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Author(s): Tim Opler and Sheridan Titman

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The Determinants of Leveraged Buyout Activity: Free Cash Flow vs. Financial Distress Costs

TIM OPLER and SHERIDAN TITMAN*

ABSTRACT

This paper investigates the determinants of leveraged buyout (LBO) activity by comparing firms that have implemented LBOs to those that have not. Consistent with the free cash flow theory, we find that firms that initiate LBOs can be characterized as having a combination of unfavorable investment opportunities (low Tobin's q) and relatively high cash flow. LBO firms also tend to be more diversified than firms which do not undertake LBOs. In addition, firms with high expected costs of financial distress (e.g., those with high research and development expenditures) are less likely to do LBOs.

THE AMERICAN CORPORATE SECTOR experienced a dramatic increase in leveraged buyout activity in the 1980s. Between 1979 and 1989 there were over 2,000 leveraged buyouts (LBOs) valued in excess of \$250 billion.¹ These transactions have been the source of considerable controversy, perhaps because a number of individuals have become very wealthy as a result of LBOs while others have lost their jobs. Two central questions that have arisen in the debate about LBOs are:

1. Do LBOs create wealth, or do they merely redistribute wealth?
2. Does the debt taken on in LBOs cause problems in periods of economic distress?

Proponents of LBOs (e.g., Jensen (1986, 1989)) argue that the transactions create wealth by improving managerial incentives and forcing disgorgement of excess free cash flow that would otherwise be invested unwisely. Jensen also addresses the second question, and argues that the costs of financial distress in LBOs are not large. Critics of LBOs argue that most of the gains to equityholders arise because of tax savings (see Lowenstein (1985)) and the expropriation of nonequity stakeholders (e.g., employees and bondholders) and have expressed concern about the effect of financial distress on the ability of LBO firms to remain competitive in the event of an economic downturn.

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¹ Calculation based on statistics from W. T. Grimm (1990) and the ADP M & A Database.

Most academic studies (e.g., Kaplan (1989a) and Marais, Schipper, and Smith (1989)) agree that tax savings are a source of large gains, but conclude that wealth is also created in LBOs. For example, Kaplan (1989b), Muscarella and Vetsuypens (1990), and Smith (1990) find that cash flows improve after LBOs. However, recent financial problems incurred by firms that did LBOs in the late 1980s have generated renewed concerns about the potential financial distress costs created by these transactions.²

In an attempt to shed light on the above questions we examine the extent to which LBOs have been motivated by the benefits of incentive realignment and the extent to which they have been deterred by the possible financial distress costs of high leverage. We do this by comparing the characteristics of firms that have undertaken LBOs with those that have not. Evidence that LBOs are undertaken by firms with characteristics that indicate high incentive realignment potential would support the hypothesis that the transactions were motivated with the intention to create rather than just redistribute wealth. In addition, evidence that firms with high potential financial distress costs are deterred from undertaking LBOs would suggest that concerns about the impact of an economic distress on the viability of leveraged buyout firms are overstated.

Previous work by Lehn and Poulsen (1989) and Lehn, Netter, and Poulsen (1990) has also examined differences between LBO and non-LBO firms. These and other related papers mainly address the incentive gains of undertaking an LBO and devote much less attention to financial distress costs. Consequently, their tests are not structured in a way that allows them to assess the importance of incentive realignment in motivating LBOs relative to the role of financial distress costs in deterring these transactions. One could argue the Lehn and Poulsen's evidence in support of Jensen's free cash flow theory is also consistent with the hypothesis that firms initiate LBOs for other reasons, such as the tax benefits of debt, but may be deterred by the prospect of incurring high financial distress costs. This is because Lehn and Poulsen's proxy for free cash flow also measures the firm's growth options which lose value in the event of financial distress (e.g., Myers (1977)). A measure of the severity of agency conflict used in Lehn, Netter, and Poulsen (1990), the ratio of the firm's market value to the replacement value of its assets (Tobin's q), may also proxy for the cost of taking on debt since high q firms typically have less collateralizable assets and greater growth opportunities.

This paper analyzes variables that allow us to cross-sectionally distinguish the importance of the incentive realignment motive for LBOs from the importance of the financial distress cost deterrent to these transactions. In

² Academic studies of bankruptcy costs and bankruptcy cost reduction in highly levered transactions include Asquith, Gertner, and Scharfstein (1991), Kaplan and Stein (1991), and Opler (1993). A press account discussing apparent costs of the LBO wave is Faltermeyer (1991).

addition to examining Tobin's q and cash flow for LBO and non-LBO firms we examine a variable which interacts q and cash flow. A similar variable was used by Lang, Stulz, and Walkling (1991) to test the free cash theory of takeovers. While the financial distress cost theory suggests that q and cash flow are important determinants of the LBO choice it does not imply that the interaction between the two variables is important. In contrast, the free cash flow theory implies an important interaction effect between these variables. High q firms, being better managed, are likely to be less subject to the free cash flow problem.

Additional variables that distinguish the agency and financial distress cost theories are research and development (R & D) expenditures and selling expenses. R & D-intensive firms are likely to have greater agency problems since they are more difficult to monitor; however, they are also likely to have higher financial distress costs since they tend to be high-growth firms that produce relatively unique products (see Titman and Wessels (1988)). Similarly, since selling expenses proxy for product specialization and high overhead, the agency hypothesis and the financial distress hypothesis also provide conflicting predictions about the effect of this variable on the likelihood of a firm undertaking an LBO.

This paper separately analyzes earlier and later LBOs to assess whether the characteristics of LBO firms changed over time. One view put forth by journalists is that later deals were of poorer quality than earlier deals either because of the adverse incentives of fee-driven investment bankers, or because LBOs were being used as a takeover defense. A related paper by Kaplan and Stein (1991) finds that the later LBOs were priced higher and were financed to a much greater extent with publicly issued debt than were the earlier deals. Recent papers by Long and Ravenscraft (1992) and Opler (1993) report conflicting evidence about the improvement in cash flow following the later LBOs.

The plan of this paper is as follows. The next section discusses the rationale for high leverage in LBOs. Section II discusses firm characteristics that are related to the costs of debt financing and describes financial variables that are likely to be related to the incentive realignment potential from LBOs. Section III describes the sample. Section IV compares the characteristics of LBO firms and non-LBO firms, before and after industry adjustment using multinomial logit analysis. Section V concludes the paper.

I. Why Are Leveraged Buyout Firms so Highly Levered?

To understand why financial distress costs can deter LBOs, one must first understand why debt financing is an integral part of these transactions. Lowenstein (1985) argues that debt is used because of the tax savings. Although realizing the tax gain does not require an LBO, several organizational aspects of LBOs may allow firms to realize the gain while avoiding

many of the associated costs of financial distress.³ Even so, it is unlikely that LBO firms assume as much debt as they do for the tax benefit alone since many LBO firms took on much more debt than was necessary to eliminate their taxable earnings. For example, roughly 50 percent of the firms studied in Opler (1992) paid no income taxes after going private. This suggests that there must also be nontax-related motives for using debt in LBOs.

Grossman and Hart (1982) and Jensen (1986, 1989) argue that debt can induce management to act in the interests of investors in ways that cannot be duplicated with optimally designed compensation packages. This incentive effect is likely to be most important immediately following LBOs when tough restructuring decisions are made. In addition, the asymmetric information inherent in LBOs is likely to encourage the use of debt. Even a management team with little private information that is useful in valuing a firm given its current operating strategies will be likely to have an informational advantage in assessing the effects of the major changes that take place following an LBO. Signalling arguments made by Ross (1977), Leland and Pyle (1977), and others suggest that in the presence of substantial asymmetric information, managers with favorable information are likely to hold a large share of their firms' stock and obtain outside financing disproportionately with debt.

Although the LBO organizational form is designed to minimize the more direct costs of bankruptcy, many of the indirect financial distress costs discussed in the next section are still likely to accompany LBOs. A firm in a business where these financial distress costs are high will find it less attractive to take on the debt required to signal management's optimism, to align management incentives with those of investors, and to thus realize the gains from going private. Such firms may be able to realize large gains from incentive realignment but may find it too costly to take on the debt required by an LBO. Thus, the magnitude of financial distress costs as well as the gains from incentive realignment, may be important factors in determining whether a firm chooses to do an LBO.

II. Firm Characteristics and the Gains to Leveraged Buyouts

The previous discussion suggests that a tradeoff between incentive gains and potential financial distress costs determine which firms undertake LBOs. These costs and benefits are likely to differ across firms in ways that depend on their characteristics. Hence, their relative importance in determining which firms undertake LBOs can be indirectly assessed by comparing the characteristics of firms that implement LBOs with the characteristics of

³ These features include (1) an institutionalized debt workout process (or the privatization of bankruptcy) that may lower bankruptcy costs, (2) strip financing where debt and equity are owned by the same investors which decreases conflict between different classes of securityholders, and (3) LBO sponsorship by specialist firms with reputational incentives to look out for debtholder interests (see DeAngelo and DeAngelo (1987), Jensen (1989), Opler (1993), and Wruck (1990)).

firms that remain public. The following subsections suggest a set of variables that serve as proxies for these characteristics.

A. Costs of Financial Distress

The variables used to identify financial distress costs include some of the those previously examined in Titman and Wessels's (1988) cross-sectional study of capital structure choice. These variables serve as proxies for the uniqueness and durability of a firm's products, the collateralizability of its assets, and the extent of its growth opportunities. As discussed in the next subsection, a number of these variables also proxy for the gains from incentive realignment.

Titman (1984) provides a model where a firm's customers, workers, and suppliers suffer when it goes out of business. As a result, these nonfinancial stakeholders are reluctant to do business with a firm in or near financial distress.⁴ This cost of financial distress is likely to be highest among firms with relatively unique products that may require future service. Consistent with this prediction, Titman and Wessels (1988) find that several proxies for product uniqueness are negatively related to leverage ratios. Proxies for uniqueness include research and development divided by sales and selling expenses divided by sales. In addition, we examine a dummy variable for firms in the machinery and equipment industries (Standard Industrial Classification (SIC) codes between 3400 and 3999) since firms in these industries are likely to sell products requiring extensive future service and spare parts. Further support for our proxies is given in our related work (Opler and Titman (1992)) which shows that leveraged firms with relatively unique products suffer the greatest losses in periods of economic distress.

Galai and Masulis (1976) and Jensen and Meckling (1976) show that equityholders of levered firms have incentives to expropriate their debtholders. To the extent that debt can be collateralized, creditors are less vulnerable to expropriation because funds may only be used for a particular project. In addition, the risk of creditor expropriation is likely to be higher for firms with profitable growth options (Myers (1977)). Tobin's q , defined as the ratio of the market value of a firm's assets to the value of its gross capital stock adjusted for inflation, can serve as a proxy for the extent to which a firm's assets are collateralized and its growth. Another indicator of expected growth is the ratio of the firm's cash flow, measured as its operating income before interest, taxes and depreciation (EBITDA), to the market value of its assets. Since the market value of assets should equal the risk-adjusted sum of discounted cash flows, firms with relatively greater cash flow to market value today are expected to have relatively less cash flow growth in the future. For both of these variables the market value of the firm's assets is measured as the sum of the market value of its equity and the book value of its debt. The ratio of

⁴ Financially distressed firms may also be unable to credibly commit to carrying out implicit agreements with their nonfinancial stakeholders (see Maksimovic and Titman (1991)).

research and development expense to sales which was previously mentioned as a proxy for product uniqueness is also likely to serve as a proxy for future growth opportunities.

B. Incentive Realignment

Jensen (1989) argues that LBOs improve management incentives by giving managers a greater equity stake, by bringing greater monitoring by outside LBO sponsors such as Kohlberg, Kravis, and Roberts, and by raising the threat of job loss in the event of poor performance (see Gilson (1989)). This realignment of incentives may lead managers to divest low-synergy assets and to cease spending cash on poor investment opportunities. The potential for incentive realignment is measured with the variables outlined below.

Most of the variables discussed in the last subsection also proxy for benefits associated with incentive realignment. For example, firms that do a lot of research and development are likely to be more difficult for outside shareholders to monitor and hence are likely to gain the most from improved managerial incentives. In addition, firms with high selling expenses may have inflated overhead and would similarly benefit from an LBO. In contrast to the financial distress hypothesis that suggests that these variables should be negatively associated with the incidence of LBOs, the preceding argument suggests that the relation should be positive.

The most direct measures of the gains associated with incentive realignment are Tobin's q and the cash flow variable described earlier. These are used by Lehn and Poulsen (1989) and Lehn, Netter, and Poulsen (1990) as proxies for Jensen's (1986) free cash flow problem and management quality. Unfortunately, these variables do not allow us to separate the effects of financial distress costs from the gains from incentive realignment since both hypotheses predict a positive relation between these variables and the likelihood of undertaking an LBO. In order to distinguish the free cash flow explanation for LBOs from the deterrence effect of financial distress costs we construct a dummy variable that identifies firms that simultaneously have low (lower than median) q and high (higher than median) cash flow. A similar approach is employed by Lang, Stulz, and Walkling (1991) to test the free cash flow explanation of takeovers. We interpret the free cash flow theory to imply that only those high cash flow firms with poor management quality are good LBO candidates. While the financial distress cost and the free cash flow theories both predict that low q and high cash flow firms are likely to go private, the theories are distinguishable since only the agency theory predicts that this interaction variable is important. Using similar logic, we investigate whether firms that are highly unlikely to have free cash flow problems, identified with a high q and low cash flow dummy, are less likely to undertake LBOs.

The gains from incentive realignment may also be related to the degree to which the LBO candidate is diversified. Indeed, several studies suggest that diversified firms are more likely to suffer from agency problems (e.g., Com-

ment and Jarrell (1992) and Morck, Shleifer, and Vishny (1990)). For example, diversified firms may cross-subsidize poorly performing divisions with the proceeds of strongly performing divisions (see Bhidé (1990) and Jensen (1989)). Muscarella and Vetsuypens (1990), Liebeskind and Opler (1992), and Liebeskind, Wiersema, and Hansen (1992) show that many firms divest assets and become more focused after going private. Consistent with this observation, Opler (1993) finds that nearly half of the firms that undertook LBOs in 1987 and 1988 precommitted to sell off assets in their bank debt covenants. To investigate the possibility that LBOs are motivated by the gains from selling off assets we investigate whether firms that undertake LBOs are more diversified than others.

To empirically measure diversification we construct a Herfindahl index which accounts for the distribution of the firm's employees across SIC codes.⁵ In addition, we include a dummy variable that identifies firms that are both more diversified than average and have low q . We hypothesize that highly diversified firms with low q 's (i.e. firms that have failed to create value through diversification) are good candidates for LBOs. Given that the level of diversification is correlated with size, which is likely to affect the ability to finance an LBO, we include the log of assets as a proxy for size in subsequent logits. Size may also proxy for the costs of financial distress.

C. Summary

This section reviews the two principal hypotheses that we investigate in this study: (1) that LBOs are motivated by the gains from realigning incentive problems (particularly those associated with free cash flow), and (2) that LBOs are deterred by potential financial distress costs. We have operationalized these hypotheses by suggesting proxy variables for financial distress costs and incentive realignment potential. Table I summarizes the proxy variables and their expected relation to the incidence of leveraged buyout activity.

III. Data

Most of the variables discussed in the preceding section are obtained from the NBER Manufacturing Firm Panel (described in Hall (1990)) which covers more than 2,500 large companies in the 1959 to 1987 period. This file is drawn primarily from the Industrial COMPUSTAT tapes. The diversification index is constructed using establishment level data on employment taken from the 1981 and 1985 versions of the TRINET Large Establishment Data Base. We obtain a list of firms that were dropped from the *NBER Manufacturing Firm Panel* because of LBOs and acquisition by a private company

⁵ The industry focus index is computed as an employee-weighted Herfindahl index over three-digit SIC codes. The Herfindahl index was computed as $\sum_{i=1} e^2 / (\sum_{i=1} e_i)^2$ where i indexes SIC industries and e is the number of the firm's employees in each industry. This index may range between 0 and 1.

from Bronwyn Hall. This list is supplemented and verified using the ADP M & A Database, the *Wall Street Journal Index*, the *Standard and Poors News*, and a list of restructurings in the 1980s from the Dow Jones Broad Tape.⁶ In total, we obtain a sample of 180 firms that undertook LBOs in the 1980 to 1990 period. LBOs are defined as transactions where the equity of a publicly traded firm was delisted while the firm was not merged into another firm. Cases where delisted firms were merged into shell organizations established by LBO sponsors are also classified as LBOs.

Table II shows the number of firms in the sample by year and the mean book value of their assets. The sample is most heavily concentrated in 1986 to 1988 and is very thin in 1989 and 1990. The non-LBO control sample consists of all firms on the *Manufacturing Panel* that are not in our LBO sample for which the requisite data are available.

Because our dataset spans 11 years we report the subsequent analyses for two subsamples: 1980 to 1984 and 1985 to 1990. One advantage of breaking the sample in this way is that many theories of LBOs are developed with knowledge of transactions that took place before 1985 so the post-1985 sample offers a cleaner test. The later subsample also includes a greater proportion of defensive transactions and has more large buyouts. Many later transactions carry higher prices relative to cash flow and have management teams with smaller equity stakes (Kaplan and Stein (1991)). Thus, firms making these transactions may be subject to a much different risk of financial distress than those in transactions in the early 1980s. By comparing the characteristics of firms making early and later LBOs we hope to clarify this issue. In the earlier (or later) subsample the explanatory variables are measured using 1980 (or 1985) data.

IV. Empirical Results

Table III presents a matrix of the Pearson correlations between the explanatory variables as well as their correlations with a dummy variable which identifies firms that undertake LBOs. There is a significant positive relation in both subperiods between the LBO dummy variable and the cash flow variable and the high cash flow/low q variable. The correlation of the LBO dummy with Tobin's q is significant and negative in both time periods while the diversification index appears to be important in the second subperiod only. The machinery industry dummy variable is significantly negatively related to LBO incidence in both subperiods, as predicted by the financial distress costs hypothesis, while the R & D variable is a significant predictor of LBOs in the first but not the second subperiod. The size variable is not significant in either subperiod. These simple correlations suggest that financial distress costs were a less-important deterrent to LBOs in the second subperiod while the gains from breaking up highly diversified firms became a more-important determinant of LBO activity as the 1980s progressed.

⁶ This list was kindly provided by Mark Mitchell.

Table I
Proxies for Determinants of the LBO Choice

Expected signs from the logit equations predicting LBOs are shown.

Variable	Proxying for (Theory)	Expected Sign
Operating income/assets	Free cash flow (incentive realignment theory)	positive
Cash & marketable securities	Lack of growth options (financial distress theory)	positive
	Free cash flow (incentive realignment theory)	positive
Tobin's q	Quality of investment opportunities (incentive realignment theory)	negative
Machinery industry dummy	Low collateral, growth options (financial distress theory)	negative
	Product uniqueness (financial distress theory)	negative
R & D expense	Product uniqueness, growth options (financial distress theory)	negative
Selling expenses	Product uniqueness (financial distress theory)	negative
Integration index	Direct financial distress costs (financial distress theory)	negative
Diversification index	Good asset utilization (incentive realignment theory)	negative
Log of assets	Direct financial distress costs (financial distress theory)	negative
	Low average financial distress costs (financial distress theory)	positive
High cash flow $\times$ low Tobin's q	High potential to waste resources and poor resource utilization (incentive realignment theory)	positive
Low cash flow $\times$ high Tobin's q	Low potential to waste resources and good resource utilization (incentive realignment theory)	negative
Diversified $\times$ low Tobin's q	High potential to waste through cross-subsidization and poor resource utilization (incentive realignment theory)	positive

Table II
Number of Going Private Transactions with
Mean Book Value by Year

Year	Number	Mean Book Value (\$000,000)
1980	4	95.0
1981	14	109.7
1982	17	80.3
1983	12	67.3
1984	30	162.2
1985	23	184.3
1986	29	228.0
1987	25	348.1
1988	19	208.3
1989	6	1047.5
1990	1	446.1

Our multivariate results are reported in Table IV. This table reports coefficients from multivariate logit regressions using all of the above-described variables as well as separate logits using variables representing deviations from industry means.⁷ The results show that after controlling for other effects firms with high cash flow are more likely to do LBOs; however, the coefficients on our cash flow variable are not statistically significant in either subperiod. The coefficients of Tobin's q are not statistically significant. After industry adjustment, the coefficients on the cash flow variable remain statistically insignificant in both subperiods. On the other hand, the coefficient on Tobin's q is negative and statistically significant in the 1985 to 1990 period. As discussed earlier, this is consistent with both the free cash flow and the financial distress cost deterrence hypotheses. The variable design to capture the prediction of the free cash flow theory, a dummy variable which identifies high cash flow and low q , is statistically significant in the first two logit regressions shown in Table IV, supporting the free cash flow theory in both periods.⁸ Similarly, the dummy variable which identifies firms that are unlikely to have free cash flow problems (low cash flow and high q) has a significant negative coefficient in both subperiods. None of the

⁷ Industry effects are adjusted out by subtracting the median values of a variable within the firm's primary three-digit SIC code. This adjustment will not be perfect for firms which conduct business in several different three-digit SIC codes.

⁸ We also examined a variable which interacted three-year stock returns prior to an LBO with cash flow using the logic in Denis (1990) that firms with poor returns on investment are most likely to suffer from agency problems which can be reduced by an LBO. This variable was not an economically nor a statistically significant predictor of LBOs. While apparently inconsistent with the free cash flow theory, dummy variables based on past stock returns are likely to have low power because LBO firms may have established poor investment records prior to the time when we began measuring the stock return.

Table III

Pearson Correlation Matrices by Time Period

Coefficients which differ significantly from zero at less than the 0.05 level are marked with *one asterisk* while those significant at the 0.10 level are marked with *two asterisks*. "Operating income/assets" is earnings before interest, taxes, depreciation, and amortization divided by the sum of the book value of debt and the market value of equity. "Tobin's *q*" is defined as the ratio of the book value of debt plus the market value of equity divided by the book value of total assets. The "Machinery industry dummy" is equal to one when firms' primary four-digit SIC is between 3400 and 4000. "R & D/sales" is the ratio of research and development expenditures to net sales revenue. "Selling expenses/sales" is the ratio of selling, general, and administrative expenses to sales. "Log of assets" is the logarithm of the book value of total assets. The diversification index is a "Herfindahl focus index" defined over the firm's four-digit SIC business activities. This is computed as the sum of squared business shares in these activities. "High cash flow, low *q*" is a dummy variable which is equal to one for firms with above the sample median operating income/assets and below sample median Tobin's *q*. Diversified, low *q* is a dummy variable which is equal to one for firms with above the sample median Herfindahl ratio, and below sample median Tobin's *q*.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Panel A. 1980-84 (<i>N</i> = 1863)											
(1) LBO dummy	1.00										
(2) Operating income/assets	0.05*	1.00									
(3) Tobin's <i>q</i>	-0.06	-0.08*	1.00								
(4) Machinery industry dummy	-0.11*	-0.08*	0.05*	1.00							
(5) R & D/sales	-0.09*	-0.06*	0.28*	0.31*	1.00						
(6) Selling expenses/sales	-0.04**	-0.04**	0.13*	0.16*	0.51*	1.00					
(7) Log of assets	-0.02	0.03	-0.08*	-0.16*	-0.06*	-0.20*	1.00				
(8) Herfindahl focus index	0.05*	0.02	-0.07*	-0.13*	-0.11*	-0.19*	0.69*	1.00			
(9) High cash flow, low <i>q</i>	0.14*	0.21*	-0.39*	-0.13*	-0.22*	-0.11*	-0.04*	-0.02*	1.00		
(10) Low cash flow, high <i>q</i>	-0.10*	-0.11*	0.53*	0.20*	0.33*	0.17*	-0.06*	-0.13*	-0.54*	1.00	
(11) Low focus, low <i>q</i>	0.02	0.08*	-0.22*	-0.04*	-0.05*	0.05*	-0.27*	-0.23*	0.37*	-0.28*	1.00
Panel B. 1985-90 (<i>N</i> = 1652)											
(1) LBO dummy	1.00										
(2) Operating income/assets	0.054**	1.00									
(3) Tobin's <i>q</i>	-0.08*	0.00	1.00								
(4) Machinery industry dummy	-0.08*	-0.01	-0.16*	1.00							
(5) R & D/sales	-0.02	-0.01	0.21*	0.05*	1.00						
(6) Selling expenses/sales	-0.04	-0.09*	0.10*	0.19*	0.01	1.00					
(7) Log of assets	0.02	0.05*	0.06*	-0.15*	-0.05*	-0.24*	1.00				
(8) Herfindahl focus index	-0.08*	-0.04**	0.05*	0.21*	0.07*	0.31*	-0.55*	1.00			
(9) High cash flow, low <i>q</i>	0.14*	0.18*	-0.36*	-0.00	-0.02	-0.14*	-0.06	-0.06*	1.00		
(10) Low cash flow, high <i>q</i>	-0.11*	-0.06**	0.52*	0.03	0.06**	0.25*	-0.05**	0.16*	-0.37*	1.00	
(11) Low focus, low <i>q</i>	0.09*	-0.02	-0.55*	0.11*	-0.03	-0.06**	-0.16*	0.04	0.66*	-0.56*	1.00

coefficient estimates for these variables differ significantly in the two subperiods.

The results in Table IV are also consistent with the theory that potential financial distress costs deter LBO activity. In both subperiods firms with high R & D expenditures as well as firms in the machinery and equipment industries were less likely to undertake LBOs. This evidence is especially strong in the earlier subperiod and supports the financial distress hypothesis. However, the coefficient of selling expenses is positive in both subperiods and significantly so in the 1985 to 1990 subperiod, supporting the incentive realignment hypothesis. The difference between the coefficients of the R & D variable is significantly different in the two subperiods while the difference between the coefficient of selling expenses in the two subperiods is not significant.

We also compare the level of diversification of LBO targets to nontargets. We find that firms which did LBOs in the early 1980s were not more diversified than other firms. On the other hand, firms which did LBOs in the 1985 to 1990 period were more diversified than others. The dummy variable that interacts q and diversification is not statistically significant in the later subperiod and is statistically significant in the earlier subperiod with a negative sign—opposite of that hypothesized (the industry-adjusted dummy is also significant with a negative sign in the 1985 to 1990 period). However, the correlation matrix of these variables shows that the low q , high cash flow dummy variable is highly correlated with the low q , high diversification dummy. In fact, in an unreported logit, we find that the low q , high diversification dummy variable has a statistically significant, positive sign when the low q , high cash flow variable is deleted. Therefore, because of a multicollinearity problem we are hesitant to rule out the theory that poorly diversified firms are good LBO candidates based on this finding. It may be that a good description of an LBO candidate is that it has low q and both high cash flow and a high level of diversity.

V. Conclusion

This paper investigates the motives for LBOs by comparing firms that undertook LBOs in the 1980s to those that did not. The results suggest that free cash flow problems as well as potential financial distress costs are important determinants of which firms undertake LBOs. Consistent with the free cash flow hypothesis we find that high cash flow firms that also have low Tobin's q are more likely to undertake an LBO. Consistent with the financial distress costs hypothesis we find that LBO firms have relatively low R & D expenditures and are unlikely to be manufacturers of machines and equipment. In the 1985 to 1990 time period we also find that firms undertaking LBOs are more diversified than other firms in the economy.

The fact that financial distress costs deter LBOs suggests that debt financing is crucial for realizing the gains from going private. If this were not the case, firms with high potential financial distress costs could still go private,

Table IV
Logit Regressions of the Probability of Going Private in the 1980 to 1984 and 1985 to 1990 Periods

Probability values associated with the asymptotic χ^2 statistic that a coefficient is statistically different from zero are also reported. Coefficients which differ significantly from zero at less than the 0.05 level are marked with *one asterisk* while those significant at the 0.10 level are marked with *two asterisks*. A χ^2 test for change in coefficients between 1980–84 and 1985–90 is also reported. “Operating income/assets” is earnings before interest, taxes, depreciation, and amortization divided by the sum of the book value of debt and the market value of equity. “Tobin’s q ” is defined as the ratio of the book value of debt plus the market value of equity divided by the book value of total assets. The “Machinery industry dummy” is equal to one when firms’ primary four-digit SIC is between 3400 and 4000. “R & D/sales” is the ratio of research and development expenditures to net sales revenue. “Selling expenses/sales” is the ratio of selling, general, and administrative expenses to sales. “Log of assets” is the logarithm of the book value of total assets. The “Diversification index” is a Herfindahl index defined over the firm’s four-digit SIC business activities. This is computed as the sum of squared market shares in these activities. “High cash flow, low q ” is a dummy variable which is equal to one for firms with above the sample median operating income/assets and below sample median Tobin’s q . “Diversified, low q ” is a dummy variable which is equal to one for firms with above the sample median Herfindahl ratio, and below sample median Tobin’s q .

Variable	1980–84		1985–90		Industry Adjusted 1980–84		Industry Adjusted 1985–90	
	Coefficient	p-Value	Coefficient	p-Value	Coefficient	p-Value	Coefficient	p-Value
Intercept	-3.06	0.001*	-2.25	0.001*	-1.79	0.001*	-2.46	0.001*
Operating income/assets	0.41	0.15	0.15	0.52	-0.02	0.91	0.06	0.79
Tobin’s q	0.02	0.87	-0.14	0.31	-0.03	0.78	-0.27	0.09**
Machinery industry dummy	-0.69	0.02*	-0.36	0.13	—	—	—	—
R & D/sales	-51.6	0.002*	-21.8	0.001*	1.22	0.001*	0.52	0.01*
Selling expenses/sales	0.78	0.54	2.01	0.01*	-0.84	0.48	0.80	0.08**
Log of assets	-0.11	0.24	0.02	0.80	-0.14	0.12	0.02	0.80
Diversification index	-0.34	0.52	0.82	0.10**	-0.02	0.41	0.06	0.56
High cash flow, low q	1.03	0.003*	0.79	0.02*	0.34	0.23	0.83	0.02*
Low cash flow, high q	-0.38	0.46	-0.77	0.06**	-0.90	0.03*	-0.74	0.03*
Diversified, low q	-0.56	0.15	-0.18	0.65	-0.68	0.08*	-0.98	0.01*
Sample size—no LBO	1769		1551		1769		1551	
Sample size—LBO	69		101		69		101	
χ^2	70.8*		73.7*		35.6*		24.3*	
Cragg-Uhler R^2	0.14		0.12		0.09		0.04	

using less debt and more equity than the typical LBO firm. As we mentioned earlier, a large percentage of LBO firms use more debt than is needed to eliminate taxes so that this crucial role for debt is unlikely to be taxes. The results in this paper support the idea that the role for debt relates to the incentive problems associated with free cash flow. However, to fully understand the LBO phenomenon, additional empirical work examining the determinants of the financial structures of these transactions is needed.

REFERENCES

- Asquith, Paul, Robert Gertner, and David Scharfstein, 1991, Anatomy of financial distress: An examination of junk-bond issuers, Manuscript, University of Chicago.
- Bhide, Amar, 1990, Reversing corporate diversification, *Journal of Applied Corporate Finance* 3, 70–81.
- Comment, Robert, and Gregg A. Jarrell, 1992, Corporate focus, stock returns and the market for corporate control, Working paper, MERC, University of Rochester.
- DeAngelo, Harry, and Linda DeAngelo, 1987, Management buyouts of publicly traded corporations, *Financial Analysts Journal* 43, 38–49.
- Denis, David, 1990, Corporate investment decisions and corporate control: Evidence from going private transactions, Manuscript, Virginia Polytechnic Institute and State University.
- Galai, Dan, and Ronald Masulis, 1976, The option pricing model and the risk factor of stock, *Journal of Financial Economics* 3, 53–81.
- Gilson, Stuart, 1989, Management turnover and financial distress, *Journal of Financial Economics* 25, 241–262.
- Grimm, W. T., 1990, *Mergerstat Review* (W. T. Grimm and Co., Chicago).
- Grossman, Sanford, and Oliver Hart, 1982, Corporate financial structure and managerial incentives, in J. McCall, ed.: *The Economics of Information and Uncertainty* (University of Chicago Press, Chicago).
- Hall, Bronwyn, 1990, The manufacturing sector master file: 1959–1987, NBER Working Paper 3366.
- Jensen, Michael, 1986, Agency costs of free cash flow, corporate finance and takeovers, *American Economic Review* 76, 323–329.
- , 1989, Eclipse of the public corporation, *Harvard Business Review* 67, 61–75.
- and William H. Meckling, 1976, Theory of the firm: Managerial behavior, agency costs and ownership structure, *Journal of Financial Economics* 11, 5–50.
- Kaplan, Steven, 1989a, Management buyouts: Evidence on taxes as a source of value, *Journal of Finance* 44, 611–632.
- , 1989b, The effects of management buyouts on operating performance and value, *Journal of Financial Economics* 25, 217–254.
- and Jeremy Stein, 1991, The evolution of buyout pricing and financial structure in the 1980s, Working paper, University of Chicago.
- Lang, Larry, René Stulz, and Ralph Walkling, 1991, A test of the free cash flow hypothesis: The case of bidder returns, *Journal of Financial Economics* 28, 315–335.
- Lehn, Kenneth, and Annette Poulsen, 1989, Free cash flow and stockholder gains in going private transactions, *Journal of Finance* 44, 771–788.
- Lehn, Kenneth, Jeffry Netter, and Annette Poulsen, 1990, Choice of organizational form: The case of leveraged recapitalizations and leveraged buyouts, *Journal of Financial Economics* 27, 315–354.
- Leland, Hayne, and David Pyle, 1977, Information asymmetries, financial structure and financial intermediation, *Journal of Finance* 32, 371–387.
- Liebeskind, Julia, and Tim C. Opler, 1992, The causes of corporate refocusing, Working paper 92–0702, Cox School of Business, Southern Methodist University.
- Liebeskind, Julia, Margarethe Wiersema, and Gary Hansen, 1992, LBOs, corporate restructuring, and the incentive-intensity hypothesis, *Financial Management* 31, 73–88.

- Long, William, and David Ravenscraft, 1992, The financial performance of whole company LBOs, Manuscript, University of North Carolina, Chapel Hill.
- Lowenstein, Louis, 1985, Management buyouts, *Columbia Law Review* 85, 730–784.
- Maksimovic, Vojislav, and Sheridan Titman, 1991, Financial policy and a firm's reputation for product quality, *Review of Financial Studies* 4, 175–200.
- Marais, Laurentius, Katherine Schipper, and Abbie Smith, 1989, Wealth effects of going private for senior securities, *Journal of Financial Economics* 23, 155–191.
- Morck, Randall, Andrei Shleifer, and Robert Vishny, 1990, Do managerial objectives drive bad acquisitions?, *Journal of Finance* 45, 31–48.
- Muscarella, Chris J., and Michael R. Vetsuypens, 1990, Efficiency and organizational structure: A study of reverse LBOs, *Journal of Finance* 45, 1389–1413.
- Myers, Stewart C., 1977, Determinants of corporate borrowing, *Journal of Financial Economics* 5, 147–175.
- Opler, Tim C., 1992, Operating performance in leveraged buyouts: Evidence from 1985–1989, *Financial Management* 21, 37–41.
- , 1993, Controlling financial distress costs in leveraged buyouts with financial innovation, *Financial Management* 22, 79–90.
- Ross, Steven, 1977, The determination of financial structure: The incentive-signalling approach, *Bell Journal of Economics* 8, 23–40.
- Smith, Abbie, 1990, Capital ownership structure and performance: The case of management buyouts, *Journal of Financial Economics* 27, 143–165.
- Titman, Sheridan, 1984, The effect of capital structure on a firm's liquidation decision, *Journal of Financial Economics* 13, 137–151.
- and Roberto Wessels, 1988, The determinants of capital structure choice, *Journal of Finance* 43, 1–19.
- Wruck, Karen, 1990, Financial distress, reorganization and organizational efficiency, *Journal of Financial Economics* 27, 419–444.