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"Do Buyouts (Still) Create Value?"

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Abstract

This paper examines whether, and how, leveraged buyouts from the most recent wave of public to private transactions create value. For a sample of 176 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, but that the deals still impose substantial default risk on the firms. For 89 of these LBOs with post-buyout data available, we find that gains in operating performance are either comparable to or 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. Returns to either pre- or post-buyout capital invested are significantly positive for the sample overall, and are positive for all outcome groups except those ending in a distressed restructuring. Returns to post-buyout capital are greater when the deal is financed with a greater proportion of bank financing, or when there is more than one private equity sponsor involved in the deal, consistent with increased monitoring by these providers of capital. We also find that performance is related to the acquisition/divestiture behavior of the post-buyout private firms, with asset sales reflecting poorer observed performance. Overall, our results provide insights into how transactions from the most recent wave of leveraged buyouts create value.

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. It has only been in the last several years that the pace of LBO activity has reached new record levels, renewing questions about whether and how these deals create value.[1]

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 operating performance post-buyout[2], 2) gains in value from pre-buyout to a later change in ownership or restructuring[3], or 3) the relationship between premiums paid in buyouts and proxies for sources of the value gain.[4] 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.[5] This paper attempts to fill this gap, studying a sample of 176 LBOs completed between 1990 and 2006.

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[1] According to Dealogic, global financial sponsor M&A buyouts reached a record high of $737.4 billion in 2006, double the record of $352.3 billion for 2005, and represented 18% of total announced M&A volume in 2006.
[2] See for example Kaplan (1989a), Smith (1990), and papers summarized in Renneboog and Simons (2005).
[3] Kaplan (1989c), Kaplan (1994), Andrade and Kaplan (1998).
[4] Examples include Kaplan (1989b) and Lehn and Poulsen (1989).
[5] Notably, Axelson, Jenkinson, Strömberg, and Weisbach (2007) provide analysis of the pricing and financial structure of recent buyouts. Ljungquist, Richardson and Wolfenzon (2007) document returns to equity investments in buyout fund portfolio firms.

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. We first show whether value has likely increased by looking at changes in operating performance post-buyout. From our initial sample, we identify 89 leveraged buyouts completed by 2005 for which post-buyout financial data is available. We find that gains in operating performance are either comparable to or 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. Performance gains increase by over 2% for some measures when we add back management and monitoring fees paid to financial sponsors.

For 85 firms in our sample, we next calculate the returns to capital invested at the time of the buyout using the methodology of Kaplan (1989c) and subsequent papers – in other words, we estimate nominal and market adjusted returns from the time of the 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. Mean (median) market adjusted returns to post-buyout capital are estimated at 66% (30.5%), even including the cases of distress. There is substantial cross sectional variation, however, in deals' realized performance.

Lastly, the documented value changes 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. Secondary LBOs, or cases where the firm has higher debt prior to the buyout, are less likely to benefit from the increase in tax shields.

2) *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.[6] Experienced financial sponsors of the buyout (private equity firms) may also improve monitoring. 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 in larger deals involving more than one private equity firm (club deals).[7]

3) *Disciplining effect of debt*. Higher post-buyout required debt payments can reduce free cash flow available to management to potentially dissipate on value reducing investments (Jensen (1986)). In the context of buyouts, a heavy 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)).

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.[8]

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[6] 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.

[7] 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.

[8] See Morck, Shleifer and Vishny (1988), McConnell and Servaes (1990), Halpern, Kieschnick and Rotenberg (1999) and references therein.

5) *Avoiding costs of public registration.* Benefits from saved reporting costs will be proportionally greater for smaller firms. Most firms with post-buyout financial data in our sample continue to file 10Ks, however.

6) *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. Halpern, Kieschnick and Rotenberg (1999) also suggest that pre-buyout management ownership reflects the motivation for the transaction; poorly performing firms with high management ownership may undergo MBOs as a defensive entrenchment device.

In addition to variables that proxy for the various theories described here, we also consider activities such as asset sales or acquisitions that occur while the firm is private. Our evidence shows that returns to post-buyout capital are greater when the deal is financed with a greater proportion of bank financing, or when there is more than one private equity sponsor involved in the deal, consistent with increased monitoring by these providers of capital. Gains in operating cash flows are greater for firms with higher pre-buyout leverage, and for firms with greater increases in leverage as a result of the buyout. We also find that performance is related to the acquisition/divestiture behavior of the post-buyout private firm, with asset sales reflecting poorer observed performance.

Our analysis also provides 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 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.

The remainder of this paper is structured as follows. In Section II, we describe the pricing and structure of the 176 buyouts in our sample, comparing them to the subsample of 89 buyouts for which post-buyout financial data is available. Section III documents the changes in post-buyout operating cash flows as well as returns to pre- and post-buyout providers of capital. Section IV relates these measures of performance to proxies for the sources of value creation. Section V 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 buyouts of publicly traded U.S. firms, with deals values of at least $100 million. From SDC, we select 181 completed acquisitions classified as leveraged buyouts with announcement dates between January 1990 and July 2006. A similar search from Dealogic of sponsored deals from January 1995 to December 2006 produces 238 deals, 123 of which are unique to the Dealogic database. Therefore, our initial screening identifies 304 possible LBOs from 1990 to 2006. We further 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.[9] Finally, we eliminate 42 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 176 LBOs from 1990 to 2006.

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. 89 of the 176 firms (50.6%) have at least one year 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 176 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. Given of the recent pace of activity in this market, our description includes transactions completed in 2006, for which a full year of post-buyout data is not yet available, in order to provide information on the most recent market trends. 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).

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 176 buyouts, the median deal size (capital) is $469.65 million, but there is a trend towards larger deals in later years. For the period 1990 to 2005, the median deal size for the 89 buyouts with post-buyout data is significantly larger ($520 million) than for

[9] 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.

the 66 remaining buyouts (median $352.7 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 earnings to price ratio of 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, however, reaching a low of 3.17 in 2006, which is lower than for any of the years from 1980 to 1989 reported by Kaplan and Stein (1993).

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 of 29.23% for 1990 to 2006) relative to Kaplan and Stein's median of 43% for the 1980s.[10] 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).

[10] 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).

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. 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 22.5% (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 46.5%). 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. Correspondingly, the ratio of total equity to capital is 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%.

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.[11] 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 well exceeds 1.0 as well. One reason for the stronger coverage ratios at the time of the buyouts is that fewer transactions rely

[11] 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.

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. Some sample firms complete asset sales concurrent with or shortly prior to the buyout. There are, however, individual transactions, where the interest coverage ratios are substantially lower.

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 31.04% versus 48.14% through 2005), as public debt financing likely replaces some bank debt for these deals. Approximately 39% of all deals overall have some other private debt financing, typically provided by large insurance companies and other financial institutions.

Public debt financing is used in approximately 50% 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.[12] 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). 73% of firms with

[12] This is consistent with Goldstein & Hotchkiss (2007) who report that since 2002, 85% of high yield bonds are sold as Rule 144A issues.

post-buyout data available have public debt financing, versus 18% for those without (through 2005), with a mean level of public debt/capital of 26.4% vs. 6.1%, 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 25% of the sample deals, approximately 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)). Approximately 15% 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 financing rated.[13] 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, 12/176 deals in our sample (all from 2005 or 2006) have a second lien term loan. The margin on the 2nd 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).

[13] Ratings on syndicated bank debt have become common since their introduction in 1995. See Sufi (2007).

III. Post-buyout performance.

III.A. Changes in operating cash flows.

In order to evaluate the economic and statistical significance of pre- to post-buyout changes in 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 methods: 1) using the industry median as the benchmark, 2) matching on industry as well as pre-buyout level of performance, and 3) matching on industry, pre-buyout level of performance, change in performance pre-buyout, and market to book ratio of assets. Details of our matching procedures are provided in an appendix. All methods require that the matching firm has financial data in at least the first full year after the buyout.

Method 1) is similar to Kaplan (1989) using firms in the same four-digit SIC code, and provides the most direct comparison to prior research. Method 2) follows Barber and Lyon (1996); in addition to matching on two-digit SIC codes, firms are matched on EBITDA/Sales or Net cash flow (NCF)/Sales in the year before the buyout. Method 3) is based on Lie (2001), who shows that this performance-adjusted 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, change in performance, and market-to-book ratio of assets, and use the median as our benchmark.[14]

Medians changes and percentage changes in operating performance are reported in Table 4 for the last full year prior to completion of the buyout (year -2 to -1), and from year -1 to up to three years after the year in which the buyout is completed (year 0). The unadjusted changes in

[14] An example of recent papers using this matching algorithm is Grullon and Michaely (2004).

EBITDA/sales, but not net cash flow/sales, are negative and significant for the changes to year +2 and +3. The changes, however, using any of the matching methodologies, are either insignificantly different from zero or significantly positive.

The industry adjusted changes are most comparable to prior research for buyouts, but do not show any significant gains. However, using the alternative methods that match on pre-buyout performance, significance depends on the benchmark. For example, using either EBITDA/Sales or net cash flow/sales, and the industry-performance-market/book adjusted change, there is a significant increase from year -1 to year +2. 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 between 18% and 29% (depending on the benchmark) for year +2, and no significant gains from year -1 to +3.

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-buyout performance.[15] For the firms in our sample, the description in Table 4 shows that overall, firms perform as well as their benchmarks, and in some cases better. Important to interpreting these results, however, 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. For our sample of 89 firms, data is unavailable in year +1 for three firms which reported data in years +2 and +3 (and so are included in our

[15] Bharath and Dittmar (2007) argue that factors driving firms to go private have changed since the 1980s, and that the free cash flow/agency problems influence the decision to go private in the 1980s but not in later periods.

sample of post-buyout data firms) because they resume reporting prior to an IPO or acquisition. In year +2, 19 firms have missing observations for a variety of reasons; most importantly, only one firm exits due to a Chapter 11 filing, 5 firms are acquired, and one firm has exited through an IPO. Similarly, for year +3, there are 2 additional Chapter 11 filings and 3 IPOs. The primary reason for missing observations is that some firms complete their buyout close to the end of our sample period. Thus, it seems unlikely that survivorship bias has any meaningful bias on the sign or magnitude of our results. The incidence of Chapter 11 filings, IPOs, and other exits for the sample firms increases significantly after year +3 (see Section III.B.).

It is also important to consider the potential impact of sample selection issues (the availability of post-buyout data from our original sample of 176 buyouts, or from buyouts in general) in interpreting our results. The post-buyout data sample includes firms with public debt outstanding, or firms which subsequently report historical financial data for a post-buyout IPO, acquisition, or financing. We rerun our results in Table 5 (not reported) eliminating 24 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, and performance remains similar to or greater than that of the benchmark firms.

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 62 of the 89 firms in our post-

buyout performance sample.[16] To understand the magnitude of their impact on measured performance, Table 5 reports the unadjusted performance changes for these 62 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 +2.[17]

III.B. Returns to pre- and post-buyout capital.

For each firm with post-buyout data available from the time of the buyout to a final resolution or "outcome" for the transaction, we estimate the return to either pre- or post-buyout capital from the time of the buyout to the outcome date 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

[16] 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.

[17] 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.

the corresponding Fama French value-weighted industry portfolio.[18] 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 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.[19]

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 & 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 6, both for the initial sample of 176 buyouts and the 89 firms which have post-buyout data available (85 of these have sufficient data for our return calculations).

Table 6 shows that 21 of the 176 firms (12%) 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. 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.[20] Interestingly, we identify only one out of court distressed restructuring, and a large number of the Chapter 11

[18] 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.
[19] Returns will likely be higher when an adjustment for the lower asset beta is made in subsequent drafts.
[20] Hotchkiss and Mooradian (1997) show that investors in debt claims frequently gain control of distressed firms.

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 6 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 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, or at the time of an IPO, or is estimated as a multiple of EBITDA if not observable. EBITDA multiples are calculated as the industry median multiple from all firms on Compustat with the same four-digit SIC code.[21] Similar results are obtained using multiples of revenues rather than EBITDA.

The realized returns to pre- and post-buyout capital are reported in Table 7. As expected, the nominal, market adjusted, and industry adjusted returns are negative for the Chapter 11 group. 5 firms still produce positive nominal returns to pre-buyout capital, similar to many of the firms studied by Kaplan and Andrade (1988). Overall, however, Table 7 demonstrates the market and industry adjusted returns are positive and significant for all other groups. For example, the median market adjusted return to pre-buyout capital for the full sample of 85 firms in the analysis is 72.2%. If we exclude firms in outcome group 5 (still private or unknown), the median return is still positive and significant (51.2%).[22]

[21] 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 (data199*data25)+ book value of debt (data9+data34) + data10, where data199 is stock price at fiscal year end, data25 is shares outstanding, data9 is long term debt, data 34 is short term debt, and data10 is liquidating value of preferred stock.

[22] 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 7 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 29 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. The returns on capital for this subsample are reported in Table 8; comparing the means or medians across methods demonstrates the magnitude of the impact of the estimated terminal value on the return. Returns using terminal values estimated from multiples rather than the observed values are consistently lower, but the differences in mean and median returns are not statistically significant.

Lastly, our return measures are expected to be closely related to performance based on changes in cash flows, as reported in Table 4. Table 9 reports the spearman rank correlation coefficients for the market adjusted returns and the benchmark adjusted change in cash flows. The correlation coefficients are all significantly positive, and range from a low of 0.19 (change in net cash flow years (-1,+1)) to a high of .41 (change in net cash flows (-1,+3)). Despite the fact that the return calculations incorporate information beyond a single year of cash flow, these measures appear strongly related.

IV. Cross sectional evidence for value creation.

In this section, we examine whether there is a relationship between post-buyout performance and the various explanations for how buyouts potentially create value. As described in the introduction, the documented value changes or performance gains are hypothesized to be related to increased tax shields, improved management incentives, discipline from higher debt levels, better monitoring by senior lenders or buyout sponsors, and other pre-buyout characteristics. Our explanatory variables are based on characteristics of the firm at the time of the buyout, as well as activities such as acquisitions or asset sales that occur while the firms are private.

The variables we use to proxy for these factors are described in Table 10 for the 89 firms with post-buyout data. 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 almost 63% of the 89 deals with post-buyout data.

We use several variables to represent potential monitoring by a private equity (PE) firm, including a dummy representing whether the PE firm ranks highly in annual rankings of deal value, indicating larger and possibly more experienced monitors (other measures of PE experience such as the number of deals or market share yield similar results). We also include a variable for "club" deals in which more than one PE firm participates, perhaps reducing incentives to monitor. 61 deals in our sample (68.5%) involve a single PE firm; 26 deals (29.2%) have more than one PE firm involved. 12 deals also have another operating company participate in the equity investment, often intended to provide some strategic benefit to the buyout firm.

We also include variables for the leverage change, as higher levels of debt may reduce agency costs by disciplining management. Increases in leverage are also associated with increased tax shields; though tax payments are not reflected in our measures of cash flows (EBITDA), returns to pre-buyout capital may reflect these gains. Monitoring by senior lenders is expected to be greater for deals with relatively higher levels of bank debt, and may serve as a substitute for monitoring by an experienced PE firm.

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 define a dummy variable for firms which engage in "significant" acquisitions or asset sales, defined as purchases or sales of at least $10 million in any of the first three years following the buyout.[23] Asset sales are common, though perhaps less frequent than buyouts of the 1980s. Acquisition activity, however, appears quite important to the firms while private, and over half of the sample firms are involved in "significant" acquisitions, with a sample median of 22.3% of capital.[24]

The cross sectional regressions for post-buyout performance are reported in Table 11. In all regressions, we control for deal size. The dependent variables are either the level of post-buyout cash flows (regressions 1&2), the change in cash flows (regressions 3&4), a dummy

[23] We use the $10 million threshold since acquisitions/divestitures above this amount appear to require the hiring of an investment banking advisor, based on reports that appear for sample firms in Dealogic. The statement of cash flows provided in 10Ks describes cash activities related to investing transactions, and provides the amount used for acquisitions (usually net the cash acquired) and the amount received from sale of assets and/or businesses. Since the statement of cash flows only reports cash transactions, we also read relevant sections in the 10K filings related to acquisitions to identify stock acquisitions (if any) and adjust as necessary.

[24] 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.

variable indicating an increase in cash flows (logit regression 5), or the S&P adjusted return to post-buyout capital, as reported in Table 7 (regressions 6&7). Results are robust to other specifications such as year +2 cash flows. Year dummies (not reported) are generally not significant, but we include a dummy variable for deals completed after 1999 (also not significant).

The regressions in Table 11 do not show evidence that deals with higher management equity contributions perform better. The changes in leverage are more 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, though coefficients for the return to capital (regressions 6&7) are not significant. These results are consistent with the disciplining effect of higher debt for the post-buyout firm.[25]

For the variables related to monitoring, we do find that the return to post-buyout capital is significantly greater for deals with more financing from senior bank lenders. Returns also appear higher when more than one private equity sponsor is involved in the deal. There is also some weak evidence that cash flow improvements are greater when another company, which is typically in the same industry, participates in funding the buyout, though this is not consistent across regression specifications.

Our most consistent result is that the cash flow performance is related to the asset sale and acquisition behavior of companies while private. I particular, asset sales appear related to poorer performance. From our reading of 10K reports for these firms, the asset sales are often motivated by poorly performing divisions subsequent to the buyout. Large acquisitions made by the private firm, perhaps with the PE sponsor serving as an advisor, may be more successful.

[25] It is also possible that PE firms use greater leverage for firms with better prospects. Results of Axelson et al (2007), however, are not consistent with this interpretation.

V. 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 176 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 80s, 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 engage in significant asset restructuring (asset sales and/or acquisitions) while private.

For 89 of these LBOs with post-buyout data available, we find that gains in operating performance are either comparable to or 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. Returns to either pre- or post-buyout capital invested, however, are significantly positive for the sample overall, and are positive for all outcome groups except those ending in a distressed restructuring.

We then relate the observed post-buyout performance to a number of variables which proxy for factors suggested by the various theories of how buyouts may create value. Cash flow gains are greater for firms with higher pre-buyout leverage, as well as firms with greater increases in leverage as a result of the buyout. Returns to post-buyout capital are greater when the deal is financed with a greater proportion of bank financing, or when there is more than one private equity sponsor involved in the deal, consistent with increased monitoring by these

providers of capital. We also find that performance is related to the acquisition/divestiture behavior of the post-buyout private firms, with asset sales reflecting poorer observed performance. Overall, our results provide insights into how transactions from the most recent wave of leveraged buyouts create value.

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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 and level of performance matching.
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.

3. 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 ±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 ±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 ±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 ration between sample firm and the matching firms and use the median as our benchmark.

Table 1 – Annual Medians for Deal Pricing

Sample consists of 176 leveraged buyouts completed between 1990 and July 2006. Post-buyout data is available for 89 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 Earnings to Price (E/P) ratio is based on the S&P500 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.

Year	*No. of LBOs*	*Capital ($mil)*	*EBITDA to capital (%)*	*Market E/P ratio (%)*	*EBITDA to capital less mkt. E/P (%)*	*Premium (%)*
Full Sample						
1990-1996	14	380.05	10.06	5.30	4.81	30.34
1997	15	399.68	8.76	4.38	4.50	24.97
1998	16	319.53	10.77	3.60	7.04	24.84
1999	33	347.60	12.55	3.06	9.39	28.71
2000	17	486.20	14.66	3.57	11.21	50.00
2001	4	844.90	18.65	3.21	15.44	35.77
2002	9	538.30	14.95	3.07	11.50	33.65
2003	9	237.01	10.91	3.78	7.37	42.21
2004	13	2162.51	10.84	5.13	5.72	19.05
2005	25	710.00	9.77	5.43	4.42	29.53
2006	21	1218.20	8.90	5.94	3.17	22.22
Total (1990-2006)	176	469.65	11.37	4.26	6.45	29.23
Total (1990-2005)	155	451.50	11.53	3.76	7.40	29.53
Subsample with post-buyout data available						
1990-1996	12	437.85	11.97	5.30	6.37	30.34
1997	11	558.70	8.67	4.38	4.28	18.61
1998	11	420.80	10.05	3.67	5.93	20.45
1999	21	457.40	12.43	3.06	9.36	33.33
2000	8	637.45	15.52	3.56	12.03	45.11
2001	3	451.50	17.71	2.82	14.89	38.21
2002	8	681.90	15.20	3.13	11.73	31.09
2003	3	445.40	10.91	4.04	7.37	-2.93
2004	5	2162.51	11.51	5.13	6.32	19.05
2005	7	647.60	8.65	5.27	3.60	26.73
1990-2006						
(1) Total (w/ post data)	89	520.00	12.43	3.67	8.59	28.54
(2) Total (w/o post data)	87	426.00	10.80	5.17	5.66	29.85
Median difference: (1)-(2)		(+)	(+)*	(-)***	(+)**	(-)
1990-2005						
(3) Total (w/ post data)	89	520.00	12.43	3.67	8.59	28.54
(4) Total (w/o post data)	66	352.70	11.35	4.25	6.84	31.29
Median difference: (3)-(4)		(+)**	(+)	(-)**	(+)	(-)

Note: The significance of median difference is based on two-sample Wilcoxon rank-sum (Mann-Whitney) test

Table 2 – Deal Financing: Aggregate Debt Levels and Coverage Ratios (Annual Medians)

Pre-buyout, 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 two subsamples are not significantly different for any variables.

Year	*pre-buyout debt to capital (%)*	*post-buyout debt to capital (%)*	*change in leverage (%)*	*Total equity to capital (%)*	*EBITDA to interest*	*EBITDA to interest + (princ in 2 yrs/2)*
Full Sample						
1990-1996	21.21	72.19	51.97	28.49	1.63	1.42
	14	14	14	14	14	11
1997	22.21	70.50	58.99	29.50	1.67	1.32
	15	15	15	15	15	12
1998	27.48	75.07	35.37	24.68	1.66	1.47
	16	16	16	16	16	13
1999	29.30	71.23	39.25	28.77	1.79	1.59
	33	33	33	33	32	23
2000	33.06	70.74	32.16	29.26	2.08	1.76
	17	17	17	17	17	12
2001	46.17	68.09	28.22	32.80	2.80	2.11
	4	4	4	4	4	3
2002	16.20	62.85	41.53	32.88	2.68	2.47
	9	9	9	9	9	6
2003	27.26	64.43	39.09	34.08	2.21	2.15
	9	9	9	9	9	6
2004	29.19	78.28	48.01	27.82	2.80	2.34
	13	13	13	13	10	6
2005	15.31	69.01	52.29	31.69	2.09	1.73
	25	25	25	25	24	14
2006	6.60	64.68	54.69	35.32	1.75	1.31
	21	21	21	21	20	11
Total	22.49	69.39	46.51	30.54	1.86	1.62
	176	176	176	176	170	117
Total 1990-2005	24.35	70.42	42.90	29.89	1.89	1.63
	155	155	155	155	150	106
Subsample with post-buyout data available						
1990-1996	21.21	71.32	51.97	29.68	1.75	1.47
	12	12	12	12	12	10
1997	15.63	69.00	59.99	30.80	1.62	1.40
	11	11	11	11	11	9
1998	24.47	75.51	40.67	24.87	1.67	1.51
	11	11	11	11	11	10
1999	29.85	71.23	36.64	28.77	1.75	1.46
	21	21	21	21	20	15
2000	35.06	72.22	36.29	27.77	2.11	1.79
	8	8	8	8	8	6
2001	50.55	77.52	26.97	24.26	2.62	2.11
	3	3	3	3	3	3
2002	22.18	64.98	42.89	35.02	2.74	2.47
	8	8	8	8	8	6
2003	7.06	60.41	56.92	39.59	2.66	2.53
	3	3	3	3	3	3
2004	17.97	67.43	48.01	32.57	2.78	2.16
	5	5	5	5	5	5
2005	5.98	69.01	52.29	30.99	1.74	1.52
	7	7	7	7	7	4
Total 1990-2005	22.83	70.63	46.49	29.50	1.89	1.62
	89	89	89	89	88	71

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.

Year	*No. of LBOs*	*Average Bank debt to capital (%)*	*Private debt (% of deals)*	*Average Private debt to capital (%)*	*public debt (% of deals)*	*Average Public debt to capital (%)*	*PIK or discount debt (% of deals)*	*Ave PIK+ discount debt to capital (%)*	*strips (% of deals)*	*Average strip debt to capital (%)*
Full sample										
1990-1996	14	27.48	42.86	13.10	57.14	27.56	7.14	1.41	21.43	7.45
1997	15	33.81	26.67	3.89	86.67	32.48	20.00	3.07	0	0
1998	16	38.55	37.50	6.41	62.50	20.68	37.50	6.31	18.75	2.32
1999	33	61.56	54.55	20.20	36.36	11.02	36.36	7.97	30.30	6.59
2000	17	47.15	64.71	11.32	23.53	7.66	47.06	8.98	11.76	2.35
2001	4	37.74	50.00	9.40	50.00	16.49	25.00	5.42	25.00	6.07
2002	9	22.42	11.11	2.12	66.67	24.19	22.22	2.62	11.11	2.12
2003	9	37.50	22.22	8.75	44.44	17.78	0	0	22.22	6.50
2004	13	41.29	30.77	11.18	53.85	19.26	30.77	5.03	0	0
2005	25	37.31	24.00	6.74	44.00	14.47	8.00	1.08	8.00	2.76
2006	21	43.75	38.10	8.19	42.86	10.87	23.81	1.84	9.52	3.05
Total	176	42.16	38.64	10.37	48.86	16.94	25.00	4.31	14.77	3.60
Total (1990-2005)	155	41.94	38.71	10.66	49.68	17.77	25.16	4.64	15.48	3.68
Subsample with post-buyout data available										
1990-1996	12	24.64	33.33	13.71	66.67	32.15	0	0	16.67	6.14
1997	11	25.64	27.27	4.40	100.00	37.20	27.27	4.19	0	0
1998	11	28.77	36.36	6.27	81.82	29.25	45.45	8.36	18.18	1.72
1999	21	39.88	52.38	9.87	52.38	15.96	47.62	11.32	38.10	7.04
2000	8	43.31	62.50	9.36	50.00	16.29	37.50	9.77	0	0
2001	3	35.95	33.33	8.09	66.67	21.99	33.33	7.22	33.33	8.09
2002	8	21.74	0	0	75.00	27.21	12.50	0.56	0	0
2003	3	19.58	0	0	100.00	44.63	0	0	0	0
2004	5	31.91	20.00	1.27	100.00	29.75	40.00	2.84	0	0
2005	7	26.32	28.57	5.93	85.71	28.93	0	0	0	0
1990-2006										
(1) Total (w/ post data)	89	31.04	34.83	7.15	73.03	26.42	28.09	5.55	14.61	2.97
(2) Total (w/o post data)	87	47.08	42.53	10.85	24.14	7.25	21.84	3.04	14.94	4.24
Mean difference: (1)-(2)		(-)***		(-)		(+)***		(+)		(-)
1990-2005										
(1) Total (w/ post data)	89	31.04	34.83	7.15	73.03	26.42	28.09	5.55	14.61	2.97
(2) Total (w/o post data)	66	48.14	43.94	11.70	18.18	6.10	21.21	3.42	16.67	4.62
Mean difference: (1)-(2)		(-)***		(-)*		(+)***		(+)		(-)

Table 4 – Changes in operating performance from pre-buyout period to post-buyout period

Median changes in cash flow performance are reported 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. 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 and performance (*Ind&perf)* adjusted change matches on industry as well as the level of EBITDA/sales or net cash flow/sales in year -1. Industry & performance & M/B (*Ind&perf.&M/B)* adjusted change further 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.

	Change in operating performance from year *i* to year *j*			
Cash-flow measures	-2 to -1	-1 to +1	-1 to +2	-1 to +3
A. *EBITDA/sales*				
Unadjusted change	0.008[a]	-0.003[c]	-0.014[b]	-0.015[b]
Unadjusted percentage change	6.14%[a]	-1.55%	-8.35%[b]	-7.08%[b]
	89 (56)	86 (36)	70 (26)	61 (24)
Industry adjusted change	0.003	0.003	0.005	0.001
Industry adjusted percentage change	2.27%	-0.15%	3.13%	1.28%
	89 (53)	86 (47)	70 (39)	61 (31)
Ind&perf adjusted change	0.001	0.006	0.001	0.007
Ind&perf adjusted percentage change	1.48%	2.69%	0.69%	5.05%
	89 (46)	86 (45)	70 (35)	61 (31)
Ind&perf.&M/B adjusted change	-0.0004	0.010[c]	0.019[b]	0.005
Ind&perf&M/B adjusted percentage change	-0.47%	7.49%[c]	12.21%[b]	5.09%
	89 (40)	86 (51)	69 (42)	58 (34)
B. *Net cash flow/sales*				
Unadjusted change	0.014[a]	-0.003	0.004	0.0004
Unadjusted percentage change	14.83%[a]	-2.19%	5.00%	1.23%
	89 (56)	85 (42)	69 (37)	61 (31)
Industry adjusted change	0.014[a]	0.003	0.003	0.009
Industry adjusted percentage change	13.90%[a]	-4.02%	-0.29%	9.03%
	89 (54)	85 (44)	69 (38)	61 (33)
Ind&perf adjusted change	0.004	0.018[c]	0.013[b]	0.012
Ind&perf adjusted percentage change	4.19%[c]	13.68%[c]	18.14%[b]	12.27%
	89 (52)	85 (53)	66 (42)	59 (34)
Ind&perf.&M/B adjusted change	0.001	0.004	0.030[a]	0.013
Ind&perf.&M/B adjusted percentage change	0.63%	5.19%	29.21%[a]	13.34%
	89 (50)	85 (45)	63 (41)	56 (35)

Table 5 – Impact of management fees on changes in operating performance

Changes in cash flow performance are as defined in Table 4, for the subsample of 62 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* to year *j*									
	-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 due to fee add-back		
A. *EBITDA/sales*										
Unadjusted change	0.005[c]	-0.003	-0.011[c]	-0.018[a]	0.0001	-0.009	-0.017[a]	0.003	0.002	0.001
Unadjusted % change	3.31%[b]	-1.47%	-6.87%	-14.97%[a]	0.20%	-6.04%	-13.01%[a]	1.67%	0.83%	0.20%
	62 (36)	61 (28)	48 (20)	39 (13)	61 (31)	48 (21)	39 (13)			
B. Net cash flow/sales										
Unadjusted change	0.009[a]	-0.004	0.011	0.0004	-0.002	0.014	0.001	0.002	0.003	0.001
Unadjusted % change	12.24%[a]	-3.13%	7.82%	1.23%	-1.98%	9.88%	3.94%	1.15%	2.06%	2.71%
	62 (38)	61 (29)	48 (28)	39 (20)	61 (29)	48 (29)	39 (20)			

Table 6 - Post-buyout deal outcomes

The table reports post-buyout outcomes for the full sample of 176 buyouts as well as the 89 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. Median time to outcome is reported in months.

Outcome:	(1)	(2)	(3)	(4)	(5)	
LBO Announcement Year	IPO	Sold	2nd LBO	Chapter 11	still private or unknown	Total
1990-1996	3 (3)	3 (2)	1 (1)	5 (4)	2 (2)	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)	7 (5)	5 (4)	5 (2)	10 (4)	33 (21)
2000	4 (4)	4 (2)	2 (1)	1 (0)	6 (1)	17 (8)
2001	2 (1)	1 (1)	0 (0)	1 (1)	0 (0)	4 (3)
2002	1 (1)	2 (1)	2 (2)	0 (0)	4 (4)	9 (8)
2003	2 (2)	0 (0)	1 (0)	0 (0)	6 (1)	9 (3)
2004	1 (1)	3 (0)	0 (0)	0 (0)	9 (4)	13 (5)
2005	1 (1)	1 (0)	0 (0)	0 (0)	23 (6)	25 (7)
2006	0 (0)	0 (0)	0 (0)	0 (0)	21 (0)	21 (0)
Total (1990-2006)	27 (26)	26 (15)	15 (11)	21 (13)	87 (24)	176 (89)
Percentage of deals (N/176)	15.3%	14.8%	8.5%	11.9%	49.4%	100.0%
Median time to outcome	28.6	58.7	52.5	48.1		47.7

Table 7 – 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.

			Nominal return on capital			S&P adjusted return			Industry adjusted return		
Outcome	Capital	N	Mean	Median	# of positive returns	Mean	Median	# of positive returns	Mean	Median	# of positive returns
1. IPO	Pre	26	253.3%***	166.5%***	26	199.5%***	123.2%***	24	140.9%***	73.4%***	24
	Post	26	156.0%***	87.4%***	25	132.7%***	73.9%***	24	71.6%***	43.0%***	21
2. Acquired	Pre	13	133.3%***	97.8%***	12	86.7%**	38.4%***	11	101.4%**	58.2%**	10
	Post	13	76.7%**	51.0%**	11	54.9%*	29.9%**	10	73.8%	14.6%	8
3. 2nd LBO	Pre	10	141.4%**	100.0%***	9	100.0%**	107.9%**	8	102.5%**	76.2%**	9
	Post	10	108.8%**	73.5%***	9	76.6%**	79.6%**	8	77.9%**	44.4%**	9
4. Chapter 11	Pre	13	-33.80%	-34.30%	5	-53.3%***	-60.3%***	2	-35.7%*	-49.5%*	4
	Post	13	-53.9%***	-54.6%***	3	-64.3%***	-65.7%***	0	-50.9%***	-60.3%**	1
5. Still private	Pre	23	172.8%***	141.0%***	22	109.1%***	104.3%***	22	94.0%***	92.6%***	22
or unknown	Post	23	98.3%***	67.4%***	20	58.6%***	46.6%***	20	45.6%***	36.8%***	18
Total (1-5)	Pre	85	156.1%***	104.8%***	74	107.4%***	72.2%***	67	90.1%***	55.3%***	69
	Post	85	90.6%***	65.8%***	68	64.0%***	31.4%***	62	46.6%***	25.2%***	57
Total(1-4)	Pre	62	149.9%***	95.9%***	52	106.8%***	51.2%***	45	88.6%***	47.4%***	47
	Post	62	87.7%***	61.3%***	48	66.0%***	30.5%***	42	47.0%***	22.2%***	39

Table 8 - returns to pre- and post-buyout capital: Comparison of observations with "observed" terminal value (TV) versus terminal value estimated as a multiple of EBITDA

Subsample of 29 firms for which terminal value is observed at outcome and also can be estimated from EBITDA multiple, consisting of 10 firms acquired, 10 firms sold in secondary LBO, and 9 bankruptcies.

		Return based on observed TV		Return based on TV from EBITDA multiples		P-value	
	N	mean	median	mean	median	t-test for difference in means	Wilcoxon test for difference in medians
Nominal Ret on pre-buyout capital	29	90.0%	86.0%	76.7%	75.3%	0.300	0.381
Nominal Ret on post-buyout capital	29	52.6%	51.0%	41.4%	34.6%	0.265	0.370
S&P adj. Ret on pre-buyout capital	29	49.8%	21.1%	42.3%	18.7%	0.452	0.738
S&P adj. Ret on post-buyout capital	29	28.3%	10.8%	22.7%	-0.02%	0.514	0.770

Table 9 - Correlations of Returns to Capital and Cash Flows Changes

Spearman rank correlation coefficients. Cash flow performance variables are as defined in Table 4. S&P adjusted return is as defined in Table 7.

Ind.-Perf. Matching Adjusted Performance Measure	Time Period	S&P Adjusted Return on Pre-LBO capital			S&P Adjusted Return on Post-LBO capital		
		N	Correlation	P-value	N	Correlation	P-value
Change in EBITDA/Sales	(-1, +1)	83	0.2884	0.0082	83	0.2510	0.0221
	(-1, +2)	70	0.4013	0.0006	70	0.3696	0.0016
	(-1, +3)	60	0.3179	0.0133	60	0.2709	0.0363
Change in NCF/Sales	(-1, +1)	82	0.1917	0.0845	82	0.1859	0.0945
	(-1, +2)	66	0.3222	0.0083	66	0.2797	0.0229
	(-1, +3)	58	0.4113	0.0013	58	0.3641	0.005

Table 10 - Summary statistics for deal characteristics

Panel A

Single PE is a dummy variable that equals 1 if there is a single private equity (PE) sponsor for the deal; Club PE is a dummy variable that equals 1 if there are two or more PE sponsors for the deal; Top 10 PE is a dummy variable that equals 1 if PE is ranked among top 10 based on total deal value according to Dealogic's financial sponsor ranking tables; Other company participation is a dummy variable that equals 1 if any operational company other than PE specialists participates in the deal; Management equity participation is a dummy variable that equals 1 if management of the target contributes equity in the firm; Sells significant assets (i.e. asset sale dummy) is a dummy variable indicating whether firms sell assets of more than $ 10 million in any year during the 3-year post-buyout period; makes significant acquisitions (i.e. acquisition dummy) is a dummy variable indicating whether firms make any acquisitions with a deal value of at least $ 10 million in any year during the 3-year post-buyout period. The percentage of deals is based on the 89 deals with post-buyout data available.

	# of deals	*% of deals*
Management equity participation	56	62.9%
Top 10 PE participation	21	23.6%
Single PE participation	61	68.5%
Club PE participation	26	29.2%
Other company participation	12	13.5%
Sells significant assets while private	33	37.1%
Makes significant acquisitions while private	46	51.7%

Panel B

Capital is as of completion of the buyout (as defined in Table 1). 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; pre-buyout leverage is defined as total debt at year -1 divided by capital; leverage change is the difference between total debt at the buyout and total debt at year -1, divided by capital; bank loan/ total debt is defined as total bank loans divided by total debt at the buyout.

	# of obs.	*mean*	*median*
Capital ($ mil)	89	974.7	520.0
Management equity /total equity	56	9.9%	5.3%
Pre-buyout leverage	89	24.8%	22.8%
Leverage change	89	43.6%	46.5%
Bank loan/total debt	89	45.1%	49.1%
Asset sales/capital	33	22.2%	10.8%
Acquisition/capital	46	41.0%	22.3%

Table 11 – Regressions for post-buyout performance

This table reports the multivariate regression results of various measures of post-buyout performance. The dependant variable in model 1-2 is return on sales (ROS) at year +1, measured as $(EBITDA/sales)_{yr=+1}$; the dependent variable in model 3-4 is the change in ROS from year -1 to year +1; the dependent variable in model 5 - 6 is a dummy variable that equals 1 if the change in ROS from year -1 to year +1 is positive, 0 otherwise. The dependent variable in models 7-10 is the S&P adjusted return to post-buyout capital (as defined in Table 7) . Other independent variables are as defined in Table 10. *P*-values are in parentheses. All regressions are OLS with heteroskedasticity adjusted standard errors, except for regression 5 (logit).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	ROS at yr +1	ROS at yr +1	Change in ROS (-1, +1)	Change in ROS (-1, +1)	Positive change in ROS (-1,+1)	Return to post-buyout capital	Return to post-buyout capital
Ebitda/capital	**-0.601**	**-0.781**	**-0.646**	**-0.831**	**-16.577**	2.483	3.001
	(0.097)	(0.061)	(0.047)	(0.032)	(0.097)	(0.407)	(0.308)
Ln(capital)	0.008	0.011	-0.000	0.005	-0.656	-0.252	**-0.283**
	(0.600)	(0.516)	(0.979)	(0.761)	(0.111)	(0.153)	(0.100)
ROS at yr -1 (ind adj.)	**0.717**	0.486	-0.142	**-0.405**	-0.407	0.588	0.028
	(0.000)	(0.015)	(0.203)	(0.031)	(0.876)	(0.538)	(0.978)
Industry ROS at yr +1	0.421	**0.713**	**-0.515**	-0.167	-2.661		
	(0.106)	(0.018)	(0.033)	(0.590)	(0.404)		
Mgmt/total equity	-0.022	-0.011	-0.003	0.017	-4.552	1.130	0.859
	(0.631)	(0.805)	(0.943)	(0.734)	(0.164)	(0.107)	(0.197)
Pre-buyout leverage	**0.469**	**0.426**	**0.469**	**0.414**	5.667	-0.467	-0.931
	(0.021)	(0.054)	(0.012)	(0.040)	(0.135)	(0.761)	(0.518)
Leverage change	**0.464**	**0.428**	**0.493**	**0.444**	**8.738**	-0.277	-0.617
	(0.019)	(0.043)	(0.007)	(0.023)	(0.028)	(0.840)	(0.637)
Bank/debt	-0.079	-0.066	-0.063	-0.048	1.514		**1.029**
	(0.226)	(0.299)	(0.315)	(0.429)	(0.211)		(0.064)
Club PE	0.008	0.018	0.016	0.025	**1.221**	**0.533**	**0.461**
	(0.711)	(0.400)	(0.439)	(0.233)	(0.030)	(0.044)	(0.068)
Top 10 ranked PE	0.017	0.029	0.014	0.026	-0.511	-0.089	0.015
	(0.599)	(0.255)	(0.522)	(0.206)	(0.439)	(0.748)	(0.958)
Other company	0.011	0.015	0.036	0.044	**1.399**	0.569	0.621
	(0.752)	(0.643)	(0.226)	(0.114)	(0.066)	(0.268)	(0.224)
Asset sales/capital	**-0.152**		**-0.153**			**-1.278**	**-1.196**
	(0.065)		(0.059)			(0.052)	(0.068)
Acquisitions/capital	0.045		**0.054**			0.435	0.367
	(0.212)		(0.077)			(0.362)	(0.393)
Asset sales dummy		**-0.047**		**-0.056**	-0.989		
		(0.067)		(0.018)	(0.109)		
Acquisitions dummy		0.034		0.024	0.653		
		(0.107)		(0.204)	(0.216)		
post99	0.009	0.024	0.032	**0.052**	0.873	0.226	0.260
	(0.685)	(0.438)	(0.132)	(0.093)	(0.249)	(0.356)	(0.277)
Constant	-0.185	-0.212	-0.191	-0.218	-0.303	1.806	1.776
	(0.195)	(0.155)	(0.141)	(0.113)	(0.905)	(0.094)	(0.082)
Observations	84	86	84	86	86	82	82
R-squared	0.637	0.599	0.391	0.339		0.176	0.219