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**ABSTRACT**

This paper examines whether, and how, leveraged buyouts from the most recent wave of public to private transactions created value. For a sample of 192 buyouts completed between 1990 and 2006, we show that these deals are somewhat more conservatively priced and lower levered than their predecessors from the 1980s. For the subsample of deals with post-buyout data available, median market adjusted returns to pre- and post-buyout capital invested are 78% and 36%, respectively. In contrast, gains in operating performance are either comparable to or slightly exceed those observed for benchmark firms. We examine the relative contribution of several potential determinants of returns; in addition to gains in operating performance, returns are strongly related to increases in industry valuation multiples. Overall, our results provide insights into how transactions from the most recent wave of leveraged buyouts created value.

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## **I. Introduction.**

The leveraged buyout (LBO) wave of the 1980s was an important phenomenon well studied by academics and practitioners. The recession of the early 1990s, however, brought most of that activity to an end, as many of the deals from later in that period defaulted. Nearly fifteen years later, however, the pace of LBO activity reached new record levels, renewing questions about whether and how these deals create value.<sup>1</sup>

A substantial body of empirical work based on leveraged buyout transactions from the 1980s supports the notion that leveraged transactions create value; specifically, those studies have documented either 1) gains in value from pre-buyout to a later change in ownership or restructuring, 2) gains in operating performance post-buyout, or 3) the relationship between premiums paid in buyouts and proxies for sources of the value gain.<sup>2</sup> The theories proposed to explain these gains include benefits of tax shields, disciplining effects of leverage, and better governance (monitoring by the financial sponsor, concentrated ownership, etc).

Numerous factors have changed in the more recent wave of buyouts including potential motivations for transactions, transaction structures, characteristics of target firms, and characteristics of the financial sponsors. Notably, there is little (or no) evidence from the more recent wave of buyouts which documents the impact of these changes on whether and how these transactions create value.<sup>3</sup> This paper attempts to fill this gap, studying a sample of 192 LBOs completed between 1990 and 2006.

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<sup>1</sup> Dealogic reports that global financial sponsor M&A buyouts reached record highs of \$352.3 billion in 2005, \$737.4 billion in 2006, and \$796.1 billion in 2007 despite the abrupt fall off in the second half of that year, and represented approximately 17% of total announced M&A volume in those years.

<sup>2</sup> See for example: Kaplan (1989c), Kaplan (1994), Andrade and Kaplan (1998); Kaplan (1989a), Smith (1990), and papers summarized in Renneboog and Simons (2005); and Kaplan (1989b) and Lehn and Poulsen (1989).

<sup>3</sup> Notably, Axelson, Jenkinson, Strömberg, and Weisbach (2007), and a series of papers written for the World Economic Forum (2008), provide analysis of the pricing and structure of recent buyouts. Kaplan and Strömberg (2008) describe recent trends the leveraged buyout / private equity industry.

Specifically, we attempt to quantify how much, if any, value is created through buyouts, and explain how that varies cross sectionally based on theories of the motivations for buyouts. From our initial sample, we identify 94 leveraged buyouts completed by 2005 for which post-buyout financial data is available. For this subsample, we first examine the changes in firm value using the methodology of Kaplan (1989c) and subsequent papers. Specifically, we estimate nominal, market, and industry adjusted returns to total capital from either just prior to the buyout (pre-buyout) or upon execution of the buyout (post-buyout) to a final outcome for the transaction, such as a subsequent IPO, sale of the firm, or bankruptcy. We find that returns to either pre- or post-buyout capital overall are positive and significant, and are positive and significant for all outcome groups except deals ending in a distressed restructuring. For example, mean (median) market adjusted returns to post-buyout capital are estimated at 64% (36%), even including the cases of distress. The large, positive returns show that on average, the buyouts in our sample create substantial value for investors. There is, however, considerable cross sectional variation in deals' realized performance depending on the outcome of the transaction.

There are several potential explanations for the relatively large realized returns we document. Primarily, if buyouts create value, we expect to observe improvements in operating performance for the sample firms while they are private. Surprisingly, we find that gains in operating performance are either comparable to or slightly exceed those observed for benchmark firms matched on industry and pre-buyout characteristics, depending on the measure of performance and the post-buyout period considered. The marginally positive gains, however, do not nearly reach the magnitude reported by Kaplan (1989a) for deals of the 1980s. At first glance, it is puzzling that deals, on average, produce large positive returns with only modest cash flow gains.

We next examine potential explanations for the observed cash flow gains, which are hypothesized to be related to the following:

- 1) *Increased tax shields.* A large increase in debt used to finance the buyout generates increased interest tax shields, particularly if the debt remains at high levels following the transaction. Kaplan (1989b) shows that tax benefits are an important source of wealth gains for a sample of 76 management buyouts (MBOs) between 1980 and 1986, and that these gains are reflected in the premiums paid to pre-buyout shareholders.
- 2) *Disciplining effect of debt.* Increasing required debt payments can also reduce free cash flow available to management to potentially dissipate on value reducing investments (Jensen (1986)). In the context of buyouts, the heavier debt burden forces management to efficiently run the firm to avoid default, and also will force a restructuring of the firm before substantial value can be lost (Jensen (1989b), Wruck (1990), Andrade and Kaplan (1998)).
- 3) *Increased monitoring reduces agency costs.* Senior lenders (banks) may be effective monitors, leading managers to focus on performance and value, and reducing wasteful uses of corporate resources.<sup>4</sup> Financial sponsors of the buyout (private equity firms) may be important to firm governance, either through their presence on the board or through their selection of new management. Recent deals involving some private equity firms have been criticized, however, either because the private equity firm allegedly channeled gains from the transaction to their own investors through dividends or other payments, or because lower

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<sup>4</sup> Cotter and Peck (2001) argue that senior debt financing can substitute for monitoring by buyout specialists, based on 64 LBOs completed from 1984 to 1989.

prices are paid when companies are acquired by more than one private equity firm (club deals).<sup>5</sup>

- 4) *Better management incentives.* Management ownership may become more concentrated with the buyout if management provides some portion of the equity financing (as in an MBO). The alignment of incentives of management and shareholders can reduce agency conflicts (Jensen and Meckling (1976)). However, high levels of management ownership can lead to management entrenchment.<sup>6</sup>
- 5) *Other pre-buyout characteristics.* Gains in operating efficiency due to post-buyout actions of management, as well as monitoring by lenders or buyout specialists, may be particularly useful for firms with poorer pre-buyout performance.

We relate variables that proxy for the various theories described here to the observed cash flow changes (from pre-buyout to the final year before the deal outcome). We also consider activities such as asset sales or acquisitions that occur while the firm is private. Our evidence shows that cash flow performance is positively related to pre-buyout leverage and to the increase in leverage as a result of the buyout. We argue that this evidence is consistent with theories of the benefits of debt, and is less likely due to the possibility that firms with better prospects are able to obtain more debt financing for the buyout. We also find that gains in operating cash flows are greater for firms where the private equity firm has replaced the CEO at or soon after the time of the buyout. Performance is worse, however, for deals where the buyout sponsors hold a greater proportion of seats on the post-buyout board.

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<sup>5</sup> See for example: "Private Equity Slugfest; Investors and regulators fear there isn't enough competition among private equity firms for deals. *Business Week*, 13 February 2007; "Harvesting big profits from low-risk buyouts --- Debt-financed dividends put a heavy burden on acquired outfits," *Wall Street Journal*, July 26, 2006.

<sup>6</sup> See Morck, Shleifer and Vishny (1988), McConnell and Servaes (1990), Halpern, Kieschnick and Rotenberg (1999) and references therein.

Finally, we examine the relative importance of potential determinants of the returns to capital. While cash flow improvements and returns to capital are strongly related, the smaller magnitude of the cash flow increases suggests that deals of the recent buyout wave are not largely motivated by the ability to produce large gains by targeting significantly underperforming companies.<sup>7</sup>

In addition to improvements in operating performance, private equity firms may increase returns by operating portfolio companies at more efficient levels of working capital, freeing up cash for dividends or to sustain higher leverage. While we do observe gains in the ratio of sales/working capital and other measures of working capital efficiency, the return to pre- or post-buyout capital is not significantly related to these improvements. Alternatively, we do find evidence that private equity firms benefit from rising valuation multiples in sectors where they invest.

A third potential explanation is that the observed returns are related to deal pricing. We find that returns to both pre- and post-buyout capital are not significantly related to the premium paid, and that post-buyout returns are only weakly related to EBITDA/capital at the time of the buyout. Interestingly, we find that returns are higher for “club” deals. We do not find evidence, however, that the returns are related to whether there is competition in bidding for the target firms. A more likely explanation for our finding is that deals with better prospects are more likely to attract participation by multiple private equity firms.

An additional contribution of our paper is to provide a useful description of the pricing and other characteristics of the most recent wave of buyouts. These statistics serve both as a comparison to earlier research to understand how deals have recently changed, and also to enable

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<sup>7</sup> To the extent governance mechanisms for public companies have improved relative to many firms of the 1980s, motivations for the more recent buyouts are likely different. See Kaplan (1997), “We are All Henry Kravis Now.”

us to address concerns about the potential impact of sample selection on our interpretation of the post-buyout performance results (specifically, the availability of post-buyout financial data). Relative to the buyouts of the 1980s, deals are somewhat less highly levered (median total debt/capital of approximately 70%), but still impose very high default risk on the firms. Premiums paid to pre-buyout shareholders, as well as the price paid relative to fundamental firm characteristics (EBITDA/capital) also indicate somewhat more conservative transactions, particularly in comparison to deals of the late 1980s. Deals completed in 2005 and later, however, show a trend toward riskier capital structures with lower interest coverage, second lien debt, and higher priced transactions.

The remainder of this paper is structured as follows. In Section II, we describe the pricing and structure of the 192 buyouts in our sample, comparing them to the subsample of 94 buyouts for which post-buyout financial data is available. Section III documents the returns to pre- and post-buyout providers of capital. Section IV examines changes in post-buyout operating cash flows, and relates this performance to proxies for the sources of value creation. Section V brings these results together, examining the relative contribution of potential determinants of the returns to capital. Section VI concludes.

## **II. Sample description.**

We define buyouts as leveraged public to private transactions, which includes but is not limited to management buyouts (which characterized much activity & empirical research from the 1980s). We use SDC and Dealogic to identify leveraged buyouts of publicly traded U.S. firms, with deals values of at least \$100 million and announcement dates between January 1990 and July 2006. Our initial screening identifies 304 possible LBOs. We eliminate firms which do

not have U.S. listed equity prior to the buyout (29 firms), firms where some equity remains publicly traded post-buyout (5 firms), firms purchased out of a Chapter 11 restructuring (10 firms), and another 42 transactions with atypical characteristics.<sup>8</sup> Finally, we eliminate 26 deals for which detailed information on the structure of the transaction is not available from SEC filings, Dealogic, and/or news reports. This produces a final sample of 192 LBOs from 1990 to 2006. In contrast to deals studied from the 1980s, relatively more firms come from service industries (28% of our sample) and fewer from manufacturing (36% of our sample). A total of 120 different private equity (PE) firms are involved in the buyouts, but no single PE firm invests in more than 14 sample companies.<sup>9</sup>

Our study of the performance of buyouts, as well as the events that occur after the firm is private, requires post-buyout financial data to be available. 94 of the 192 firms (49%) have some amount of post-buyout data available from 10Ks or other SEC filings. These firms either have widely held publicly traded debt securities outstanding, or have provided historical financial statements at the time of a subsequent IPO, acquisition, or public debt financing. We provide descriptive statistics for the full sample of 192 buyouts in order to compare the structure of these transactions to prior research from the 1980s, and also so that we can address the impact of sample selection on observed post-buyout performance. In order to provide information on recent market trends, our description includes transactions completed in 2006 for which a full year of post-buyout data is not yet available. Thus, we document the evolution of buyout pricing and financial structure for our sample period (1990-2006), providing a useful comparison to the results of Kaplan and Stein (1993).

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<sup>8</sup> This includes cases where the target firm is intended to be merged with another operating company, or where a private equity firm acquires the target using the stock of another portfolio company.

<sup>9</sup> The largest concentrations of PE firms are Blackstone (14 deals), Texas Pacific Group (13 deals) and KKR (11 deals).

Table 1 describes the buyout sample and deal pricing. The buyout price, referred to as total “capital”, is measured as the sum of the market value paid for the firm’s equity, the value of the firm’s outstanding debt, and the fees paid in the transaction, minus cash removed to finance the buyout. For the full sample of 192 buyouts, the median deal size (capital) is \$463.7 million, but there is a trend towards larger deals in later years. For the period 1990 to 2005, the median deal size for the 94 buyouts with post-buyout data is significantly larger (\$509.3 million) than for the 72 remaining buyouts (median \$336.9 million). This is due to the fact firms with public debt financing, therefore reporting 10Ks post-buyout, are typically larger.

We describe the price paid relative to fundamentals using the firms’ earnings before interest, taxes, depreciation, and amortization (EBITDA) in the last full year prior to the buyout completion, as a percentage of capital. This measure is not significantly different between firms with and without post-buyout data completed by 2005. We subtract the same ratio for firms in the S&P 500 at the time of the buyout to control for the general level of the stock market. The market adjusted measure is greater for the deals with post-data available, suggesting they are less aggressively priced, but the difference is not economically or statistically significant. The ratio does appear to decline in recent years, reaching a low of 0.86 in 2006, suggesting the later deals are more aggressively priced.<sup>10</sup>

As an additional measure of deal pricing, we also report in Table 1 the premium paid for the deal, calculated as the percentage difference between the price paid for a firm’s equity and the price one month before the first announcement of the buyout. The median premium does not appear to increase over our sample period, and for the full time period is relatively low (median

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<sup>10</sup> To provide a more direct comparison to Kaplan and Stein (1993), a market adjusted ratio based on the S&P 500 P/E ratio reaches a low of 3.23 in 2006, which is lower than for any year reported for their sample.

of 29.2% for 1990 to 2006) relative to Kaplan and Stein's median of 43% for the 1980s.<sup>11</sup> Overall, the sample deals do not appear aggressively priced relative to the transactions of the 1980s, and importantly for our study, do not appear substantially different for firms depending on whether post-buyout data is available. Deals from 2006, however, do appear to be higher priced. Using "net cash flow", defined as EBITDA minus capital expenditures, yields similar comparisons (not reported).

Tables 2 and 3 describe the financing structure of the deals. Table 2 describes the aggregate debt levels and coverage ratios, based on data from SEC filings, Dealscan, and Dealogic. Overall leverage is measured by the ratio of pre- or post-buyout debt to capital or to EBITDA. Post-buyout debt is equal to the sum of new debt issued to finance the buyout and pre-buyout debt retained. We use book values of debt, as most new debt is issued near to its face value, and relatively little long term pre-buyout debt is retained. Prior to the buyout, firms have a leverage ratio of approximately 23.7% (pre-buyout debt/capital) for the full sample. However, leverage is significantly increased with these transactions, to a sample median of nearly 70% post-buyout debt/capital (and a median percentage increase in leverage of 45.7%). Thus, a potentially large source of value for the sample firms is an increase in interest tax shields. The high level of post-buyout debt may also serve as a disciplining mechanism, as firms take on substantial default risk in these transactions. Similarly, debt as a multiple of EBITDA increases from 1.8 to 6.0. This leverage corresponds to a ratio of total equity to capital of approximately 30% (versus a sample average of 6.52% from Kaplan and Stein). Although they are very highly levered, the deals in our sample are more conservatively financed than deals of the late 1980s, where leverage ratios approached 90%.

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<sup>11</sup> There are two cases of negative premiums in 2003 where 1) the stock price of the target firm declined significantly from one month prior to the day before the buyout announcement, and 2) the purchase price was lower than the market price, but agreement with shareholders was reached (following shareholder lawsuits).

Interest coverage ratios (EBITDA/interest) are similarly stronger than the deals of the 1980s. These coverage ratios are based on expected interest payments at the time of the buyout, using EBITDA for the last full fiscal year prior to the buyout.<sup>12</sup> Coverage ratios using net cash flow (not reported) also generally exceed 1.0. Where data is available, we also report the coverage of required interest plus principal repayments. Using the average projected principal payments for the first two post-buyout years, this coverage ratio also well exceeds 1.0. One reason for the stronger coverage ratios at the time of the buyouts is that fewer transactions rely on expected asset sales subsequent to the buyout (see Section IV), and so rely only on the firm's operating cash flows to repay debt. Several sample firms complete asset sales concurrent with or shortly prior to the buyout.

Despite the fact that firms with publicly traded debt are more likely to have post-buyout data available, none of the median leverage statistics in Table 2 are significantly different between the groups of deals with and without post-buyout data available. The characteristics of the debt financing, however, are provided in Table 3. Using data from Dealscan, Dealogic, and SEC filings, we categorize the types of debt financing as bank debt, other private debt, or public debt. Bank debt typically consists of a term loan and revolving credit facility. It is also frequently syndicated and therefore can be dispersely held, and can be traded in the secondary loan market, potentially impacting the ability to restructure the debt in the event of financial distress. Deals with post-buyout data available have lower levels of bank debt to capital (median of 31.2% versus 47.5% through 2005), as public debt financing likely replaces some bank debt for these deals.

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<sup>12</sup> Expected interest payments are based on stated interest rates or on stated spreads over LIBOR. We use the 3-month LIBOR rate at the end of the announcement month for this calculation.

Public debt financing is used in approximately 45% of all deals, similar to what is found by Kaplan & Stein (1993) for deals in the late 1980s. In all but 3 cases, high yield bonds are issued in the 144A market.<sup>13</sup> The level of public debt to capital is the most significant difference between firms that do or do not have post-buyout data available. This is also related to the finding that the post-buyout data firms tend to be somewhat larger (Table 1). 70.2% of firms with post-buyout data available have public debt financing, versus 16.7% for those without (through 2005), with a mean level of public debt/capital of 25.3% vs. 5.6%, respectively.

The composition of debt (public versus private) is important to potential monitoring by lenders, as well as the ability to restructure debt in the event of financial distress. Other characteristics of the debt, however, can be useful indicators of lenders' views of the risk of these financings. For example, debt sold with of pay-in-kind (PIK) features or discount debt can indicate that the firm is not expected to have sufficient cash flow to pay current interest on all its indebtedness. PIK or discount bonds are used relatively frequently, and are observed for 23.4% of the sample deals, more than one half of the incidence of public debt financing. The mean amount issued, as a percentage of capital, is not statistically different for deals through 2005 for firms with versus without post-buyout data. Lastly, strip financing, where the provider of debt financing also holds an equity stake, has been suggested to reduce conflicts in the event of financial distress (Jensen (1989a)). 13.5% of deals use this type of financing, very similar to what was observed for deals from the 1980s.

An alternative way to measure the riskiness of the debt is its credit rating. Although not all sample firms have publicly traded debt, a large proportion of the firms have their bank debt

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<sup>13</sup> This is consistent with Goldstein & Hotchkiss (2007) who report that since 2002, 85% of high yield bonds are sold as Rule 144A issues.

financing rated.<sup>14</sup> Of the firms with information available from Dealscan or Dealogic, post-buyout credit ratings range as low as CCC+, indicative of their high level of risk. Further, 14/192 deals in our sample (all from 2005 or 2006) have a second lien term loan. The margin on the 2<sup>nd</sup> lien term loan is on average 366 basis points higher than the margin on the first lien loan for the same deal, indicative of their junior position and risk (we classify these loans as bank financing in Table 3).

### **III. Returns to pre- and post-buyout capital.**

For each firm with post-buyout data available, we estimate the return to either pre- or post-buyout capital from the time of the buyout to a final resolution or “outcome” for the transaction using a methodology based on that of Kaplan (1989a, 1989c, 1994) and Andrade and Kaplan (1998). The nominal return on capital is calculated as the sum of all interim payments to capital from the buyout completion to the outcome date plus a terminal value estimated at the outcome date, divided by total capital (minus one). Interim payments to capital equal the sum of cash interest and debt principal paid, dividends, and equity repurchased, net of proceeds from new debt and equity issues. The terminal value is the total dollar value received by capital at the outcome date (see below). We also report market adjusted returns by discounting all interim payments and the terminal value by the return on the S&P 500 index, and industry adjusted returns by discounting by the return on the corresponding Fama French value-weighted industry portfolio.<sup>15</sup> This is equivalent to the realized net present value of the transaction, scaled by the pre- or post-buyout capital invested. Discounting by the return on the S&P 500 assumes the asset

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<sup>14</sup> Ratings on syndicated bank debt have become common since their introduction in 1995. See Sufi (2007).

<sup>15</sup> Groh and Gottschalg (2007) show that performance of equity investments in buyouts depends both on leverage and operating risks. We examine returns to total capital, but operating risk may not be comparable between firms in the S&P 500 and our sample firms in various industries.

beta of the buyout firm is equal to one. Discounting by the industry portfolio return assumes the asset beta is equal to the levered beta of the industry group.<sup>16</sup>

Calculating the terminal value requires that we identify the “outcome” for the transaction (for firms with financial sponsors, this can be described as the initial “exit” date from the private equity firm’s portfolio). We search financial statements and other SEC filings, news sources, Lexis/Nexis, and Dealogic to identify outcomes including a subsequent IPO, acquisition by another company, acquisition by another private equity firm (known as a secondary LBO), Chapter 11 or distressed restructuring, firms which are still private, or unknown. A summary of these outcomes is provided in Table 4, both for the initial sample of 192 buyouts and the 94 firms which have post-buyout data available (90 of these have sufficient data for our return calculations).

Table 4 shows that 22 of the 192 firms (11.5%) enter Chapter 11 or a distressed restructuring. The proportion of failures is higher for deals of the 1990s, many of which failed in the early 2000s. For comparison, Andrade and Kaplan (1998) report that 29% of their initial sample of 136 MBOs and leveraged recaps fail, most of which are deals completed between 1985 and 1989.<sup>17</sup> In the Chapter 11 cases in our sample, there is typically almost no recovery to equity holders, and control of the firm is given to senior lenders. Interestingly, we identify only two out of court distressed restructurings, and a large number of the Chapter 11 restructurings are “prepackaged” bankruptcies. This is consistent with the idea that the resolution of distress via Chapter 11 may not be costly for these firms. Table 4 also shows the proportion of firms for which there is no observed outcome – for all but 5 of these firms (all of which are deals prior to

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<sup>16</sup> This likely produces conservative estimates of the returns to capital.

<sup>17</sup> Strömberg (2008) reports a bankruptcy rate of 6% for financial sponsor buyouts from 1970 to 2007.

2000), we are able to verify from Lexis/Nexis that the firm is still private. Many of the still private companies are MBOs.

Using this information, the terminal value at the outcome date is determined from the observed value at exit from Chapter 11, sale of the firm, the time of an IPO, or the last available year if still private. When a terminal value cannot be directly observed (cases where information on final distributions is not available, or the firm is still private), it is estimated as a multiple of EBITDA. EBITDA multiples are calculated as the industry median multiple from all firms on Compustat with the same four-digit SIC code.<sup>18</sup> Similar results are obtained using multiples of revenues rather than EBITDA.

The realized returns to pre- and post-buyout capital are reported in Table 5. As expected, the nominal, market adjusted, and industry adjusted returns are negative for the Chapter 11 group. 4 firms still produce positive nominal returns to pre-buyout capital, a lower proportion than reported by Andrade and Kaplan (1998) (whose study largely includes financially but not economically distressed firms). Overall, however, Table 5 demonstrates the market and industry adjusted returns are positive and significant for all other groups, with the single exception of the median industry adjusted returns to post-buyout capital of acquired firms. For example, the median market adjusted return to pre-buyout capital for the full sample of 90 firms in the analysis is 78.2%. If we exclude firms in outcome group 5 (still private or unknown), the median return is still positive and significant (71.5%).<sup>19</sup>

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<sup>18</sup> Comparisons are made at the three-digit or two-digit level when fewer than five industry matches are found. The EBITDA multiple is calculated as market value/EBITDA, where the market value is calculated as market value of equity at the most recent fiscal year end + book value of long and short term debt + liquidating value of preferred stock.

<sup>19</sup> Ljungquist, Richardson and Wolfenzon (2007) focus on returns to buyout fund investors rather than total value created for the portfolio firms. They examine portfolio firms of 207 buyout funds between 1981 and 2000, and find average (median) *annualized* geometric returns on equity capital invested by the fund are 12.7% (4.9%); the equity returns they calculate reflect both the impact of fees and the effect of leverage the buyout funds' investments.

The return calculations depend substantially on the terminal value realized. For firms that are still private, and for some firms in other outcome groups where the final payoff to providers of the buyout capital could not be determined, the terminal value is estimated. We examine the sensitivity of our return calculations to the estimation methodology in two ways. First, excluding cases in Table 5 where the return uses an estimated terminal value, the overall sample returns (both nominal and market or industry adjusted) are still positive and significant. Secondly, we examine a subsample of 31 cases that use an observable terminal value, but for which we can also apply a multiple of EBITDA to produce an estimate of the terminal value; comparing the means or medians across methods demonstrates the magnitude of the impact of the estimated terminal value on the return. Mean returns using terminal values estimated from multiples rather than the observed values (not reported for brevity) are nearly identical, and median returns are slightly lower (74% versus 78% for the nominal return to pre-buyout capital); differences in the mean and median returns are not statistically significant.

It is also important to consider the potential impact of sample selection issues (due to the availability of post-buyout data) in interpreting our results. Within the 90 firms used to calculate the returns, 65 firms used public debt to finance the buyout and therefore report subsequent financial statements regardless of the ultimate reason for exit. The remaining 25 firms present a more obvious selection bias (perhaps reflecting better performance), as they subsequently report historical financial data for a post-buyout IPO (12 firms), acquisition (9 firms), or financing (4 firms). We therefore rerun our results in Table 5 eliminating these 25 firms; the median returns are very similar to those in Table 5 (and so not reported).

#### **IV. Sources of value creation: gains in operating cash flows**

The large positive returns to invested capital suggest that, at least on average, value is created for those investors. We expect a primary determinant of the returns to be the changes in operating performance of the firm after it is taken private. In this section, we first document the post-buyout operating performance for the 94 sample firms with post-buyout financial data. We then relate observed operating performance gains to variables which proxy for sources of these gains, such as improved management incentives, discipline from higher debt levels, better monitoring by senior lenders or buyout sponsors, and other pre-buyout characteristics.

#### *IV.A. Changes in operating cash flows.*

In order to evaluate the economic and statistical significance of pre- to post-buyout changes in operating performance, cash flows changes must be adjusted by some benchmark. Empirical literature suggests several approaches for determining the matching firms used for this benchmark. We report results for three measures: 1) unadjusted changes, 2) using the industry median as the benchmark, 3) matching on industry, pre-buyout level of performance, change in performance pre-buyout, and market to book ratio of assets.<sup>20</sup> The industry median adjusted performance provides the most direct comparison to prior research (Kaplan (1989a)), using firms in the same four-digit SIC code. Our alternative performance-adjusted benchmark is based on Lie (2001), who shows that this benchmark yields more powerful test statistics, especially for samples with extreme pre-event performance. We select up to 5 matching firms that have the smallest sum of absolute differences from the sample firm in the year -1 level of performance,

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<sup>20</sup> Matching on industry as well as pre-buyout level of performance does not impact interpretation of our results and for brevity is not reported.

change in performance, and market-to-book ratio of assets, and use the median as our benchmark.<sup>21</sup>

Medians changes and percentage changes in operating performance are reported in Table 6 for the last full year prior to completion of the buyout (year -2 to -1), from year -1 to up to three years after the year in which the buyout is completed (year 0), and from the last full pre-buyout year to the year prior to the deal outcome or the last available year if still private (year -1 to last year). We also report this last measure for the subset of deals with outcomes as of December 2007 (an IPO, sale, secondary buyout, or bankruptcy of the firm). The unadjusted changes in EBITDA/sales, but not net cash flow/sales, are negative and significant for the changes to each post-buyout year.

The industry adjusted changes are most comparable to prior research for buyouts, but do not generally show any significant gains. However, using the industry-performance-market/book adjusted change, there is a significant increase from year -1 to year +1 or +2 for both EBITDA/sales and Net cash flow/sales. Still, even in these cases, the magnitudes are substantially smaller than reported by Kaplan (1989a). For example, Kaplan reports percentage gains in industry adjusted net cash flow/sales (relative to year -1) of 45.5%, 72.5%, and 28.3%, for the first three years following the buyout, respectively. At best, we find a median percentage gain in net cash flow of 12.4% using the performance adjusted benchmark. The smaller magnitude of the cash flow gains in comparison to buyouts of the early 1980s may be due to the fact that many of the buyouts from the earlier period were of firms with relatively poor pre-

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<sup>21</sup> An example of recent papers using this matching algorithm is Grullon and Michaely (2004). Details of our matching procedure are provided in an appendix to this paper; we require that the matching firm has financial data in at least the first full year after the buyout.

buyout performance.<sup>22</sup> However, for the firms in our sample, the description in Table 6 shows that firms perform above or similarly to their industries, based on changes from years -2 to -1.

Important to interpreting these results is the potential impact of survivorship bias. If the most successful firms leave the sample prior to year +3 due to an IPO, this will downward bias our results. On the other hand, if firms exit due to Chapter 11 or a distressed restructuring, the remaining sample will look relatively better. Therefore, returns from year -1 to the last year may be most informative. Panel B demonstrates the variability in performance from year -1 to last, depending on outcome. The gains for the IPO and secondary buyout samples are substantially greater, though the industry adjusted measures even for these groups (most comparable to prior research) are still not largely significant. To address concerns of sample selection bias, we also rerun our results in Table 6 (not reported) eliminating 28 firms for which we have post-buyout data, but which did not use public debt to finance the buyout – the remaining firms therefore report post-buyout financial data regardless of the ultimate reason for exit. The results are qualitatively similar to those reported.

We also consider the possibility that the buyout firms generate significant gains in operating performance, but that those gains are captured by the deals' financial sponsors. When private equity sponsors are involved, management and "monitoring" fees are typically expensed within the firms' operating cash flows. These fees, however, are described in the proxy statements or other SEC filings at the time of the buyout for 66 of the 94 firms in our post-buyout performance sample.<sup>23</sup> To understand the magnitude of their impact on measured

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<sup>22</sup> Bharath and Dittmar (2008) show that factors driving firms to go private have changed since the 1980s. Mehran and Peristiani (2008) argue that free cash flow/agency problems influence the decision to go private in the 1980s but not in later periods.

<sup>23</sup> Two types of fee agreements are typically observed between sponsors and the buyout firm: 1) management fees, most often specified in dollar amount per year (mean of \$1.5 million and maximum of \$23.9 million per year in our sample); 2) subsequent transactions fees, per a transaction advisory agreement, ranging from 1% to 2% of the transaction value. We include only the first type in our calculations.

performance, Table 7 reports the unadjusted performance changes for these 66 firms; we report results with and without adding back disclosed fees to the reported EBITDA. Particularly for net cash flow/sales, there is a non-negligible impact on observed performance, with a median increase of over 2.7% for year +3.<sup>24</sup>

#### *IV.B. Explanations for post-buyout operating performance.*

The variables used to proxy for factors related to operating gains are summarized in Table 8 for the 94 firms with post-buyout data, and are described as follows:

1) *Management incentives.* The alignment of management incentives with shareholders is expected to be greater when management contributes a greater proportion of equity financing for the buyout. Management contributes some fraction of the equity in 58 of the 94 deals (62%, Panel A); for 44 of these cases with sufficient information in SEC filings, we observe on average management contributes 12.8% of the equity (Panel B).

2) *Benefits of increased debt.* Higher debt may reduce agency costs by disciplining management, as well as increasing tax shields. We measure debt relative to pre-buyout cash flow (EBITDA) rather than as a percentage of capital, as capital also reflects deal pricing. While median pre-buyout leverage is not high (median debt/EBITDA at year -1 of 1.9), the leverage increases are large, increasing by 4 times EBITDA on average.

3) *Improved governance and monitoring.* We use several variables to represent potential monitoring by a private equity (PE) firm. We include a variable for “club” deals, in which more than one PE firm participates, perhaps reducing incentives to monitor. 26 deals in our sample (27.7%) have more than one PE firm involved. PE firms are also active in governance on the board of the portfolio firm, holding one half of the board seats on average (“sponsor director

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<sup>24</sup> Since we consider only operating cash flows, the measures reported in Table 5 do not reflect the impact of dividends paid to financial sponsors (or fees paid to financial sponsors for subsequent financing transactions, acquisitions, or divestitures) on returns to other providers of buyout capital.

ratio”). Lastly, PE firms are active in the selection of management for the portfolio firm; 35 firms (37.2%) replace the CEO at the time of the buyout or within the first year.<sup>25</sup> We also control for whether the post-buyout CEO also holds the position of Chairman; if management is not replaced and the CEO is also Chairman, he or she retains substantial control, perhaps reflecting the PE firm’s belief that reducing the influence of pre-buyout management would not lead to improved performance. Greater monitoring by bank lenders (bank loan/total debt) may also substitute for monitoring by financial sponsors.

4) *Other pre-buyout characteristics and activities while private.* The ability to improve operating performance may be greatest for firms which are underperforming pre-buyout, which we measure by return on sales (EBITDA/sales) in year -1. The firms in our sample are also active in buying and/or selling assets while private, even when these activities are not described at the time of the buyout. Financial sponsors of the buyout may serve as advisors for these transactions (often collecting a transactions fee), perhaps reducing the likelihood of poorly devised acquisition strategies, or helping firms to restructure by divesting certain divisions. We use information from the statement of cash flows to identify acquisitions and asset sales; over half of the sample firms are involved in purchases or sales of at least \$10 million in any of the first three years following the buyout.<sup>26</sup>

The cross sectional regressions for post-buyout operating performance are reported in Table 9, first for deals which have reached an outcome (regressions 1-4) and then for the full sample (regressions 5-6). The dependent variables are the level of post-buyout cash flows in the final year prior to the deal outcome (ROS at last year) or the change in cash flows from the year

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<sup>25</sup> Kaplan, Klevanov and Sorensen (2007) discuss CEO selection processes for PE firms.

<sup>26</sup> Some sample firms make a substantial number of large acquisitions once private. For example, SunGard Data Systems, which was taken private in 2005, has so far disclosed 14 acquisitions of firms in related businesses while private.

prior to the buyout to the last post-buyout year. All regressions control for the deal size (ln (total buyout capital)). Year dummies (not reported) are not significant, but we include a dummy variable for deals completed after 1999 (also not significant). Results are similar for the subset of deals with post-buyout public debt, which continue to file 10Ks regardless of the deal outcome.

Each regression also controls for performance at year -1 (relative to the matching firm), and for the matching firm's performance at the last year. The level of post-buyout performance is positively related to that of the matching firm. However, we do not find evidence that firms with lower pre-buyout return on sales perform better or show greater improvement post-buyout.

The regressions in Table 9 also do not show evidence that deals with higher management equity contributions (management/total equity) perform better. However, the changes in leverage are systematically related to cash flow performance. Both firms with higher pre-buyout leverage, and firms with greater increases in leverage as a result of the buyout, show better cash flow performance. These results are consistent with the disciplining effect of higher debt for the post-buyout firm.<sup>27</sup> The coefficient for the fraction of debt from senior bank lenders (not reported) is not significant.

For the variables related to monitoring by the PE firm, we find that the management change variable is consistently positively related to cash flow performance. We control for whether the CEO is also Chairman (positive and significant), and find that the positive effect of a management change is reduced when the CEO is also Chairman. Controlling for board size, the fraction of board seats held by the PE firm is negative. This does not necessarily imply a

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<sup>27</sup> It is also possible that PE firms use greater leverage for firms with better prospects. A key result of Axelson et al (2007), that buyout leverage is largely driven by current lending rates, is not consistent with this interpretation. Based on their results, we estimate a two stage least squares model using inflation adjusted leveraged loan interest rates (available for deals 1997 and later) as an instrument for leverage. Regressing post-buyout performance on the instrumented leverage along with other variables used in our OLS regressions, the results are qualitatively the same as reported in Table 9.

negative role for the PE firm in the governance process; an alternative explanation for this finding is that firms with more problematic operations may require more direct intervention by the PE firm on the board.<sup>28</sup> Lastly, the regressions show that cash flow performance is not significantly different for “club” deals involving more than one PE firm. Cash flow performance also appears unrelated to the asset sale and acquisition behavior of companies while private.

Overall, the leverage changes and governance activities appear important in explaining operating gains. These operating gains, in turn, are a key source of the value created by these deals, i.e. the returns to invested capital. In the next section, we examine this relationship directly, as well as other potential sources of value changes.

## **V. Explaining returns to pre- and post-buyout capital.**

Given the large returns to capital documented in Table 5, it may be puzzling that the improvements in operating cash flows, at least on average, are of relatively small magnitude. In this section, we examine potential determinants of returns to pre- and post-buyout capital including operating gains, working capital improvement, sector-wide changes in valuation multiples, and deal pricing.

Table 10 reports results for regressions where the dependent variable is the S&P adjusted return to pre- or post-buyout capital. As above, we report results both for the subsample of deals which have reached an outcome, as well as the full sample of all firms where returns could be estimated. We report [in brackets] standardized regression coefficients, allowing us to better compare magnitudes of effects across coefficients. As expected, operating performance changes, measured as the unadjusted change in return on sales from year -1 to the last year available, are strongly related to the returns to either pre- or post-buyout capital. For example, from regression

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<sup>28</sup> See also Cornelli and Karakas (2008).

(1), a one standard deviation increase in the change in operating performance is associated with a 0.34 standard deviation increase in the return to pre-buyout capital.

If post-buyout firms are operated at more efficient levels of working capital, the cash that is freed up could be used to pay dividends or to sustain higher leverage. These distributions would potentially increase returns to the capital invested, though our measure of cash flow performance would be unaffected. Although we observe a significant increase in the ratio of sales to working capital for the sample firms, the regression in Table 10 show that this change is not significantly related to the returns.<sup>29</sup>

Independent of changes in operations, the change in value of the sample firms will be affected by changes in overall market valuations. For each firm, we measure the concurrent change (from the pre-buyout year to the last available post-buyout year) in the ratio of capital to EBITDA for firms in the S&P 500, as well as the change for firms in the same SIC industry portfolios. From Table 8, we observe in particular that the changes in industry valuation multiples during the time the firms are private are on average positive. The regressions in Table 10 show that the change in the industry valuation multiple, relative to the change for the S&P 500, is important in explaining the returns. Thus, at least ex-post, the buyout firms have benefited from investing in industries whose valuations increased relative to the overall market during the investment period.

The remaining variables are related to the deal pricing. A lower price paid in the buyout should be associated with higher returns to post-buyout capital, but does not necessarily help pre-buyout capital. Our measure of deal pricing, industry adjusted EBITDA/capital, is positively related to the return to post-buyout shareholders only for regression (4), and is not significant for any other regressions including those for the return to pre-buyout capital (similar results are

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<sup>29</sup> Improvements in working capital usage are documented by Smith (1990) for MBOs in the 1980s.

obtained using an unadjusted pricing measure). The premium paid, however, is not significant in any regressions (not reported).

The variable indicating “club” deals is positive and significant across all specifications. One possible explanation for this result is that there is less competitive bidding for these deals. However, the club PE variable is significant for both returns to pre- and to post-buyout capital; if the impact of the club PE variable is simply to lower the price paid to selling shareholders, this would increase the return to post-buyout capital but should be unrelated to pre-buyout capital’s return.

We address this issue further by directly measuring whether there is competition in bidding for the firm, using a measure of competition based on Boone and Mulherin (2007).<sup>30</sup> To characterize the bidding process, we identify the number of potential buyers making written private bids before the merger announcement, and the number of potential buyers making public bids. We define the variable “competition” as a dummy variable that equals 1 if there are multiple bidders making either private or public bids. This measure of competition, however, is insignificant in all regressions except regression 6, as is the interaction of Club PE and competition. Our results for the Club PE variable are robust to other non-linear specifications of our control variable for deal size.

Thus, our evidence appears more consistent with an alternative explanation; deals which are particularly attractive ex-ante based on their prospects at the time of the buyout may be more likely to be shared between more than one PE firm. Panel B of Table 10 further addresses this issue using a two step treatment effects model.<sup>31</sup> In the first step (the treatment equation), we

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<sup>30</sup> Following Boone and Mulherin (2007), we obtain information on the details of the pre-public, private bidding process for each firm from the background section of 14A and S-4 filings (for mergers) and 14D filings (for tender offers).

<sup>31</sup> The estimators are derived in Maddala (1983) and Green (1999).

estimate a probit model for the Club PE indicator variable, using the subset of observations where management projections are provided at the time of they buyout. In addition to deal size, projected sales growth is in fact significantly related to Club PE. From the probit estimates, the hazard rate for each observation is computed following Maddala (1983), which is used in the second step regression in addition to the variables used for our OLS model. The coefficient for the hazard rate is not significant in the second step regressions. The significance of the remaining variables, in particular the industry valuation multiple change and the Club PE variable, are similar to Panel A, and support our interpretation of the OLS regressions.

Overall, it is striking to observe high realized returns to invested capital yet relatively small average operating gains for the buyout firms. The regressions show, however, that the returns are cross sectionally related not just to operating gains but also to changes in sector valuations and the presence of multiple PE firms. Comparison of the standardized regression coefficients for these effects also helps in understanding why the magnitude of the returns appears substantially greater than one might expect based solely on the operating gains.

We also consider that PE firms may exit in favorable market conditions before the benefits of operational changes show up in realized cash flows. For the subsample of firms exiting via an IPO, however, the cash flow improvements from pre-buyout to the first or second year *post*-IPO are not substantially greater than those we report earlier.

The ability of private equity firms to purchase firms and later exit at a higher valuation multiple, producing substantial returns, also may be explained in part by credit market conditions, particularly late in our sample period. By taking on large amounts of cheaply priced debt, firms can lower their WACC and therefore increase their valuation multiple.<sup>32</sup> While

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<sup>32</sup> The authors are thankful to Jeremy Stein for suggesting this explanation. Demiroglu and James (2007) also discuss the relationship between credit spreads and LBO valuations.

growth in the junk bond market may have fueled the buyout boom of the 1980s, the impact of collateralized debt obligation (CDO) packaging of senior bank debt on credit spreads may have served that role more recently. For our sample period, we do not find that year dummies (either for the year of the buyout or the year of exit) are helpful in explaining returns, however.

## **VI. Conclusions.**

This paper examines whether, and how, leveraged buyouts from the most recent wave of public to private transactions create value. While earlier literature focuses almost entirely on buyouts from 1980-1989, largely consisting of management buyouts, we show that the deals completed in the most recent peak of activity differ in a number of important respects. For a sample of 192 buyouts of over \$100 million completed between 1990 and 2006, we show that these deals are somewhat more conservatively priced and lower levered than their predecessors from the 1980s, but that the deals still impose substantial default risk on the firms. The deals we examine frequently involve more than one private equity sponsor, and frequently involve significant asset restructuring (asset sales and/or acquisitions) while private.

For LBOs with post-buyout data available, the returns to either pre- or post-buyout capital invested on average are large and positive, and are positive for all outcome groups except those ending in a distressed restructuring. However, gains in operating performance are either comparable to or slightly exceed those observed for benchmark firms matched on industry and pre-buyout characteristics, depending on the measure of performance and the post-buyout period considered. The magnitude of cash flow gains does not approach that documented for deals from the 1980s buyout wave, and may appear small relative to the returns we document.

We then relate the observed post-buyout operating performance to a number of variables which proxy for factors suggested by theories of how buyouts may create value. Consistent with the benefits of higher debt, cash flow gains are greater for firms with higher pre-buyout leverage, and for firms with greater increases in leverage as a result of the buyout. Cash flow performance is also greater when the private equity firm has replaced the CEO at or soon after the time of the buyout.

Finally, we show that in addition to operating gains, returns to pre- or post-buyout capital are positively related to concurrent increases in industry valuation multiples, as well as to the presence of multiple PE sponsors. Without significant operating gains, however, it is unclear whether the returns we document can persist under less favorable credit and general market conditions. This concern applies as well to the record levels of buyout activity outside the U.S. over this period.<sup>33</sup> Overall, our results provide insights into the sources of value in transactions from the most recent wave of leveraged buyouts.

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<sup>33</sup> Weir, Jones and Wright (2008) document relatively small operating gains for U.K. buyouts over this time period.

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## Appendix - Matching procedures for benchmark adjusted cash flow changes.

### *1. Industry median adjustment.*

Similar to Kaplan (1989), we use the industry median as the benchmark. Firms in the same industry as the buyout company must have (1) the same four-digit SIC code (three- or two-digit level when fewer than three industry matches are found), (2) total assets of at least \$50 million at the end of the year before the buyout, and (3) financial data in the first full year after the buyout.

### *2. Industry, level of performance, change in performance, and market to book ratio of assets matching.*

We follow Lie (2001) and Grullon and Michaely (2004) with some small modifications. We choose matching firms that closely resemble the sample firms in industry classification, level of performance in year  $-1$  (the year before the buyout), change in performance in year  $-1$ , and market-to-book ratio of assets in year  $-1$ . The comparison group includes firms that have the following characteristics: (1) the same two-digit SIC code as the buyout firm, (2) a level of operating performance between 80%-120% or within  $\pm 0.01$  of the level of the sample firm's performance in year  $-1$ , (3) a change in operating performance between 80%-120% or within  $\pm 0.01$  of the sample firm's change in operating performance in year  $-1$ , (4) a market-to-book ratio between 80%-120% or within  $\pm 0.1$  of the sample firm's market-to-book ratio in year  $-1$ , (5) financial data available in the first full year after the buyout.

If we find no matching firms, we first, change the SIC code restriction to one-digit. Next, we impose no SIC code requirement. If we find no matching firms, we choose the firms that minimize the sum of the absolute differences in level of performance, change in performance, and market-to-book ratio between sample firm and the matching firms. If there are still no matching firms (or the sample firm doesn't have sufficient data for this matching method), we use the industry and level of performance matching method described above.

We keep (up to) 5 firms that have the smallest sum of the absolute differences in level of performance, change in performance, and market-to-book ratio between sample firm and the matching firms and use the median as our benchmark.

### *3. Industry and level of performance matching (not reported).*

We follow Barber and Lyon (1996). The comparison group includes all firms with (1) the same two-digit SIC code, (2) performance measure (EBITDA/Sales or NCF/Sales) within 90%-110% of the buyout firm's performance in the year before the buyout, (3) financial data in the first full year after the buyout. When we cannot find matching firms with the above criteria, we use an alternative rule with three steps. First we attempt to loose the restriction on SIC code to the one-digit level. If we still find no matching firms, we match performance within the 90%-110% filter using all firms without restriction on SIC code. If we still find no matching firms, we choose the firm with performance closest to the buyout firm with no restriction on SIC code. The benchmark is the median of the comparison group.

**Table 1 – Annual Medians for Deal Pricing**

Sample consists of 192 leveraged buyouts completed between 1990 and July 2006 with deal values of at least \$100 million. Post-buyout data is available for 94 firms from 10Ks or other SEC filings. Capital is defined as the sum of the market value paid for the firm's equity, the amount paid for outstanding debt, the book value of debt retained, and fees paid in the transaction, minus cash removed to finance the buyout. Market EBITDA to Capital ratio is based on the value-weighted S&P500 component firms in the month before the buyout is announced. The buyout premium is defined as the percentage difference between the price per share paid for the firm's equity and the price one month before the buyout announcement. The significance of difference in medians is based on two-sample Wilcoxon rank-sum (Mann-Whitney) test. \*\*\*, \*\*, and \* indicate significance at the 1, 5, and 10 percent level, respectively.

<i>Year</i>	<i>No. of LBOs</i>	<i>Capital (\$mil)</i>	<i>EBITDA to capital (%)</i>	<i>Market EBITDA to capital (%)</i>	<i>EBITDA to capital less market EBITDA to capital (%)</i>	<i>Premium (%)</i>
<i>Full Sample</i>						
1990-1996	14	380.1	10.83	10.53	0.90	30.3
1997	15	399.7	8.76	8.59	0.18	25.0
1998	16	319.5	10.77	7.97	2.62	24.8
1999	33	350.6	12.51	6.98	5.46	28.7
2000	19	486.2	15.06	6.69	8.37	50.0
2001	6	386.3	18.65	7.81	10.85	44.6
2002	11	538.3	14.11	8.19	5.74	33.7
2003	9	237.0	10.91	7.69	2.92	42.2
2004	14	1,827.3	11.18	7.47	3.71	18.2
2005	29	647.6	10.54	7.72	2.86	29.5
2006	26	1,231.2	8.95	8.23	0.86	20.7
Total 1990-2006	192	463.7	11.37	7.72	3.45	29.2
<i>Subsample with post-buyout data available</i>						
1990-1996	12	437.9	11.97	10.49	1.64	30.3
1997	11	558.7	8.67	8.59	-0.11	18.6
1998	11	420.8	10.05	8.10	1.43	20.5
1999	21	457.4	12.35	6.98	5.45	33.3
2000	9	655.6	15.70	6.74	8.96	53.9
2001	5	321.1	17.71	7.86	9.62	50.9
2002	9	538.3	14.95	8.19	5.88	33.7
2003	3	445.4	10.91	7.69	2.92	-2.9
2004	5	2162.5	11.51	7.40	3.97	19.1
2005	8	846.3	9.59	7.74	1.90	25.0
Total w/ post data, 1990-2005	94	509.3	12.43	7.70	4.25	28.9
Total (1990-2005)	166	448.2	11.54	7.68	3.97	29.9
(1) w/ post data	94	509.3	12.43	7.70	4.25	28.9
(2) w/o post data	72	336.9	11.26	7.58	3.81	31.3
Difference in medians (1)-(2)		(+) <sup>***</sup>	(+)	(+) <sup>**</sup>	(+)	(-)

**Table 2 – Deal Financing: Annual Medians of Aggregate Debt Levels and Coverage Ratios**

Pre-buyout debt, post-buyout debt, and common stock values are as described in SEC filings at the time of the buyout. Post-buyout debt is equal to the sum of new debt issued to finance the buyout and pre-buyout debt retained. Total equity includes common and preferred stock. EBITDA is measured in the last full year before the buyout announcement. Interest payments and required debt principal payments are as projected in documents describing the buyout. Medians between subsamples with and without post-buyout data are not significantly different for any variables. Number of observations is shown in parentheses.

Year	<i>pre-buyout debt to capital (%)</i>		<i>post-buyout debt to capital (%)</i>		<i>change in debt to capital (%)</i>		<i>pre-buyout debt to EBITDA ratio</i>		<i>post-buyout debt to EBITDA ratio</i>		<i>Total equity to capital (%)</i>		<i>EBITDA to interest</i>		<i>EBITDA to interest + (princ in 2 yrs/2)</i>	
<i>Full Sample</i>																
1990-1996	21.2	(14)	72.2	(14)	52.0	(14)	1.5	(14)	6.1	(14)	28.5	(14)	1.63	(14)	1.42	(11)
1997	22.2	(15)	70.5	(15)	59.0	(15)	1.7	(15)	6.8	(15)	29.5	(15)	1.67	(15)	1.32	(12)
1998	27.5	(16)	75.1	(16)	35.4	(16)	3.3	(16)	6.9	(16)	24.7	(16)	1.66	(16)	1.47	(13)
1999	29.3	(33)	71.2	(33)	39.3	(33)	2.6	(33)	5.6	(33)	28.8	(33)	1.77	(33)	1.59	(23)
2000	39.5	(19)	70.8	(19)	32.2	(19)	2.5	(19)	4.8	(19)	29.2	(19)	2.08	(17)	1.76	(12)
2001	46.2	(6)	67.8	(6)	28.2	(6)	2.7	(6)	4.2	(6)	32.8	(6)	2.80	(6)	1.49	(4)
2002	28.2	(11)	62.9	(11)	39.3	(11)	1.7	(10)	4.8	(10)	32.9	(11)	2.74	(10)	2.47	(6)
2003	27.3	(9)	64.4	(9)	39.1	(9)	3.1	(9)	5.8	(9)	34.1	(9)	2.21	(9)	2.15	(6)
2004	31.5	(14)	75.2	(14)	47.7	(14)	2.9	(14)	6.4	(14)	28.7	(14)	2.82	(11)	2.34	(6)
2005	15.3	(29)	69.0	(29)	49.8	(29)	1.3	(29)	6.5	(29)	32.9	(29)	2.09	(26)	1.69	(15)
2006	7.9	(26)	66.1	(26)	52.3	(26)	0.7	(24)	6.8	(24)	33.9	(26)	1.75	(22)	1.31	(11)
Total	23.7	(192)	69.9	(192)	45.7	(192)	1.8	(189)	6.0	(189)	30.4	(192)	1.87	(179)	1.61	(119)
Total 1990-2005	25.2	(166)	70.5	(166)	41.5	(166)	2.1	(165)	5.9	(165)	29.8	(166)	1.90	(157)	1.62	(108)
<i>Subsample with post-buyout data available</i>																
1990-1996	21.2	(12)	71.3	(12)	52.0	(12)	1.5	(12)	6.0	(12)	29.7	(12)	1.75	(12)	1.47	(10)
1997	15.6	(11)	69.0	(11)	60.0	(11)	1.4	(11)	6.9	(11)	30.8	(11)	1.62	(11)	1.40	(9)
1998	24.5	(11)	75.5	(11)	40.7	(11)	2.6	(11)	6.8	(11)	24.9	(11)	1.67	(11)	1.51	(10)
1999	29.9	(21)	71.2	(21)	36.6	(21)	2.9	(21)	5.9	(21)	28.8	(21)	1.77	(21)	1.46	(15)
2000	39.5	(9)	72.3	(9)	32.8	(9)	2.5	(9)	4.6	(9)	27.7	(9)	2.11	(8)	1.79	(6)
2001	50.6	(5)	77.0	(5)	27.0	(5)	2.9	(5)	4.4	(5)	24.3	(5)	2.62	(5)	1.49	(4)
2002	28.2	(9)	62.9	(9)	39.3	(9)	1.8	(9)	4.7	(9)	37.2	(9)	2.80	(9)	2.47	(6)
2003	7.1	(3)	60.4	(3)	56.9	(3)	0.4	(3)	5.5	(3)	39.6	(3)	2.66	(3)	2.53	(3)
2004	18.0	(5)	67.4	(5)	48.0	(5)	1.8	(5)	6.0	(5)	32.6	(5)	2.78	(5)	2.16	(5)
2005	11.5	(8)	72.2	(8)	49.6	(8)	1.1	(8)	7.5	(8)	28.2	(8)	1.82	(8)	1.43	(5)
Total 1990-2005	23.9	(94)	70.7	(94)	44.3	(94)	1.9	(94)	5.8	(94)	29.4	(94)	1.89	(93)	1.59	(73)

**Table 3 – Deal Financing: Debt Characteristics**

Characteristics of debt financing used to finance the buyout are identified from Dealscan, Dealogic, and SEC filings. Public Debt includes Rule 144A bonds. Strip financing is defined as cases where a lender also provides equity financing for the transaction.

<i>Year</i>	<i>No. of LBOs</i>	<i>Average Bank debt to capital (%)</i>	<i>Private debt (% of deals)</i>	<i>Average Private debt to capital (%)</i>	<i>Public debt (% of deals)</i>	<i>Average Public debt to capital (%)</i>	<i>PIK or discount debt (% of deals)</i>	<i>Ave PIK+ discount debt to capital (%)</i>	<i>Strips (% of deals)</i>	<i>Average strip debt to capital (%)</i>
<i>Full sample</i>										
1990-1996	14	28.1	42.9	15.2	57.1	27.6	7.1	1.4	21.4	7.5
1997	15	33.8	26.7	3.9	86.7	32.5	20.0	3.1	0	0
1998	16	38.6	37.5	6.4	62.5	20.7	37.5	6.3	18.8	2.3
1999	33	44.3	54.5	11.9	36.4	11.0	36.4	8.0	30.3	6.6
2000	19	42.3	68.4	18.9	21.1	6.9	42.1	8.0	10.5	2.1
2001	6	39.7	50.0	13.6	33.3	11.0	33.3	5.7	16.7	4.1
2002	11	22.5	27.3	8.2	54.6	19.8	18.2	2.1	9.1	1.7
2003	9	37.5	22.2	8.8	44.4	17.8	0	0	22.2	6.5
2004	14	43.4	28.6	10.4	50.0	17.9	28.6	4.7	0	0
2005	29	39.6	24.1	6.3	41.4	13.5	6.9	0.9	6.9	2.4
2006	26	44.0	34.6	9.8	34.6	8.8	19.2	1.5	7.7	2.5
Total	192	39.1	39.1	10.2	45.3	15.7	23.4	4.0	13.5	3.3
Total (1990-2005)	166	38.3	39.8	10.3	46.9	16.8	24.1	4.4	14.5	3.4
<i>Subsample with post-buyout data available</i>										
1990-1996	12	24.6	33.3	13.7	66.7	32.2	0	0	16.7	6.14
1997	11	25.6	27.3	4.4	100	37.2	27.3	4.2	0	0
1998	11	28.8	36.4	6.3	81.8	29.3	45.5	8.4	18.2	1.72
1999	21	39.9	52.4	9.9	52.4	16.0	47.6	11.3	38.1	7.04
2000	9	38.5	66.7	17.0	44.4	14.5	33.3	8.7	0	0
2001	5	39.0	40.0	13.7	40.0	13.2	40.0	6.8	20.0	4.85
2002	9	24.4	11.1	0.1	66.7	24.2	11.1	0.5	0	0
2003	3	19.6	0	0	100	44.6	0	0	0	0
2004	5	31.9	20.0	1.3	100	29.8	40.0	2.8	0	0
2005	8	28.2	25.0	5.2	87.5	29.1	0	0.0	0	0
<i>1990-2005</i>										
(1) Total (w/ post data)	94	31.2	36.2	8.1	70.2	25.3	27.7	5.4	13.8	2.8
(2) Total (w/o post data)	72	47.5	44.4	13.1	16.7	5.6	19.4	3.1	15.3	4.2
Mean difference: (1)-(2)		(-) <sup>***</sup>		(-) <sup>*</sup>		(+) <sup>***</sup>		(+)		(-)

**Table 4 - Post-buyout deal outcomes**

The table reports post-buyout outcomes for the full sample of 192 buyouts as well as the 94 deals with post-buyout data available. The number of observations is reported, followed in parentheses by the number of those observations having post-buyout data.

Outcome:	(1)	(2)	(3)	(4)	(5)	Total
LBO Announcement Year	IPO	Sold	2nd LBO	Chapter 11	still private or unknown	
1990-1996	3 (3)	4 (3)	1 (1)	5 (4)	1 (1)	14 (12)
1997	5 (5)	2 (2)	2 (2)	3 (2)	3 (0)	15 (11)
1998	2 (2)	3 (2)	2 (1)	6 (4)	3 (2)	16 (11)
1999	6 (6)	8 (6)	5 (4)	6 (3)	8 (2)	33 (21)
2000	5 (5)	4 (2)	2 (1)	1 (0)	7 (1)	19 (9)
2001	2 (1)	1 (1)	2 (2)	1 (1)	0 (0)	6 (5)
2002	2 (2)	2 (1)	2 (2)	0 (0)	5 (4)	11 (9)
2003	2 (2)	0 (0)	1 (0)	0 (0)	6 (1)	9 (3)
2004	1 (1)	3 (0)	0 (0)	0 (0)	10 (4)	14 (5)
2005	1 (1)	1 (0)	0 (0)	0 (0)	27 (7)	29 (8)
2006	0 (0)	0 (0)	0 (0)	0 (0)	26 (0)	26 (0)
Total (1990-2006)	29 (28)	28 (17)	17 (13)	22 (14)	96 (22)	192 (94)
Percent of deals, N/192 (N/94)	15% (30%)	15% (18%)	9% (14%)	11% (15%)	50% (23%)	100% (100%)
Median months to outcome	35.1	62.5	50.7	56.9	--	53.4

**Table 5 – Realized returns to pre- and post-buyout capital**

The nominal return on capital is calculated as the sum of all interim payments to capital from the buyout completion to the outcome date, plus a terminal value estimated at the outcome date, divided by total capital, minus one. Interim payments to capital equals the sum of cash interest and debt principal repaid, dividends, and equity repurchased, net of proceeds from new debt and equity issues. Terminal value is the total dollar value received by capital at the outcome date. Value at the outcome date is determined from the observed value at exit from Chapter 11, sale of the firm, or at the time of an IPO, or is estimated as a multiple of EBITDA if not observable. Pre-buyout capital is measured of the last fiscal quarter ending at least one month prior to the buyout completion. S&P adjusted return discounts payments to capital by the return on the S&P500. Industry adjusted return discounts payments to capital by the Fama-French 49 industry portfolio return. Chapter 11 outcome group includes one firm completing an out of court debt restructuring. Significance levels are based on two-tail t-test for means and Wilcoxon signed-ranks test for medians. \*\*\*, \*\*, and \* indicate significance level at 1, 5, and 10 percent respectively.

Outcome	Capital	N	Nominal return on capital			S&P adjusted return			Industry adjusted return		
			Mean	Median	# of positive returns	Mean	Median	# of positive returns	Mean	Median	# of positive returns
1. IPO	Pre	28	232.5%***	150.7%***	28	181.2%***	118.4%***	26	126.9%***	71.3%***	25
	Post	28	151.9%***	87.4%***	27	128.5%***	73.9%***	26	100.8%**	37.7%***	22
2. Acquired	Pre	14	125.9%***	114.0%***	13	83.6%**	46.9%**	12	103.0%**	52.4%**	11
	Post	14	76.4%***	58.4%***	12	57.0%**	30.5%**	11	82.5%*	16.1%	9
3. 2 <sup>nd</sup> LBO	Pre	12	137.5%**	105.7%***	11	110.3%***	118.7%**	10	104.0%**	89.0%**	10
	Post	12	101.6%**	73.5%***	11	75.6%***	78.3%***	10	74.7%**	51.3%**	11
4. Chapter 11	Pre	14	-24.4%	-26.3%	4	-43.8%**	-40.5%**	3	-31.4%	-34.4%*	3
	Post	14	-48.8%***	-53.5%***	3	-57.2%***	-60.3%***	1	-47.1%***	-48.7%**	1
5. Still private or unknown	Pre	22	165.2%***	141.4%***	21	98.8%***	89.4%***	21	79.4%***	64.8%***	20
	Post	22	101.9%***	73.8%***	20	58.3%***	45.6%***	19	40.1%***	35.0%***	18
Total (1-5)	Pre	90	146.9%***	104.8%***	77	101.4%***	78.2%***	72	83.9%***	51.2%***	69
	Post	90	90.0%***	65.8%***	73	64.3%***	36.4%***	67	56.6%***	25.1%***	61
Total(1-4)	Pre	68	140.9%***	97.3%***	56	102.3%***	71.5%***	51	85.4%***	51.0%***	49
	Post	68	86.1%***	65.5%***	53	66.2%***	32.1%***	48	62.0%***	22.2%***	43

**Table 6 – Changes in operating performance from pre-buyout period to post-buyout period**

Panel A reports median changes in cash flow performance relative to the fiscal year ending prior to completion of the buyout (year -1). Year +1 is the first full fiscal year following the year of buyout is completion. Last Year is the last post-buyout fiscal year available prior to the deal outcome or the last available fiscal year for deals still private. Panel B reports median changes in cash flow performance from year -1 to last year grouped by outcome. Adjusted percentage change equals the difference between the change for the buyout company and the change for the median of a portfolio of matching firms. Industry adjusted change subtracts the median for firms in the same four-digit SIC code. Industry & performance & M/B (*Ind&perf.&M/B*) adjusted change matches on the change in performance from years -2 to -1, and the market to book ratio of assets at year -1 (see appendix for matching methodology). Net cash flow is defined as EBITDA minus capital expenditures. Data is obtained from Compustat, 10Ks, and other SEC filings. Significance levels of medians are based on a two-tailed Wilcoxon rank test. a, b, and c denote levels that are significantly different from zero at the 1%, 5%, and 10%, respectively. Number of observations (positive observations) is reported below statistics.

Panel A	Change in operating performance from year <i>i</i> to year <i>j</i>					
	-2 to -1	-1 to +1	-1 to +2	-1 to +3	-1, last year	-1, last year: deals with outcome
<b>Cash-flow measures</b>						
<i>EBITDA/sales</i>						
Unadjusted change	0.007 <sup>a</sup>	-0.003 <sup>c</sup>	-0.018 <sup>a</sup>	-0.017 <sup>a</sup>	-0.015 <sup>a</sup>	-0.012 <sup>b</sup>
Unadjusted percentage change	5.55% <sup>a</sup>	-1.89%	-10.60% <sup>a</sup>	-8.89% <sup>a</sup>	-6.88% <sup>a</sup>	-5.99% <sup>b</sup>
# observations (# positive)	94 (58)	84 (35)	56 (17)	46 (15)	94 (31)	72 (26)
Industry adjusted change	0.003	0.007	0.005	0.000	-0.002	0.004
Industry adjusted percentage change	2.12%	2.29%	3.13%	0.92%	-0.84%	0.65%
# observations (# positive)	94 (55)	84 (48)	56 (32)	46 (23)	94 (46)	72 (38)
<i>Ind&amp;perf.&amp;M/B</i> adjusted change	-0.001	0.010 <sup>b</sup>	0.014 <sup>c</sup>	0.002	0.009	0.010
<i>Ind&amp;perf.&amp;M/B</i> adjusted percentage change	-0.47%	7.83% <sup>b</sup>	10.76% <sup>b</sup>	1.57%	4.26%	5.27%
# observations (# positive)	94 (42)	84 (51)	55 (33)	44 (24)	94 (52)	72 (42)
<i>Net cash flow/sales</i>						
Unadjusted change	0.014 <sup>a</sup>	0.003	-0.003	-0.008	-0.007	-0.002
Unadjusted percentage change	15.24% <sup>a</sup>	2.61%	-2.50%	-5.03%	-4.98%	-1.80%
# observations (# positive)	94 (59)	83 (43)	55 (25)	46 (20)	94 (42)	72 (34)
Industry adjusted change	0.013 <sup>a</sup>	0.007	0.003	-0.004	-0.010	-0.008
Industry adjusted percentage change	13.12% <sup>a</sup>	5.70%	1.05%	-2.34%	-9.36%	-9.36%
# observations (# positive)	94 (57)	83 (46)	55 (31)	46 (21)	94 (44)	72 (34)
<i>Ind&amp;perf.&amp;M/B</i> adjusted change	0.001	0.012 <sup>c</sup>	0.009 <sup>b</sup>	0.008	0.012	0.017
<i>Ind&amp;perf.&amp;M/B</i> adjusted percentage change	0.58%	10.34% <sup>c</sup>	12.39% <sup>b</sup>	11.84%	11.18%	14.85%
# observations (# positive)	94 (52)	83 (45)	52 (32)	43 (26)	94 (57)	72 (45)

<b>Panel B</b>						
Change in operating performance from year -1 to last year, grouped by outcome						
Cash-flow measures	IPO	Sold	2 <sup>nd</sup> LBO	Chapter 11	Still private	All deals
<b><i>EBITDA/sales</i></b>						
Unadjusted change	-0.002	-0.028	0.006	-0.100 <sup>a</sup>	-0.024 <sup>a</sup>	-0.015 <sup>a</sup>
Unadjusted percentage change	-1.56%	-15.92%	4.77%	-58.34% <sup>a</sup>	-15.86% <sup>b</sup>	-6.88% <sup>a</sup>
# observations (# positive)	28 (13)	17 (5)	13 (8)	14 (0)	22 (5)	94 (31)
<i>Industry adjusted</i> change	0.018 <sup>b</sup>	-0.019	0.011	-0.057 <sup>a</sup>	-0.011	-0.002
<i>Industry adjusted</i> percentage change	12.17% <sup>b</sup>	-26.03%	10.55%	-39.28% <sup>b</sup>	-9.53%	-0.84%
# observations (# positive)	28 (22)	17 (6)	13 (8)	14 (2)	22 (8)	94 (46)
<i>Ind&amp;perf.&amp;M/B adjusted</i> change	0.020 <sup>a</sup>	0.011	0.018 <sup>b</sup>	-0.063 <sup>a</sup>	-0.003	0.009
<i>Ind&amp;perf.&amp;M/B adjusted</i> percentage change	11.36% <sup>a</sup>	6.94%	16.05% <sup>b</sup>	-50.10% <sup>a</sup>	-2.72%	4.26%
# observations (# positive)	28 (21)	17 (10)	13 (9)	14 (2)	22 (10)	94 (52)
<b><i>Net cash flow/sales</i></b>						
Unadjusted change	0.010	-0.028	0.033 <sup>a</sup>	-0.076 <sup>b</sup>	-0.012	-0.007
Unadjusted percentage change	8.22%	-26.72%	30.30% <sup>a</sup>	-66.87% <sup>b</sup>	-13.09%	-4.98%
# observations (# positive)	28 (17)	17 (5)	13 (10)	14 (2)	22 (8)	94 (42)
<i>Industry adjusted</i> change	0.013	-0.042 <sup>c</sup>	0.023	-0.037	-0.014	-0.010
<i>Industry adjusted</i> percentage change	15.94%	-44.65% <sup>c</sup>	11.89%	-37.86%	-10.72%	-9.36%
# observations (# positive)	28 (18)	17 (4)	13 (8)	14 (4)	22 (10)	94 (44)
<i>Ind&amp;perf.&amp;M/B adjusted</i> change	0.033 <sup>c</sup>	-0.004	0.046 <sup>b</sup>	-0.038 <sup>c</sup>	0.004	0.012
<i>Ind&amp;perf.&amp;M/B adjusted</i> percentage change	30.42% <sup>c</sup>	-3.61%	51.42% <sup>b</sup>	-29.45% <sup>c</sup>	3.23%	11.18%
# observations (# positive)	28 (22)	17 (7)	13 (11)	14 (5)	22 (12)	94 (57)

**Table 7 – Impact of management fees on changes in operating performance**

Changes in cash flow performance are as defined in Table 6, for the subsample of 66 firms for which SEC filings at the time of the buyout describe post-buyout fees to be paid to financial sponsors. “Adding back fees” adds management and monitoring fees disclosed at the time of the buyout to post-buyout realized EBITDA.

	Change in operating performance from year <i>i</i> to year <i>j</i>									
	-2 to -1	-1 to +1	-1 to +2	-1 to +3	-1 to +1	-1 to +2	-1 to +3	-1 to +1	-1 to +2	-1 to +3
Cash-flow measures										
		As reported			Adding back fees			Difference in median due to fee add-back		
<i>A. EBITDA/sales</i>										
Unadjusted change	0.005	-0.001	-0.016 <sup>b</sup>	-0.017 <sup>b</sup>	0.001	-0.015 <sup>c</sup>	-0.015 <sup>b</sup>	0.002	0.001	0.002
Unadjusted % change	3.31% <sup>b</sup>	-0.79%	-9.87% <sup>c</sup>	-13.68% <sup>b</sup>	0.69%	-9.37% <sup>c</sup>	-12.42% <sup>b</sup>	1.48%	0.50%	1.26%
# observations (# positive)	66 (38)	60 (28)	38 (15)	29 (10)	60 (31)	38 (16)	29 (10)			
<i>B. Net cash flow/sales</i>										
Unadjusted change	0.010 <sup>a</sup>	-0.001	0.002	0.000	0.001	0.003	0.001	0.002	0.001	0.001
Unadjusted % change	12.31% <sup>a</sup>	-0.56%	2.51%	1.23%	0.52%	3.14%	3.94%	1.08%	0.63%	2.71%
# observations (# positive)	66 (41)	60 (30)	38 (20)	29 (15)	60 (30)	38 (21)	29 (15)			

**Table 8 – Summary statistics for deal characteristics***Panel A*

Management equity participation is a dummy variable that equals 1 if management of the target contributes equity. Management change indicates there is a CEO change at or within a year of LBO completion. Post-LBO CEO is the chairman of the Board indicates the post-LBO CEO is also chairman. Single PE indicates there is a single private equity (PE) sponsor, while Club PE indicates there are two or more PE sponsors for the deal. Sells significant assets indicates the firm sells assets of more than \$10 million in any year during the 3-year post-buyout period. Makes significant acquisitions indicates the firm makes an acquisition with a value of at least \$10 million in any year during the 3-year post-buyout period. The percentage of deals is based on the 94 deals with post-buyout data available.

	<i># of deals</i>	<i>% of deals</i>
Management equity participation	58	61.7%
Single PE participation	67	71.3%
Club PE participation	26	27.7%
Management Change	35	37.2%
Post-LBO CEO is the chairman of the Board	48	51.1%
Sells significant assets while private	34	36.2%
Makes significant acquisitions while private	47	50.0%

*Panel B*

Pre-buyout leverage is measured at year -1. Leverage change is the difference between total debt at the buyout and total debt at year -1, divided by EBITDA at year -1. Bank loan/ total debt, board size, and capital are measured at the time of the buyout. Sponsor director ratio is defined as the number of directors from sponsors divided by total number of directors on board. Duration measures the number of fiscal years from the completion of buyout to exit if the deal reaches an outcome or the number of fiscal years to the last post-buyout year if the firm is still private. Asset sales/capital is the total value of asset sales during the 3-year period after completion of buyouts divided by post-buyout capital. Acquisition/capital is the total value of acquisitions made during the 3-year period after completion of buyouts divided by capital. Change in buyout firm multiple measures the change in capital/EBITDA from pre-buyout to last post-buyout year, and is reported here only for firms which have reached an outcome. Industry multiple and S&P multiple measure the concurrent change in capital/EBITDA for firms in the same industry group or in the S&P500.

	<i># of obs.</i>	<i>mean</i>	<i>median</i>
Management equity /total equity	44	12.8%	6.5%
Pre-buyout leverage (total debt/EBITDA)	94	2.58	1.90
Leverage change	94	4.03	3.70
Board Size	94	7.44	7
Sponsor director ratio	89	0.495	0.5
Bank loan/total debt	94	45.8%	49.1%
Asset sales/capital	34	21.7%	10.5%
Acquisition/capital	47	40.2%	22.2%
Capital (\$ mil)	94	945.3	509.3
EBITDA/capital	94	0.127	0.124
Duration (years)	94	3.86	3.32
Change in buyout firm multiple (-1, last)	61	-0.14	0.63
Change in industry multiple (-1, last)	94	1.65	1.23
Change in S&P multiple (-1, last)	94	-0.75	-0.82

**Table 9 – Regressions for post-buyout performance**

This table reports the multivariate regression results for post-buyout performance for subsample of deals that have reached an outcome and for the full sample. The dependant variable in models 1, 2, and 5 is return on sales (ROS) at last post-buyout fiscal year, measured as  $(EBITDA/sales)_{yr=last}$ ; the dependent variable in models 3, 4 and 6 is the unadjusted change in ROS from year -1 to the last post-buyout year. Adjusted ROS -1 is the matching firm adjusted ROS one year prior to buyout announcement. CEO\_chair indicates the CEO is also Chairman. Other independent variables are as defined in Table 8. *P*-values are in parentheses. All regressions are OLS with heteroskedasticity adjusted standard errors.

	<i>Subsample with outcome</i>				<i>Full sample</i>	
	(1)	(2)	(3)	(4)	(5)	(6)
	ROS at last yr	ROS at last yr	Unadj. Change in ROS (-1, last)	Unadj. Change in ROS (-1, last)	ROS at last yr	Unadj. Change in ROS (-1, last)
In (capital)	0.009 (0.489)	0.011 (0.432)	-0.016 (0.109)	-0.016 (0.120)	0.006 (0.602)	<b>-0.016</b> (0.067)
Adjusted ROS -1	0.171 (0.767)	0.203 (0.744)	-0.662 (0.285)	-0.672 (0.301)	0.381 (0.391)	-0.442 (0.336)
Matching firms' ROS at last yr	<b>0.711</b> (0.000)	<b>0.691</b> (0.000)			<b>0.722</b> (0.000)	
Matching firms' Chg in ROS (-1, last)			0.030 (0.835)	0.029 (0.850)		0.078 (0.615)
Mgmt equity pct	-0.193 (0.148)	-0.192 (0.143)	-0.027 (0.766)	-0.025 (0.788)	<b>-0.128</b> (0.015)	-0.051 (0.174)
Pre-buyout leverage	<b>0.018</b> (0.000)	<b>0.018</b> (0.000)	<b>0.019</b> (0.000)	<b>0.020</b> (0.000)	<b>0.019</b> (0.000)	<b>0.018</b> (0.000)
Leverage change	<b>0.024</b> (0.000)	<b>0.023</b> (0.000)	<b>0.022</b> (0.000)	<b>0.022</b> (0.000)	<b>0.017</b> (0.000)	<b>0.015</b> (0.001)
Management change	<b>0.068</b> (0.021)	<b>0.074</b> (0.013)	<b>0.053</b> (0.022)	<b>0.053</b> (0.031)	<b>0.044</b> (0.047)	<b>0.040</b> (0.033)
CEO_chair	<b>0.092</b> (0.001)	<b>0.095</b> (0.001)	<b>0.056</b> (0.014)	<b>0.056</b> (0.014)	<b>0.073</b> (0.000)	<b>0.049</b> (0.003)
Mgmt chg*CEO_chair	<b>-0.121</b> (0.003)	<b>-0.127</b> (0.002)	<b>-0.072</b> (0.035)	<b>-0.072</b> (0.052)	<b>-0.096</b> (0.004)	<b>-0.060</b> (0.042)
In (boardsize)	0.009 (0.761)	0.013 (0.702)	0.021 (0.386)	0.022 (0.387)	0.021 (0.455)	0.027 (0.211)
Sponsor director ratio	<b>-0.143</b> (0.017)	<b>-0.140</b> (0.017)	-0.075 (0.154)	-0.075 (0.155)	<b>-0.091</b> (0.057)	-0.048 (0.255)
Club PE	0.039 (0.160)	0.036 (0.184)	0.014 (0.539)	0.014 (0.552)	0.030 (0.189)	0.023 (0.245)
Asset sale dummy		-0.015 (0.497)		-0.002 (0.923)	-0.009 (0.603)	0.006 (0.653)
Acquisition dummy		0.013 (0.560)		-0.001 (0.972)	0.012 (0.482)	0.001 (0.967)
Post 1999	0.009 (0.692)	0.005 (0.822)	0.024 (0.206)	0.024 (0.219)	-0.009 (0.611)	0.016 (0.313)
Constant	-0.138 (0.147)	-0.155 (0.143)	-0.103 (0.164)	-0.104 (0.168)	-0.129 (0.095)	-0.090 (0.124)
Observations	66	66	66	66	88	88
Adjusted R-squared	0.697	0.689	0.517	0.498	0.683	0.412

**Table 10 – Regressions for return to capital**

Panel A reports the OLS regression results for return to capital for subsample of deals that have reached an outcome and for the full sample with post-buyout data available. The dependent variable in models 1, 2, and 5 is the S&P adjusted return to pre-buyout capital (as defined in Table 5). The dependent variable in models 3, 4, and 6 is the S&P adjusted return to post-buyout capital (as defined in Table 5). Change in sales/WC (-1, last) is defined as change in sales-to-working capital ratio from pre-buyout year to last post-buyout year. Changes in industry multiple – change in S&P multiple measures the difference between the change in industry and the change in S&P component firms' capital/Ebitda from pre-buyout year to last post buyout year. Competition is a dummy variable that equals 1 if there are multiple bidders for the company, otherwise 0. Other independent variables are as defined in Table 8. P-values are reported under the coefficients in parentheses and standardized coefficients are reported in brackets.

Panel A	<i>Subsample with outcome</i>								<i>Full sample</i>				
	Return to:	(1) Pre-buyout capital		(2) Pre-buyout capital		(3) Post-buyout capital		(4) Post-buyout capital		(5) Pre-buyout capital		(6) Post-buyout capital	
Unadj. Change in ROS (-1, last)		<b>4.723</b>	<b>[0.338]</b>	<b>6.622</b>	<b>[0.364]</b>	<b>3.517</b>	<b>[0.363]</b>	<b>5.204</b>	<b>[0.414]</b>	<b>4.583</b>	<b>[0.318]</b>	<b>3.583</b>	<b>[0.354]</b>
		(0.015)		(0.073)		(0.017)		(0.052)		(0.013)		(0.013)	
Change in sales/WC (-1, last)				-0.000	[-0.020]			0.000	[0.008]				
				(0.760)				(0.896)					
Change in S&P multiple (-1, last)		0.061	[0.239]	0.059	[0.220]	0.036	[0.201]	0.032	[0.174]	0.007	[0.027]	0.010	[0.057]
		(0.456)		(0.473)		(0.525)		(0.544)		(0.880)		(0.737)	
Change in industry multiple - Change in S&P multiple (-1, last)		<b>0.129</b>	<b>[0.574]</b>	<b>0.123</b>	<b>[0.526]</b>	<b>0.080</b>	<b>[0.514]</b>	<b>0.073</b>	<b>[0.456]</b>	<b>0.083</b>	<b>[0.412]</b>	<b>0.059</b>	<b>[0.417]</b>
		(0.069)		(0.077)		(0.095)		(0.094)		(0.014)		(0.005)	
ln (capital)		-0.357	[-0.173]	-0.333	[-0.158]	-0.231	[-0.161]	-0.226	[-0.156]	<b>-0.366</b>	<b>[-0.224]</b>	<b>-0.240</b>	<b>[-0.208]</b>
		(0.122)		(0.149)		(0.138)		(0.139)		(0.047)		(0.061)	
Ind. adj. EBITDA/capital		6.074	[0.178]	7.801	[0.226]	4.780	[0.202]	<b>6.124</b>	<b>[0.257]</b>	4.221	[0.135]	3.933	[0.179]
		(0.236)		(0.137)		(0.173)		(0.073)		(0.264)		(0.130)	
Club PE		<b>1.416</b>	<b>[0.399]</b>	<b>1.506</b>	<b>[0.414]</b>	<b>0.915</b>	<b>[0.372]</b>	<b>1.016</b>	<b>[0.404]</b>	<b>1.221</b>	<b>[0.389]</b>	<b>0.790</b>	<b>[0.357]</b>
		(0.039)		(0.040)		(0.059)		(0.049)		(0.032)		(0.046)	
Competition		0.349	[0.107]	0.335	[0.101]	0.318	[0.141]	0.305	[0.133]	0.420	[0.143]	<b>0.342</b>	<b>[0.165]</b>
		(0.260)		(0.320)		(0.175)		(0.216)		(0.104)		(0.094)	
Club PE*Competition		-0.667	[-0.111]	-0.819	[-0.137]	-0.443	[-0.107]	-0.575	[-0.139]	-0.753	[-0.159]	-0.486	[-0.146]
		(0.520)		(0.465)		(0.478)		(0.389)		(0.271)		(0.273)	
Post 1999		0.027	[0.008]	-0.022	[-0.006]	-0.088	[-0.038]	-0.153	[-0.065]	-0.184	[-0.064]	-0.245	[0.121]
		(0.945)		(0.956)		(0.746)		(0.573)		(0.561)		(0.259)	
Constant		<b>2.582</b>		<b>2.458</b>		<b>1.605</b>		<b>1.584</b>		<b>2.785</b>		<b>1.764</b>	
		(0.077)		(0.096)		(0.096)		(0.100)		(0.017)		(0.027)	
Observations		67		64		67		64		89		89	
Adjusted R-squared		0.198		0.193		0.174		0.186		0.199		0.190	

**Table 10 – continued**

Panel B reports the two-step estimation results for return to capital for full sample with post-buyout data and projected sales growth available. Projected Growth in Sales is the average projected sales growth rate by management at the buyout in the Proxy statement, 13E3, or 14D1. ln(# of projected years) is the number of years of projections provided. From the step 1 probit model estimates, the hazard rate for each observation is computed following Maddala (1983, pp.120-122). P-values are reported under the coefficients in parentheses

<b>Panel B</b>		<i>Full Sample</i>			
<i>Step 1</i>	Club PE	<i>Step 2</i>	Return to:	(1) Pre-buyout capital	(2) Post-buyout capital
ln(capital)	<b>0.545</b> (0.019)	Unadj. Change in ROS (-1, last)		<b>12.615</b> (0.000)	<b>10.036</b> (0.000)
Projected Growth in Sales	<b>5.939</b> (0.065)	Change in S&P multiple (-1, last)		-0.004 (0.939)	0.004 (0.919)
Return on Sales pre-buyout	1.726 (0.273)	Change in industry multiple - Change in S&P multiple (-1, last)		<b>0.078</b> (0.058)	<b>0.058</b> (0.039)
ln (# of projected years)	0.977 (0.148)	ln (capital)		<b>-0.514</b> (0.043)	<b>-0.350</b> (0.043)
Constant	-6.330 (0.001)	Ind. adj. EBITDA/capital		5.162 (0.144)	<b>5.314</b> (0.026)
		Club PE		<b>2.063</b> (0.096)	<b>1.520</b> (0.073)
		Competition		0.306 (0.423)	0.288 (0.267)
		Club PE*Competition		-1.142 (0.110)	<b>-0.874</b> (0.071)
		Post 1999		-0.508 (0.218)	<b>-0.521</b> (0.063)
		Constant		<b>3.996</b> (0.004)	<b>2.618</b> (0.006)
		Hazard Rate		-0.278 (0.715)	-0.256 (0.622)
		Observations		62	62
		Rho		-0.231	-0.310