categories of leverage: the bottom quartile, the second and third quartiles, and the top 25%. Because the sample sizes vary widely, we look at cumulative returns (from −5 to +5 days) computed at the medians. The cumulative returns for cash mergers show a fairly large and positive difference between middle leverage and the lowest leverage but little difference among the higher groups. In the stock transactions, there is an increase in returns from the middle leveraged firms to the highest.

Prior research shows that the relative size of the underlying assets involved in a corporate acquisition may affect the returns to the buyer. In general, the acquisition of a small company does not have the same financial impact as the purchase of a large firm. Most researchers have found a positive relation between size and returns, but the results are mixed.[8] Instead of a relation between the levels of size and returns, we argue that size affects variance.

In the acquisition of a small company, any positive returns may be lost in the noise to a large buyer, *and the same is true of any negative returns*. This suggests, not a relation between buyer returns and relative size, but a positive relation between the variance of returns and relative size. To investigate this argument, we regress the log of the squared residuals from the excess returns equation in table 2 on the log of size ratio. The estimated coefficient is .3603 with a *t*-statistic of 3.979. Residual variance in abnormal performance is an increasing function of size ratio for this sample.

The nature of this heteroscedastic relation calls into question the precision of the estimates of the *t*-statistics on the variable of interest in table 2. Kmenta (1971, p. 257) suggests that the following form is both convenient and plausible to correct for heteroscedasticity in this situation. Let $\sigma_i^2 = \sigma^2 Z_i^{\delta}$, where Z_i is the value of the heteroscedastic variable for the ith observation, and σ^2 is a constant. Using the squared ordinary least square (OLS) error terms to estimate σ_i^2 and size ratio for Z_i, this is the relation that we estimated in the preceding paragraph and found that $\delta = .3603$. Thus, to correct for the heteroscedasticity we weight the regression of abnormal performance by size ratio raised to the .3603 power. This weighting produces the results reported in column 1 of table 3. The coefficient estimates and *t*-statistics do not change markedly from the OLS version.[9] For the debt variable, both the coefficient estimate and *t*-statistic increase.

Many factors influence the optimal capital structure for a firm. These factors can vary across time and across industries. To investigate whether the debt results hold intertemporally and intraindustry, we perform additional analyses.

8. Asquith, Bruner, and Mullins (1983) find a positive relation between the target-buyer relative size ratio and the returns to buyers, as do Hayn (1989), Jarrell and Poulsen (1989), and Morck, Shleifer, and Vishny (1990). However, You, Caves, Smith, and Henry (1986) find an insignificant relation, Travlos (1987) finds a negative sign, and Asquith, Bruner, and Mullins (1990) find a positive relation for cash mergers and a negative relation for stock.

9. Including size ratio in the various models presented throughout this article yields the same result reported in the literature: sometimes the coefficient is positive, sometimes negative. Including size ratio does not affect the estimates associated with the debt variable. Also note that there is no heteroscedastic relation between the debt variable and error variance either before or after accounting for their relation with size ratio.

TABLE 3 **Weighted Regression Estimates of the Relation between Acquirer Returns for Mergers and Debt Equity Both Unadjusted and Adjusted for Economy-wide Debt Equity over Time and Industry Debt Equity**
Dependent Variable: Acquirer's 3-Day Abnormal Returns (in %)
Weight Variable: Ratio of Target to Buyer Size

	Specification		
Independent Variable	(1)	(2)	(3)
Long-term debt-equity ratio	.644	.738	.608
	(2.801)	(3.198)	(2.447)
Cash vs. stock transaction	2.058	2.038	2.022
	(4.261)	(4.233)	(4.148)
Announcement year	−.155	−.132	−.154
	(−4.719)	(−4.043)	(−4.639)
Intercept	10.087	8.822	10.198
	(4.274)	(3.752)	(4.279)
F-ratio	13.327	14.18	12.166
R^2	.0862	.0912	.0796
Sample size	428	428	426
Weight factor, δ	.3603	.3592	.3391
	(3.979)	(3.865)	(3.621)

NOTE.—Specification 1 = unadjusted long-term debt-equity ratio; specification 2 = long-term debt-equity ratio net of economy-wide debt-equity value in year prior to merger; specification 3 = long-term debt-equity ratio net of debt-equity value for industry classification in which firm operated in year of merger. *t*-statistics are in parentheses.

First, we adjust each firm's debt-equity ratio at the time of merger announcement by the existing, economy-wide debt-equity ratio at that time. Figure 1 plots the economy-wide long-term debt-equity ratio over time computed from the 1984 Value Line Data Base-II file using the annual average long-term debt-equity ratio for each firm.[10] We normalize each firm's debt-equity ratio in the year prior to its merger by subtracting the average debt-equity ratio in that year for all firms in the Value Line survey. This corrects the firm's debt-equity ratio for economy-wide effects. This mean correction yields a measure of unexplained capital structure. Employing this mean-corrected debt-equity measure, we reestimate the abnormal returns equation. These results are shown in table 3, column 2. The regression is weighted by size ratio to account for heteroscedasticity using the technique previously discussed. We include the annual trend variable although the results are identical when the quartile class variables are substituted. Again we find that firms with higher debt-equity ratios in the year prior to merger have higher abnormal announcement returns.

Second, we adjust the debt-equity ratios of the acquiring firms by the debt-equity average of their industry cohorts. Bradley, Jarrell, and

10. The underlying distribution of the economy-wide debt-equity ratio appears to change about 1969. See also Masulis (1988). Our investigation suggests that accounting, reporting, or sample size phenomena do *not* explain this shift.

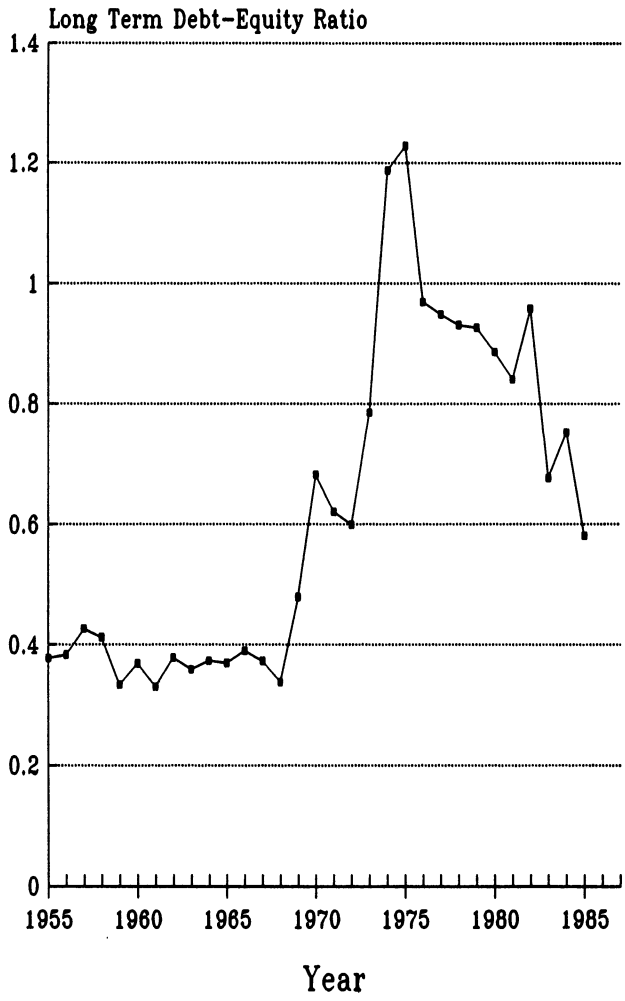

FIG. 1.—Economy-wide capital structure

Kim (1984) and Long and Malitz (1985) have shown that capital structure varies systematically across industries. To determine if industry-related events account for the relation between returns and capital structure, we subtract the industry debt-equity ratio from our debt variable. We construct an industry capital structure variable in the following way. The CRSP gives a Standard Industrial Classification (SIC) code for each firm. This classification changes over time as CRSP updates the primary industry in which the firm does business. We match firms found on the 1984 Value Line Data Base-II file with the SIC codes taken from CRSP, which provides a time series of industry

cohorts. We then compute the average debt-equity ratio for each four-digit SIC code. Data coverage varies by SIC code. When, in our judgment, there is insufficient data at the four-digit level, we aggregate to the three- or two-digit level using the rule that each industry classification must have at least 25 data points from a minimum of five firms. This technique produces 262 different industry classifications. There is considerable variation in the debt-equity ratio across them; the average industry debt-equity ratio is .42, with a standard deviation of .36. The upper and lower 5% tails are 1.30 and .06, including, for example, "Certificated Air Transportation" (SIC 4510) with a debt equity of 1.63 and "Metal Mining-Gold Ores" (SIC 1041) with a debt equity of .05.

The industry debt-equity ratios are then matched to the industry classifications for the acquiring firms in the merger sample in the year of their merger. The acquirers' SICs are also taken from CRSP. Of the 428 mergers, we are able to match 257 at the four-digit level, 125 at the three-digit level, 44 at the two-digit level, and two are left missing. This industry debt-equity value is subtracted from the acquirer's debt-equity ratio in the year prior to merger. The abnormal performance is then regressed on this adjusted value. Table 3, column 3, shows this regression. The results are again consistent with the debt-monitoring theory. The higher is the debt equity, *net of industry,* the higher is abnormal performance.

IV. Empirical Analysis: All Acquisitions, 1982–86

We further test the debt-control notion by examining an independent set of data. Mitchell and Lehn (1990) examine 401 acquisitions made between 1982 and 1986 by NYSE and American Stock Exchange (ASE) companies tracked by Value Line. The data set comprises all types of acquisitions, including mergers and buyouts and purchases of divisions, plants, and other assets for which the acquisition price was 5% or more of the acquirer's value 20 days before the announcement. For the 401 acquisitions, Mitchell and Lehn also report stock holding by company insiders and the percentage of cash used in the transaction.[11] For each of the acquisitions, we obtain financial data on the buyer from Compustat. Data from Compustat are not available for all firms, reducing the sample size to 389. However, the breadth of financial data for these firms is far greater than that available for the merger sample. Hence, here we examine total as well as long-term debt over several years prior to the acquisition announcement. We again use a 3-day announcement-period abnormal rate of return as our measure of

11. The inside ownership data are the percentage of equity held by managers at the end of 1981.

the quality of the managerial decision to make the acquisition.[12] In addition, we include the inside holdings of managers in the regression as a control.[13] Finally, we include the percentage of cash used in the transaction to control for the Myers-Majluf (1984) argument.

Table 4 shows some summary statistics of acquisitions. Many variables do not differ markedly from the merger sample. The debt-equity ratio in the year prior to announcement is almost identical among the samples as is the ratio of target to buyer size. Target size is measured as the amount paid for the acquisition as ultimately reported in *Mergers and Acquisitions*. The percentage of cash used to finance the transaction is not measured the same way between the two samples. In this acquisition sample, the cash variable is continuous; we measure the actual amount of cash and notes compared to stock used as payment. Here, 50% of the transactions are all cash (median value is one) compared to only 25% in the merger sample; the acquisitions analyzed in this sample include purchases of divisions, plants, and other assets not generally associated with stock financing. In this case, there is no correlation between the percentage of cash used in the transaction and the debt-equity ratio. Acquirers do about the same in this sample as in the merger sample; abnormal performance was −.08%. Additionally, we have information on inside holdings and various measures of debt. On average, insiders held 9% of the common stock in the acquiring firms. We have three different measures of debt-equity ratios—1, 2, and 5 years prior to announcement for total and for long-term debt. The differences in the summary statistics for the various debt measures are not notable. The acquirers in this sample are taken from Value Line in 1981. We track the Value Line industry group debt-equity ratios over the period 1982–86 for these firms and use these as an industry adjustment factor.[14]

Table 5 shows the regressions of acquisition announcement abnormal returns on the control variables and the debt-equity ratio prior to announcement. The regressions are again weighted by the ratio of target to buyer size using various weighting factors taken from the regression of the log of residual variance from the OLS specification on the log of size ratio. The *t*-statistic from this regression is shown

12. The acquisition announcements were taken from the Dow Jones Broadtape. The announcement period is defined as the 3-day window centered on the announcement day. Since the Broadtape report is normally the day before the *Wall Street Journal* story, this definition of the announcement window is consistent with the definition used in the merger sample.

13. Lewellen, Loderer, and Rosenfeld (1985) and You et al. (1986) report a positive relation between inside holdings and returns.

14. The industry debt-equity ratios are lower on average than the debt equities for the firms in our sample. In part this is due to the fact that the industry ratios are ratios of the sum of debt to the sum of equity for the industry, whereas the average across the acquirers is the average of the individual ratios.

TABLE 4 Sample Statistics for 389 Acquisitions of All Types, 1982–86

Variable	Mean	Median	Standard Deviation	Minimum Value	Maximum Value
Long-term debt-equity ratio:					
Year prior to acquisition	.554	.422	.605	0	5.56
Average of 2 years prior	.560	.433	.645	0	6.40
Average of 5 years prior	.608	.442	.651	0	5.28
Total debt-equity ratio:					
Year prior to acquisition	.613	.454	.689	0	5.66
Average of 2 years prior	.623	.465	.680	0	6.33
Average of 5 years prior	.672	.483	.700	.005	5.30
Long-term debt-equity ratio across Value Line industry groups	.384	.353	.278	.042	1.75
Insider holdings, 1981 (in %)	8.6	4.1	11.9	.01	69.5
Ratio of target to buyer size	.370	.181	.596	.050	7.00
Percentage of cash in transaction	.813	1	.351	0	1
3-day abnormal buyer return at announcement (in %)	−.08	−.43	5.37	−22.85	32.28

NOTE.—Number of observations = 389.

TABLE 5 Weighted Regression Estimates of the Relation between Buyer Announcement Returns for 389 Acquisitions of All Types for 1982–86 and Leverage Defined in Various Ways
Dependent Variable: Acquirer's 3-Day Abnormal Returns (in %)
Weight Variable: Ratio of Target to Buyer Size

	Specification				
Independent Variable	(1)	(2)	(3)	(4)	(5)
Debt-equity ratio	.746	.785	.705	.721	.835
	(1.855)	(2.051)	(1.795)	(2.009)	(1.919)
Insider holdings, 1981 (in %)	.050	.050	.052	.050	.048
	(2.381)	(2.418)	(2.495)	(2.422)	(2.291)
Percentage of cash used to finance acquisition	1.803	1.738	1.790	1.728	1.696
	(2.785)	(2.712)	(2.765)	(2.691)	(2.658)
Intercept	−2.219	−2.193	−2.233	−2.184	−1.847
	(−3.541)	(−3.557)	(−3.534)	(−3.544)	(−3.161)
F-ratio	6.113	6.37	6.039	6.276	6.111
R^2	.0455	.0470	.0449	.0466	.0455
Weight factor, δ	.4981	.5273	.4791	.5223	.5481
	(4.401)	(4.523)	(4.310)	(4.715)	(4.602)

NOTE.—t-statistics are in parentheses. Sample size is 389. For specifications, 1 = long-term debt year prior to announcement; 2 = long-term debt 2-year average prior to announcement; 3 = long-term debt 5-year average prior to announcement; 4 = long-term plus short-term debt 2-year average prior to announcement; 5 = long-term debt 2-year average prior to announcement minus industry long-term debt-equity ratio.

beneath the weight factor coefficient in table 5. Five different specifications are shown in which alternative measures of the debt-equity ratio are used. In all cases the control variables perform as expected. The higher is the percentage of cash used to finance the transaction, the higher is the abnormal announcement return. An all-stock transaction results in a return almost 2 percentage points below that of an all-cash transaction, roughly the same as for the merger sample and prior work. Also, the higher the level of common stock held by insiders, the more valuable is the acquisition. For example, an increase in insider ownership from 0% to 20% increases announcement-period returns 1 percentage point.[15]

Across all specifications, acquisition performance is positively related to leverage with significance levels ranging from .074 to .04. The unweighted OLS estimates (not reported) are similar. The first three specifications measure long-term debt to equity for various periods, 1, 2, and 5 years prior to announcement. As we found in the merger sample, announcement returns are positively associated with capital structure in the year prior to the project announcement. Managerial performance is significantly related to the relative level of debt over several years prior to announcement as well. Looking at the average debt-equity ratio 2 years or 5 years prior, shown in specifications 2 and 3, or even the debt-equity ratio in the second and fifth year before announcement, not shown, the relation is also positive and equally strong. Indeed, while the *t*-statistics vary slightly, the coefficient estimates are remarkably similar across the specifications shown in table 5. Also note that the coefficient estimates of the leverage effect on managerial performance are nearly the same for this broad sample of acquisitions as for the sample of mergers shown in the last section.

Specification 4 employs the ratio of total debt to equity. Adding in short-term debt to the ratio does not materially affect the relation between leverage and performance. Indeed, looked at separately, the short-term debt-equity ratio is not strongly related to acquisition performance. Finally, specification 5 shows the relation between managerial performance and debt-equity net of the industry average debt equity. The coefficient estimate of the performance effect of leverage relative to industry cohorts is slightly higher. Overall, the results drawn from this sample offer additional support for the debt-monitoring hypothesis.[16]

15. We tried different specifications for the insider-holdings variable. They had no impact on the coefficient estimate and *t*-statistic for the debt variable. Overall, the results are similar to those of other studies mentioned earlier. Also, for this sample there is a positive correlation between insider holdings and the leverage of the firm.

16. Lang, Stulz, and Walkling (1991) examine the free cash flow hypothesis in the context of bidder returns and include a variable measuring leverage. However, their research methodology differs from ours in several fundamental respects, sufficiently so

V. Alternative Explanations for the Results

A. Risk Aversion

Some argue that managers of highly levered companies are risk averse. Those taking this view claim that the restrictions placed on managers by the debt market impede managers from taking some positive NPV projects when the variance of the payoffs is high. Following this argument, managers of debt-laden companies only take projects when the expected NPV is some amount greater than zero; that is, they require a premium. When they accept a project, the stock price reacts more than for a company that accepts all positive NPV ventures. Accordingly, this argument says that our empirical results are purely a symptom of managerial risk aversion. At the same time, if managers of high-debt companies are risk averse in project selection, then they will undertake fewer and smaller projects than all equity companies, ceteris paribus.

The 401 acquisitions (389 with complete data) in our second data set were made by 281 firms: 197 firms engaged in a single project, 57 firms undertook two projects, while 27 firms made three or more. We total the value of projects undertaken for each firm. We divide this sum by firm size in 1981. The resulting variable measures the extent of project participation for 281 firms in the sample from 1982 through 1986. The risk-aversion argument says that this variable will be negatively related to the debt-equity ratio. We regress this total-projects variable on the debt-equity ratio as well as several other control variables (inside holdings, method of finance, and firm size).[17] The risk-aversion argument is not supported. Of all the variables, only the debt-equity ratio is remotely significant, and it has a *positive* sign with a t-statistic of 1.5. For this sample, there is no evidence that levered companies pass up positive NPV projects because they are risk averse.

While there is no evidence of risk aversion within the sample of firms that made acquisitions, we pursue the matter further: Does leverage keep firms completely out of the acquisition market? In this regard we compare the leverage position of the Value Line firms that made acquisitions to those that did not. If leverage is creating risk aversion, then we should find that the nonacquirers had significantly higher leverage than the Value Line firms in our sample that made one or more purchases. We summed debt and summed equity for the years 1982–86 for the 1,089 firms tracked by Value Line in 1981, and then took the

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that a direct comparison of our estimated models is not revealing. Sample selection criteria, model specification, variable definitions, event windows, and sample sizes are all different. See also Kim and Smith (1991).

17. For firms engaging in multiple projects, we used the average of their debt-equity ratios in the year prior to acquisition.

ratio. We then did a *t*-test of the difference in this ratio between the acquirers and nonacquirers. The average debt-equity ratios are .520 and .553, respectively. The acquirers do have slightly lower leverage. However, the leverage of acquirers compared to nonacquirers is not statistically different at conventional levels of confidence (the *t*-statistic is .7).

The result that levered firms take on the same number and size of projects as unlevered companies is not inconsistent with the debt-monitoring hypothesis. The theory says that there are (debt) disciplined and undisciplined managers. The disciplined ones choose among projects to maximize shareholder wealth. They accept the highest positive net present value project available. The undisciplined managers use a different selection criterion. Instead of choosing projects that are monotonic in maximizing shareholder wealth, they search for projects that further other goals, such as entrenchment, managerial perks, and so forth. Both sets of managers have search rules for deciding when a promising project, given the different objectives, is the best project that can be expected to develop. Put differently, both sets of managers face constraints in project selection; there are only so many projects that they have the resources to undertake. In this view, undisciplined managers do not take on more projects than disciplined managers, just different ones. In Jensen's (1986) story, on the one hand, undisciplined managers start out with free cash flow that may allow them more flexibility and the opportunity to engage in more projects. But, on the other hand, disciplined managers make more money and thereby acquire flexibility. All these angles considered, there is nothing inconsistent between the debt-monitoring theory and the fact that levered firms take on the same number and size of projects as unlevered firms.[18]

B. Signaling: Financial Information

It has been suggested that our empirical findings are a signaling result. Consider a company that has experienced recent declines in equity. For such a company, an acquisition announcement can signal that the

18. Two other theories appear to be in conflict with these results. The Myers (1977) underinvestment argument taken alone says that highly levered firms pass up low positive return, low variance projects because these sometimes transfer wealth from stockholders to bondholders. However, the flip side of the underinvestment problem is the Jensen and Meckling (1976) bankruptcy behavior that says highly levered firms will take on high variance projects that may have negative present value. In this world, high leverage is not associated with high return. Second, in the Myers and Majluf (1984) model, levered firms require a higher return on new projects if their current assets are undervalued and if they are less likely to be able to finance projects with financial slack. However, this only means that levered firms will engage in fewer projects if they have a harder time getting financing than their unlevered counterparts. There is no empirical support for the second part of this argument revealed by our data as we show below.

company has regained financial health. By definition, this company will also have higher leverage as a result of the equity decline. Thus, by this argument, there may be a spurious relation between leverage and acquisition returns.

To examine this issue, we deleted all firms from the acquisition sample that experienced negative returns of more than 20% in the year prior to the acquisition announcement. We used gross return so that the net-of-market performance represented by this filter is somewhat more negative. Around 10% of the sample (41 firms) satisfied this criterion. These firms have slightly higher leverage than the rest of the sample (.61 compared to .55), and their acquisition performance is slightly more negative (−.2% vs. −.07%). The fact that these firms had negative performance, on average, suggests that our findings are not a signaling phenomenon. For these firms with negative average returns preceding the acquisition we found a positive relation between leverage and performance. Deleting these firms from the larger sample does not alter the findings reported in table 5.

Another perspective on the signaling argument is that levered firms, even healthy ones, are more capital constrained than unlevered firms. While it may seem that levered firms should have a more difficult time getting funding for any given project than unlevered firms, we do not find that this is true in our data. In the merger sample, the probability of cash financing goes up with leverage. This relation is statistically significant. In the acquisitions sample there is no relation between the percentage of cash used in the purchase and the leverage of the acquirer. This suggests that companies with good projects are able to get financing regardless of their level of leverage. In the spirit of the debt-monitoring hypothesis, levered firms are more likely to locate good projects than free cash flow enterprises.[19]

C. *Wealth Transfers from Bondholders*

The positive acquisition announcement returns enjoyed by levered firms may be associated with decreases in bond values. To investigate this possibility, we collected data on bond rating changes in the Mitchell and Lehn (1990) sample. We searched the Dow Jones Broadtape and the Wall Street Journal Index for announcements of bond-rating changes consequent to the acquisitions in the sample. That is, where we found a report of a bond-rating change in the year following the acquisition and where the report linked the change to the acquisition,

19. The leverage-acquisition performance relation is not just a cash-only phenomenon. In the acquisition sample, where 75% of the observations are cash only, the result that higher leverage is positively associated with returns holds in the subsample of cash-only transactions. Alternatively, in the merger sample where 80% of the observations are stock financing, the leverage result holds also in the subsample deleting the cash mergers.

we coded the change as +1 when the rating improved and −1 when the rating declined. In the remaining cases, we coded 0. For the 389 acquisitions, there were 60 down ratings and six upgrades.

To tackle this issue, we divided the acquisition returns into three groups: high, low, and average. The high group contains the top 25% of the returns, the low group has the lowest 25%, and the average group holds the remaining 50%. Similarly, we split the sample along the lines of debt equity. If the results are a redistribution phenomenon, we should find a large concentration of high returns and high leverage in the bond-downgrade group. However, this is not what we find. Within this classification, there are only two highly levered firms with large positive returns out of the 60 total bond downgrades. For the 3 × 3 table of 60 bond-rating downgrades, the χ^2 statistic for independence is 1.363, which is insignificant; the cells are randomly distributed. This suggests that the high returns associated with leverage are not systematically linked with subsequent bond-rating decreases.[20]

Alternatively, we regressed the bond rating change on the debt variable and the acquisition return using the technique of multichotomous logit. The sign on the debt variable is positive and significant at the 10% level. More leverage is associated with bond grade improvements. (The relation between the bond-rating change and equity return is positive.) Again, there is no evidence that acquisition performance linked with leverage is being driven by redistributions of wealth from debtholders.

D. Leveraged Returns

Another concern is that the relation between leverage and performance is purely mechanical. The line of reasoning goes as follows: Consider a project worth $100 million in net present value. If this project falls on a $1 billion company with a debt equity of one, the stock price increases 20%. If it falls on a similarly sized company that has no debt, the stock price increases only 10%. This would seen to suggest that highly levered companies have higher abnormal rates of return mechanically without accounting for any incentive or debt-monitoring effects.

The problem with this argument is twofold. First, the leverage argument assumes that all projects are positive NPV, which is not the case for bidder returns. If returns are levered, then for bad projects, high debt-equity firms should do worse than their low debt counterparts. For our estimated relation between leverage and returns to be mechanically driven, the positive leverage effect would have to overwhelm

20. Moreover, we deleted the two levered companies that had large positive returns and bond rating decreases from the sample and reestimated the returns regression reported in table 5. The results on the debt variable are nearly identical.

the negative. This speculation can be examined empirically by splitting the sample into positive and negative NPV acquisitions. If our finding is produced by a mechanical result of leverage, then negative NPV projects should have a negative debt-equity coefficient and positive NPV projects should have a larger positive leverage effect than that reported for the entire sample. This speculation is *not* supported by the data. When the sample is split along the lines of positive and negative returns, the debt-equity coefficient is positive and of nearly identical magnitude is both subsamples to the ones reported in table 5. In fact, the leverage coefficient is slightly larger for the negative returns subsample than for the positive.

Second, the leverage argument fails to account for the distributional phenomena at play in project selection. If projects are randomly distributed across firm sizes and debt equities, and if firm size and debt equity are independently distributed, then the densities of equity returns and debt-equity ratios are stochastically independent. That is, big or small positive NPV projects can go to big or small firms that have either big or small debt-equity ratios. As an empirical matter, for the 1,941 firms on Compustat for the year 1985 with equity values in excess of $100 million, the simple correlation coefficient between debt equity and equity is $-.0169$ (p level $= .46$).[21] Although the leverage argument makes it appear that highly levered firms will have high abnormal equity rates of return simply because they have small equity values, in fact, there is little reason to believe that highly levered firms have small equities. On both counts, we conclude that a mechanical relation between leverage and returns is not driving the results we are reporting.

E. Capital Asset Pricing Contradictions

Related to another leverage effect, recent research has uncovered empirical contradictions in the capital asset pricing model (CAPM) (see Fama [1991] for a review and Fama and French [1992*a*, 1992*b*] for recent evidence). Relevant to our work, Bhandari (1988) reports a relation between leverage and returns after accounting for beta. It is important to determine if our documentation of the relation between leverage and acquisition announcement-period abnormal returns reflects a CAPM anomaly rather than the debt-monitoring hypothesis. We address this issue in the following manner. For each firm on the CRSP daily data file from 1985 to 1989, we compute the debt-equity ratio from Compustat for the firm's fiscal year—call this t. For each of these fiscal year periods, we estimate the market model for each

21. The inverse of equity is also stochastically independent of the debt-equity ratio. In addition, empirically the correlation coefficient is $-.00851$ for the same 1985 Compustat firms.

firm. Using the market model estimates, we forecast each firm's abnormal return for its next fiscal year, $t + 1$, which we average for the year. Unlike Bhandari, we then regress the average annual return for $t + 1$ on the debt equity from year t; this procedure mimics the approach we use in our acquisition-returns regressions. We find that the relation between the average daily abnormal return and the debt-equity ratio is positive but quite small. To compare the coefficient to the leverage effect in the acquisition-returns regressions, we divide the coefficients shown in tables 2, 3, and 5 by three as these are 3-day returns. Across samples of 5 different years, the magnitude varies between one-twentieth and one-hundredth of the debt-equity coefficient estimated for acquisition returns. Hence, netting our debt-monitoring coefficients by any such effect leaves them basically unaffected in economically meaningful terms. Thus, we interpret the relation between leverage and announcement-period returns to reflect the debt-monitoring effect rather than a pricing artifact.

Like Bhandari (1988), Fama and French (1992*a*) uncover a relation between average returns and leverage in univariate tests. In multivariate analysis, however, Fama and French show that leverage has no explanatory power; instead, firm size and book-to-market equity explain cross-sectional stock returns. In contradiction of the capital asset pricing model, they also find that beta does not do a good job at explaining average returns. Using time-series data, Fama and French (1992*b*) find that three factors—market and proxies for size and market-to-book equity—explain average returns across stocks. One conclusion they draw is that residuals from their three-factor regression model is better at isolating abnormal returns than the standard market model. We believe that for short event windows such as employed in this article, the Fama and French model will have little affect on the basic summary statistics such as average abnormal return for the data sets we examine. Our concern, however, is that in our cross-sectional regressions, the positive relation between leverage and abnormal stock market performance may simply be mimicking their book-to-market equity risk factor. Thus, we replicate the results for the second data set using the Fama-French technique and find no change in either coefficient size or t-statistics for all the various models displayed in table 5.

F. Tax Shields

A third argument is that acquisition performance by highly leveraged firms simply reflects the tax benefits of increasing leverage. In other words, if highly leveraged firms are more likely to become even more leveraged when they make acquisitions, then their abnormal acquisition performance may just reflect the anticipated tax shields of this increased leverage. One problem with this argument is that if the tax

shields by themselves are profitable, the firm should already have taken them. As an empirical matter, we find that highly levered firms in the acquisitions data base do increase their leverage slightly more than the average firm increases its leverage as a consequence of the acquisition.[22] However, including the change in leverage in the regression explaining acquisition returns does not alter the estimated positive relation between returns and the preexisting level of leverage. Furthermore, acquisition performance is independent of the change in leverage. (This is consistent with the existing literature, which finds that debt issues alone do not produce significant positive returns.)

VI. Empirical Analysis: Acquisitions before and after Financial Restructuring

While the empirical results presented so far support the argument that a heavy debt burden induces managers to make better decisions, it may simply be that good managers can obtain more debt than bad managers and that the positive relation between the debt-equity ratio of the acquiring firm and its return at the acquisition announcement is picking up this good manager effect. This is not to say that the debt-monitoring effect is not also present; however, it may be entangled with a manager-quality effect that is not accounted for by insider holdings and the form-of-financing control variables. One way to determine the extent of the manager-quality effect is to examine acquisitions made by firms that have significantly increased their leverage. Differences between the quality of acquisitions made before and after an increase in a firm's leverage can reasonably be attributed to the capital structure adjustment.

Reconsider the Goodyear example. While Goodyear has not made any diversifying acquisitions since Goldsmith's takeover attempt, it has expended more dollars on its core business. During March 1988, Goodyear disclosed a plan to build a radial-tire plant, costing up to $500 million. This new plant would be Goodyear's first major expansion since Goldsmith's takeover attempt. Goodyear's stock price increased over 4% at the announcement. Our argument is that its increased debt burden is the reason behind its change in strategy and the market's assessment of its strategy.

We try to determine whether the Goodyear case generalizes to a sample of firms that have undergone leverage increasing restructurings. Specifically, we ask the question, Do firms that lever up make better decisions after the increase in leverage than before? We also seek to determine whether the increased debt burden reduces the num-

22. We find as does Bruner (1988) that firms on average increase leverage as a result of acquisitions.

ber and size of acquisitions. Recall that in the second data set examined in the article, firms with higher leverage actually made more and larger acquisitions. This fact suggests that leverage does not necessarily impair project selection. For firms forced to restructure, however, the debt-monitoring hypothesis suggests that fewer acquisitions will be made after the financial restructuring to the extent that absence of debt monitoring allows the firm to take negative NPV projects.

To address these questions, we examine a sample of 1,158 firms that were tracked by Value Line during the fourth quarter of 1981 searching for the ones that engaged in a financial restructuring during the period 1982–89.[23] Our search yields several types of financial restructurings. At one extreme is the example of Goodyear. Similar to Goodyear, several other firms have received hostile takeover bids and thwarted the bid with a financial restructuring program that typically included a large stock buyback or special dividend that was financed with debt and asset sales. At the other extreme are firms that announced and completed stock buybacks of 10% or more of the stock outstanding. Some of these firms financed the stock buybacks with debt, whereas others simply used retained earnings. In any case, the firm's debt-equity ratio increased as a result of the retirement of equity. Somewhere in between these two extremes are firms that underwent massive financial restructuring programs similar to Goodyear but were not forced to do so by a hostile takeover attempt. Of course, these restructurings may have been due to the perceived threat of a hostile bid.

In total, we find 52 firms that engaged in leverage-increasing restructurings and remained independent thereafter. We then examine this sample of firms for acquisitions over a period ranging from 5 years prior to the restructuring event through 5 years after the restructuring event ending in 1990. This selection criteria yields some 173 acquisitions by 44 firms for which data on the purchase price of the acquisition are available. For these 44 firms, 23 made acquisitions both prior to and following the restructuring, 17 made acquisitions only in the preperiod, and 4 made purchases only in the postperiod.

In the construction of this sample, we measure the size of these firms in three different ways in order to accurately reflect the nature of their restructuring. We examine the market value of equity, book value of debt, and book value of total assets. Market value of equity alone does not give a good picture of firm size for restructuring firms even though it does a good job of describing firm size in our other samples. First, restructuring firms are shifting their capital structure away from equity and into debt. Second, many are selling assets in the process. Third, equity values are rising relative to the amount of assets, possibly because of the debt-monitoring hypothesis that we are

23. See Mitchell and Lehn (1990) for a discussion of this Value Line sample.

testing. This examination leads us to conclude that book value of assets is the best measure of size in this particular analysis.

Table 6 shows some characteristics of the firms in this sample. The first thing that we see is that the restructurings led to substantial increases in debt. We take the ratio of average book value of debt to average book value of assets in each of the 2 periods to assess the change in leverage. The mean change in leverage is 24 percentage points from pre- to postrestructuring. Indeed, by construction, every

TABLE 6 Sample Characteristics of Firms Restructuring, 1982–90

A. Firms and Acquisitions

	No. of Firms	No. of Acquisitions
With acquisitions only in the prerestructuring period	17	40
With acquisitions both pre- and postrestructuring:	23	
Prerestructuring		73
Postrestructuring		55
With acquisitions only in the postrestructuring period	4	5

B. Prerestructuring—40 Firms*

	Mean	Median	SD	Minimum	Maximum
Total value of acquisitions as % of equity	.358	.203	.361	.011	1.559
Total value of acquisitions as % of equity + debt	.253	.144	.245	.009	.977
Debt to book value of assets	.183	.161	.097	.047	.426

C. Postrestructuring—27 Firms

	Mean	Median	SD	Minimum	Maximum
Total value of acquisitions as % of equity	.212	.110	.319	.005	1.426
Total value of acquisitions as % of equity + debt	.104	.045	.137	.003	.689
Debt to book value of assets†	.421	.317	.243	.146	1.024

D. Difference Pre- and Postrestructuring

	Difference	t	Prob($\|t\|$) > 0
Total value of acquisitions as % of equity	−.146	−1.701	.094
Total value of acquisitions as % of equity + debt	−.149	−3.164	.002
Debt to book value of assets	.238	4.753	.001

* Equity is measured by market value 2 days before acquisition announcement. Debt and book value of assets is measured as the average over the 5 years preceding restructuring in the preperiod and up to 5 years following restructuring in the postperiod.

† Figures are based on 26 firms as a result of missing financial data for 1990.

firm increased leverage. There were a few firms over this period that engaged in stock *and debt* buybacks financed out of asset sales. For firms like these, if the ratio of debt to total assets fell, we delete them from the sample. Hence, we are left with a sample of firms that have definitionally restructured their book assets toward more debt.

Table 6 also shows the acquisition history of these firms. They engaged in 113 acquisitions prior to restructuring and 60 after. On the face of it this suggests that restructuring reduced the acquisition appetite. It did, but some care in measurement is required. By construction of the sample, there are always 5 years of prerestructuring acquisition history. However, for firms restructuring late in the 1980s, we have less than 5 years of postacquisition data. In fact, the average postrestructuring time period is 3.3 years. Accounting for the shorter time frame in the postperiod, the number of acquisitions per year is nearly constant pre and post. However, the value of acquisitions falls substantially after restructuring. Measured as a percent of debt plus equity, the cumulative value of assets acquired in the preperiod amounted to 25% of the value of the firm. In the postperiod, accounting for the shorter time frame, this number falls to 10%. The difference is significant at the .002 level. Whatever else the debt burden did for these firms, it significantly reduced the amount of external expansion that they undertook.

Table 7 shows the summary statistics on the acquisitions made by the restructuring firms. Most important, table 7 shows that they experienced an increase in performance. Investor reaction to acquisitions made prior to restructuring was negative. The average 3-day abnormal return is $-.624\%$. By itself this value is significantly different from zero at the .057 level. After restructuring, performance improves. The postrestructuring average abnormal performance is .398% and the difference between pre- and postperformance is 1.02%. The t-statistics testing the difference in these two averages is 1.883, significant at the .061 level. Given the relatively small sample in this test, we treat this as direct evidence that debt monitors managerial decisions and improves performance.

Table 7 shows statistics on some of our control variables. It is interesting that the restructuring firms tended to use cash in their acquisitions following the restructuring event more often than before it. This result may seem somewhat odd in that after restructuring firms are expected to have less cash. One explanation follows from another result shown in table 7, which is that the size of acquisitions falls following restructuring. The ratio of target to buyer size is lower in the postrestructuring period. To the extent that cash is the more likely medium of exchange in small compared to large purchases, the cash versus stock percentage makes sense.

TABLE 7 **Summary Statistics on Acquisitions by 44 Firms Restructuring, 1982–90**

A. Prerestructuring—113 Acquisitions

	Mean	Median	SD	Minimum	Maximum
3-day abnormal performance (in %)	−.624	−.455	3.450	−13.674	11.396
Cash vs. stock transaction	.788	1	.411	0	1
Insider holdings at announcement (in %)	5.037	3.300	5.091	0	30
Ratio of acquisition size to buyer's equity	.127	.055	.198	<.001	1.368

B. Postrestructuring—60 Acquisitions

	Mean	Median	SD	Minimum	Maximum
3-day abnormal performance (in %)	.398	.20	3.330	−6.963	13.280
Cash vs. stock transaction	.900	1	.303	0	1
Insider holdings at announcement (in %)	3.998	2.0	6.434	0	29
Ratio of acquisition size to buyer's equity	.068	.036	.111	<.001	.593

C. Difference Pre- and Postrestructuring

	Difference	t	Prob($\|t\|$) > 0
3-day abnormal performance (in %)	1.022	1.883	.061
Cash vs. stock transaction	.112	2.045	.043
Insider holdings at announcement (in %)	−1.039	−1.083	.281
Ratio of acquisition size to buyer's equity	−.056	−2.503	.013

Table 7 shows another somewhat anomalous result: Insider holdings fall after the restructuring event. This result is probably spurious and due to the change in the sample of firms. We did not collect data on insider holdings before restructuring for firms that did not make acquisitions in that period. For the firms with acquisitions in both periods, insider holdings do not change. It should be noted that the sample size is small, only 27 firms with both pre- and postrestructuring acquisitions, many of which involve normal stock repurchases for which we would not necessarily expect a large change in insider holdings. In all events, there is no evidence of an increase in insider holdings that might account for the improved performance.

Table 8 shows another way of measuring the effect of debt on acquisition performance. We regress the 3-day abnormal stock performance associated with each acquisition on the amount of restructuring undertaken by each firm. In the prerestructuring period we take the ratio of leverage in the preperiod divided by leverage in the postperiod. In the postperiod, we invert this ratio. Again, we measure leverage as the

TABLE 8 **Regression Estimates of Relation between Acquirer Returns and Leverage Changes for 44 Firms Restructuring, 1982–90**
Dependent Variable: Acquirer's 3-Day Abnormal Performance (in %)
Weight Variable: Ratio of Target to Buyer Size in Specifications 1 and 2; Specification 3 Is Unweighted

	Specifications		
Independent Variables	(1)	(2)	(3)
Ratio of leverage pre- and postrestructuring	.373	.389	.420
	(1.973)	(2.086)	(2.206)
Insider holdings at acquisition announcement	. . .	−.061	−.057
		(−1.310)	(−1.234)
Cash vs. stock transaction	. . .	1.579	1.780
		(2.279)	(2.583)
Intercept	−.536	−1.670	−1.972
	(−1.606)	(−2.325)	(2.791)
F-ratio	3.904	3.832	4.418
R^2	.023	.066	.075
Weight factor, δ	.322	.153	0
	(2.048)	(1.326)	

NOTE.—Sample size is 167. t-statistics are in parentheses.

ratio of debt to book value of assets to account for the effect of asset sales and other corporate restructuring. Comparing leverage pre and post for each firm allows for the idiosyncratic nature of each firm's restructuring event. It measures the financial restructuring undertaken by each firm, relative to its own baseline. The argument is that, the more a firm restructures, the more its acquisition performance should improve in the postperiod, and, before the restructuring, the more the firm needs to restructure, as measured by how much it ultimately does, the worse its performance will be.

The specifications shown in table 8 support the debt-monitoring argument. The more a firm increases its leverage, relative to its own baseline, the worse is its acquisition performance prior to restructuring and the better it becomes after the fact. As we suspected they might, insider holdings have a negative sign in this sample, which we treat as a spurious relation. The relation is not particularly strong, and omitting the variable does not affect the estimate of the debt-monitoring effect. The cash versus stock dummy variable is significant and has the expected sign. Stock acquisitions show lower stock market gains at announcement than cash offers. The heteroscedastic relation between the variance in acquisition returns and the relative size of the acquisition is significant when the cash and insider holdings control variables are omitted. However, it is substantially weaker when these variables are included. Because of this, we show the unweighted-regression coefficient estimates as well. Across the specifications, the debt variable is

significant at the .05, .04, and .03 levels, respectively, adding further empirical support to the debt-monitoring hypothesis.

VII. Summary and Conclusions

Agency cost theory argues that the debt market disciplines management. To investigate this prediction we accumulated evidence across several sets of managerial decisions. First, we look at 428 mergers over the period 1962–82. We find a positive relation between the leverage of the acquiring firm and the abnormal returns of the acquirer at merger announcement. Next, we examine all types of acquisitions. This sample contains 389 purchases over the period of 1982–86. Here we also find a positive and significant relation between leverage and the market's assessment of the quality of the managerial decision to acquire. The first two inquiries are simple cross-sectional studies comparing acquirer returns to their debt level. In the final sample, we examined the acquisition performance of firms that undertook significant increases in their own leverage. In this sample, acquisition performance prior to the leverage increase is significantly negative, the change in performance is significantly positive, and both of these effects are significantly related to the degree of leverage restructuring.

The results imply that agency costs are a real phenomenon and that capital structure adapts to account for them. Even so, the estimated coefficient on the debt variable is fairly small (around .75). To put this number in perspective, consider the change in leverage required to substantially improve managerial decision making. In the acquisition sample analyzed in Section IV, 70 purchases were made by firms that were subsequently themselves the object of hostile takeover attempts. Assume that the control battle for these firms occurred as an attempt to improve managerial performance. The average performance for these poorly managed firms was -1.5% per acquisition. The average acquisition performance for the firms not subject to any control battle was $+.5\%$. Based on these average performance measures, leverage would have to increase by 2.67, that is, from the lowest quartile to the top 1% in order to achieve the improvement in managerial performance sought by the market for corporate control.

Our results should not be interpreted to mean that a company that increases leverage will increase in value. We have not examined this issue. The point is, agency costs exist and debt works to control them, but debt is not used nearly as extensively as one might expect. The reason must be that the costs of debt are high. Underinvestment, asset substitution, and bankruptcy costs constrain the use of leverage in the normal corporate setting. The recent wave of experimentation with organization forms that allow a more extensive use of debt is a re-

sponse to these costs and benefits. However, it is not yet clear that all the organizational problems have been solved.

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