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Author(s): Chris J. Muscarella and Michael R. Vetsuypens

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Efficiency and Organizational Structure: A Study of Reverse LBOs

CHRIS J. MUSCARELLA and MICHAEL R. VETSUYPENS*

ABSTRACT

This paper is a report on 72 firms which went public since 1983 but previously underwent a full or divisional LBO. Accounting measures of performance reveal significant improvements in profitability which resulted mainly from these firms' ability to reduce costs. Firms experience dramatic increases in leverage at the LBO, but the leverage ratios are gradually reduced. The evidence is consistent with the hypothesis that the change in the governance structure of these firms towards more concentrated residual claims created a new organizational structure which is more efficient than its predecessor.

GOING-PRIVATE TRANSACTIONS, OR leveraged buyouts (LBOs), have become an important method of corporate restructuring. In a typical going-private transaction, incumbent management acquires all outstanding publicly-traded shares of a corporation and merges the assets of the firm with a newly organized, privately-held shell corporation that it controls. Outside equity participants or buyout specialists often share equity ownership in the new private entity with management and help arrange financing for the buyout with lending institutions (DeAngelo, DeAngelo, and Rice (1984)). A variation on the going-private transaction is the divisional management buyout. In a divisional buyout, a division or subsidiary of a public corporation is acquired from the parent company by divisional executives and/or parent company managers (Hite and Vetsuypens (1989)).

Various hypotheses have been offered to explain going-private transactions.¹ One theory is that LBOs create real wealth gains and improvements in operating performance, perhaps because of a more efficient ownership structure and allocation of residual claims under private ownership. In contrast, some have argued that leveraged buyouts mainly effect wealth transfers (e.g., transfers from bond-

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¹ See DeAngelo, DeAngelo, and Rice (1984), Easterwood, Hsieh, and Singer (1988), Lehn and Poulsen (1988, 1989), Lowenstein (1985), Jensen (1986), Marais, Schipper, and Smith (1989), Shleifer and Vishny (1988), and Hite and Vetsuypens (1989).

holders or tax authorities to shareholders, or transfers from selling stockholders to manager-insiders) rather than create wealth.²

Recently, some corporations which had been taken private in the past, either in a full LBO or in a divisional buyout, have gone public again. These transactions are known as "reverse LBOs." When such corporations go public, financial statements covering several years of operation under private ownership are disclosed in the initial public offering (IPO) prospectus. Reverse LBOs therefore offer a unique opportunity to study direct evidence of the effects of a leveraged buyout.³ The purpose of this paper is to analyze the characteristics of reverse LBOs in light of agency theory. Specifically, we attempt to discover whether changes in governance have occurred under private ownership which can be expected to better align managerial incentives toward value maximization. Furthermore, we examine whether improvements in productivity and asset utilization took place after the LBO. Finally, we document changes in leverage and equity value between the LBO and the IPO.

A potential limitation on this study is that our sample firms may well belong to the set of ex post successful buyouts and are not necessarily representative of the typical corporation which went through an LBO. Countering this argument is the possibility that at least some of our sample firms go public again because the benefits from the LBO turned out, ex post, to be smaller than anticipated.

Our study parallels the work by Kaplan (1989b) and Smith (1990) but is unique in two important respects. First, three quarters of our sample consist of divisional reverse LBOs. At the time of the LBO, such divisional buyouts are less likely to suffer from the absence of "arm's-length bargaining" between buyer and seller than for full LBOs (Hite and Vetsuypens (1989)). Any observed changes in efficiency for our sample firms are therefore more likely to reflect real operating improvements than wealth transfers from the sellers.

Second, our analysis of LBOs that reenter capital markets is more likely to be indicative of the full benefits (if any) that can be achieved through an LBO than a study of companies in the year immediately following the buyout. This is because going public per se provides the LBO specialists in our companies with two "exit strategies": 1) the IPO itself enables the specialist to sell its equity interest and 2) the appraisal mechanism provided by public capital markets may facilitate a subsequent sale of the entire company to a third-party acquiror.⁴ Exit strategies are important because LBO specialists' unique expertise lies in their ability to oversee the efficient restructuring of operations. Once such restructuring is largely accomplished in a given firm, the LBO specialist's marginal productivity will be higher if it redeploys capital and efforts elsewhere.⁵ Therefore,

² For instance, Lowenstein (1985, p. 734) claims that "Despite the premiums over market price, it was difficult to find in a management buyout any gains in productivity or other value added".

³ Financial statements under private ownership can be obtained if some debt is still publicly traded after the LBO or if the company is subsequently sold to a third party. Kaplan (1989b) and Smith (1990) used this approach although their samples also include several reverse LBOs.

⁴ This conjecture is consistent with the fact that about 25% of our sample firms were acquired by a third party corporation after their IPO.

⁵ See DeAngelo and DeAngelo (1987). We are grateful to the referee for suggesting this interpretation (as well as for many other valuable comments) to us. Fully one-third of the buyouts we analyzed are restructurings where well-known LBO specialists were involved.

reverse LBOs are arguably cases where any benefits from undergoing a leveraged buyout are more likely to have been fully realized.

Section I of our paper describes the sample and presents some descriptive statistics on reverse LBOs. Section II documents changes in management equity ownership, compensation, and turnover under private ownership. Section III presents evidence on various restructuring activities undertaken after the LBO. Section IV is an examination of changes in performance and efficiency under private ownership. Section V provides an analysis of leverage, firm size, and equity value changes. Finally, we present a summary of the evidence and our conclusions in Section VI.

I. Sample Selection and Data

Our sample consists of all firms (which we could identify) that went public through July 1987 but were formerly publicly-held corporations or divisions of publicly-held corporations prior to being acquired in an LBO. We initially identified such firms with the assistance of several investment banks. Specifically, we sent written requests to 25 major investment banking firms and LBO specialists. Of those, Bear Stearns, E. F. Hutton, Merrill Lynch, and Salomon Brothers responded and searched their LBO data bases for companies which had subsequently gone public. Additional sample firms were obtained from a list provided by an editor of *Going Public: The IPO Reporter*. Finally, some firms were obtained through searches of the *Wall Street Journal Index* and the *Dow Jones News Retrieval Service*.

The final sample consists of 72 reverse LBOs. Eighteen firms (or 25.0% of the sample) represent full reverse LBOs. Fifty-four sample firms (or 75.0% of the sample) are divisional reverse LBOs. The reverse LBOs cover a broad spectrum of industries, most prominently industrial products manufacturing (12 firms), real estate development and housing products (10 firms), retailing (8 firms), packaging and container manufacturing (6 firms), electronic equipment (5 firms), and consumer products (5 firms). Twenty-four of the 72 buyouts were effected with the assistance of well-known buyout specialists. Kohlberg, Kravis, Roberts & Co. was a stockholder in 8 sample firms, Wesray Co. organized 4 reverse LBOs, and Gibbons, Green, van Amerongen had an equity participation in 3 reverse LBOs.

To put reverse LBOs in perspective it is useful to compare them to the size of the leveraged buyout market in general. *Mergers and Acquisitions* reports that a total of 1333 full LBOs as well as unit management buyouts took place over the period 1981 through 1986. Sixty-two of our sample firms undertook their LBO over this same 6-year period. Our reverse LBOs thus represent about 5% of all LBOs over this period. While this is a small percentage, LBOs themselves are fairly recent, and we would generally not expect firms to reconvert to public ownership immediately after their LBO.

Table I provides a breakdown of the year of the LBOs and subsequent IPOs. Reverse LBOs represent a new type of corporate restructuring; no sample firm went public prior to 1983, and more than 50% of all reverse LBOs took place in 1986 alone. In tests not reported here we verified that the shareholder wealth

Table I
Year of LBOs and IPOs

Distribution of leveraged buyout (LBO) completion dates and initial public offering (IPO) dates by calendar year for 72 firms engaging in reverse LBOs over the period January 1976–July 1987.

Year	Number of LBOs	%	Number of IPOs	%
1976	2	2.6	—	—
1977	1	1.4	—	—
1978	1	1.4	—	—
1979	—	—	—	—
1980	6	8.3	—	—
1981	9	12.5	—	—
1982	14	19.4	—	—
1983	7	9.7	10	13.9
1984	12	16.7	5	6.9
1985	13	18.1	4	5.6
1986	7	9.7	37	51.4
1987	—	—	16	22.2
Total	72	100.0	72	100.0

effects at the LBO announcement for our sample firms were similar to the general population of LBOs (as studied by DeAngelo, DeAngelo, and Rice (1984) and Lehn and Poulsen (1988) for going-private transactions and by Hite and Vetsuypens (1989) for divisional LBOs).

Table II provides descriptive statistics on LBO transaction value (defined as price paid plus assumption of liabilities), size of the IPO, and length of time between the LBO and the IPO. For the 43 firms for which this information could be determined from 13E-3 filings or IPO prospecti, Panel A reveals that the mean (median) LBO transaction value was \$449.9 million (\$105.2 million). Not surprisingly, firms undergoing a full LBO were larger than those resulting from a divisional LBO. Panel B shows that the mean (median) LBO value was \$990.3 million (\$155.8 million) for the 16 full LBOs. The corresponding information in Panel C for 27 divisional LBOs is \$129.7 million (\$98.0 million).

On average, sample firms remained under private ownership for 34.7 months or almost 3 years (median = 29.0 months). The mean (median) number of months under private ownership for 18 full LBOs is 37.0 (36.5) which is slightly higher than the 33.9 months (29.0 months) for 54 divisional LBOs.

The IPOs of our sample firms are large security offerings. The mean (median) offering size for the 72 firms is \$52.4 million (\$31.4 million), a larger offering size than is usually the case in IPOs. When reverse LBO firms reenter public capital markets, their equity issues are significantly less underpriced than similar-sized IPOs (Muscarella and Vetsuypens (1989)).

One interesting characteristic of the equity offerings of reverse LBOs is the number of shares sold by existing stockholders. Thirty of the 72 IPOs (or 42%) are cases in which only new shares were sold, whereas 42 IPOs (or 58%) represent offerings in which current stockholders also sold some of their shares. For these

Table II
Descriptive Statistics on Reverse LBOs

Transaction value at the time of the leveraged buyout (LBO), the number of calendar months between the LBO and the initial public offering (IPO), and the value of the equity sold in the IPO, for firms engaging in reverse LBOs over the period January 1976–July 1987.

Variable	Mean	Median	Standard Deviation	Minimum	Maximum	Number of Observations
Panel A: All Reverse LBOs						
LBO transaction value (in \$M) ^a	449.9	105.2	1,632.4	1.6	10,698.0	43
Time from LBO through IPO (in months) ^b	34.7	29.0	22.3	4.0	93.0	72
Size of IPO (in \$M) ^c	52.4	31.4	64.5	4.2	420.0	72
Panel B: Full LBOs						
LBO transaction value (in \$M)	990.3	155.8	2,627.8	21.4	10,698.0	16
Time from LBO through IPO (in months)	37.0	36.5	23.7	7.0	84.0	18
Size of IPO (in \$M)	91.4	45.0	102.5	12.6	420.0	18
Panel C: Divisional LBOs						
LBO transaction value (in \$M)	129.7	98.0	185.3	1.6	928.3	27
Time from LBO through IPO (in months)	33.9	29.0	22.0	4.0	93.0	54
Size of IPO (in \$M)	39.4	22.5	38.8	4.2	201.6	54

^a Defined as the total consideration paid plus assumption of liabilities. Source: IPO prospecti and 13E-3 filings.

^b Measured from the completion date of the LBO (as reported in the *Wall Street Journal*) to the date of the initial public offering.

^c Defined as the offer price per share times the number of shares sold, excluding over-allotments. Source: IPO prospecti.

42 offerings, the shares sold by existing stockholders represent, on average, 38% of all the shares sold. The return to public ownership thus appears to be a vehicle that allows current equity holders to cash in on a part of their investment.

II. Managerial Ownership, Compensation, and Turnover

To examine possible changes in incentives and governance following the LBO, we report in Table III descriptive statistics on managers' equity ownership in their firms, the existence of management incentive compensation plans, and the degree of management turnover. We find that managers own a substantial fraction of the equity of their firm after the LBO, that most executive officers remain with the firm after the LBO, and that these firms have implemented a variety of incentive compensation plans under private ownership.

Table III**Characteristics of the Governance Structure of Reverse LBOs**

Managerial equity ownership, managerial turnover, and managerial incentive compensation plans for corporations engaging in reverse LBOs in the period January 1976–July 1987.^a

Panel A: Managerial Equity Ownership							
	Mean	Median	Minimum	First Quartile	Third Quartile	Maximum	Number of Observations
All officers and directors:							
before IPO	57.2%	63.4%	0.0%	23.3%	89.1%	100.0%	66
after IPO	41.3%	44.5%	0.0%	15.9%	63.6%	88.9%	66
Three most highly paid executive officers:							
before IPO	37.8%	26.5%	4.4%	12.8%	60.0%	89.1%	23
after IPO	27.2%	20.1%	3.6%	9.4%	33.0%	64.3%	23
Most highly paid executive officer:							
before IPO	17.7%	9.2%	1.0%	4.8%	29.7%	100.0%	59
after IPO	12.7%	6.5%	0.2%	3.1%	18.9%	80.2%	59
Panel B: Managerial Incentive Compensation Plans							
Total Number of Plans:				Number of firms		Percent	
Number of firms with 0 incentive plans:				3		4.2%	
Number of firms with 1 incentive plan:				17		23.6%	
Number of firms with 2 incentive plans:				34		47.2%	
Number of firms with 3 incentive plans:				15		20.8%	
Number of firms with 4 incentive plans:				3		4.2%	
Total				72		100%	
Structure of incentive plans for subset of 17 firms with only 1 plan:							
Number of firms where at least 1 plan is based on stock price				= 6 (out of 17)			
Number of firms where at least 1 plan is based on earnings				= 5 (out of 17)			
Structure of incentive plans for subset of 34 firms with 2 plans:							
Number of firms where at least 1 plan is based on stock price				= 30 (out of 34)			
Number of firms where at least 1 plan is based on earnings				= 16 (out of 34)			
Structure of incentive plans for subset of 15 firms with 3 plans:							
Number of firms where at least 1 plan is based on stock price				= 15 (out of 15)			
Number of firms where at least 1 plan is based on earnings				= 5 (out of 15)			
Structure of incentive plans for subset of 3 firms with 4 plans:							
Number of firms where at least 1 plan is based on stock price				= 3 (out of 3)			
Number of firms where at least 1 plan is based on earnings				= 2 (out of 3)			
Panel C: Managerial Turnover							
Executive present at IPO date	Same job with firm prior to LBO		Different job with firm prior to LBO		Not with firm prior to LBO		Number of observations
Most highly paid executive officer	58 (81%)		1 (1%)		13 (18%)		72
Second most highly paid executive officer	54 (76%)		6 (9%)		11 (15%)		71
Third most highly paid executive officer	56 (80%)		1 (1%)		13 (19%)		70

^a Source: IPO prospecti.

Panel A presents managerial equity ownership data before and after the IPO. The top executives of our sample firms owned a substantial fraction of the equity in their company; for the 66 companies reporting this information, all officers and directors owned collectively a median 63.4% of the equity of their firm before the IPO and 44.5% afterwards. As a basis of comparison, Morck, Shleifer, and Vishny (1988) reported a mean equity ownership by board members of 10.6% for a sample of 371 firms from the 1980 Fortune 500. (The average Fortune 500 corporation is larger than the average reverse LBO, so this comparison should be interpreted with caution.)

Large insider ownership percentages also characterize the equity holdings of executive officers engaged in the day-to-day management of the corporation. For 59 firms for which this information was available, the most highly paid executive officer owned a median 9.2% of the equity prior to the IPO. For a smaller set of 23 firms with sufficient ownership data, the three most highly paid executive officers owned a median 26.5% of their firm's equity before the IPO.

These substantial insider ownership percentages sharply contrast with pre-LBO insider holdings. For 17 of the 18 full LBOs, we were able to collect pre-LBO inside ownership of officers and directors from proxy statements and 13E-3 filings. The pre-LBO mean (median) percentage of shares owned by officers and directors was 31.4% (28.5%). Prior to going public again, however, officers and directors of these firms had a mean (median) ownership of 62.3% (58.0%), nearly double the pre-buyout level.

We also measured divisional executives' pre-LBO share ownership in their parent for 44 divisional reverse LBOs with sufficient data available in Computer Directions Advisors' *Spectrum 6 Insider Holdings* yearbooks. In 35 of the 44 cases, none of the top three executive officers of a division after the LBO owned equity in the parent prior to the LBO. For the other nine divisional reverse LBOs, divisional executives' average percentage holdings of their parent prior to the LBO was 0.25%. Given these very low ownership statistics, the incentive effects of large post-LBO insider equity holdings are likely to be particularly important to these divisional managers.

Further evidence on possible improvements in incentives under private ownership is presented in Panel B of Table III which reports the frequency of various management incentive plans in effect before the IPO. The source of this data is the management compensation section in the IPO prospectus of the firm.⁶ Almost all sample firms (69 out of 72) had implemented at least one type of incentive plan prior to the IPO. Almost three quarters of the sample firms (52 firms out of 72) had at least two separate incentive plans in place at the IPO. Among the different types of plans, those based on the stock price of the firm (most frequently, incentive stock option plans and stock appreciation rights) are the most popular. The prevalence of stock-price-based compensation plans, some of which were put in place well before the IPO, suggests that a subsequent return to public ownership may have been planned all along since the LBO. Approximately one-third of the sample firms had implemented stock option plans more

⁶ We excluded company-sponsored employee savings and retirement plans listed as incentive compensation plans; these are routinely offered as part of standard compensation contracts.

than two years prior to the IPO, and another third had put such a plan in place between six and two years before the IPO.

Finally, we report in Panel C information on managerial turnover under private ownership. We examine whether the three most highly paid executive officers were employed in the same capacity by the old public predecessor firm (in the case of full LBOs) or by the predecessor division or parent firm (in the case of divisional buyouts). In 76 to 81% of all cases, the three top managers of the firm at the IPO were also with the company performing the same function prior to the LBO. Thus, during the approximately 3 years, on average, that these firms were private, top management's turnover rate was about 20%. This turnover rate is roughly comparable to the overall 11.5% annual rate of top management change per firm reported in Warner, Watts and Wruck (1988) for their sample of 269 randomly selected NYSE and AMEX firms from 1963 through 1978.

This continuity in the management team of reverse LBOs has implications for the sources of potential wealth gains created under private ownership. Some corporate control contests, such as hostile tender offers and proxy fights, can be motivated by the need to eliminate inefficient incumbent managers. Martin and McConnell (1989), for example, analyzed management turnover for 253 successful tender offers and takeovers from 1958 through 1984. They found a top manager (CEO or president) turnover rate of 41.5% within 14 months after the takeover announcement. Panel C of Table III shows that the top managers of reverse LBOs turn over at a rate of 19% during the 3 years, on average, that they are private. Thus it appears that the changes occurring under private ownership do not in general result from the elimination of inefficient executives.

III. Restructuring Activities under Private Ownership

Anecdotal evidence suggests that the going-private process often leads to substantial changes in the operations of the firm. If LBOs create more efficient executive compensation contracts, or if the incentive effects of high leverage are powerful, one would expect our sample companies to reorganize their activities in a variety of ways. Qualitative evidence on restructuring activities is often disclosed by management in the IPO prospectus. We compiled the restructuring activities undertaken since the LBO as they were reported in the prospecti and classified them into the summary categories presented in Table IV.

Three-fourths of all firms (54 out of 72) disclosed at least one restructuring activity undertaken since the LBO. The remaining 18 corporations either did not conduct business in any different way after the LBO or did not disclose any changes in operations in the prospectus. Table IV indicates that for many reverse LBOs, substantial changes in operations along various dimensions have taken place under private ownership. For instance, particularly noticeable is the large number of companies which reportedly had divested some assets or had reorganized their production facilities (31 cases, or 43.1% of the firms) or had made acquisitions since the LBO (18 cases, or 25.0% of the firms).

The frequency of asset sales after the LBO might be expected because proceeds from such sales are often used to reduce the firm's indebtedness. However, such

Table IV
Restructuring Activities

Frequency distribution of reported restructuring activities undertaken under private ownership by corporations engaging in reverse LBOs in the period January 1976–July 1987.^a

Type of restructuring	Number of firms	Percentage of all 72 firms
Panel A: Redeployment of Resources		
Asset Sales, Consolidation and Reorganization of Production Facilities	31	43.1
Acquisitions	18	25.0
Termination of Overfunded Pension Plan	4	5.6
Panel B: Operational Efficiencies		
Reduction in Production Costs	16	22.2
Improved Inventory Control and Accounts Receivables Management	5	6.9
Productivity Increase	7	9.7
Panel C: Changes in Marketing		
Broader Market Penetration	8	11.1
Changes in Pricing, Product Quality, Customer Service and Product Mix	32	44.4
Reorganization of Distribution Channels or Franchising/Licensing Agreements	10	13.9
Panel D: Personnel Changes		
Reduction in Personnel	10	13.9
New Top Management Team	5	6.9
Reorganization of Management Structure	3	4.2

^a Source: IPO prospecti.

transactions can be more than just a way of raising cash. They also enable the selling firm to eliminate business operations in which it may no longer enjoy a comparative advantage and transfer ownership of such assets to a party that can put them to a higher valued use. The fact that many reverse LBO firms made acquisitions, i.e., transactions which do not immediately raise cash, is consistent with the notion that optimization of the firm's asset mix is a primary concern.

Interestingly, the intensity of divestiture activity is different for the full reverse LBOs relative to the divisional reverse LBOs. Ten out of 18 full reverse LBOs (55.5%) reported asset sales after the LBO, compared with only 11 out of 54 divisional reverse LBOs (20.3%). A chi-square test rejects the null hypothesis of no association between the frequency of reported asset sales and the type of reverse LBO at the 0.01 level. We conjecture that this finding may be due in part to the fact that entire firms going private are more likely to have a diversified asset mix. To the extent that the bonding effects of high leverage may help correct ill-conceived past diversification strategies, as Jensen (1986) would argue, we would expect to observe more frequent divestiture activity for full reverse LBOs.

Several firms also reported initiating cost reduction programs (16 cases, or 22.2% of the sample), but the precise source of cost savings was seldom explicitly described in the prospectus. A large fraction of our sample (32 cases, or 44.4% of the firms) also reported significant changes in various aspects of their marketing decisions, including changes in product mix, pricing, quality, and customer service. Of course, firms routinely make pricing and product decisions, but the offering prospecti suggest that the activities described in Table IV represent significant departures from pre-LBO strategies which would not have been implemented by the predecessor company. Overall, the LBO appears to be more than just the financing vehicle to acquire the company from its previous owner. The operations of the typical post-buyout firm seem to have been substantially altered in a variety of ways. This finding is consistent with the hypothesized incentive effects of high leverage as well as of increased insider ownership after the LBO.

IV. Changes in Performance After the LBO

Table V presents descriptive statistics on changes in various accounting measures of performance between the last fiscal year before the LBO and the last fiscal year before the IPO. We report the median percentage change in each variable between these two dates and the proportion of sample firms experiencing a positive percentage change. We emphasize the medians in our discussion of the data because the distribution of most variables in Table V (as well as in the tables that follow) is highly skewed.

As a basis of comparison, we compute the same accounting measures of performance for random samples of companies drawn from the COMPUSTAT annual industrial tape. For each accounting variable i , we generated 100 draws of N_i firms, where N_i is the number of reverse LBO firms for which we had data on variable i . Each randomly selected firm was "matched" to a sample firm in that we measured variable i over the same calendar period as the reverse LBO firm. For each draw, we computed the median percentage change in variable i for the N_i randomly selected firms. Thus we obtained 100 median percentage changes in variable i , and compared these numbers to the actual median percentage changes of the reverse LBOs. The results of this experiment are presented in the rightmost column of Table V. This column reports the percentage of random samples with a median percentage change less than the median percentage change for the reverse LBOs. We also report a Z-statistic which tests whether the fraction of firms in the sample with positive changes is different from the mean percentage of firms from COMPUSTAT (based upon 100 random samples) with positive rates of change.

A potential weakness of this simulation is that it does not control for industry effects. The fact that our reverse LBOs cover a rather broad spectrum of industries, as described earlier, should mitigate this problem. Furthermore, the alternative procedure, comparing each reverse LBO with one or more control firms in the same industry, has shortcomings of its own in that industry classifications can be unreliable.

Table V
Changes in Efficiency under Private Ownership
 Changes in accounting measures of efficiency between the last fiscal year before the LBO and the last fiscal year before the IPO for reverse LBOs.^a

Variable	Sample	N	Median percentage change between LBO and IPO	Percentage of firms with positive percentage change (Z-score) ^b	Percentage of COMPUSTAT random samples with median percentage change less than that of reverse LBOs
1. Sales ^c	All firms	43	9.40	74.4 (2.06)**	58
	Firms with no acquisition/divestiture activity	23	4.54	69.5 (0.97)	27
	Full LBOs	14	21.39	78.6 (1.58)	79
	Divisional LBOs	29	5.24	72.4 (1.46)	28
2. Gross Margin (Gross Profit/Sales) ^d	All firms	40	14.26	82.5 (3.80)***	100
	Firms with no acquisition/divestiture activity	21	17.87	85.7 (2.95)***	100
	Full LBOs	12	6.47	75.0 (1.43)	61
	Divisional LBOs	28	17.79	85.7 (3.36)***	100

Table V—Continued

Variable	Sample	N	Median percentage change between LBO and IPO	Percentage of firms with positive percentage change (Z-score) ^b	Percentage of COMPUTAT random samples with median percentage change less than that of reverse LBOs
3. Operating Margin (Operating Income/Sales) ^e	All firms	35	23.50	80.0 (4.35)***	100
	Firms with no acquisition/divestiture activity	16	36.60	81.2 (2.93)***	99
	Full LBOs	13	19.27	69.2 (1.42)	84
	Divisional LBOs	22	56.84	86.4 (3.47)***	100
4. Net Margin (Net Income After Tax/Sales) ^f	All firms	29	-31.50	44.8 (-0.79)	0
	Firms with no acquisition/divestiture activity	16	-3.76	50.0 (0.04)	24
	Full LBOs	9	-31.50	44.4 (0.80)	3
	Divisional LBOs	20	-22.60	45.0 (-1.01)	0
5. Asset Turnover (Sales/Book Value of Total Assets) ^g	All firms	34	-3.05	41.2 (0.57)	68
	Firms with no acquisition/divestiture activity	19	-1.90	42.1 (0.29)	48
	Full LBOs	12	-18.99	25.0 (-1.88)	3
	Divisional LBOs	22	-0.40	50.0 (1.46)	77

Table V—Continued

Variable	Sample	N	Median percentage change between LBO and IPO	Percentage of firms with positive percentage change (Z-score) ^b	Percentage of COMPUSTAT random samples with median percentage change less than that of reverse LBOs
6. Sales per Employee ^a	All firms	19	3.14	63.1 (-1.54)	1
	Firms with no acquisition/divestiture activity	7	-15.10	28.5 (-7.09)***	0
	Full LBOs	13	3.14	61.5 (-2.11)**	0
	Divisional LBOs	6	11.21	66.6 (-0.26)	46

^a Source: IPO prospecti and various proxy statements and 13E-3 filings. The sales data used in rows 1 and 6 are inflation adjusted.

^b The Z-statistic tests whether the fraction of firms with positive changes is different from the mean percentage of firms from COMPUSTAT (based upon 100 random samples) with a positive rate of change.

^c For the random samples, variable is computed from COMPUSTAT annual data item: No. 12.

^d Firms are excluded if gross margin is nonpositive. For the random samples, variable is computed from COMPUSTAT annual data items: (No. 12-No. 41)/No. 12.

^e Firms are excluded if operating margin is nonpositive. For the random samples, variable is computed from COMPUSTAT annual data items: (No. 13-No. 14)/No. 12.

^f Firms are excluded if net margin is nonpositive. For the random samples, variable is computed from COMPUSTAT annual data items: No. 18/No. 12.

^g For the random samples, variable is computed from COMPUSTAT annual data items: No. 12/No. 6.

^h For the random samples, variable is computed from COMPUSTAT annual data items: No. 12/No. 29.

** Significant at the 5% level.

*** Significant at the 1% level.

We present separate results for (a) the entire sample, (b) full reverse LBOs, (c) divisional reverse LBOs, and (d) all reverse LBOs but excluding companies which reported acquisitions or divestitures after the buyout. This latter partitioning is necessary to verify whether possible gains in efficiency occur in the companies' core businesses or whether they result instead from the acquisition (sale) of high (low) profitability assets.⁷

The first row in Table V shows changes in inflation adjusted sales between the LBO and the IPO. For 43 companies for which we were able to collect this information, total sales revenues increased for the median firm by 9.40% in real terms. However, compared with random samples of firms over the same time period, this improvement in sales is not exceptional. Forty-two random samples out of 100 had real increases in sales superior to that of reverse LBOs. Full reverse LBOs have increased sales revenues at a faster rate than divisional LBOs. The median rate of change in sales for 14 full LBOs is 21.39% (which puts them above 79% of the random samples), compared to 5.24% for 29 divisional LBOs.

If reverse LBOs have not experienced dramatic increases in sales, they have on the other hand significantly reduced production costs. The second row of Table V reports that the median percentage change in gross margin (defined as sales revenues minus costs of goods sold, divided by sales) for 40 companies with sufficient data is 14.26%.⁸ Eighty-two and one-half percent of these firms experienced improvements in gross margin, a significantly higher proportion (Z -score = 3.80) than the average fraction of control firms with improvements in gross margin. The median change in gross margin is also superior to that of 100% of the control samples. This improvement is not driven by the possible sale (acquisition) of low (high) gross margin units after the LBO. For the subset of 21 reverse LBOs with no reported post-LBO acquisition and divestiture activity, the change in gross margin is 17.87%, which is larger than for the full data set and also larger than for all the control samples. The improvement in gross margin is also more noticeable for divisional reverse LBOs (median = 17.79%) than for full reverse LBOs (median = 6.47%). The median change in gross margin for divisional LBOs exceeds that of all control samples, but 39% of all control samples had better median changes than the full reverse LBOs.

Similar findings are presented in the third row of Table V which shows changes in the ratio of operating income to sales. Operating income is defined as sales minus costs of goods sold minus selling, general, and administrative expenses (including depreciation expense). The median change for the full sample of 35 reverse LBOs with sufficient data is 23.50%, a number higher than all of the

⁷ The sample sizes in Table V are considerably lower than 72 because pre-LBO accounting numbers were unavailable for many of our divisional reverse LBOs. The small sample sizes in some of the data subsets limits the inferences that can be drawn from our analysis. Furthermore, the various accounting measures presented in Table V are not independent from one another.

⁸ Because changes in the ratio of profit to sales are meaningless when profit is negative in a given year, the figures in Table V are based only on observations with nonnegative profit figures. This requirement led to the exclusion of two observations from the operating margin computations (i.e., two firms had negative operating income in the year prior to the LBO) and six observations from the net margin calculations (i.e., two firms had negative net income prior to the LBO and four other firms had negative net income prior to the IPO).

control samples. Eighty percent of the firms experienced improvements in operating margin, which is a significantly higher fraction (Z-score = 4.35) than for the control firms. Divisional LBOs again outperformed full LBOs; the median change in operating margin for divisional LBOs of 56.84% exceeds that of all of the control samples whereas the corresponding figure of 19.27% for the full LBOs is exceeded by 16% of the control samples.

In contrast, row 4 of Table V indicates a substantial decrease in net margins (defined as net income after taxes divided by sales). Net margin for all reverse LBOs decreased for the median firm by 31.50%. This figure is less than the corresponding number for all the control samples. A plausible explanation for this finding is that higher post-LBO interest expenses will tend to reduce after tax net income, other things being equal. Of course given how highly levered our sample firms are, even a substantial reduction in post-LBO net income could still generate large rates of return to equity, as we will show in Section V.

As a check on the robustness of our finding of increased operating efficiency, we conducted three additional tests. First, we examined the changes in absolute dollar measures of profitability (i.e., not deflated by sales) and compared these numbers with those of our control firms. For the full sample, gross profit increased by a median 25.79% (exceeding the median change of 76% of the control samples); operating profit increased by a median 40.42% (above 82% of the control samples); and net income declined by 7.82% (a number below that of all control samples). Similar findings were produced by excluding reverse LBOs which reported divestiture and acquisition activity after the LBO. Gross profit rose by a median 27.00% (higher than 71% of the control samples); operating profit increased by a median 52.23% (exceeding 82% of the control samples); and net income increased by a median 0.91% (above 6% of the control samples). Thus, in addition to improvements in gross margin and operating margin, reverse LBOs have also experienced sizeable increases in absolute dollar measures of gross profit and operating income.

Our second additional test replicated the analysis of profitability ratios using book value of total assets as a deflator instead of sales. Because of accounting write-ups at the LBO, this measure of profitability is likely to be biased against finding evidence of increased efficiency. Nevertheless, this alternative procedure produces findings similar to those in Table V. For example, for reverse LBOs with no reported divestiture and acquisition activity after the LBO, gross margin (using total assets as a deflator) increased by a median 10.48%, exceeding the median change of 95% of the control firms. Similarly, operating margin increased by a median 14.80% (higher than 93% of the control samples).

Our third additional test compared profitability ratios of our full reverse LBOs under private ownership with time-series averages of these ratios in the 10-year period before the LBO (data availability prevented us from conducting this analysis for the divisional reverse LBOs). The ratio of gross profit to sales in the last fiscal year before the IPO exceeded the 10-year historic average by a median value of 19.14%; similarly, the ratio of operating income to sales exceeded the average pre-LBO value by a median 41.91%. Hence, results of time-series analyses of gross margin and operating margin confirm the findings in rows 2 and 3 in Table V (at least for the full reverse LBO firms).

Rows 5 and 6 of Table V list two activity ratios: asset turnover (defined as sales divided by book value of total assets) and sales per employee. For 34 firms for which this measure could be computed, the median change in asset turnover between the LBO and the IPO is -3.05% . Over the same time period, 32% of the control firms had superior increases in median turnover rates than our sample firms. The decline in turnover is particularly noticeable for the subset of full reverse LBOs, with a median change in turnover of almost -19% . This decline may be due to the step-up of the book value of assets that often occurs at the LBO. The median change in sales per employee (using inflation adjusted sales) for 19 firms with sufficient data is 3.14% . Over the same time period, however, all but one random sample of control firms had increases in sales per employee superior to that of the sample firms.

Overall, we conclude from Table V that reverse LBOs have experienced improvements in conventional accounting measures of operating performance, both in an absolute sense and when compared with randomly selected firms over a similar time period. These improvements in profitability are driven by these firms' ability to control production costs rather than because of increases in sales or changes in asset turnover. The profitability gains reported in Table V are not primarily caused by possible divestiture or acquisition activity under private ownership, furthermore, and efficiency gains are more pronounced for divisional reverse LBOs than for full reverse LBOs.

It is conceivable that the operating efficiency gains are primarily due to management manipulation of the accounting figures. Managers of our sample firms may have depressed accounting income prior to the LBO and inflated it before the IPO. DeAngelo (1986), however, examined accounting decisions of managers of 64 firms who proposed to take their firms private during 1973–82 and found no evidence they systematically manipulated accounting numbers to understate reported earnings prior to the going private proposal.⁹ It is also possible that the efficiency gains we document would have occurred anyway, and that managers timed the buyout to exploit favorable inside information.

Table VI presents data on tax rates, capital expenditures, and employment levels of reverse LBO firms. Panel A reports median values of operating tax rates and capital expenditures as of the last fiscal year prior to the IPO. Panel B presents percentage changes in capital expenditures and employment between LBO and IPO. As with Table V, we report comparisons with control samples

⁹ Most LBO transactions in our sample were accounted for through the purchase method in accordance with generally accepted accounting principles (GAAP). GAAP require that the acquired predecessor assets be recorded at their fair market value. However, seven of our sample companies stated that the LBO purchase price was *below* the fair market value of the net assets acquired. In that case, the long-term fixed assets are arbitrarily reduced, causing a reduction in the recognized depreciation expense and potentially making the subsequent financial statements appear as if operating efficiencies have occurred when they really didn't. We replicated Table V excluding these seven observations, but none of the qualitative conclusions were affected. Another accounting procedure complicates the interpretation of Table V; it is likely that the pre-LBO overhead and other expenses of some divisional reverse LBOs include amounts allocated to the division by the parent. This would make the pre-LBO and pre-IPO Operating Income and Net Income incomparable.

drawn from COMPUSTAT at the same time (Panel A) or over a similar time period (Panel B) as the reverse LBOs.

Row 1 of Panel A provides evidence of the operating tax rates faced by reverse LBOs in their last fiscal year prior to going public. We define the operating tax rate as the sum of all federal and foreign taxes paid in a current year divided by the operating income for that year. This unusual form of tax rate computation allows us to investigate the tax consequences induced by the large interest expense typical in leveraged buyouts. For 53 firms with sufficient data, the median operating tax rate was 14.6%. Sixteen percent of the COMPUSTAT random samples had median operating tax rates less than that of the reverse LBOs. The fact that only a small number of control samples faced lower tax rates than our sample firms may indicate that tax reasons were an important motivation for LBOs. These findings are consistent with the studies of Kaplan (1989a) and Schipper and Smith (1988).

Row 2 in Panel A reports evidence on the ratio of capital expenditures to sales. For 57 firms with sufficient data, the median pre-IPO value of this variable is 2.4%. All of the random samples had median ratio values of capital expenditures to sales greater than or equal to that of reverse LBOs. This finding is to be expected because the high debt usage typically found in LBOs may not be an appropriate financing structure for companies with large capital expenditures needs.

In addition to having a rather modest level of capital expenditures to sales, row 1 in Panel B reveals that the typical reverse LBO experienced a decrease in the relative level of capital expenditures under private ownership. For 25 firms with sufficient data, the median percentage change in the ratio of capital expenditures to sales is -11.4% between the LBO and the IPO. This figure exceeds the median percentage change of only 14% of the random samples over a similar time period. The decline in the relative level of capital expenditures is most relevant for the subsample of firms which do not engage in any acquisition or divestiture activity. None of the random samples had cuts in relative capital expenditures larger than the 14 reverse LBOs in this subsample.

Finally, row 2 in Panel B reports that for 26 firms with sufficient data the median number of employees fell by 0.6% between LBO and IPO. The change in employment of our sample firms between the LBO and the IPO sharply contrasts with the random samples. Ninety-two percent of the random samples have a median percentage change in employment which is larger than that of the reverse LBOs over a similar time period. The low employment growth for reverse LBO firms, however, can be attributed to divestiture activities after the LBO. The subset of 12 reverse LBOs with no reported asset restructuring under private ownership experienced a median employment growth of 17%, putting it in the top 15% of the random samples. This evidence does not support the conventional wisdom that LBOs threaten workers' employment. Controlling for divestiture activity also helps explain differences in employment growth between full and divisional LBOs. We reported earlier that full reverse LBOs divested assets much more frequently than divisional reverse LBOs. Table VI shows that full LBOs experienced declines in employment whereas the typical divisional LBO increased employment.

Table VI

Changes in Tax Rates, Capital Expenditures, and Employment under Private Ownership

Descriptive statistics on operating tax rates, capital expenditures, and employment for corporations engaging in reverse LBOs in the period 1976–1987. Panel A reports levels of the specified variable as of the last fiscal year prior to the IPO. Panel B presents percentage changes between the last fiscal year before the LBO and the last fiscal year before the IPO.^a

Panel A			
Variable	Sample	N	Median value before IPO (%)
1. Operating Tax Rate (Current Taxes Paid/ Operating Income) ^b	All firms	53	14.6
	Firms with no acquisition/divestiture activity	29	13.6
	Full LBOs	12	19.1
	Divisional LBOs	41	13.6
2. Capital Expenditures: (Capital Expenditures/ Sales) ^c	All firms	57	2.4
	Firms with no acquisition/divestiture activity	31	2.4
	Full LBOs	13	2.9
	Divisional LBOs	44	2.4
			Percentage of COMPUSTAT random samples with median values less than that of reverse LBOs
			16
			20
			52
			13
			0
			1
			3
			0

^a Source: IPO prospecti and various proxy statements and 13E-3 filings.

^b Current taxes paid are the sum of all current federal and foreign taxes payable, as reported in the notes to the financial statements; operating income is defined as sales less cost of goods sold and operating expenses (including depreciation expense but not interest expense). Both variables are measured as of the last full fiscal year prior to the IPO. Firms are excluded if pre-IPO reported financial statements cover less than a full 12-month period, if the corporation's operating income prior to the IPO is nonpositive, or if the firm's tax status is unconventional (i.e., the corporation is a limited partnership, or has elected to be an 'S' corporation for tax purposes). For the random samples, companies were excluded from the simulation if they had nonpositive operating income. COMPUSTAT samples computed based on annual data items: (No. 63–No. 64)/(No. 13–No. 14).

^c Obtained from the statement of changes in financial position as of the last full fiscal year prior to the IPO. COMPUSTAT samples based on annual data items: No. 128/No. 12.

Table VI—Continued

Panel B					
Variable	Sample	N	Median percentage change between LBO and IPO	Percentage of firms with positive percentage change (Z-score) ^d	Percentage of COMPUSTAT random samples with median percentage change less than that of reverse LBOs
1. Capital Expenditures: (Capital Expenditures/Sales) ^e	All firms	25	-11.4	40.0	14
	Firms with no acquisition/divestiture activity	14	-29.3	(-1.08) 28.6 (-2.20)**	0
	Full LBOs	9	-11.4	44.4 (-0.45)	11
	Divisional LBOs	16	-20.1	37.5 (-1.74)	6
2. Employment: (Number of employees) ^e	All firms	26	-0.6	50.0 (-0.78)	8
	Firms with no acquisition/divestiture activity	12	17.0	58.3 (0.21)	85
	Full LBOs	16	-2.1	50.0 (-0.87)	9
	Divisional LBOs	10	7.7	50.0 (-0.31)	77

^e Obtained from the statement of changes in financial position as of the last full fiscal year prior to the IPO. COMPUSTAT samples based on annual data items: No. 128/No. 12.

^d The Z-statistic tests whether the fraction of firms with positive changes is different from the mean percentage of firms from COMPUSTAT (based upon 100 random samples) with a positive rate of change.

^e COMPUSTAT samples based on annual data item: No. 29.

** Significant at the 5% level.

V. Changes in Leverage and Value

A. Changes in leverage

Table VII documents the increase in leverage experienced by the companies in our sample. The first row indicates that for a subset of 24 companies with sufficient data, the pre-LBO ratio of book value of debt to book value of assets averaged 41.4% (median = 43.2%).¹⁰ We next compute market value leverage ratios for a larger set of 42 firms (see row 2 in Table VII) by measuring the percentage of the total LBO transaction value financed with debt. On average, more than 90% of the value of the transaction was financed with debt. The extremely high leverage ratios at the LBO are only temporary. Row 3 reports that the book value of leverage declines under private ownership. The mean and median values for leverage immediately prior to the IPO are 78.0% and 78.6%, respectively.

An additional reduction in leverage also occurs after the return to public capital markets. Support for this claim comes from an analysis of the intended use of the proceeds of the offering as reported in the IPO prospectus. Sixty-two firms out of 72 (86.1%) declared that some proceeds of the offering would be used to retire debt, and a median 88% of the dollar proceeds of the equity offering was earmarked for this purpose. After deducting the equity proceeds used to retire debt, we find that post-IPO accounting leverage falls, on average, below 60% (see row 4 in Table VII). This represents a substantially less-leveraged position than at the LBO, but it is still in excess of the typical leverage ratios commonly observed for industrial firms. Masulis (1988), for instance, reported that based upon market values, the typical U.S. firm had a debt to total assets ratio between 25% and 35% in 1983–1986. It is noteworthy that reverse LBO firms could have retired even more debt by increasing the size of their IPO but chose not to do so.

Interestingly, few companies (only 8 out of 72) intend to use some of the IPO proceeds for capital expenditures. The reconversion to public ownership, aside from creating liquidity for existing stockholders, apparently serves mainly as a vehicle to lower a company's leverage rather than to raise funds to expand the firm's asset base. Reentering capital markets, however, also provides firms with the option to issue new publicly traded securities in the future. An analysis of news reports in the *Dow Jones News Retrieval* service about our sample firms reveals that after their IPO (and until December 15, 1989, the date of our data search) nine corporations had a subsequent public equity offering, and five firms had a public debt offering after the IPO.

B. Changes in firm size and equity value

Summary statistics on changes in firm size and changes in equity values of reverse LBOs are presented in Table VIII. We report the annualized rate of

¹⁰ The small sample size is due to the fact that three-fourths of all reverse LBOs involve corporations which originated through a divisional LBO. Many of these firms did not have any debt of their own prior to the LBO. Furthermore, divisional leverage ratios (if available) are difficult to interpret to the extent that the debt is assumable by the parent. We replicated row 1 in Table VII excluding divisional reverse LBOs. The average pre-LBO leverage ratio for the full LBOs only is 44.5%.

Table VII
Changes in Leverage

Descriptive statistics on various measures of leverage for corporations engaging in reverse LBOs in the period January 1976–July 1987.

Variable	Mean	Median	First Quartile	Third Quartile	Number of Observations
	%				
1. Pre-LBO Accounting Leverage (Debt/ Total Assets) ^a	41.4	43.2	28.1	50.1	24
2. LBO Market Leverage (Debt/ Total Value) ^b	90.6	93.4	88.8	98.8	42
3. Pre-IPO Accounting Leverage (Debt/ Total Assets) ^c	78.0	78.6	71.0	86.2	70
4. Post-IPO Accounting Leverage (Debt/ Total Assets) ^d	56.0	55.5	47.2	69.5	68

^a Defined as book value of long-term debt plus current liabilities divided by book value of total assets, as of the most recent annual balance sheet prior to the completion of the leveraged buyout. Source: 13E-3 filings and IPO prospecti.

^b Defined as the percentage of the total consideration paid at the time of the LBO financed with debt. Source: 13E-3 filings and IPO prospecti.

^c Defined as book value of long-term debt plus current liabilities divided by book value of total assets, as of the most recent annual or quarterly balance sheet prior to the initial public offering. Source: IPO prospecti.

^d Defined as book value of long-term debt plus current liabilities as of the most recent annual or quarterly balance sheet prior to the initial public offering minus the IPO proceeds used to repay debt, all divided by book value of total assets after the offering. Source: IPO prospecti.

change in total firm size from the LBO to the IPO in Panel A and annualized rates of price appreciation of equity claims between the LBO and the IPO in Panel B.

The size of the firm at LBO is defined as the price paid for the acquired assets plus any assumption of liabilities. We measure firm size at IPO as the number of shares outstanding immediately prior to the IPO times the IPO offer price, plus the pre-IPO book value of debt. The median annualized rate of change in total size is 34.2% for the 41 firms with sufficient data. Despite the conventional wisdom that LBO firms shed assets, our sample firms emerge from private ownership as larger entities than when they were taken private. This is influenced by the predominance of divisional LBOs in the sample. Recall that Section III documented that divisional reverse LBOs experience divestitures less frequently than full reverse LBOs. Not surprisingly, the 25 divisional LBOs have a rate of change in firm size of 37.2% which is more than 50% higher than the 21.3% annual rate of increase in size for the 16 full LBOs. All of the divisional LBOs grew in total firm size, but only 75% of the full LBOs grew in total firm size. The rate of change in firm size for firms with no acquisition or divestiture activity is

Table VIII
Changes in Firm Size and Equity Value

Summary statistics on annualized rates of change in firm size (Panel A) and on annualized rates of return on equity (Panel B) between the LBO and the IPO for corporations engaging in reverse LBOs over the period January 1976–July 1987.^a

Sample	Mean	Median	First Quartile	Third Quartile	Number of Observations
%					
Panel A: Change in firm size ^b					
All Firms	97.5	34.2	14.9	76.2	41
Firms with No Acquisition/ Divestiture Activity	119.7	35.8	22.2	183.3	24
Full LBOs	70.2	21.3	−0.9	50.1	16
Divisional LBOs	115.0	37.2	23.2	116.1	25
Panel B: Change in equity value ^c					
All Firms	1,998.7	268.4	121.1	644.6	58
Firms with No Acquisition/ Divestiture Activity	3,049.0	402.0	118.9	930.6	34
Full LBOs	2,306.6	220.3	50.7	515.9	12
Divisional LBOs	1,918.4	301.2	124.7	668.5	46

^a Source: 13E-3 filings and IPO prospecti.

^b Defined as $(1 + ((\text{NEW}/\text{OLD})^{1/\text{MONTHS}} - 1))^{12} - 1$,

where OLD = firm value at the LBO (computed as price paid for the acquired assets plus any assumption of liabilities).

NEW = firm value prior to the IPO (computed as the number of shares outstanding prior to the IPO times the offer price, plus the pre-IPO book value of debt).

MONTHS = number of calendar months between LBO completion date and public offering.

^c Defined as $(1 + ((\text{PNEW}/\text{POLD})^{1/\text{MONTHS}} - 1))^{12} - 1$,

where PNEW = offer price per share at time of public offering.

POLD = price per share paid by equity participants at time of LBO (adjusted for stock splits occurring under private ownership).

about the same as for the total sample. Thus the typical reverse LBO is much larger at the IPO than at the LBO. This is contrary to the popular notion that firms shrink after their LBO.

Rates of return on equity are based on comparisons between the price per share paid at the LBO and the IPO offering price per share (adjusted for stock splits occurring under private ownership). For the full sample, the median annualized rate of return on equity for 58 firms with sufficient data is 268.4%. Returns to equity holders in divisional reverse LBOs are somewhat higher than those for full reverse LBOs. For a subset of 12 full reverse LBOs, the median annualized rate of return on equity is 220.3%. The corresponding number for 46 divisional reverse LBOs is 301.2%. These shareholder wealth gains are not primarily driven by acquisition or divestiture activities under private ownership. For the subset of 34 firms out of 58 which reported no asset restructuring after

the LBO, the median annualized rate of return of 402.0% is larger than for the full sample.

While these rates of return to equity claimants are large in an absolute sense, they are subject to a number of important caveats. First, the numbers in Table VIII are not adjusted for risk. Recall that our sample firms typically have debt-to-value ratios in excess of 90% at the LBO. Such extreme leverage substantially increases the risk of the equity claims. Hence, at least part of the rates of returns on equity represent compensation for unusually high financial risk. Second, reverse LBOs have generally taken place during times of aggregate economic growth. High absolute returns on equity can be a natural consequence of modest growth in asset values when combined with very high leverage. Third, the data in Table VIII do not account for the lack of marketability of the equity. From the LBO until the subsequent IPO, equity securities in reverse LBOs are essentially illiquid. Research shows that liquidity is priced in capital markets (see Amihud and Mendelson (1986)). Stockholders in reverse LBOs should therefore expect, and on average receive, an additional return premium as compensation for the absence of a market for their securities.

As a rough means of determining whether equity holders have earned abnormal returns, we conducted the following experiment. We computed a comparison rate of return by simulating a leveraged investment in the Standard & Poor's 500 Index over the same 58 LBO to IPO time periods as our sample firms. We used a 93.4% leverage ratio (equal to the median debt ratio of our sample firms at the LBO) and assumed an 18% interest rate on debt. We also assumed that the companies in the S&P 500 had an average debt-to-value ratio of 30%. The mean (median) rate of return on this hypothetical portfolio is 674.4% (195.7%). A *t*-test for difference in mean returns between the 1998.7% return for the sample firms and the 674.4% return for the comparison portfolio is not significant at the 0.05 level. Altering the experiment by using a 24% interest rate on debt did not qualitatively change the results. Thus it would appear that the rates of return earned by equity holders of reverse LBOs, while large in absolute terms, are not dissimilar to those that could have been earned by holding similarly levered investments in the S&P 500 over the same time periods. Given the previously delineated caveats as well as the results of this experiment, it is difficult to conclude that investors in reverse LBOs earned excess returns.

VI. Summary and Conclusions

We analyzed 72 corporations which went public since 1983 but were previously publicly traded companies or divisions of publicly traded companies before their temporary conversion to private ownership after an LBO. We find that managers and directors of our sample companies owned a substantial fraction of the equity of the firm after the LBO, that most executive officers remained with the company after the going-private transaction, and that these firms implemented a variety of incentive compensation plans. To effect the LBO, our sample firms predictably experienced dramatic increases in leverage, but the leverage ratios were gradually reduced over time. After reentering capital markets, how-

ever, the sample firms' leverage ratios remained at higher levels than prior to the buyout.

The companies in our sample appear to have undertaken numerous restructuring activities designed to increase the efficiency of the firm's operations. An analysis of conventional accounting measures of performance reveals that reverse LBOs have experienced significant improvements in profitability when compared with random samples of publicly traded firms over similar time periods. These improvements in profitability result mainly from our sample firms' ability to reduce costs rather than to generate more revenues or to improve asset turnover. The efficiency gains are independent of acquisition or divestiture activity after the LBO, and are more pronounced for divisional reverse LBOs than for full reverse LBOs. Our sample firms on average reduced their relative capital expenditures but did not implement reductions in employment. While private, these firms experienced a median annualized increase in firm size of 34%. Due to the extreme use of leverage, the rate of return experienced by equity holders was very high. We cannot conclude, however, that equity holders earned abnormal returns.

The divisional LBOs in this study are particularly noteworthy because of the larger measure of 'arms-length' bargaining involved in their acquisition. The large increases in value found for the divisional LBOs are more likely to reflect real operating improvements rather than wealth expropriation from former shareholders.

Overall, the evidence we present is consistent with the hypothesis that the change to a privately held corporation and the resulting change in the governance structure of the firm towards more concentrated residual claims has enabled owners of such entities to improve asset utilization and redirect resources towards higher-valued uses. Although our tests do not allow us to reject the claim that buyout promoters and managers exploit inside information, the data suggest that the buyout process created a new organizational structure which appears to be more efficient than its public predecessor.

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