

Corporate Takeover Bids, Methods of Payment, and the Effects of Leverage

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Abstract

Recent research examining the role of the method of payment in explaining common stock returns of bidding firms at the announcement of takeover bids shows significant differences between the abnormal returns in cash and stock transactions. These differences may reflect differences in changes in leverage in addition to, or perhaps rather than, differences in method of payment. **This study tests for a leverage effect while controlling for the method of payment.** The results indicate a strong leverage impact on the abnormal returns to acquiring firms' shareholders in addition to the method of payment effect.

Introduction

Recent articles by Travlos (1987) and Wansley, Lane, and Yang (1987) examine the role of the method of payment in explaining common stock returns of bidding firms at the announcement of takeover bids. Both studies show significant differences between the abnormal returns in cash and stock transactions. Wansley, Lane, and Yang find that cash transactions yield positive and significant abnormal returns while stock transactions result in no significant change in shareholders wealth. Travlos' results show that stock transactions exhibit significant losses at the announcement of acquisition proposals while cash transactions exhibit no significant abnormal returns. Furthermore, Travlos found his results to be independent of both the type of bid, merger or tender offer, and of bid outcome. The results of both studies are consistent with the signaling hypothesis which holds that the use of stock (cash) financing is a signal that the acquiring firm is overvalued (undervalued).

This study extends the prior research to consider explicitly the effects of leverage. Cash transactions often are funded with debt and thus tend to increase leverage. Conversely, stock transactions tend to decrease leverage. Several hypotheses on the role of leverage in acquisitions have been posited, including:

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latent debt capacity, increased debt capacity, and coinsurance effects (Bruner, 1988; Dennis and McConnell, 1986; Eger, 1983; Kim and McConnell, 1977; and Shrieves and Pashley, 1984). More generally, Jensen and Smith (1985) note that leverage-increasing transactions typically result in positive abnormal returns while leverage-decreasing transactions typically result in negative abnormal returns. Thus, the effects documented by Wansley, Lane, and Yang and Travlos may reflect differences in anticipated changes in leverage in addition to, or perhaps rather than, differences in method of payment. This study tests for a leverage effect while controlling for the method of payment. The results indicate a strong leverage impact on the abnormal returns to acquiring firms' shareholders in addition to the method of payment effect.

Data and Methodology

A sample of 122 completed acquisitions occurring between 1970 and 1985 were gathered from *Mergers and Acquisitions*. These transactions include both mergers and tender offers that meet the following criteria:

- The acquiring firm is publicly traded on the NYSE or AMEX with security price data available from the Center for Research in Security Prices (CRSP);
- The acquiring firm has no other significant event occurring during the period from 15 days prior to 15 days following the announcement of the acquisition in *The Wall Street Journal*; and
- The acquiring firm has a method of payment identifiable as all cash or all stock.¹

Abnormal Returns

Average abnormal returns ($AR_{i,t}$) to firm i on each day t are estimated as:

$$(1) \quad AR_{i,t} = R_{i,t} - a_i - B_i R_{m,t}$$

where:

$R_{i,t}$ and $R_{m,t}$ = the daily returns including dividends of the firm and the CRSP equally weighted index, respectively.

¹The method of payment was identified from *Mergers and Acquisitions* and was not necessarily disclosed in the initial announcement in the *Wall Street Journal*.

The market model parameters (a_i , B_i) are estimated for each firm using 120 days of return data beginning 135 days prior to the date of announcement (AD) in the *Wall Street Journal*. Cumulative average abnormal returns from day a to day b ($CAR_{a,b}$) are estimated by summing the average abnormal returns over the interval of interest.

To test statistical hypotheses concerning cumulative average abnormal returns over two or more days, this study follows the methodology of Mikkelsen and Partch (1988). The abnormal returns are standardized by dividing them by their estimated standard errors ($S_{i,a,b}$) given in equation (2):

$$(2) \quad S_{i,a,b} = S_i [T + T^2/EP + (\sum_{t=a}^b (R_{m,t} - \bar{R}_m))^2 / \sum_{j=-135}^{-16} (R_{m,j} - \bar{R}_m)^2]^{1/2}$$

where:

- S_i = the root mean square error of the market model;
- $\bar{R}_m$ = the mean market return over the estimation period;
- EP = the number of days in the estimation period (EP = 120); and
- T = the length of the interval of interest (T = b - a + 1).

Average standardized cumulative abnormal returns ($ASCAR_{a,b}$), from day a to day b are calculated as:

$$(3) \quad ASCAR_{a,b} = (1/N) \sum_{i=1}^N [(\sum_{t=a}^b AR_{i,t}) / S_{i,a,b}]$$

where:

N = the number of firms.

Given multivariate normality of the abnormal returns and independence of $AR_{i,t}$ and $AR_{k,t}$ ($i \neq k$), the following test statistic is asymptotically (unit) normally distributed.

$$(4) \quad Z = N^{1/2} ASCAR_{a,b}$$

To test the significance of the difference between two average cumulative standardized abnormal returns (ASCAR) for two groups J and K, the Z statistic is:

$$(5) \quad Z = (ASCAR_J - ASCAR_K) / (1/N_J + 1/N_K)^{1/2}$$

Leverage Measurement

This study tests the hypothesis that abnormal returns around acquisitions are related to the changes in leverage that are anticipated to accompany these transactions. To measure the leverage change that had occurred over the period of the acquisition, financial data were taken from the last annual financial statement preceding AD and the first annual statement following the effective date of the acquisition.² Leverage is measured as the ratio of book value of total debt (TD) to book value of total assets (TA).³ The change in leverage $CHGLEV_i$ for firm i is measured as follows:

$$(6) \quad CHGLEV_i = [(TD_{post,i}/TA_{post,i}) / (TD_{pre,i}/TA_{pre,i})] - 1$$

where the subscripts pre and post refer to the time of measurement, prior to or following the merger, respectively.⁴ Data were taken from *Compustat* and from the annual reports of the acquiring firms. If leverage remains unchanged during the merger, $CHGLEV$ will equal zero.⁵

²The average time between the announcement date and the effective date is 124 days (approximately four months). The range is from 18 to 501 days, and the median number of days is 99.

³Market value measures of leverage are theoretically preferable, but exhibit high volatility due to the movement of stock returns. Attempts to employ a market value-based measure of leverage at an early stage of this research resulted in generally insignificant results due to the increased variance of $CHGLEV$. Because of this problem, book value measures are used frequently. See Asquith and Kim (1982), Masulis (1983), and Shrieves and Pashley (1984) for further discussion and evidence.

⁴Alternatively, the change in leverage may be measured as the difference between the postacquisition debt-to-assets ratio of the combined firm and the pooled debt-to-assets ratio of the merging firms measured prior to the announcement of the offer. For 89 transactions for which data were available, the correlation between this alternate leverage measure and $CHGLEV$ is .845. The measure used in this study was selected because it emphasizes the leverage change experienced by the acquiring firms' shareholders.

⁵An alternative method of stratifying the sample by leverage also was tested. Firms with leverage changes of less than 5 percent, plus or minus, were categorized as having not significantly changed leverage and were deleted from further study. This alternative definition was tested because of the potential for misclassifying firms with relatively small leverage changes. This problem is exacerbated by the ability of management to step up the basis of acquired assets

The use of this leverage measure as an explanatory variable for abnormal returns at the acquisition announcement requires the assumption that the market either knows or can anticipate the leverage effects of the transaction at the initial announcement.⁶ The degree to which this is a correct assumption is an empirical issue. This assumption is no different, however, from several other market efficiency-related assumptions made implicitly by most researchers. The use of two day abnormal returns around acquisition announcement dates presumes that investors are able to gauge quickly and accurately the economic impact of highly complex and typically unconsummated transactions.

An attempt was made to segregate those transactions for which concrete financing information was provided. The *Wall Street Journal Index* was searched for all financing announcements from day -15 through the effective date of each transaction. Each financing announcement was scrutinized for information tying it to the acquisition. This process was largely unsuccessful, as virtually no financing announcements discussed the intended use of the funds. This problem is similar to the one faced by Bruner (1988, p. 215) who notes that "it is not possible to tell whether the new financing raised by bidders was used for the acquisition or to fund the target's investment opportunities."

Regression Analysis

The following regression equation is used to test the hypothesis that the returns to acquiring firms' shareholders are affected by the change in leverage.

$$(7) \text{ ASCAR}_i = a_1 + a_2 \text{ METHOD}_i + a_3 \text{ CHGLEV}_i + E_i$$

where:

ASCAR_i = measured over the two day announcement period (days -1 and 0);
and

in cash transactions during the period studied. This increase in the stated book value of assets, which occurs with the use of purchase accounting, results in the debt-to-assets ratio declining strictly due to the change in recorded accounting value. Thus, firms that actually increased leverage a small amount may be misclassified as having decreased leverage slightly due to increases in the recorded book value of acquired assets. The study results were duplicated with this reduced sample of 75 and were qualitatively identical to those reported in this paper.

⁶As Bruner (1988) notes, the anticipated change in leverage need not be caused directly by the transaction itself. For example, the transaction may create debt capacity that is utilized in subsequent transactions.

METHOD = a dummy variable coded 1 for stock transactions and 0 for cash transactions.⁷

The expected sign of the slope coefficient, a_2 , is negative, as stock transactions are expected to result in negative and significant abnormal returns. The coefficient of the CHGLEV variable, a_3 , is expected to be positive, as increases in leverage have been found to increase shareholder returns.

Although the single regression equation specified in equation (7) provides a direct test of the hypothesis, there are potential problems. The regression results reported for equation (7) empirically show no apparent multicollinearity problems, but there are reasons to suspect multicollinearity between the two independent variables. Most important, the hypothesis of the study is that the method of payment reflects the expected change in leverage; that is, that the two variables are collinear. Further, if multicollinearity is present, the standard errors of the coefficients will be overstated and the significance levels will be understated.

To ensure that the results are not driven by multicollinearity, two additional series of regressions are estimated. First, average standardized cumulative abnormal returns, ASCAR, for each firm i are regressed against method of payment as follows.

$$(8) \text{ ASCAR}_i = a_1 + a_2 \text{ METHOD}_i + E_i$$

The expected sign of the slope coefficient, a_2 , is negative, as stock transactions are expected to result in negative and significant abnormal returns.

The residuals from equation (8), E_i , may be interpreted as standardized abnormal returns adjusted for the method of payment effect. To determine if leverage changes have any further explanatory power, these residuals are regressed on the variable CHGLEV.

$$(9) E_i = b_1 + b_2 \text{ CHGLEV}_i + v_i$$

If changes in leverage have explanatory power not already accounted for by the method of payment, the sign of the slope coefficient in equation (9), b_2 , should be positive. If changes in leverage simply reflect the method of payment effect, b_2 should be insignificant.

⁷Although most current research concentrates on two day announcement effects, the tests reported in this study also were replicated using longer intervals of measurement for ASCAR. The results were qualitatively unchanged.

Equation (9) tests whether changes in leverage have explanatory power beyond that contained in the method of payment. If identical information is contained in both the method of payment and the change in leverage, however, a_2 will be significant while b_2 will be insignificant. This result will occur simply because of the order of the regressions. Therefore, the two regressions are reestimated with the independent variables exchanged as follows.

$$(10) \quad \text{ASCAR}_i = c_1 + c_2 \text{CHGLEV}_i + U_i$$

$$(11) \quad U_i = d_1 + d_2 \text{METHOD}_i + w_i$$

These two regressions test whether method of payment has any further explanatory power beyond the changes in leverage. The coefficient of the CHGLEV variable, c_2 , is expected to be positive. If method of payment has explanatory power beyond the change in leverage, d_2 will be negative and significant. If identical information is contained in the method of payment and the change in leverage, a_2 and c_2 will be significant and b_2 and d_2 will be insignificant.

The test of the hypothesis based on equations (8), (9), (10), and (11) are substantially more complex than the simple approach employed in equation (7). The results, however, are more robust. Because the effect of one explanatory variable is isolated from the other, this approach directly tests whether method of payment has explanatory power in addition to the change in leverage. Similarly, the effects of leverage may be tested after explicitly controlling for the effect of method of payment.

Results

Table 1 shows the distribution of leverage changes for the sample by method of payment. Of the 122 acquisitions, 75 were for cash and 47 were for stock. As expected, a larger proportion of cash acquisitions (50 of 75) result in increased leverage. Also as expected, the majority of stock acquisitions (30 of 47) result in decreased leverage. The relationship between leverage change and method of payment is not conclusive, however, as approximately one-third of cash transactions are accompanied by decreases in leverage and one-third of stock transactions are accompanied by increases in leverage.

Table 2, Panel A, shows the cumulative abnormal returns for the sample of 122 firms by method of payment. Over the two day announcement period (days -1 and 0), cash transactions outperform stock transactions by a significant 2.65 percent ($Z = 5.40$). Over this period, cash offers show a positive but insignificant .35 percent, while stock offers yield a significant -2.30 percent ($Z =$

-6.47). The finding that cash offers outperform stock offers around acquisition announcements is similar to the conclusions of Travlos (1987) and Wansley, Lane, and Yang (1987). The significant difference between cash and stock offers also is reflected in the abnormal returns over the longer period reported in Panel A of the table.

Table 2, Panel B, shows the CARs to acquiring firms stratified by the changes in leverage experienced by the firm. Over the two day announcement period (days -1 and 0), transactions accompanied by a leverage increase marginally outperform transactions accompanied by a leverage decrease (difference = .16 percent, $Z = 1.32$). Over the 11 day period from day -5 to day +5, transactions with leverage increases outperform those with decreases by a significant 2.05 percent ($Z = 2.49$). Over all intervals, the direction of the difference is consistent with transactions accompanied by leverage increases earning higher abnormal returns than those with decreases in leverage.⁸ Thus, the hypothesized effects of the changes in leverage are reflected in the abnormal returns. Because the abnormal returns reflect the method of payment as well as the leverage effect, however, it is impossible to determine which factor, if either, is dominant in explaining these differences.⁹

The results of the regression analyses of equation (7) are shown in Table 3, Panel A. The coefficient for the method of payment variable, $METHOD_i$, is negative and significant, indicating that stock transactions earn significantly less than cash transactions. This result is as expected and consistent with prior research. The coefficient for the change in leverage variable, $CHGLEV_i$, is also significant with the expected sign. This finding is evidence of a leverage effect

⁸The results reported in Table 2, Panel B also were replicated with those firms experiencing small leverage changes ($-5 \text{ percent} < CHGLEV < +5 \text{ percent}$) deleted. The direction and magnitude of the differences are similar to those reported in the table. The differences (and Z-statistics) are as follows:

Days -1 to 0.....	.17 percent (2.46)
Days -5 to + 5.....	2.22 percent (2.25)
Days -10 to +10.....	3.12 percent (1.11)
Days -15 to +15.....	.20 percent (.60)

⁹Over the two day announcement period, the 25 leverage-decreasing cash transactions exhibit an insignificant CAR of .23 percent ($Z = -.42$). The CAR for the 17 leverage-increasing stock transactions is a significant -3.67 percent ($Z = -5.25$). The 3.90 percent difference is statistically significant ($Z = 4.43$). This result is consistent with the method of payment effect dominating the leverage effect. This comparison of two subsamples with offsetting effects, however, is not conclusive proof that leverage changes, in general, have no impact on abnormal returns to shareholders.

present in the two day abnormal returns in addition to the method of payment effect.

Asquith, Bruner, and Mullins (1983) provide evidence that the relative size of the transaction is a significant determinant of bidder stock returns. To test whether the exclusion of this variable impacts the results reported in this study, equation (7) was reestimated with the variable $RELSIZE_i$ included. $RELSIZE_i$ is measured as the ratio of the market value of equity of the acquired firm to the market value of equity of the acquiring firm on day -16. Stock price and outstanding shares data were taken from *Standard and Poor's Daily Stock Price Record*.¹⁰

As shown in Table 3, Panel B, including $RELSIZE$ does not alter the results reported above. The coefficient of the relative size variable is not significantly different from zero. Furthermore, the coefficients of the method of payment variable and the change in leverage variable remain significant and with the expected signs.

Table 4, Panel A shows the estimated coefficients of equations (8) and (9). For equation (8), the coefficient for the method of payment variable (a_2) is negative and significant, indicating, as expected, that stock transactions result in significantly lower abnormal returns than cash transactions. The results of the regression for equation (10) show that changes in leverage have significant explanatory power beyond method of payment. The coefficient for $CHGLEV$ (b_2) is positive and significant, indicating that leverage-increasing acquisitions benefit shareholders after accounting for the influence of method of payment. These results are consistent with those for the combined equation and strongly suggest that the method of payment alone is not sufficient to explain the abnormal returns to acquiring firms' shareholders around acquisitions.

Panel B of Table 4 shows the estimated coefficients of equations (10) and (11). The results for equation (10) show a positive and significant coefficient for $CHGLEV$, c_2 , as expected. The residuals (U_i) from equation (11) may be interpreted as the standardized abnormal return of firm i adjusted for changes in leverage. Thus, if the method of payment is simply a proxy for leverage changes, equation (12) should have no explanatory power. As shown, the coefficient of the $METHOD$ variable (d_2) is negative and significant, however. This is evidence that stock transactions harm shareholders even beyond the leverage effects. These results suggest that both method of payment and changes

¹⁰Equation (7) also was reestimated with $RELSIZE$ measured as the ratio of transaction value, as reported in the *Wall Street Journal*, to the market value of equity of the acquiring firm. For the 81 transactions for which this information was available, the Pearson correlation between the two measures of relative size was a highly significant .69 and the regression results were qualitatively identical.

in leverage are important determinants of abnormal returns to acquiring firms' shareholders.

Conclusions

Prior research (Travlos, 1987; Wansley, Lane, and Yang, 1987) has shown that abnormal returns to acquiring firms' shareholders vary systematically by method of payment. This paper presents additional results to show that while the method of payment remains important, it does not fully explain abnormal returns at the announcement of acquisition. Specifically, changes in leverage have significant additional explanatory power beyond the method of payment. Furthermore, the leverage effects and the method of payment effects were found to be independent as both variables explain abnormal returns previously adjusted for the other effect.

Bruner (1988) suggests that acquisitions may create value by pairing firms rich in financial slack with those that are slack-poor. The results of this study, which show leverage changes to have significant impact on stockholder wealth in addition to method of payment effects, are consistent with Bruner's findings.

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Table 1
Number of Bidder Firms by Method of Payment
and Changes in Acquiring Firm Leverage

Change in Leverage	Cash Transactions	Stock Transactions	Total
Decreases in Leverage			
Greater than 30.0%	2	1	
25.0% to 29.9%	1	1	
20.0% to 24.9%		1	
15.0% to 19.9%	1	3	
10.0% to 14.9%	2	7	
5.0% to 9.9%	6	7	
0.0% to 4.9%	13	10	
Total Decreasing Leverage	25	30	55
Increases in leverage			
0.0% to 4.9%	17	7	
5.0% to 9.9%	7	2	
10.0% to 14.9%	7	1	
15.0% to 19.9%	5	4	
20.0% to 24.9%	2	1	
25.0% to 29.9%	4		
Greater than 30.0%	8	2	
Total Increasing Leverage	50	17	67
Total Firms	75	47	122

Table 2
Cumulative Abnormal Returns (CAR) by Method of Payment
and Changes in Leverage—Selected Intervals

Panel A: Method of Payment Effects

Event Period	Type of Transaction				Difference	
	Cash		Stock			
	CAR%	Z	CAR%	Z	CAR%	Z
Days -1 to 0	.35	.53	-2.30	-6.47**	2.65	5.40++
Days -5 to +5	.99	1.45	-2.18	-2.72**	3.17	3.03++
Days -10 to +10	.66	.69	-2.23	-1.79*	2.89	1.84++
Days -15 to +15	1.92	1.60	-1.71	-1.19	3.63	1.92++

Panel B: Changes in Leverage Effects

Event Period	Change in Leverage					
	Increase		Decrease		Difference	
	CAR%	Z	CAR	Z	CAR%	Z
Days -1 to 0	-.60	-1.78*	-.76	-3.39**	.16	1.32+
Days -5 to +5	.69	1.26	-1.36	-2.21**	2.05	2.49++
Days -10 to + 10	.01	.36	-1.02	-1.24	1.03	1.16
Days -15 to + 15	1.07	1.12	-.15	-.46	1.22	1.09

** significant at the .01 level using a two-tail test

* significant at the .05 level using a two-tail test

++ significant at the .01 level using a one-tail test

+ significant at the .05 level using a one-tail test

Table 3
Regression Estimates for Equation (7)

Panel A: Estimated Coefficients and t-Statistics for Equation (7)

$$\text{ASCAR} = a_1 + a_2 \text{METHOD}_i + a_3 \text{CHGLEV}_i + E_i$$

	a1	a2	a3
Coefficient	-.133	-.881	1.556
t-statistic	-.574	-2.419**	2.732**
F-statistic	8.119**		
R ²	.120		

Panel B: Estimated Coefficients Including RELSIZE

$$\text{ASCAR} = a_1 + a_2 \text{METHOD}_i + a_3 \text{CHGLEV}_i + a_4 \text{RELSIZE}_i + E_i$$

	a1	a2	a3	a4
Coefficient	-.237	-.782	1.808	.040
t-statistic	-.823	-1.989**	2.819**	.096
F-statistic	5.185**			
R ²	.130			

** Significant at the .05 level

Table 4
Estimated Coefficients and t-Statistics for Equations (8), (9), (10), and (11)

Panel A: Estimated Coefficients for Equations (8) and (9)

	Equation (8) F= 8.328** R ² = .065 ASCAR = a ₁ + a ₂ METHOD _i + E _i		Equation (9) F = 7.262** R ² = .057 E _i = b ₁ + b ₂ CHGLEV _i + v _i	
	a ₁	a ₂	b ₁	b ₂
Coefficient	.044	-1.061	-.104	1.505
t-statistic	.192	-2.886**	-.583	2.695**

Panel B: Estimated Coefficients for Equations (10) and (11)

	Equation (10) F= 9.984** R ² = .077 ASCAR = c ₁ + c ₂ CHGLEV _i + U _i		Equation (11) F = 5.696** R ² = .045 U _i = d ₁ + d ₂ METHOD _i + w _i	
	c ₁	c ₂	d ₁	d ₂
Coefficient	-.490	1.805	.328	-.852
t-statistic	-2.688**	3.160**	1.481	-2.387**

**Significant at the .05 level