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**THE FINANCIAL PERFORMANCE  
OF WHOLE COMPANY LBOs\***

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CES 93-16 November 1993

## ABSTRACT

Using the previously untapped Census Quarterly Financial Report (QFR) file, we explored the financial performance of a large unbiased sample of 209 leveraged buyouts (LBOs) and 48 going private transactions occurring between 1978 and 1989. Our principal findings are: First, we confirm previous work showing that LBOs substantially increase operating performance and reduce taxes. Second, we find that the operating performance gains are sustained for three years. However, there is a significant drop in performance in the fourth and fifth years. Performance in these years is not significantly above the pre-LBO level. Third, total debt to assets displays only a slight insignificant downward trend. Thus, high debt remains after the drop in performance. Fourth, we find evidence that the performance gains decline in the mid- to late 1980s, with the exception of 1989. Fifth, the data suggest that LBOs target typical firms. The only significant pre-LBO firm characteristic was lower bank debt relative to nonbank debt. Sixth, we identify a number of factors that differentiate LBO performance. Performance tends to be higher when pre-LBO performance is low and the firm is classified as a large R&D performer. Conversely, management buyouts and buyouts involving extensive restructuring did not outperform other buyouts. Finally, we observe a clear linkage between debt and performance, since nonleveraging going-private deals have significantly lower performance than LBOs.

Keywords: LBO, financial performance, debt, restructuring

\*The Bradley Foundation, the Brookings Institution, the Kenan Institute, the U.S. Bureau of the Census and a National Science Foundation grant supported the study. The views expressed here do not necessarily reflect those of any of the funding agencies or the authors affiliated institutions. Most of the work for this study was performed at the Center for Economic Study, U.S. Bureau of Census. We are grateful for help and comments from Bob Eisenbeis, Paul Malatesta, Robert McGuckin, Richard Rendleman and Paul Zarrett and seminal thoughts by F.M. Scherer. We acknowledge the excellent research help of David Parr, George Pascoe, Nam Pham, Shawn Phelps, Tracy Probst, and Edith Purdie. Bronwyn Hall, Steve Kaplan, Frank Lichtenberg, Donald Siegel, Harbir Singh and Abbie Smith were kind enough to provide us with lists of firms in their samples. We also received valuable comments from seminar participants at the Brookings Institution, Bureau of Census, Federal Trade Commission, University of North Carolina and the Western Finance Association.

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The 1980s represented a time of enormous change in corporate governance. One of the most dramatic forms of this change was the leveraged buyout (LBO). An LBO often transforms a large diversified public corporation with low debt and little management ownership to a more focused private corporation with high debt and extensive management ownership. By the end of the 1980s, LBOs had become one of the largest single components in the greatest merger wave in U. S. history. More than 2,000 companies or divisions of companies were acquired through LBOs in the 1980s. The total value of these deals exceeded \$250 billion. In late 1989, LBO activity ground to a halt. The 1990 LBOs have largely returned to their pre-1980 form. Currently, LBOs are primarily used as a means for selling a division to management or selling a private company.

Despite the recent decline in activity, LBOs remain an important research topic. The LBO wave of the 1980s provides a natural laboratory for testing corporate governance and capital structure theories. Never in recent history has such a large number of firms so dramatically changed their capital structure. Furthermore, we need to understand what happened to LBOs. How did they switch from being a vehicle for transforming even the largest U. S. corporations to primarily a means of financing divisional sell-offs and private company sales, in a matter of a few months? Finally, it is important to assess what role LBOs should play in the future. If LBOs created significant gains for companies, then public policy should help restore public confidence and help encourage LBO financing.

A substantial academic literature has developed on LBOs. The conclusions from these papers are almost universally positive. Numerous studies have shown that LBOs generated gains of between 15 and 40 percent for a company's pre-buyout shareholders (DeAngelo, DeAngelo and Rice 1984, Lehn and Poulsen 1989, Marais, Schipper and Smith 1989). The deal makers and participating management earned over a 200 percent annualized return or roughly 30 to 40 percent above a highly leveraged market return during the

same period (Kaplan 1989, Muscarella and Vetsuypens 1990). And, all studies of post-LBO performance concluded that LBOs improve a company's operating performance, cash flow management or productivity (Kaplan 1989, Lichtenberg and Siegel 1991, Muscarella and Vetsuypens 1990, Opler 1992, Singh 1990, and Smith 1991).

This paper employs the previously untapped 1977-1991 Census Bureau Quarterly Financial Report (QFR) data base, which is uniquely suited for studying the post-LBO performance of whole-company LBOs. The data base contains the universe of all firms -- public and private -- with assets over \$25 million in manufacturing, mining, wholesaling and retailing. These industries encompass more than 85 percent of the total value of LBO activity. The data permit the comparison of pre- and post-LBO performance for over 209 whole-company LBOs and 48 nonleveraging going private transactions occurring between 1978 and 1989.

These data allow us to extend the literature on post-LBO performance in a number of key directions. First, our sample is two to three times the size of prior work. The largest previous sample is Kaplan and Stein (1993) with one year post-LBO operating performance on 87 LBOs and two year post-LBO performance data on 66 LBOs. Our sample has one-year of post-LBO data on 209 companies and three-years of post-LBO data on 154 companies. Second, most other studies rely on publicly reported LBO performance data. The majority of these observations stem from LBOs that are subsequently taken public through an initial public offering (IPO), creating a potential public reporting bias. DeGeorge and Zeckhauser (1993) and Kaplan (1989) find some evidence that these LBOs have significantly greater performance than the typical LBO. The QFR data avoids this potential public reporting bias.<sup>1</sup> Third, we investigate both

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<sup>1</sup>Lichtenberg and Siegel (1991) also employ confidential Census data. However, they use the Census Longitudinal Research Data (LRD) plant data file, while our paper employs the whole company QFR file. Their post-performance data covers only 1981-1985 LBOs and they employ an unknown mix of whole and divisional LBOs. A number of studies employ indirect tests for the potential public reporting bias (Kaplan 1989, Smith 1991).

short and long term LBO performance. Most LBO studies measure performance for only one year after the buyout and no study has looked at more than three years of post-buyout performance for a balanced panel. Critics argue that many of the gains to LBOs are short lived and some of the cost cutting comes at the expense of longer run performance. Fourth, we explicitly investigate the changing nature of LBOs yielding insight into what happen to LBO activity. Only Kaplan and Stein (1993) study changes in LBO characteristics over time. They focus primarily on ex-ante variables (pricing, capital structure, and incentives), although they do report some preliminary evidence on unadjusted changes post-buyout performance. Fifth, this is the one of the first study to systematically investigate causes of differential LBO operating performance. All studies find substantial variability in LBO performance. We test a number of hypotheses derived from the corporate governance and capital structure literature that may explain this variability.<sup>2</sup> Sixth, we employ an explicit definition of LBO. This definition allows use to compare nonleveraging going private transactions to LBOs, isolating the critical role of debt in the LBO performance improvements. These advances enhance our ability to understand what happened to LBOs and to draw business and public policy conclusion regarding the future of LBO activity.

This paper is organized into two main sections. The first half is largely descriptive, focusing on the central tendency of LBOs for nine key firm indices. These indices include three components of profitability (operating income before depreciation, income taxes and net income), three components of cash management (inventories, accounts payable and accounts receivable), and two measures of indebtedness (bank and nonbank debt). This section begins by discussing the QFR data and fixed effects methodology used to analyze these central tendencies. The results are presented for samples with one, three, and five years of post-LBO data. Since almost all theories

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<sup>2</sup>One other study that systematically analyzes LBO performance is Kaplan and Stein (1993). They relate pricing, capital structure and incentive variables to three measures of financial distress.

of LBOs predict an increase in performance, we reserve the theoretical discussion for the second half of the paper. This half tests agency and capital market imperfection theories. It also attempts to isolate the role of debt, managerial incentive and restructuring in explaining the supra-normal LBO performance. After discussing the theory and hypotheses, this section describes the variables and discusses the regression results.

### Impact on Firm Performance

#### **Data**

This study links two large data bases -- a comprehensive list of whole-company LBOs compiled by the authors and the previously untapped financial data from the Quarterly Financial Report Program. The primary source of data for identifying LBO companies was the ADP/MLR Publishing M & A Data base, which contains numerous data items on LBOs completed since January 1981.<sup>3</sup> After eliminating duplicates and misclassified deals, this file contained 626 whole-company LBOs. The sample was supplemented with the names of LBO companies supplied from other researchers. Hall (1990), Lehn and Poulsen (1989), Lichtenberg and Siegel (1991), Kaplan (1989), Singh (1990), and Smith (1991) were kind enough to make available their lists of companies. Some of the samples included mergers that take a publicly listed company private, or mergers that employ significant junk bond financing. Our research is restricted to companies that are not acquired by another company with existing operations in some industry. To screen out mergers and deals that were not completed, a search of the financial press was conducted on all of these companies. These sources increased the final list of LBO candidates to 821 potential whole-company LBOs.

Our LBO master file also includes data on up to 50 variables on each LBO. The file contains information on the announcement and completion date, the value of the transaction, senior management ownership, management

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<sup>3</sup>The Mergers and Acquisitions data did not classify deals as LBOs before 1981. The list was made available for a fee by ADP Incorporated, which contracts with Mergers and Acquisitions Journal to distribute its database.

participation in the deal, number of bidders, management opposition to a prior bid, and acquisition and divestiture activity. We obtained these data from M&A Data base, the Wall Street Journal, COMPUSTAT, Moody's, CRSP, and Value Line.

LBOs most often transform a public corporation into a private company. An analysis of LBOs confronts the problem that many LBO companies no longer issue public financial reports. As noted, our solution is to employ the data at the Census Bureau's Quarterly Financial Report (QFR) Program.<sup>4</sup> The QFR program has been collecting mandatory data on all public or private companies with assets over \$25 million, and a sample of smaller companies, since shortly after WWII. The industrial sectors surveyed by the program include manufacturing, mining, wholesaling and retailing. In the 1980s, there were roughly 15,000 companies per quarter in the QFR sample with approximately half in the over \$25 million assets category. Each company reports an abbreviated income statement and balance sheet. QFR staff accountants carefully audit each report, making sure uniform accounting conventions are followed and checking for consistent reporting over time.<sup>5</sup> The program's main purpose is

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<sup>4</sup>Since the QFR data had never been used by researchers, our solution was a costly one. A number of obstacles had to be overcome to create a research based time-series of QFR data. First, the archived data had to be located. With the exception of the fourth quarter of 1978 (which we estimated from the previous 3 quarters), we successfully retrieved all data for 1977 - 1991. We aggregated the quarterly data into annual data by adding the income statement items across the four quarters and averaging the four quarters' balance sheet items as balance sheet data for the year in question. Thus, for every firm in the sample we have calendar year data. Second, the QFR program is not concerned with extreme observations unless they affect the aggregate industry or size classification totals. Regression analysis, on the other hand, needs to check for outliers. We followed a procedure common in microdata analysis of eliminating a priori all observations outside reasonable ranges. An observation was eliminated if its cash flow to sales ratio was more than 3.5 standard deviations away from the mean of its industry. Third, the QFR data had to be linked across time. This task was challenging since the QFR program changed a company's identification code (ID) when the size class or primary industry of the firm changed.

<sup>5</sup>The QFR program is also preparing a report comparing the QFR and COMPUSTAT data for public companies. The QFR data contains only the U.S. domestic segment of the company, while COMPUSTAT data contains the entire company (foreign and domestic). Therefore, the two data bases are most comparable for firms with a small foreign segment. For the almost 700 common

to publish a very timely quarterly report that aggregates the data into size classes and into roughly two-digit SIC code categories.

Through extensive computer programming and investigation of notes on the hard copies of the firm's filings, we identified 209 LBOs and 48 going private transactions with one year of data immediately before and after the LBO year. While this figure is almost three times the size of previous samples with matched pre/post LBO data, it is still much less than the 821 whole-company LBOs and going private transactions in the comprehensive list discussed above. For deals with size information, 125 of the companies are less than \$25 million. The QFR program randomly samples companies with assets less than \$25 million. However, these companies report for only two years before a new random sample is taken. Thus, companies with under \$25 million in assets rarely had three continuous years of data. In addition, 126 companies with a value over \$25 million are in one of the industry categories not included in the QFR survey. This leaves a potential of 570 LBOs within the scope of the QFR data. However, for 20 percent of the remaining LBOs, size data are missing. Assuming that almost all the LBOs with missing size information are small, we are left with 456 potential QFR LBOs. We found one year of pre-LBO and post-LBO data for 294 of these deals or 65 percent. We eliminated 37 of the 294 because the QFR forms revealed that the firm had been acquired by an existing private or foreign company. In sum, our 257 company coverage of the potential QFR LBOs and going private transactions is fairly complete. These 257 transactions are compared to 37,628 observations on QFR firms that did not undergo an LBO or going private deal.

We develop three samples from the QFR data. The first sample contains data for one year before and one year after the LBO. This sample allows us to calculate the change in LBO performance for the largest possible number of

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firms with a small foreign segment, 95 percent report similar 1988 data (within 5 percent) on net income, stockholders equity, sales and total assets. Most of the disagreements stem from permissible differences in accounting procedures.



LBOs and for the most recent LBOs. Because accounting data might be manipulated in the year before or after the buyout, our second sample selects firms with data in each of the three years before the buyout and in each of the three years after the deal. With this sample we investigate the difference between the average of three pre-LBO years and the average of the three post-LBO years. This averaging also reduces the noise from year to year fluctuations and allows a focus on medium term performance. The final sample attempts to capture longer run performance. This sample selects firms with data in the year before the buyout and in the fourth and/or fifth year after the buyout. If data exists for both the fourth and fifth year, we average these two years, otherwise we use whichever year is available.<sup>6</sup> Our measure of long run performance is the difference between the year before the buyout and the fourth and/or fifth year average after the buyout.

Table 1 gives the total number of LBOs for each year. The number of LBOs reaches a peak in 1988. There is a sharp drop in the number of deals in 1989. This table also demonstrates the tradeoff from extending the post-LBO time period. With our one year pre/post sample, we are able to span the complete time frame of whole company LBO activity, 1978-1989.<sup>7</sup> Since the time series of QFR data that we developed covers 1977-1991, we lose 17 LBOs occurring in 1978, 1979 and 1989 when we move to the 3 year pre/post sample. For the long run sample, we are unable to investigate 1988 and 1989 LBOs.

### **Methodology and Variables**

The basic methodology is designed to measure the industry-adjusted level or change in LBO performance. However, instead of simply subtracting the industry mean for the relevant year from the LBO variable, we control for

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<sup>6</sup> If one of the years is missing, it is generally the fifth year after the buyout. However, there are occasional gaps in QFR data reporting which could result in a missing fourth year, but not a missing fifth year. These gaps also explain why this long run sample is not a subset of the one year pre/post sample. On rare occasions the QFR program may lose track of a company after the LBO, but correct the problem by the fourth or fifth year after the buyout.

<sup>7</sup>Almost all large LBO deals since 1989 have been divisional buyouts.

industry and time factors through a fixed effects model. Specifically, we include a dummy variable for each industry in each year. The QFR program employs 35 industry categories. Thus, the maximum number of industry-year dummies is 420 (35 industries times 12 years, 1978-1989). The difference between LBO and nonLBO firms is captured by an additional dummy variable that equals one if the firm underwent an LBO and zero otherwise. An advantage of the fixed effects model is it forces us to carefully match the time period for the LBO and nonLBO firms. Each sample places certain survival restrictions on the LBO group. Our fixed effects model approach insures that the control group has the same survival characteristics. For example with the one year pre/post sample, a 1982 LBO would be compared to a 1982 nonLBO firm that had data in both 1981 and 1983. The change in performance from t-1 to t+1 would be 1983 minus 1981 for both the LBO firm and the control group firm. For the three year pre/post sample, both the 1982 LBO and its matched control group would be required to have six years of data from 1979 to 1985, excluding 1982. The long run sample would require 1981 and 1986 or 1987 data for both the LBO and control group.

We selected eleven measures of LBO performance from the income statement and the balance sheet data contained in the QFR reports. We investigate three profitability related variables, operating income / sales, income tax / sales, and net income / sales. Operating income does not include depreciation and net income omits extraordinary expenses. Purchase accounting, together with the generally large premiums paid over book value of assets, causes assets to be stepped-up substantially after the acquisition. Thus, we use sales instead of assets in the denominator. The general critique that return on sales is not comparable across industries is not relevant, since the performance measures are all industry-adjusted. Operating income / sales should reflect any operating improvements that stem from LBOs. Income tax / sales will yield insight into the size and durability of tax savings stemming from the increased debt. Net income / sales will almost surely decrease after the LBO

due to the increased leverage. However, this variable will reflect the ability of operating improvements and tax savings to cover interest payments.<sup>8</sup>

LBOs can also enhance performance through improved cash management. These improvements should result in less working capital. However, decreases in working capital can also signal financial distress. Therefore, we isolate three aspects of working capital that are most likely to reflect improved cash management -- inventories, accounts receivable and accounts payable. An LBO should result in a tightening of inventories and accounts receivable, while extending accounts payable. We also focus on the amount and type of debt incurred in an LBO for two reasons. First, we wanted to distinguish between LBOs and going private transactions. Thus, for our LBO sample we required that debt increase by at least 20 percentage points. If the debt increase is less than 20 percentage points, we labeled the transaction a nonleveraging going private transaction.<sup>9</sup> We incorporate these transactions in the regression analysis in the next section. This section focuses only on LBOs. Second, the QFR form collects bank and other long-term debt separately. While it is obvious that debt will increase after the LBO, the ratio and time dynamics of bank versus other debt warrant investigation. Similarly, we would like to track the magnitude and dynamics of the interest payments stemming from the debt. The QFR data does not contain an explicit interest expense item. It does have a non-operating expenses category. Most of the pre/post LBO change in non-operating expenses will be due to increases in interest payments.

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<sup>8</sup>The QFR data does not contain a direct measure of interest payments.

<sup>9</sup>We used the QFR data for the first screen. If the measure ((1 year post-LBO total debt/assets) - (1 year pre-LBO total debt/assets)) was greater than .2, we defined the deal as a LBO. For the remaining deals we checked the QFR form and public sources to see if the debt was increased by more than 20 percentage points, but then paid off sufficiently to bring the change to below 20 percentage points prior to the end of the first year after the buyout.

The mean of the performance variables for the entire sample (LBO and control group) is presented Table 2. We use these means to assess the magnitude of the LBO related changes. For example, the full sample mean of operating income / sales is approximately 10. Therefore, the 1.5 percentage point improvement in operating income / sales in Table 3 represents a 15 percent increase. **Results**

Table 3 presents our findings on the 11 key variables for our short, medium and long run samples. We present separate numbers on the pre-LBO and the post-LBO variables for only the one year pre/post sample. For the medium and long run samples, we focus on the difference between the pre-LBO and post-LBO period. This table gives the coefficient and t-statistic on the LBO dummy variable contained in the industry/year fixed effects regression model. The values in this table represent the industry and year adjusted difference between the LBO firms and the control group.

#### Targets of LBOs

Before the buyout, LBO candidates are not exceptional relative to their industry. LBOs do not appear to target above or below average performers. They do not tend to seek firms with above average tax bills or excessive working capital. And, they do not single out firms with significantly below average debt. There are only two pre-LBO variables that are significant, bank and nonbank debt.<sup>10</sup> The LBO firms tend to rely more on nonbank debt and less on bank debt than other firms in their industry. In contrast, all but three of the post-LBO variables are significant. We will discuss these LBO induced changes by focusing on the post-LBO minus pre-LBO change for the one, three and four to five year post-LBO samples.

#### Impact on Operating Performance

For the one year pre/post sample, operating income / sales shows a significant increase. The LBO improves the operating performance by almost 15

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<sup>10</sup>Unless otherwise noted, "statistically significant" implies the t statistic passes a 10 percent level two-tail test.

percent. This finding confirms most prior work showing substantial gains in operating performance after an LBO. The magnitude of the gain is also comparable with previous work.<sup>11</sup> The potential public reporting bias contained in most prior LBO work does not appear to bias the average LBO performance.

This performance gain is sustained for three years. As the fourth column in Table 3 shows, the improvement over the three post-LBO years is almost identical to the one year post-LBO gain. As expected, the averaging of the three pre-LBO and post-LBO years reduces the noise in the accounting data. The LBO induced 3 year improvement in operating income / sales is significant at the 1 percent level. The three year findings also demonstrate that the increased operating performance does not stem primarily from short term improvements or accounting manipulations.

The LBO engine, however, appears to have its limits. There is no significant improvement in operating income / sales in the fifth column of Table 3. This column captures our measure of long run performance, the difference between the pre-LBO year and the fourth and/or fifth post-LBO years. A separate analysis confirms that the drop in performance is related to the post-LBO time period and not the loss of observations as the post-LBO time period is extended. For the sample of 107 LBOs with data for at least the first four post-buyout years, each of the first three post-buyout years shows a statistically significant increase in industry adjusted operating income / sales relative to the year before the buyout. On average, the three year improvement for this sample of 107 was almost identical to the one year pre/post and three year pre/post samples. There is no significant improvement in cash flow to sales in the fourth and fifth year relative to the pre-LBO

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<sup>11</sup>For example, Kaplan (1989) found a 12.4% industry adjusted change in operating income/sales from one year before the buyout to one year after the buyout for his sample of 45 firms (Table 3 p.227).

year.<sup>12</sup> The drop in performance between the average of the first three post-buyout years and the average of the fourth and fifth buyout years is 0.88 with a t statistic of 1.64.

#### Taxes, Interest and Net Income

All studies of LBO tax effects show that tax payments drop substantially after the LBO. Thus, it is not a surprise that we find a strong statistically significant decline in income tax / sales. In the year after the LBO, income tax payments are cut in half relative to the year before the LBO. No study has focused on the post-LBO time dynamics. Our medium and long run samples show that the income tax savings remain even after four to five years. However, the amount of income tax savings declines substantially as the post-LBO years progress. The tax savings are 50 percent lower in the fourth and fifth post-buyout year than the first post-buyout year.

Like income tax savings, it is obvious that interest payments must increase after the LBO. Our proxy for interest payments, non-operating expenses, does increase by more than twofold after the LBO. However, the time-dynamics of interest payments are less obvious a priori. Interest payments relative to sales remain consistently high throughout the first five post-buyout years. There is only a slight decline in non-operating expenses / sales between the third, fourth and fifth columns in Table 3. Most of this decline can be attributed to the decline in the mean non-operating expenses / sales across samples in Table 2. Five years after the buyout, the industry adjusted non-operating expenses / sales is still more than twice the overall manufacturing average.

What is the net impact of these operating improvements, tax savings and interest payment increases? For each of the first five years after the buyout the interest payment increases dominate the operating improvements and tax

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<sup>12</sup>Specifically, the post-LBO minus pre-LBO change in industry-adjusted cash flow / sales is 1.28, 1.78, and 1.26 for the first, second and third buyout years. The corresponding t statistics are 2.17, 2.90 and 1.80. This change is 0.66 with a t statistic of 0.78 for the average of the fourth and fifth year.

savings making net income / sales significantly below the industry average. Net income / sales does improve slightly over the post-buyout years. The average unadjusted net income / sales was  $-.36$  in the year after the buyout. By the fourth and fifth year after the buyout, this number had turned to a positive  $.45$ .<sup>13</sup> However, even the positive net income / sales number is significantly below the industry average, the overall manufacturing average and their own pre-LBO level.

#### Changes in Cash Flow Management

The LBO induced changes may also encourage firms to be more efficient in managing their cash flow. In fact, Smith (1991) finds that LBOs significantly improve cash management and not operating income. We find significant cash management savings when we use the aggregate working capital / sales measure.<sup>14</sup> The LBO induced decline in working capital / sales is large and statistically significant in the short, medium and long run sample with only a slight decline over the post-LBO period. However, working capital / sales is also a traditional measure of financial distress. The decline in working capital may simply stem from the drawing down of cash and near cash items to service the debt.

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<sup>13</sup>These numbers are approximations. They are obtained by adding the overall mean value in Table 2 to the post-LBO value in Table 2. The post LBO value of net income / sales for the four to five year sample is  $-2.92$ .

<sup>14</sup>It is more common to study working capital / assets rather than working capital / sales. However, most LBOs pay a substantial premium over book value. In these cases, assets are increased to reflect the new recognized market value of the firm. Most of the increased valuation is allocated to plant, property and equipment and goodwill, and not working capital items. A possible important exception inventories. If firms tend to substantially increase inventory values after the LBO, then assets would be the appropriate denominator. This would tend to cancel the accounting set up in the numerator and denominator. By consistently using sales in the denominator, we are assuming that any inventory set up is small relative to the increase valuation of total assets. This, however, is a critical assumption since the post-LBO minus pre-LBO value of inventories to assets is significantly negative.

Three aspects of working capital that are probably better measures of improved cash management are inventories, accounts receivable and accounts payable. As Table 3 shows, these three measures tell a different story. The average post-LBO minus pre-LBO change in these three variables is essentially zero for all three samples. We find no evidence that LBOs reduce inventories, increase collections of accounts receivable or extend accounts payable.

#### Debt Sources and Repayment

If you want to be ensured of a great t statistic, test a definition. We define an LBO as a going private transaction with a 20 percentage point increase in debt / assets. Table 3 column 3 shows that LBO firms increase debt / assets by 37.63 percentage points with a t statistic of 22.13. The average debt / assets for LBO firms is 23.77 in the year before the LBO. Therefore, the 37.63 represents a 160 percent increase in debt / assets.

More important is the trend in debt repayment. A comparison of the last three columns in Table 3 shows that relative to assets, the debt level remains fairly constant in the first five years after the buyout. The short, medium and long run samples show comparable increase in total debt / assets of between 37.63 and 36.53.<sup>15</sup> This surprising finding of almost no decline in debt / assets over the post-LBO period warrants clarification. First, debt does get repaid through asset sales. However, despite the prominence of these assets restructurings in the popular press, we found that only about 25 percent of the all whole company LBOs engaged in significant post-LBO divestitures. And, for these 25 percent the total sell-off averaged 10 percent of pre-LBO assets (Long and Ravenscraft, 1993a). For most LBOs, asset sales were not the primary means of repaying debt. For the sample of 209 LBOs with one year of pre- and post-LBO data, only 12 percent had divested more than 30 percent of their assets within 3 years after the LBO (see Table 5).

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<sup>15</sup>While the mean is comparable, the standard error is almost twice as large in the long run sample. Some of this is due to one outlier in the long run sample. Eliminating this observation increases the difference between the one year and four to five year sample by only about 1 percentage point.



Second, sell-offs only ensure a drop in the level of total debt, not in the debt level relative to the remaining assets. Third, this finding represents the average tendency. Some firms are paying down the debt relative to their assets.<sup>16</sup> Besides asset sales, the most dramatic way to bring down the debt is through an IPO. Muscarella and Vetsuypens (1990) show that while debt declines after the IPO, it remains well above normal. However, some firms are also increasing their debt / assets, especially those in the mid to late 1980s. Some of the creative financing arrangements, like payment-in-kind bonds, were designed to postpone the debt until three to five years after the buyout.

Additional insights stem from separating total debt into bank and other debt. On average, LBO firms rely on both bank and nonbank sources to raise capital with a slight bias towards bank financing. The post-LBO distribution of bank and nonbank debt is almost even. However, this is a significant change from the pre-LBO period where bank debt was underrepresented relative to the firm's industry counterparts. A comparison of the short and long run samples indicates that the proportion of bank and nonbank debt remains fairly constant over time.<sup>17</sup>

#### CAUSES OF DIFFERENTIAL LBO PERFORMANCE

##### **Theory and Hypotheses**

Ever since Modigliani and Miller (1958) argued that with perfect capital markets the source of financing was irrelevant, scholars have wrestled with the impact of a firm's capital structure on corporate behavior. Modigliani and Miller's conclusion has been criticized on several grounds. Debt can help

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<sup>16</sup>Sixty percent of the buyouts reduced debt/assets over the first five post-buyout years. Most of the decreases and increases in debt over the post-buyout period were substantial. The change in debt to assets over the five post-buyout years was less than 10 percent in only one-third of the buyouts.

<sup>17</sup>The use of total debt instead of long term debt masks a potentially important conclusion. Long term bank debt declines faster than long term nonbank debt. This result coupled with the Table 3 findings suggests a substitution of long-term for short-term bank debt.

resolve agency problems that result from the separation of ownership and control, especially when debtholders are concentrated or when the debt is used to increase managerial equity (Jensen and Meckling, 1976). Debt increases can create wealth transfers from taxpayers and bondholders to shareholders (Jensen and Smith, 1985). Debt can be used to take advantage of the asymmetric information possessed by managers, although debt changes may signal this information to shareholders (Leland and Pyle, 1977). Leveraged buyouts have been credited with solving or exploiting all of these agency problems and capital market imperfections.<sup>18</sup>

The means by which leverage buyouts solve these problems and imperfections are multidimensional. The increase leverage in LBOs force managers to be more efficient and to maximize firm value by disgorging "free cash flow". Many LBOs increase senior managers' equity stake reducing the divergence between ownership and control. LBOs increase managerial monitoring, since nonmanagement debt and equity are often more highly concentrated post-buyout. Many buyouts also restructure corporate assets. If diversification is inversely correlated with profits, this refocusing can increase the performance of the remaining lines.

Our hypotheses concerning these issues are divided into three categories. First, we develop proxies measuring the extent of agency problems prior to the buyout. The greater the pre-buyout agency problems, the larger the potential buyout gain. Second, we develop proxies for three of the sources of buyout gain, free cash flow, monitoring and restructuring. Third, we explore alternative hypotheses that might explain differences in the buyout gain. These include inside information, myopic behavior, and increased competition. We regress these proxies on the post-LBO minus pre-LBO change in

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<sup>18</sup>Even from the firm's perspective, debt is not a free lunch. Debt increases the probability of financial distress. It can also restrict the firm's ability to finance future net present value projects (Myers, 1984). LBOs can reduce these downside risks by targeting firms with stable cash flows in low growth industries (Jensen, 1986) or by employing strip financing which minimizes the cost of financial distress (Jensen, 1989).

operating income / sales. Since our focus is on operating performance, many of the concerns about wealth transfers do not apply.<sup>19</sup>

We employ three proxies for pre-buyout agency problems, hostile takeover attempts, pre-buyout firm performance, and size. Hostile takeovers should target firms with extensive agency problems (Morck, Shleifer and Vishney, 1988 and Ravenscraft and Scherer, 1987). We, therefore, hypothesize a positive relationship between hostile takeover attempts and post-buyout improvements. If managers are not acting in shareholder interests, the firm will perform poorly relative to its industry peers. We measure relative firm performance by the industry adjusted pre-buyout operating income / sales. We predict that this measure will be negatively correlated with performance. The separation between ownership and control generally grows with firm size. Therefore, agency problems should rise with size, causing a positive size - LBO performance relationship.<sup>20</sup>

As the name implies, a primary source of gain from leveraged buyouts should be leverage. One theory that focuses primarily on this aspect of buyouts is the "free cash flow" theory (Jensen 1986). The increased leverage forces firms to disgorge cash flows that management previously used to invest in negative net present value projects. We test for the role of leverage by comparing leveraged buyouts to nonleveraged going private transactions. Nonleveraging going private transactions should yield smaller gains than LBOs.

A second potential source of the buyout gain is asset restructuring. Divestitures should refocus the firm and improve the performance of the remaining divisions. Several studies have found a link between asset sales and stock performance. Whether this link is caused by increased performance

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<sup>19</sup>An exception would be transfers from employees. Proxying the extent of this transfer is difficult.

<sup>20</sup> Size is also an important control variable. Size is correlated with a large number of LBO characteristics including hostile activity, MBO, divestitures, management ownership, and LBO completion date. Size is also a key characteristic that distinguishes LBO performance studies, since some studies limit their analysis to very large firms.

(Hite, Owens and Rogers, 1987) or reduction in financial distress from debt repayment (Lang, Poulsen and Stulz, 1992) is more controversial. If the divestiture is linked to performance, then LBO firms that undergo post-buyout asset restructuring should outperform firms that do not engage in major asset sales.<sup>21</sup>

Several theories predict that the source of financing is likely to play an important role in LBO success. Shareholders lack incentives to monitor corporations, because of the free rider problem. The required interest payment on debt financing makes monitoring easier. However, some of this advantage is lost if the debt is also widely held. Bank debt tends to be more concentrated, creating incentives for careful and early monitoring before a crisis leads to a default in interest payments. Banks also have a cost advantage in gathering information, because they often have long term, repetitive relationships with clients. This advantage helps banks reduce the asymmetric information and moral hazard problems that might prevent indebted firms from raising capital for net present value projects (Campbell and Kracaw, 1980, Diamond, 1984). In addition, these longer term bank/client relationships reduce opportunistic behavior that increases the transaction costs associated with debt restructuring (Williamson, 1988). These theories predict a positive relationship between bank financing and LBO performance.<sup>22</sup>

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<sup>21</sup>Controlling for post-LBO divestitures is also important for a more technical reason. If firms divest their divisions with below average performance (Ravenscraft and Scherer, 1987), the operating performance of the remaining firm will naturally increase. This impact should be observed almost immediately. Therefore, it should be present in the short to medium term performance measures. All whole company LBO studies are susceptible to this potential sell-off bias.

<sup>22</sup>The investment bank responsible for the buyout may also play an important monitoring role, since these firms often own a significant amount of the post-LBO equity or debt. The dealmakers experience and ability may also be an important factor in determining the LBO's success. Unfortunately, we do not know who did many of the deals in our sample. One of the most famous dealmakers, KKR, has published a list of all of their deals, a substantial percentage of which are in our sample. To see if KKR's influence was an important influence in buyout performance, we added to the regression equations a dummy variable that equals one if the LBO was done by KKR and zero otherwise. This KKR variable never obtained a t statistic above 1.01.

Two hypotheses, insider information and myopia, suggest that the LBO gains may not be directly link to efficiency enhancements. Management buyouts (MBOs) have been an especially controversial form of leveraged buyout. Managers possess confidential information about their firm. Critics argue that this informational advantage may allow managers to buy the firm at below market value (Lowenstein, 1985). Phelps, Khorana, Long and Ravenscraft (1992) show that the premiums paid in MBOs are not statistically different from nonMBOs. Therefore, if the market allows managers to take advantage of their confidential information, it must be in the form of buying firms with superior performance at a price comparable to LBOs with normal performance. MBO is also an important variable because many researchers have limited their sample to only MBOs and because many LBO investors believe that management participation is a key component of LBO success.

In a detailed study of the impact of LBOs on R&D, Long and Ravenscraft (1993b) discovered that large R&D performing LBOs had greater short term and long term gains in operating income / sales than LBOs with little or no R&D. This finding contradicts critics who claim that LBO related cutbacks in R&D hurt competitiveness. We include the same R&D intensity measure in this study as a control variable to see if the other factors considered here might explain the positive R&D / performance link.

Our final hypothesis focuses on the dynamics of the buyout market. Many LBO characteristics have changed dramatically over the 1980s. The size of the deal, the premium paid, the firm's level of diversification, and the extent of post-LBO divestiture all increased over time, while the pre-LBO senior management stake decreased (Long and Ravenscraft 1993a). Kaplan and Stein (1993) also demonstrate extensive changes in the pricing, capital structure and management equity participation over time. Therefore, time may act as a proxy for unquantified (or mismeasured) dynamic characteristics that affect the operating performance of LBOs. Second, the supply of capital increased dramatically over time. Unless the long run marginal efficiency of

capital schedule for LBO investments is horizontal (i.e., there is a large supply of equally good LBO candidates), more marginal LBO candidates will be targeted.<sup>23</sup> This increased competition should cause the performance of LBO firms to decline over time.

### **Data and Methodology**

Because most of the independent variables discussed above are specific to LBOs (e.g., hostile, going private, late 80's LBO, and MBO), we restrict our regression analysis to only the LBO and going private sample. The dependent variable is the industry adjusted post-LBO minus pre-LBO change in operating income / sales. Industry adjustments are computed by subtracting off the mean value of the control group for the LBO firm's industry and for the relevant year. The industry mean is calculated from the same control group used in the Table 3 fixed effects regressions.

Table 4 lists the acronym, definition and source of each of the variables employed in the regression analysis. For a more detailed description of the variables contained in the LBO master file see Long and Ravenscraft (1993a). Table 5 gives the mean and standard deviation of the each variables. Table 5 indicates that only a minority of buyouts were motivated by extensive asset restructuring or explicit hostile takeover threats. Post-LBO divestitures accounted for more than 30 percent of the pre-LBO assets in only about 13 percent of the LBOs. Only roughly 15 percent of the LBOs experience a pre-buyout hostile takeover threat. Non-leveraging going private deals, which were excluded from the Table 3 LBO analysis, now comprise fifteen to twenty percent of the sample. The sample is more evenly divided between late 80's LBOs, MBOs, and large NSF R&D LBOs. These three LBO types comprise approximately 60, 50 and 40 percent of the total sample, respectively. The Table 3 change in operating income / sales results are

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<sup>23</sup>For example, in real estate increased competition not only bids up building prices and lowers rents, but it also leads to new buildings in less desirable locations. Similarly, increased competition in farming causes land prices to rise and food prices to fall. Competition also brings into production more marginal farming land.

confirmed in Table 5.<sup>24</sup> The improvement in operating income / sales is statistically significant for the one and three year pre/post samples, but not for the four to five year post-LBO sample. However, the addition of the going private deals makes the decline over the post-LBO years a little less pronounced. Table 5 also reinforces our previous findings that pre-LBO operating income / sales and post-LBO bank debt / total debt are not significantly different from their industry average.

### **Results**

We had some success in uncovering factors that determine LBO performance (Table 6). Our hypothesis that LBO performance declines over time receives support, especially in the long run sample. The late 1980s dummy is negative in all three samples and significant in the four to five year post-LBO sample. The individual year dummy variables reveal a slightly more complex time pattern. Most of the time variables are negative, because we omit 1984 which was a peak performance year. The time pattern is generally an inverted U-shape with performance improving until 1984 and declining after 1984. The worst years appeared to be 1985 and 1988. The most notable exception to the inverted U-shaped time pattern is 1989. While the number of deals dropped from 46 in 1988 to 19 in 1989, the average 1989 performance was superior to any other year. It was not the 1989 deals that led to the downfall of the LBO market. The roots of the decline appear to date back to 1988 and possibly as far back as 1985. By 1989, concerns of loan defaults had raised a financing barrier that only the best LBO deals could surmount.

Two agency theory proxies, industry adjusted pre-LBO operating income / sales (IAPROP/S) and hostile takeover attempt (HOSTILE), have the correct sign. However, the HOSTILE variable is not statistically significant in any of the specifications in Table 6. On the other hand, the IAPRCF/S variable is statistically the most powerful variable in all three samples. LBOs that

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<sup>24</sup>This robustness also confirms that the results are not being driven by either the fixed effects or straight difference in means methodology.

target underperformers have a much better chance of improving operating performance than those that target average or above normal performers.<sup>25</sup>

MBOs are one the most controversial and frequently studied forms of LBOs. This concern is not justified on the basis of their operating performance. MBOs have no statistically significant impact on performance in Table 6. If pre-buyout managers are taking advantage of inside information, it is not showing up in performance.

The divest variable is also insignificant in all equations. This finding is more consistent with Lang et al. (1992) than Hite et al. (1987). The near zero value of the divest coefficient in the one and three year samples suggests that the LBO related performance gains do not stem from firms divesting unprofitable units.

Size is a potentially important variable because of its dramatic growth over time and because several studies focus on primarily large LBOs. The size coefficient is negative and significant in the one year pre/post sample. Smaller firms are superior at generating short-term gains in operating performance. However, this advantage dissipates quickly over time. Thus, size factors cannot consistently explain differences in performance over time or differences in findings across studies. The negative sign is also contrary to hypothesized positive size/agency cost relationship.

The positive coefficient on the NSF R&D dummy found by Long and Ravenscraft (1993b) remains in all specifications except one. Our nine variable model with or without individual year coefficients does not diminish the importance of this variable. Why LBOs of firms with over \$500,00 to \$1 million in pre-LBO R&D should raise performance by 15 to 25 percent more than LBOs of firms with little or no R&D remains unclear. However, this finding

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<sup>25</sup>Some of this improvement may represent regression to the mean. There is a tendency in many samples for below average numbers to move back towards the mean. Regression to the mean generally occurs over time. Therefore, you would expect to find greater improvements in the longer run sample. While there is some evidence for this time pattern, the bulk of the improvement occurs in the year after the LBO.



does detract from the concern that LBO induced R&D cut backs are driving the short term performance increases.

The use of more bank debt than nonbank debt does appear to increase LBO performance as predicted. However, the coefficient on this variable never attains traditional levels of statistical significance.

The critical role of leverage in generating performance gains is confirmed by the going private variable. The coefficient on this variable is negative and significant for all three samples. Without leverage, going privates are unable to generate the same performance gains as LBOs.

#### CONCLUSION

This paper takes a new look at the performance of whole-company LBOs. Using previously untapped Census Bureau Quarterly Financial Report data, matched data on one year before and one year after the buyout were found for 209 LBOs and 48 going private deals. Three years of matched pre/post data were found for 154 LBOs and 27 going private deals. These samples of 1978-1989 LBOs are over twice the size of comparable samples from previous whole-company LBO studies. The majority of the added companies do not issue publicly available financial reports. No study has systematically investigated performance beyond the first three post-buyout years. The QFR data allowed us to develop a sample of 107 LBOs and 27 going privates with data on one year before the deal and four to five years after the deal. We employed these data to augment prior work on LBOs in numerous ways.

The paper finds some of the strongest evidence to date that LBOs worked, in the sense of producing substantial gains for the firm. We also identified the general sources of these gains. A key source is improvements in the firm's operating performance. LBO firms produced a statistically significant 15 percent increase in industry-adjusted operating income divided by sales. Of the five previous LBO studies isolating whole-company LBOs (Kaplan 1989, Muscarella and Vetsuypens 1990, Opler 1992, Singh 1990 and Smith 1991), only Kaplan found statistically significant improvements in the one year pre/post

change for this measure of operating performance. Furthermore, we find that firms are able to sustain this supra-normal operating performance for three years. A second key source of gain was income tax savings. Income tax to sales were cut in half in the year after the buyout. While tax payments began to rise again after the first buyout year, income tax / sales remained 30 percent below normal after four to five years. One source that did not produce the expected gains was cash management. Working capital / sales did decline significantly, but most of this decline was caused by increased short term debt. The three key specific cash management items we considered -- inventories, accounts payable, and accounts receivable -- did not change after the buyout.

The paper also tested some central hypotheses predicting differences in LBO performance. For our short, medium and long run change samples, we regressed industry adjusted change in operating income / sales on nine variables and nine individual year dummies. Many LBOs increase debt, raise management participation, undergo asset restructuring and increase managerial monitoring. Each of these changes has been hypothesized to produce the supra-normal post-LBO gains. Our findings confirm the critical role of debt in creating these gains. Nonleveraging going private transactions produce significantly lower gains in operating performance than LBOs. Without leverage, firms will not generate the same improvements found in LBOs. Conversely, we did not find a performance effect for many of the nonleveraging related changes surrounding LBOs. Management participation (in the form of an MBO), asset restructuring and increased bank monitoring does not significantly raise the performance level of LBOs. These findings are more consistent with Jensen's (1986) free cash flow theory than the more general agency theory. The sign or insignificance of the coefficients on the hostile takeover threat and size variables are also inconsistent with the agency theory hypothesis. The one variable that yields results consistent with agency theory is industry adjusted pre-LBO operating income / sales. LBOs that target firms

who are underperforming relative to their industry are more likely to produce significant LBO related gains in operating performance.

If LBOs create substantial gains and leverage plays a central role in producing these gains, why did the LBO market decline dramatically in 1989 and remain stagnant? Our study has produced a number of potential answers. First, there is some evidence that in the later 1980s LBOs were less effective at generating gains than their earlier counterparts. The coefficient on a dummy variable that is one if the LBO occurred in 1985 - 1989, is negative in all specifications and significant in the long run sample. In the regressions with individual year dummy variables, the coefficients on 1985 and 1988 LBO dummies are significantly negative in several specifications. Second, we discovered that the LBO gains were eroded over time. Specifically, unlike the first three buyout years, operating income / sales in the fourth and fifth post-LBO years was not significantly greater than operating income / sales in the year before the LBO. It is difficult to sustain a competitive advantage in any of today's highly competitive markets. Three years of sustained competitive advantage might be considered a clear success. However, financial distress could occur if the premium paid for the company was based on projections that did not recognize this declining advantage and if significant debt remained after the advantage was eroded. Our third finding confirms that debt / assets often remain high. Debt relative to the remaining assets is essentially flat for the first five years after the buyout. Thus, what created problems for some buyouts was that the ability of any nondivested assets to improve operating performance and reduce taxes declined while the debt servicing requirements from these assets stayed high.

Why did all these potential problems come to a head in 1989? It was not because the 1989 buyouts were particularly bad. In fact, the few buyouts that were financed in 1989 were an exceptional crop. The roots of the decline lay much deeper. Certainly the significant number of poorly performing LBOs in the 1985 to 1988 period helped sour the market. So did some of the creative

financing employed in the later 1980s. Given that the LBO gains declined in the post-buyout period, financing arrangements (like payment-in-kind bonds) that added debt or delayed debt repayment until years after the buyout, are particularly dangerous. Finally, the fact that in 1989 we were on the eve of an economic downturn no doubt played an important role. The failure of the average LBO to rapidly pare down debt / assets accentuated the impact of a recession. If the average LBOs had quickly reduced debt, then only the most recent LBOs would have been impacted by a recession. Instead, many LBOs -- even those that were completed five years before the recession -- had high debt to asset ratios.

A number of caveats should be added to these conclusions. First, while we identified some broad sources of the buyout gain, a more detailed investigation would shed additional light on the LBO process. How much of the increased operating income / sales stems from increases in prices? What changes are made to reduce costs? Second, the cause of the decline in post-LBO performance should be explored. Is this a natural consequence of competitive forces or a result of myopic actions taken by the firm? For example, Long and Ravenscraft (1993b) show that LBOs reduce R&D expenditures, but that these cuts can not be linked to the long run performance decline. A similar analysis needs to be done on the observed cuts in capital expenditures (Kaplan, 1989). Third, a more direct measure of management participation might reveal a linkage between incentive alignment and performance. Our MBO measure relies on statements in the Wall Street Journal and classifications used by other authors. Data on the change in senior management equity participation (in both total wealth invested and percent of equity owned) would allow a more conclusive test. For example, Kaplan and Stein (1993) find that management equity participation is inversely related to defaults on debt payments. Fourth, a linkage between our findings and post-LBO events like IPO, bankruptcy and acquisition, is warranted. Is the post-IPO decline in performance observed by DeGeorge and Zeckhauser (1993) related to our finding

of a long run performance deterioration? Do liquidation and acquisitions cause a survival bias in our long run performance sample? Finally, we have not succeeded in explaining why LBOs with a large amount of pre-LBO R&D expenditures significantly outperform those with little or no R&D. R&D expenditures are no doubt proxying for some key aspect of LBO performance that we have yet to uncover.

Table 1 - Number of LBOs per year for each of the three samples			
Year	1 Year Pre/Post Sample	3 Year Pre/Post Sample	1 Year Pre and 4 to 5 Year Post Sample
1978-1980	6	3	4
1981	10	8	8
1982	12	10	6
1983	12	11	6
1984	28	22	18
1985	27	19	17
1986	33	27	25
1987	22	20	23
1988	45	34	
1989	14		
Total	209	154	107

Table 2 - Means of Performance Variables (All variables are in percentage terms.)			
Variable	1 Year Pre/Post Sample	3 Year Pre/Post Sample	1 Year Pre and 4 to 5 Year Post Sample
Operating Income / Sales	9.54	10.12	10.26
Income Tax / Sales	2.50	2.82	2.89
Net Income / Sales	2.63	3.30	3.37
Working Capital / Sales	17.79	18.68	18.54
Inventories / Sales	16.26	16.25	16.39
Accounts Receivable / Sales	14.88	14.41	14.78
Accounts Payable / Sales	8.60	7.88	8.17
Total Debt / Assets	26.90	24.87	25.29
Bank Debt / Assets	14.54	12.83	13.17
Other Debt / Assets	12.36	12.03	12.12
Non-Operating Expenses / Sales	3.06	2.75	2.72
# of Observations	37837	18259	22299

Table 3 - Comparison of Pre-LBO and Post-LBO Performance for the 1, 3, and 4-5 Year Post-LBO Sample (Cell values give the difference between the LBO and control group; t statistics are in parentheses)					
Variable	One Year Pre/Post Sample			3 Yr Pre/Post Sample	1 Yr Pre- and 4 to 5 Yr Post Sample
	Pre-LBO	Post-LBO	Post-minus Pre-LBO	Post-minus Pre-LBO	Post-minus Pre-LBO
Operating Income/Sales	0.92 (1.39)	2.39 (3.16)	1.47 (1.93)	1.48 (2.58)	0.79 (0.83)
Income Tax / Sales	0.32 (1.12)	-1.14 (-3.65)	-1.46 (-4.51)	-1.18 (-4.58)	-1.05 (-2.43)
Net Income / Sales	0.42 (0.44)	-2.99 (-2.34)	-3.41 (-2.38)	-3.82 (-4.21)	-3.18 (-2.03)
Working Cap. / Sales	0.31 (0.11)	-6.00 (-1.75)	-6.30 (-2.27)	-6.60 (-3.84)	-5.30 (-1.54)
Inventories / Sales	-0.59 (-0.57)	-0.54 (-0.62)	0.05 (0.08)	-0.29 (-0.44)	-0.03 (-0.03)
Acc. Rec. / Sales	-0.99 (-0.39)	-0.68 (-0.27)	0.31 (0.17)	-0.30 (-0.26)	-1.27 (-0.32)
Acc. Pay. / Sales	-0.75 (-0.37)	-0.33 (-0.16)	0.42 (0.29)	0.03 (0.03)	-0.18 (-0.06)
Total Debt / Assets	-1.44 (-1.00)	36.19 (22.14)	37.63 (35.65)	36.53 (31.13)	36.99 (18.82)
Bank Debt / Assets	-3.53 (-2.97)	17.60 (13.04)	21.13 (22.13)	18.97 (18.28)	20.06 (11.70)
Other Debt / Assets	2.10 (2.05)	18.59 (16.24)	16.50 (21.00)	17.57 (19.24)	16.93 (11.36)
Non-Oper. Expenses / Sales	0.33 (0.54)	6.90 (10.23)	6.57 (8.85)	6.54 (11.42)	5.37 (5.62)
# of LBO observations	209	209	209	154	107
# of Control Group obser.	37628	37628	37628	18105	22192



Table 4: Definition of Table 4 and 5 variables and their data sources

Acronym	Definition
DIVEST	A dummy variable that equals one if the LBO divested 30 percent or more of its assets in the three years after the buyout. Source: LBO Master File.
GOPRIVATE	A dummy variable that equals one if the deal was a nonleveraging going private transaction. (I.e., a going private deal with a change in debt of less than 20%.) Source: QFR data.
HOSTILE	A dummy variable that equals one if a hostile takeover was attempted or rumored in the three years before the buyout. Source: LBO master file.
IACHOP/S	Industry adjusted change in operating income / sales. The industry adjustment simply subtracts the cash flow/sales for the industry and relevant year from the firm's cash flow/sales. The change is the post-LBO year industry adjusted cash flow minus the pre-LBO industry adjusted cash flow. Cash flow is defined as operating income before depreciation. Source: QFR data.
IAPROP/S	Industry adjusted pre-LBO operating income / sales. Source: QFR data.
IAPOBD/TD	Industry adjusted post-LBO long term bank debt/total long term debt. Source: QFR data.
LATE80s	A dummy variable that equals one if the LBO was completed between 1985 and 1989. Source: LBO master file.
LNSLS	The natural log of company sales in the year before the buyout. Source: QFR data.
MBO	A dummy variable that equals one if there is an indication that pre-LBO management took an equity stake in the buyout. Source: LBO master file.
NSFR&D	A dummy variable that equals one if the LBO is a large R&D performer in the year before the buyout according to the NSF R&D survey. Source: U.S. Bureau of the Census R&D survey conducted for NSF.

Table 5 - Mean (Standard Deviation) of Regression Variables			
Variable	1 Year Pre/Post Sample	3 Year Pre/Post Sample	1 Year Pre and 4 to 5 Year Post Sample
DIVEST*	0.12 (0.33)	0.13 (0.34)	0.13 (0.33)
GOPPRIVATE*	0.19 (0.39)	0.15 (0.36)	0.20 (0.40)
HOSTILE*	0.14 (0.35)	0.17 (0.37)	0.15 (0.36)
IACHOP/S	1.42 (7.29)	1.33 (5.47)	0.94 (8.51)
IAPROP/S	0.14 (5.99)	-0.31 (5.25)	0.14 (5.89)
IAPOBD/TD	-0.43 (35.99)	0.98 (32.50)	3.15 (35.11)
LATE80s*	0.63 (0.48)	0.60 (0.49)	0.54 (0.50)
LNSLS	12.63 (1.23)	12.70 (1.22)	12.58 (1.25)
MBO*	0.47 (0.50)	0.50 (0.50)	0.49 (0.50)
NSFR&D*	0.41 (0.49)	0.44 (0.50)	0.35 (0.48)
# of Observations	257	181	134

\*For these dummy variables, the number of observations with a value of one can be obtained by multiplying its means times the total number of observations.

Table 6 - Test of Hypotheses Concerning Differential LBO Performance  
 Dependent Variable - IACHOP/S (Industry Adjusted Change in Cash Flow/Sales)

Independent Variables	1 Year Pre/Post Sample		3 Year Pre/Post Sample		1 Year Pre and 4 to 5 Year Post Sample	
	1	2	3	4	5	6
INTERCEPT	9.42* (1.95)	10.38* (2.09)	7.11 (1.53)	7.92* (1.65)	0.47 (0.06)	0.29 (0.04)
YEAR 78-80		-1.24 (-0.51)		-2.83 (-0.97)		0.39 (0.12)
YEAR 81		-1.36 (-0.36)		-1.54 (-0.81)		-1.89 (-0.69)
YEAR 82		-1.02 (-0.50)		0.40 (0.23)		-1.78 (-0.60)
YEAR 83		-0.53 (-0.26)		-1.11 (-0.65)		-0.03 (-0.01)
YEAR 85		-3.62* (-2.19)		-1.61 (-1.05)		-4.03* (-1.72)
YEAR 86		-0.86 (-0.55)		-1.53 (-1.06)		-2.50 (-1.17)
YEAR 87		-2.00 (-1.13)		-1.26 (-0.83)		-2.70 (-1.21)
YEAR 88		-1.43 (-0.92)		-2.88* (-2.88)		
YEAR 89		1.78 (0.91)				
LATE 80s	-0.88 (-0.95)		-1.37 (-1.60)		-2.41* (-1.75)	
NSF R&D	1.69* (1.94)	1.31 (1.46)	1.74* (2.17)	1.73* (2.06)	2.60* (1.89)	2.63* (1.80)
DIVEST	-1.07 (-0.78)	-0.76 (-0.58)	0.59 (0.49)	0.45 (0.37)	3.22 (1.60)	3.18 (1.53)
HOSTILE	2.03 (1.58)	1.95 (1.50)	0.78 (0.69)	0.76 (0.66)	0.53 (0.26)	0.12 (0.06)
IAPROP/S	-0.48* (-6.61)	-0.50* (-6.69)	-0.27* (-3.54)	-0.25* (-3.27)	-0.70* (-6.00)	-0.71* (-5.82)
IAPODB/TD	0.02 (1.32)	0.02 (1.41)	-0.00 (0.05)	0.00 (0.08)	0.03 (1.48)	0.03 (1.45)
LNSLS	-0.63 (1.64)	-0.66* (-1.69)	-0.48 (-1.30)	-0.48 (-1.28)	0.11 (0.18)	0.16 (0.26)
MBO	0.53 (0.62)	0.71 (0.79)	0.77 (0.97)	0.41 (0.50)	-0.57 (-0.44)	-0.34 (-0.25)
GOPRIVATE	-2.32* (-1.96)	-2.39* (-1.98)	-1.90 (-1.62)	-2.04* (-1.71)	-3.59* (-1.99)	-3.57* (-1.92)
R-Square	0.18	0.22	0.13	0.15	0.32	0.33
# of Obs.	257	256	181	181	134	134

\*Significant in a two-tailed test at the 10 percent level.

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