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Essays on reverse leveraged buy-outs

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by

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Chapter 1: Introduction

1.1. Background

This dissertation is comprised of two essays on public-to-private reverse leveraged buyouts (RLBO). The first essay uses firm fundamentals to examine profitability, financial structure, operations, and cost structure from before the leveraged buyout (LBO) to after the RLBO to uncover restructuring activities during the private period. I then determine which of those private period actions lead to post-RLBO success.

The second essay investigates the long-run stock performance of public-to-private RLBOs after exiting the private period. In this essay, I study whether empirical regularities documented for initial public offerings (IPO) are also found to occur in RLBOs. I also analyze whether private period restructuring leads to superior stock returns after the offering. Finally, I determine which elements of corporate governance determine post-RLBO stock performance.

Public-to-private reversed leveraged buyouts occur when exchange listed firms are taken private financed primarily through long-term debt, and then subsequently go public again. As the firm was publicly traded in the past, they most closely resemble a second IPO. A division-to-private RLBO happens when a component of a large publicly traded firm is acquired by a private equity group, and is then offered to the public. These transactions can best be described as a highly levered equity carve-out. When a private equity firm directly acquires an unlisted firm and then later conducts public offering, it is considered to be a private-to-private RLBO. As the firm was not publicly traded before, these RLBOs are effectively first IPOs with large amounts of long-term debt.

Prior research on RLBOs uses samples which are primarily private-to-private and division-to-private transactions, and therefore focuses on the years after the RLBO. As a result,

the literature has been unable to shed light on restructuring during the private period. The first essay, titled "Reverse Leveraged Buyouts: What Happens during the Private Period?" studies these restructuring activities undertaken during the private period.

Using a large sample of exclusively public-to-private RLBOs, I compare firm fundamentals from before to after the private period. These results are enhanced by private period data available for a subset of firms, to better understand corporate decisions taken while restructuring. Employing this research design, this study is the first to document restructuring activities during the private period, and their relation to subsequent financial performance. I then investigate how private period activities influence post-RLBO valuations.

Private period duration and whether it is related to post-RLBO success generates considerable discussion in the business media. This essay investigates whether a basis for these concerns exists, and whether conditions at the LBO are related to the time in restructuring. At the same time, prior studies document that RLBOs have a high attrition rate after the offering, while offering few explanations for why these firms are vulnerable in the market for corporate control. I close this gap in the literature by identifying those actions that lead to post-RLBO long-run independence.

If private period restructuring influences post-RLBO valuation, is this due to changes in management behavior? Theory suggests that excess free cash flow combined with insufficient growth opportunities leads to overinvestment. Long-term debt is the mechanism proposed to ameliorate these costs, which suggests that RLBOs should be less susceptible than their peers to negative net present value investments. To test this, I investigate whether restructuring impacts the relationship between capital expenditures and free cash flow over time and within classes of firms.

The second essay is titled "Determinants of Long-run Stock Price Performance Following Reverse Leveraged Buyouts" This study investigates the long-run stock performance of public-to-private RLBOs. Prior research documents that initial public offerings (IPOs) suffer from long-run underperformance. As public-to-private RLBOs are a second IPO, examining the stock returns of these unique transactions provides an opportunity to explore the role of asymmetric information in long-run performance.

If equity values represent market expectations for long-run cash flows, then stock returns are the realization of these projections. If markets are efficient, then the determinants found to be relevant to post-RLBO equity values in the first essay should be similarly correlated to long-run stock performance. To investigate this, I test the relationship between firm fundamentals during the private period and at the RLBO with long-run stock returns after the RLBO.

I next examine whether corporate governance after the RLBO impacts long-run stock returns, by investigating the executive committee of the board of directors. Finally, I study the relationship between underwriter reputation and stock performance to determine if the relationship found for first IPOs exists for RLBOs.

1.2. Organization of the Dissertation

The rest of this dissertation is organized as follows. The first essay is presented in Chapter 2 and includes an introduction, literature review, hypothesis development, data sources, methodology, results, and conclusions. Chapter 3 includes the second essay and is organized similarly to Chapter 2. Overall conclusions are discussed in Chapter 4. Tables and figures are included in appendices at the end of the dissertation.

Chapter 2: Reverse Leveraged Buyouts: What Happens During the Private Period?

2.1. Introduction

Reverse leveraged buy-outs (RLBOs) are receiving increased attention from finance researchers and the business media in recent years due to their significant growth as a percentage of the U.S. buyout industry.[1] While prior research has focused on the financial and stock price performance after the RLBO (see e.g. Cao and Lerner, 2009, Holthausen and Larcker, 1996, among others), the business media, enamored by the currency of these transactions, speculate based on anecdotal evidence on the types of restructurings that are undertaken during the private period.[2] To date, however, researchers remain silent on the restructuring initiatives undertaken during the private period from LBO to RLBO.

Based on a comprehensive sample of public-to-private RLBOs, the following questions are addressed: What types of restructurings, in terms of changes in operating, financial and cost structures, are typically undertaken during the private period? What private period actions determine post-RLBO valuation? What role does private period length play in the firm's financial performance (success) after the RLBO? Is the firm's vulnerability to the market for corporate control related to private period initiatives?

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[1] Cao and Lerner (2009) find that from 1981 to 1999, RLBOs represented 8.25 percent of all IPO offerings. They report that this grew to 18.64 percent of all public offerings from 2000 to 2003. In addition, the RLBO has significant wealth implications for investors. Cao and Lerner report, that from 1981 to 1999, the gross proceeds from the RLBOs in their sample averaged $105.73 million per deal. This is almost twice as large as the average proceeds of $55.52 million from other IPOs.

[2] A good example can be found in the following quote from the February 17, 2006 issue of Business Week concerning the 2006 RLBO by Burger King, "Burger King's total revenue for the last half of 2005 was up 5 percent to $1.02 billion, income from operations was up 29 percent to $142 million and net income (after including the debt burden from the LBO and paying Uncle Sam) was up 9 percent to $49 million. How to explain the improvement in operating income? Standard LBO playbook -- cut expenses. S, G & A dropped 10 percent even as sales rose. The bad news, though, was that comparable store sales were pretty weak, up just 1.3 percent in the second half of 2005 versus a 7 percent gain in the comparable period of 2004". Another example is this quote which appeared in the December 10, 2007 issue of Forbes, "Beware the quick flip; such deals tend to underperform the S&P Index in the three years after listing."

The uniqueness of RLBOs is demonstrated by findings that show only a small fraction of LBOs return to public capital markets. Kaplan and Stromberg's (2009) LBO study finds that only 14 percent of their firms subsequently exit private domain by conducting an RLBO. Guo, Hotchkiss, and Song (2010) and Mehran and Peristiani (2010) obtain similar results. Further, Kaplan (1991), and Van de Gucht and Moore (1998) show that RLBO probability does not peak until several years into the private period. Their findings provide additional motivation to understand restructuring activities during the private period. Hence, a study of RLBOs that uncovers restructuring actions during the private period will enable us to understand what distinguishes these transactions from other public offerings.

This study complements and expands on prior research by considering public-to-private-to-public firms only. I begin by compiling a comprehensive sample of 208 *public-to-private* RLBOs for the period, 1978 to 2006. By restricting the study to public-to-private-to-pubic transactions, I can discern changes in profitability and valuation, financial structure, operating structure, and cost structure by examining firm characteristics pre-LBO compared to post-RLBO. The analysis is supplemented by examining firm data one year before and after the LBO, as well as the year immediately preceding and following the RLBO. This research design facilitates understanding what types of actions are typically undertaken during the private period.

The analysis contributes to the RLBO literature in a number of ways. First, leading up to the LBO, I find that sample firms expend more resources on capital expenditures than competitors, while their growth options are at par with rivals. These factors in combination with low ownership concentration and excess free cash flow suggest the existence of overinvestment.

Second, the increased leverage from the LBO transaction leads to significant declines in free cash flow and capital expenditures during the private period, while ownership concentration

increases—all of which alleviate agency problems. As agency issues may manifest in overinvestment, the evidence of downsizing during the private period is consistent with increased management discipline.

Third, after emerging from the private period, I document that employee productivity and gross margin improve relative to competition. Further, the results show that firm's growth opportunities and free cash flow are above industry levels as the newly public firm deleverages. In addition, capital expenditures remain at industry norms indicating that agency issues remain under control post-RLBO.

Fourth, the evidence suggests that private period restructuring which improves growth prospects and reduces cost structure leads to higher post-RLBO valuations. I also find that firm value at the RLBO is positively associated with the concentrated ownership. Finally, equity markets respond more favorably at the RLBO to restructuring which reduces overhead and increases investments in research and development. Overall, the findings support Jensen's (1986) proposition that leveraged buyouts provide the incentives that motivate management to act in the interest of shareholders.

Fifth, I also find evidence that sample firms are subject to higher taxes in the pre-LBO period than their counterparts, which implies that LBO firms were under-levered. Higher levels of long-term debt lead to substantial reductions in marginal tax rates following the RLBO.

Sixth, insights are obtained into the relationship between firm fundamentals at the LBO and private period duration. The findings show that the private period is negatively correlated with leverage, intangible assets, and employee productivity. The evidence suggests that firms spend less time restructuring when the term structure of interest rates is steep, and during active

leveraged buyout markets. In contrast, firms that pay out excess cash as dividends remain private longer.

Seventh, evidence is obtained that explains the high post-RLBO attrition rate documented in the literature. Firms which use private period restructuring to develop new growth opportunities have a higher probability of long-run independence post-RLBO, while a reverse relationship exists for excessive personnel reductions. I also find that active leveraged buyout markets and high marginal tax rates reduce post-RLBO takeover probability. Finally, the results imply that a nonlinear relationship exists between private period duration and the probability of remaining independent post-RLBO. I argue that public-to-private RLBOs after an extremely long private period more closely resembles a first IPO.

The results are robust to controlling for potential endogeneity and the influence of outliers. The rest of the chapter is organized as follows. The next section discusses the background literature on RLBOs. Section 2.3 describes the sample selection process and the data sources. The empirical findings are presented in Section 2.4. Section 2.6 then concludes.

2.2. Literature Background

The transition from public-to-private and then public again is complex with many factors to consider. In understanding this process, I next summarize prior RLBO research beginning with studies of the benefits from LBOs. I then discuss articles investigating post-event operating performance. Studies on the probability of conducting an RLBO after the LBO are reviewed, followed by a summary of research into agency costs in the process. The literature review concludes by discussing one international study of RLBOs.

2.2.1. The Gains from LBOs

Previous literature examines the gains from LBOs in the 1980s and find increased leverage

provide benefits to such firms through reduction in agency problems and more robust tax shields from interest deductions (DeAngelo, DeAngelo, and Rice, 1984, Lehn and Poulsen, 1989, and Kaplan, 1989b).

2.2.2. RLBO Operating Performance

In the RLBO literature, prior work has focused primarily on post-event performance of division-to-private and private-to-private transactions. For example, Muscarella and Vetsuypens (1990) analyze 72 RLBOs (including 18 public-to-private RLBOs) from 1983 to 1987, and detect significant improvements in profitability due to lower costs, while Mian and Rosenfeld (1993) find that operating margins of 85 RLBOs (53 are division-to-private RLBOs) improve during restructuring. Earlier work on management buyouts also document significant increases in operating returns after the private period (Kaplan, 1989a and Smith, 1990).[3]

Extending the analysis to four years post RLBO, Holthausen and Larcker (1996) find that fundamentals are better than the industry. However, their results contrast with Degeorge and Zeckhauser (1993) who document lower performance after the RLBO compared to before. In a recent study, Cao (2011) shows that post-RLBO underperformance is concentrated in firms remaining private less than a year. Previous research also provides evidence of declines in leverage post-RLBO (Mian and Rosenfield, 1993), and decreases in insider ownership (Holthausen and Larcker, 1996).

2.2.3. Post-RLBO Attrition

Kaplan's (1991) study reports a high attrition rate that is also obtained by Mian and Rosenfield (1993), where 40 percent of their samples are taken over within three years of the RLBO. In the same vein, Holthausen and Larcker (1996) find that over one-third of their sample is de-listed within four years post-RLBO. The high post-RLBO attrition rate is an empirical

[3] Smith's (1990) sample of 53 MBOs includes 17 RLBOs.

regularity that prior research has yet to explain, leaving a gap in the literature addressed in this chapter.

2.2.4. Agency Costs and the RLBO

Post-RLBO agency costs are another topic of past research, where Holthausen and Larcker (1996) find decreasing insider ownership after the event, while Mian and Rosenfield (1993) report declining leverage. Mian and Rosenfield (1993) also show that post-RLBO takeovers are characterized by greater outside investor participation, and lower ownership by officers and directors. In contrast, Muscarella and Vetsuypens (1990) and Bruton, Keels, and Scifres (2002) find that ownership is still concentrated post-RLBO, suggesting an improved governance structure. This study complements and expands on these articles by considering public-to-private-to-public firms.

2.2.5. International RLBOs

Nikoskelainen and Wright (2007) examine 321 United Kingdom buyouts over 1995 to 2004, by analyzing realized value increases after the event.[4] They show that valuation is positively related to improved post-LBO governance such as increased managerial equity holdings. As such, they provide additional evidence consistent with agency theory by showing that the likelihood of positive returns is related to acquisitions carried out while private. One interesting aspect of this study is that RLBOs are as common in the United Kingdom as in the United States, suggesting that firms are responding to agency issues occurring in the Berle and Means (1932) corporations common in both countries.

[4] Their sample includes 52 RLBOs.

2.3. Sample Selection Process and Data Sources

2.3.1. RLBO Terminology

In this study I employ terminology typically used to define transitions surrounding the private period, namely the leveraged buyout (LBO) followed by the reverse leveraged buyout (RLBO). The LBO defines the transfer from initial public trading to the private period, while a second initial public offering denotes the RLBO. Further, the term RLBO is typically used to describe three distinct classes of these transactions. Public-to-private RLBOs occur when firms are independent and publicly traded companies before the LBO and after the RLBO, in contrast to division-to-private or private-to-private transactions. Division-to-private RLBOs involve a segment of a company pre-LBO, and as such more closely resemble highly levered equity carve outs.[5] Private-to-private RLBOs occur when an unlisted company is acquired by a private equity group and subsequently taken public via an IPO.[6]

2.3.2. Data Sources

A common approach in the literature is to commingle private-to-private and division-to-private RLBOs with public-to-private RLBOs.[7] The results from such comingling would reflect different attributes and starting points for the firms taken private. I examine public-to-private-to-public transaction. This research design has two advantages: First, I am able to track the same firm across the different parts of its journey— from being public to going private and up to a few years following going public after restructuring. Second, the comingling of different types of

[5] Celestial Seasonings is an example of a division to private RLBO, which was owned by Kraft Foods prior to the LBO.
[6] One example of a private equity group is Kohlberg, Kravis and Roberts.
[7] For example, Kaplan (1991) examines 183 leveraged buyouts from 1979 through 1986. A majority of Kaplan's sample are divisions of public companies at the time of the LBO. The study also finds that approximately 45 percent of the buyouts eventually conduct a second IPO. Cao and Lerner (2009) report that their sample of 437 firms includes 307 private to private, 96 division to private, and 34 public to private RLBOs.

going private transactions ignores the fact that private-to-private and division-to-private transactions may have a completely different motivation than public-to-private.

As Bharath and Dittmar (2010) show, there are different economic forces at play in private and public firms. For example, unlike public-to-private transactions, private-to-private transactions do not forgo benefits of liquidity when they go private. Further, firms that undergo public-to-private transactions tend to be larger than industry as opposed to private-to-private which are more likely to be smaller and hence, more likely to suffer from adverse selection. The research design of a sample comprised exclusively of public-to-private RLBOs allows me to draw clean and reliable conclusions about firm activities from pre-LBO through post-RLBO. Compiling a comprehensive list of these transactions entails hand-collection of data from different sources since there is no one definitive database for such transactions.

I undertake a multi-step process using several sources to create an exhaustive sample of public-to-private-to-public transactions. I start with the Securities Data Company's (SDC) database to obtain RLBO transactions from 1978 to 1998. Mergers and Acquisitions data provides information on LBOs with a future IPO, while the New Issues table contains data on IPOs with a previous LBO. These two sources are then verified against each other. Because SDC stopped tracking RLBOs after 1998, the sample is expanded with IPOs from 1999 to 2006, which are then matched against the existing list of LBOs. The SDC data is supplemented with the sample from Cao and Lerner (2009).[8]

Next, the Gale Business and Company Resource Center is used to validate candidate RLBOs by reviewing each firm's history, verifying that a company was publicly listed, privately held, and then public again. I also use this source to identify name changes taking place over the private period, and verify that SDC transaction dates are accurate. For example, SDC often

[8] I thank Jerry Cao and Josh Lerner for making their list of public to private RLBOs available to me.

defines the LBO as when the firm was first acquired by a private equity firms (such as Kohlberg, Kravis and Roberts), even if the firm previously was taken private in a management buyout (MBO). Additionally, news articles related to the firm are also obtained from Gale for pertinent information.

Firm names before the LBO and after the RLBO are then used to search the Compustat Names table, as well as the Center for Research in Security Prices (CRSP) Stocknames file, enabling identification of all required CUSIP codes. The CRSP delisting code is also verified to confirm that it is for a merger or acquisition. Additional requirements include that firm data is available in both Compustat and CRSP. This results in a comprehensive sample of 208 public-to-private RLBOs for the period, 1978 to 2006. Appendix B contains a list of all databases utilized in this dissertation.

Table 1, Panel A, reports sample transactions by year for both the LBO and the RLBO. There is a cluster of transactions for the years 1984 to 1989, corroborating previous research that in these years Drexel, Burnham, and Lambert financed a large volume of LBOs using junk bonds.[9] In Panel B, firms are grouped by private period duration, and approximately 60 percent go public again in less than five years, with almost 25 percent conducting an RLBO within two years. The business media has coined the phrase "quick flip" to describe these transactions.

Panel C shows that median (mean) time in the private period is 4.4 (5.4) years, which is somewhat longer than that reported in earlier studies.[10] The longer private period is due to the fact that duration has generally increased since the year 2000 and perhaps because the sample is composed exclusively of public-to-private RLBOs. For example, some MBOs are later acquired by a private equity firm (typically called a second LBO), which leads to two private periods.

[9] I note that over half (57 percent) of the LBOs are management buyouts (MBO).
[10] For example, Muscarella and Vetsuypens (1990) obtain a median private period of slightly more than 3.0 years.

RLBOs by 2-digit SIC code are reported in Panel D, and the sample is spread uniformly across industries.

2.4. Empirical Results

2.4.1. Univariate Analysis

Table 2 reports univariate results examining firm profitability, valuation, financial restructuring, operating restructuring, and cost structure from pre-LBO (LBO-0) through post-RLBO (RLBO+0). First, firm fundamentals in the year of the LBO are compared to those at the RLBO. Next, in Table 3 the analysis is expanded by accessing private period data existing for a subset of firms, to examine changes surrounding both the LBO and RLBO. This approach reveals types of restructuring taking place during the private period and later I examine how these changes impact post-RLBO performance.

Following Barber and Lyon (1996) I apply the Wilcoxon signed rank test of medians in the univariate analysis. Additionally, since RLBOs lead to significant changes in asset composition, several variables are standardized by sales (such as free cash flow, EBITDA, capital expenditures, research and development expenses, advertising, cost of goods sold and selling, general and administrative expenses). However, to maintain comparability between leverage, taxes and interest expense, and not confound results with changes in market conditions, I follow Cao (2011) and normalize these variables with book value of assets. Market-to-book ratio (*MktBook*) is employed to proxy for firm valuation and to measure future growth options, while price-to-sales (*PSlsRatio*) serves as the equity multiple.[11]

In Table 2, I present changes from the year of the LBO (LBO-0) to the year of the RLBO (RLBO+0). Panel A reports findings using unadjusted variables, while Panel B documents industry-adjusted variables. Industry values are based on the yearly median value for each 2-digit

[11] I note that market-to-book is equivalent to Tobin's Q.

SIC code. In Panel B I also test whether industry-adjusted values at LBO-0 and RLBO+0 differ statistically from zero. Univariate analysis in Table 3 reports results for the subsample of firms with private period data surrounding the LBO and the RLBO. Panel A of this table reports industry-adjusted results at the LBO compared to those one year later (LBO+1), while a similar analysis comparing variables before (RLBO-1) and at the RLBO (RLBO+0) is included in Panel B of Table 3.

2.4.1.1. Changes in Profitability and Valuation

Table 2 (Panel A) shows that there is no significant change in unadjusted return on assets (*ROA*) during the private period, namely from before the LBO to after the RLBO. However, Panel B of the table reveals that the industry-adjusted *ROA* is positive and highly significant at both the LBO and the RLBO. Although firm performance improves during the private period, the improvement is not statistically different from zero.

In Table 3 I report that *ROA* declines significantly one year surrounding the LBO. However, the evidence suggests that this trend is reversed during the private period, as *ROA* is positive and highly significant both one year before and the year after the RLBO, but the change surrounding the RLBO is statistically insignificant. The combination of these results implies that firms that undergo LBO transactions are not underperforming firms.

Table 2, Panel A indicates that sample firms experience substantial improvement in growth opportunities during the private period as market-to-book (*MktBook*) increases significantly over this time. Panel B results are similar as pre-LBO *MktBook* is at par with the industry, but significantly increases following the RLBO. Opler and Titman (1993) argue that LBOs are characterized by poor growth opportunities; however, my results do not substantiate that argument. To ensure that my results are not impacted by the years studied, I group the sample

into time periods aligned with Opler and Titman (1993), and my results hold for the same era they analyze.[12] The analysis also reveals that both unadjusted and industry-adjusted price-to-sales (*PSlsRatio)* increases substantially during the private period. The findings imply that private period restructuring improves the firms' growth opportunities as well as their equity valuation multiple.

I use free cash flow to sales (*FCF/Sales*) to provide evidence on operating cash flows and how restructuring influences insiders' use of these funds. Free cash flow to sales (*FCF/Sales*) changes little over the private period whether the variable is raw or industry-adjusted. Similarly, I find that *FCF/Sales* is significantly greater than that of the industry immediately preceding the LBO and subsequent to the RLBO. The high free cash flow prior to the LBO is consistent with previous literature and reflects lesser need by these firms to access capital markets.

As expected, post-LBO *FCF/Sales* declines relative to that of the industry, and the difference is highly significant. If proceeds from the public offering are used to pay down debt, then post-RLBO free cash flow should rise. The findings are consistent with this prediction as there is a highly significant increase in *FCF/Sales* from the year preceding RLBO to one year following the RLBO. Figure 1 graphs *FCF/Sales* from before the LBO to after the RLBO.

The analysis reveals a highly significant increase in *EBITDA/Sales* over the private period. However, the evidence suggests that this trend is not at par with the corresponding industry-wide improvement, as *EBITDA/Sales* declines relative to competition. Immediately surrounding the LBO, there is a highly significant improvement in *EBITDA/Sales*. In contrast, I find the opposite effect surrounding the RLBO, and the decline is highly significant. One explanation for the changes in *ROA* and *EBITDA/Sales* surrounding the LBO is that asset write-ups lead to increased

[12] Results not tabulated for conciseness.

depreciation and amortization. Additionally, declining *EBITDA/Sales* while *ROA* remains unchanged, suggests that tax savings play a role in post-LBO benefits.

Retained earnings to assets (*RetTA*) provide additional evidence on profitability.[13] Pre-LBO industry-adjusted *RetTA* is positive, economically material, and highly significant, while after restructuring the same variable is negative and statistically differs from zero at the 1 percent level. In addition, changes in *RetTA* over this time are negative and at better than a 1 percent confidence level on both a raw and industry-adjusted basis. Private period changes in *RetTA* appear to be concentrated at the LBO, as changes surrounding the RLBO are not statistically different from zero. One possible explanation for these findings is that divestitures after asset write-ups generate large losses on disposal, which leads to the observed decrease.

2.4.1.2. Financial Restructuring

The evidence in Table 2 suggests that substantive changes in capital structure take place over the RLBO process. Firms rely more on debt (*Leverage*) post-RLBO compared to pre-LBO whether using raw or industry-adjusted variables, and the increases are highly significant. Not surprisingly, Table 3 documents that *Leverage* increases dramatically from 0.099 to 0.427 surrounding the LBO. In contrast, there is a large and highly significant drop in *Leverage* post-RLBO, suggesting that the proceeds from the offering are used to reduce debt. [14] Figure 2 maps trends in *Leverage* from before the LBO to after the RLBO.

As expected, changes in *InterestTA* mirror those of *Leverage*. On an industry-adjusted basis the variable is insignificant pre-LBO, but increases to a positive and highly significant value at the RLBO. I find statistically significant growth in *InterestTA* during the private period

[13] See studies by Ohlson (1995) and Dhaliwal, Erickson, Frank, and Banyi (2003) from the accounting literature. Altman's (1968) Z-Score, which predicts financial distress, provides an example from the finance literature.

[14] As long-term debt can substitute for short-term credit, notes payable to assets is examined (not reported for conciseness). While the unadjusted variable declines during restructuring, this appears to be an industry effect as the industry-adjusted variable is insignificant.

for both raw and industry-adjusted values. Focusing on changes surrounding the LBO, the evidence suggests that *InterestTA* increases substantially. However, this trend is reversed at the RLBO, as there is a significant decrease due to the reduction in long-term debt.

Higher leverage is likely responsible for the decrease in taxes to total assets (*TaxRate*), where the effective rate of almost 33 percent pre-LBO decreases to slightly more than 18 percent as the firm emerges from the private period restructuring. The decrease is significant at the 1 percent level and supported by industry-adjusted results that are qualitatively similar. Further, at the LBO, industry-adjusted *TaxRate* is positive and significant at 5 percent, which declines significantly to a negative value one year into the private period. At the RLBO, the downward trend in taxes is reversed, where a negative and highly significant value pre-offering becomes insignificant one year later. Overall the results support Kaplan's (1989b) findings that RLBOs create value through tax benefits.[15]

I employ cash to total assets (*CashTA*) as a proxy for liquidity, which declines significantly from LBO to RLBO on both a raw and industry-adjusted basis. In addition, while *CashTA* is at industry levels pre-LBO, it becomes negative and highly significant after the private period. Table 3 indicates that there is a decline in *CashTA* surrounding the LBO that is statistically different from zero, and it is negative and highly significant one year into the private period. However, I detect no impact on *CashTA* surrounding the RLBO as differences over this year are insignificant.[16] These changes reflect a more stringent cash policy when the firm is private which is maintained when the firm re-emerges publicly.

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[15] Tax loss carry-forwards also shield firms from taxes. In unreported results, I find a significant increase in raw and industry-adjusted tax loss carryforwards during restructuring.

[16] In unreported results, net working capital increases significantly surrounding the RLBO. One possible explanation is that increased business activity leads to greater inventories and accounts receivable, while an alternative, but not mutually exclusive rationale is that current liabilities and payables are reduced by the RLBO. I find that the inventory turnover ratio declines over this time. Since firm sales are increasing, this suggests that inventories are growing, which is consistent with the first explanation.

Raw and industry-adjusted dividends to total assets (*DivTA*) decreases significantly during the private period. However, it is important to note that RLBOs still pay an above industry level of dividends even after the private period. Results reported in Table 3 suggest that dividend declines occur at the LBO, but the change surrounding the RLBO is insignificant. Substantial leverage increases due to the LBO, as well as tighter liquidity, may explain dividend reductions during the private period.

Ownership concentration (*Shares/Owner*) increases significantly from 3,020 shares per equityholder at the LBO to a post-RLBO level of 48,000. While industry-adjusted *Shares/Owner* is insignificant pre-LBO, this grows to a highly significant value post-RLBO. This increase in ownership concentration during the private period is significant at the 1 percent level. Although the decline in *Shares/Owner* after the RLBO is statistically significant, it is still above the corresponding industry norm. Thus, the change in the ownership structure prompted by the LBO transaction is maintained to some degree after the RLBO.

2.4.1.3. Operations Restructuring and Changes in Cost Structure

Table 2 shows that the real book value of assets (*Assets*), based on either raw or industry-adjusted basis, does not change significantly during the private period.[17] Although the typical sample firm is larger than the industry both before the LBO (going into the private period) and after the RLBO (emerging from the private period), this finding may be influenced by asset write-ups at the LBO, and results reported in Table 3 are consistent with this possibility.[18] The analysis reveals a significant increase in *Assets* surrounding both the LBO as well as the

[17] I adjust book value of assets and net sales to the base year 2000 using the consumer price index (CPI). The CPI data are obtained from the Bureau of Labor Statistics website www.bls.gov.

[18] I find that firms taken private through a management buyout (MBO) have significantly lower *Assets* before and after the private period compared to transactions without management participation.

RLBO.[19,20] My sample firms experience substantial declines in *Sales* during the private period relative to the industry. However, private period restructuring bears fruit as firms generate above industry-level sales within a year following the RLBO as evidenced by the statistically significant increase in sales from pre-RLBO to post-RLBO window.

Since asset write-ups at the LBO can obfuscate asset restructuring, I investigate restructuring of tangibles as captured by property, plant, and equipment (*PPETA*). I find that this asset measure declines significantly during the private period. This decrease is highly significant not only on an absolute basis but also relative to the industry. Table 3 indicates that a substantial reduction in *PPETA* is executed within the first year of the firms entering the private period. The findings also indicate that the downsizing of *PPETA* is completed prior to the year before the firm goes public again.

Table 2 shows that personnel counts (*Employees*), both raw and industry-adjusted, decline significantly over the private period, an indication of firms engaging in restructuring to improve efficiency and productivity. However, Table 3 shows that these actions do not typically occur near the LBO, as the difference in *Employees* pre- and post-LBO is insignificant. The combined evidence from Tables 2 and 3 suggest that substantive personnel reductions begin at least one year into the private period. However, employment levels increase significantly from pre-RLBO to one year after going public again.

The findings indicate the above restructuring leads to efficiency gains in employee productivity for the sample firm on both an absolute basis as well as relative to the industry. As employment declines over the private period, there is a highly significant increase in sales per

[19] In unreported results, I find a decline in Sales/Assets over this time, which is significant at the 1 percent level.
[20] The Compustat Segment files are also examined for changes in firm structure, where firms without data are assumed to have one segment. There is no evidence of changes in business segments over the private period, as the mean number of segments at the LBO (1.428) is virtually the same as those found at the RLBO (1.452).

employee (*Sales/Employee*). The industry-adjusted results are qualitatively similar. Overall, private period restructuring leads to improved efficiency as indicated by the increase in revenue generated per employee. This significant improving trend in *Sales/Employee* continues after the RLBO. I present a graph of *Sales/Employee* from before the LBO to after the RLBO in Figure 3.

The findings suggest that there is overinvestment prior to the LBO in terms of capital expenditures to sales (*Capex/Sales*). Specifically, the industry-adjusted *Capex/Sales* is positive and significant pre-LBO but insignificant post-RLBO. Declines in *Capex/Sales* that are statistically different from zero occur during the private period in terms of both raw and industry-adjusted values. Leading up to the RLBO, *Capex/Sales* is negative and significant at 5 percent, while one year later, the variable is insignificant. These trends are depicted in Figure 4.

Examining cost structure, I find that cost of goods sold to sales (*COGSSls*) changes markedly from LBO to RLBO. The decrease in *COGSSls* on both an unadjusted basis, as well as relative to the industry is accompanied by increases in gross margin. I also find that the changes surrounding the LBO and RLBO are insignificant, suggesting that longer private periods are required to effect improvements in margins.

Table 2 shows that the sample firms are characterized by below industry-level selling, general, and administrative expenses to sales (*SG&A/Sales*) for both at the LBO and at the RLBO, perhaps due to economies of scale given that sample firms tend to be larger than the industry norm. Further, changes in *SG&A/Sales* during the private period are insignificant for both raw and industry-adjusted values. This suggests that private period restructuring improves gross margin, but not overhead expenses that are already below the industry norms when entering the private period. Table 3 indicates that changes in *SG&A/Sales* around the LBO are insignificant but there is a significant decrease surrounding the RLBO.

Research and development expenditures (*R&D/Sales*) are another avenue firms can explore during restructuring. Industry-adjusted *R&D/Sales* at the LBO is similar to that of industry counterparts, while after the private period it is significantly lower than that of rivals. Higher post-restructuring leverage may incentivize reduced investments in R&D. I note that changes in *R&D/Sales* surrounding the LBO and RLBO are insignificant.

2.4.1.4. Private Period Outliers

Five of the sample firms have a private period less than 60 days, where in one case the RLBO occurs 10 days after a buyout after being held up by a shareholder lawsuit. However, to preclude the possibility that the results are driven by these extreme values, I repeat the analysis of Table 2 excluding these firms, and obtain qualitatively similar results, with coefficients consistently having the same sign and magnitude.

2.4.2. RLBO Performance by Time in the Private Period

The findings so far suggest that substantial restructuring takes place during the private period. However, there is a wide variation in the time spent restructuring, raising interesting questions on the relationship between private period length and post-RLBO success. As mentioned previously, the business media warns about the so-called "quick flip," where too short a restructuring interval leads to post-RLBO underperformance. I now explore the validity of that warning in Table 4, which reports industry-adjusted firm fundamentals by quartiles of private period length.[21] I also compare the shortest quartile (*Q1*) to the longest quartile (*Q4*) using an unpaired test of group medians.

2.4.2.1. Profitability and Valuation

Firms with the shortest private period earn lower post-RLBO returns on equity (*ROE*) than those in a longer restructuring, and the difference is significant at the 5 percent level. Further,

[21] The table only reports quartiles 1 and 4 for conciseness.

ROE for *Q1* drops significantly over the private period, while the change for *Q4* is not statistically different from zero. In contrast, no substantive differences in *ROA* and *EBITDA/Sales* are detected between quartiles. One explanation for this finding is that wealth transfers from shareholders to creditors are concentrated in firms with shorter private periods. There are also no detectable differences for *FCF/Sales* by private period length.

I find noticeable differences due to private period length in pre-LBO valuations. Both *PlsRatio* and *MktBook*, are lower before the LBO for *Q1* compared to *Q4*, and the differences are significant at the 5 percent level. However, by the RLBO changes in *PSlsRatio* across quartiles are not statistically different from zero, while firms remaining private longer still demonstrate a significantly higher *MktBook*. These findings suggest that restructuring duration is positively related to post-RLBO firm valuation, but has no discernable impact on equity values after restructuring.

2.4.2.2. Financial Restructuring

Pre-LBO capital structure is varies by private period length, as *Q1* firms already have higher *Leverage* than their competition, while the same variable for *Q4* firms is insignificant. Consequently, the quartiles differ statistically at the 1 percent level before the LBO. In contrast, after restructuring *Leverage* of both quartiles has converged to similar levels. This implies that there is an optimal capital structure at the RLBO, where restructuring irrespective of length leads to qualitatively similar levels of long-term debt.

As interest expense is intrinsically related to long-term debt, the findings for *InterestTA* are the same as those found for *Leverage*, where differences between quartiles existing pre-LBO

disappear by the RLBO. Not surprisingly, private period duration has an inverse relationship to *TaxRate* compared to those found for interest and long-term debt.[22]

I find that firms with shorter private periods have less liquidity before the LBO, as *CashTA* for *Q1* differs statistically from that of *Q4* at the 1 percent level. However, by the RLBO both quartiles are similarly below industry norms. In a related finding, *Q4* firms pay significantly higher levels of dividends pre-LBO, while by the RLBO dividends are at similar above industry levels irrespective of private period length.

2.4.2.3. Operating Restructuring and Changes in Cost Structure

There is little evidence that private period length is related to *Assets*, which may be impacted by write-ups from the LBO. *Sales* provide a measure of firm size not impacted by accounting at the LBO, and the results are consistent with smaller firms remaining private a shorter time, where the quartiles differ statistically at the 1 percent level post-RLBO.

Personnel counts are an alternative measure of scale and both quartiles are qualitatively similar pre-LBO. After restructuring, *Employees* for *Q4* is significantly greater than for *Q1*. By grouping the sample into quartiles of private period duration, I am able to discern evidence of divestitures occurring among firms with the shortest private periods.

Pre-LBO cost structure differs by private period length. First, *Q4* firms have higher *SG&A/Sales* than their *Q1* counterparts, while firms spending a longer time restructuring also expend more on *R&D/Sales*. In both cases the difference are significant at the 5 percent level. However, restructuring ameliorates any differences, as by the RLBO all cost structure variables are qualitatively the same irrespective of quartile.

[22] Tax loss carryforwards are another avenue by which firms can shield income from taxes. In results not tabulated for conciseness, a shorter private period is associated with higher tax loss carryforwards at the LBO. However, differences disappear by the RLBO, suggesting that tax benefits are correlated with private period duration, as firms with sufficient loss carryforwards cannot take advantage of the debt shield.

2.4.2.4. Long-run Status after the RLBO

Kaplan's (1991) study shows that RLBOs experience above average attrition and this sample also demonstrates this tendency. Out of 208 firms that exit restructuring, sixty-four are no longer publicly traded within five years. A majority of the delistings (53) result from mergers and acquisitions, while only 11 firms delist for bankruptcy/insufficient capital. The remaining 144 firms are still publicly traded five years post-RLBO.

The evidence suggests that private period length is related to post-RLBO status. In unreported results, firms delisted for mergers have a median private period of 3.4 years compared to 4.7 for those publicly traded after five years, and the difference is significant at 5 percent. One explanation for this finding is that too short a private period results in ineffective restructuring, leaving the firm vulnerable to the market for corporate control. Alternatively, some "quick flips" may be used by incumbent management to reduce or dispose of their investment.

2.4.3. Multivariate Analysis

Next, in order to determine how restructuring impacts post-RLBO valuation, I use regression analysis to explore the relationship between changes in fundamentals during the private period and market-to-book ratio and price-to-sales multiple. I test cost structure, investments, ownership concentration, and growth in determining what factors drive post-RLBO values. Several robustness checks are performed to validate the key findings. The valuation results are reinforced by an analysis of the factors driving free cash flow at both the LBO and RLBO. I then investigate those ex-ante factors impacting restructuring length, and why RLBOs experience such a high attrition rate.

2.4.3.1. What Determines Valuation after the RLBO?

Table 5, Panel A presents regressions with the equity valuation multiple, price-to-sales ratio (*PSlsRatio*), as the dependent variable, while Panel B displays the same specifications using firm valuation proxy market-to-book ratio (*MktBook*) as the regressor.[23] The control variables include *Assets*, *Leverage*, *RLBOYears*, a dummy set to one for firms delisted for reasons other than a merger (*Delist*), and a variable proxying for the yield curve (*TermPremium*). Several specifications of equation (1) below are reported in Table 5, where all firm fundamentals are industry-adjusted and defined in Appendix A.

$$\text{Valuation} = f(Assets, Leverage, PPETA, COGS/Sls, Growth, Delist, \Delta Capex/Sales, \Delta R\&D/Sales, \Delta Shares/Own, \Delta SG\&A/Sales, RLBOYears, TermPremium) \quad (1)$$

With regard to control variables, the results show that valuation is not influenced by firm size, tangibles or leverage. Further, the delisting status of the firm post-RLBO is also not material to firm valuation at the RLBO.

Turning to the focus variables, a key finding is the negative and highly significant coefficients on *COGSSls* in all specifications implying that equity markets value restructuring which improves gross margin. This also reinforces the univariate analysis presented in Table 2. Also important is that the sign and magnitude of the coefficient is consistent with the alternative representation of *PSlsRatio* as a factor of profit margin. Similarly, I find that restructuring that reduces overhead expenses (Δ*SG&A/Sales*) improves post-RLBO equity values. The coefficients in Models 3 and 6 are negative and highly significant, with the expected sign.

Another key determinant of equity valuation is growth in sales (*Growth*), which is positive and highly significant in all regressions. It stands to reason that effective restructuring

[23] I note that Damodaran (2005) classifies *PSlsRatio* as an equity multiple, where price in the numerator can be represented as the product of profit margin, payout ratio, and the growth rate.

that results in sales growth that exceeds industry rivals should lead to higher market valuations. Similarly, coefficients for Δ*R&D/Sales* are economically and statistically significant in all models in which it is included with the expected positive sign. This finding reinforces those for *Growth*, and implies that restructuring which generates new investment opportunities improves equity valuation. In contrast, changes in capital expenditures (Δ*Capex/Sales*) have little explanatory power for *PSlsRatio*, as the coefficient is not statistically different from zero.

Theory predicts that equity held by insiders is positively related to stock valuation (see Jensen and Meckling, 1976). I employ changes in ownership concentration (Δ*Shares/Own*) to test this relationship. The coefficients on this variable are positive and significant in all models, and are consistent with Denis' (1994) case study of Kroger and Safeway, which shows that increased insider ownership and long-term debt by the latter leads to superior post-RLBO returns.[24]

Finally, additional evidence on the importance of cost structure is obtained, where the coefficient for Δ*SG&A/Sales* is negative and significant in Model 3. *Leverage*, which was insignificant in the first three specifications, is excluded in Models 4 to 6, and the results for the focus variables are qualitatively the same.

For robustness, I employ industry-adjusted *MktBook* as another proxy for firm valuation. In Panel B I report a similar set of regressions to explain *MktBook* at the RLBO. The results are qualitatively similar to those obtained from Panel A with minor exceptions. For example, among the focus variables, *COGSSls*, *Growth*, Δ*R&D/Sales,* and Δ*Shares/Own* are statistically significant with the expected sign, similar to results obtained earlier when *PSlsRatio* was the dependent variable. However, Δ*SG&A/Sales*, although negative, is no longer significant in Models 2 and 3 suggesting that shareholders place greater value on low overhead than creditors

[24] Safeway's LBO was engineered by KKR, while Kroger chose to remain publicly traded through a recapitalization.

do. In addition, the coefficients on Δ*Capex/Sales* are now significantly positive in Models 3 and 6 suggesting that increased capital expenditures improve firm value.

One concern is whether my results are impacted by endogeneity from firms self-selecting a reverse leveraged buyout. In order to control for this possibility, the Heckman (1978) self-selection model is applied. The first step Probit regression includes all firms with Compustat data, where the dependent variable (*Selflg*) is set to one for sample firms in the year of the LBO and zero otherwise. The choice of explanatory variables to predict leveraged buyouts included in equation (2) below are guided by the literature.

$$\text{Selflg} = f(\textit{Sales}, \textit{MktBook}, \textit{DivDummy}, \textit{R\&D/Sales}, \textit{Capex/Sales}, \textit{CashTA}, \textit{Leverage}, \textit{Turnover}, \textit{FCF/Sales}, \textit{PPETA}) \quad (2)$$

The Inverse Mills Ratio (*Mills*) from the first step becomes an extra independent variable in equation (1) and alleviates any omitted variable bias. The results suggest that my conclusions are not impacted by endogeneity.[25] Consistent with the findings reported previously, coefficients retain the same sign, magnitude, and comparable levels of statistical significance. I next perform the robustness check used on Table 2 on results reported in the regressions of Tables 5, and again the findings hold. All coefficients have the same sign and magnitude, and statistical significance is virtually unchanged from results reported previously.

In summary, the findings imply that restructuring that increases sales growth and improves gross margin consistently engender superior valuations. The evidence also shows that concentrated ownership and long-term debt resulting from the LBO translate into greater firm valuation. I interpret the results as showing that RLBOs lead to a capital investment policy that increases firm values after the firm is public again. In contrast, shareholders place greater importance on private period actions that reduce overhead expenses. Finally, consistent with the

[25] Not tabulated for conciseness.

results for sales growth, investments in research and development improve equity values following the RLBO.

2.4.3.2. The Ex-Ante Determinants of Private Period Duration

While prior research investigates the relationship between post-RLBO variables and the time of restructuring, the literature has yet to explore the role of ex-ante factors in determining private period duration.[26] In addition, the univariate analysis fails to account for the interrelatedness which may exist between variables. To control for these factors, Table 6, Panel A reports regressions using *RLBOYears* as the dependent variable. As *RLBOYears* is truncated at zero, a Tobit specification is employed to mitigate potential endogeneity.

I include as control variables *Assets*, a dummy variable if the firm went private in a management buyout (*MBO*), and the same yield curve proxy used previously (*TermPremium*). I also control for the impact of the Tax Reform Act of 1986 (*TRA86*) by creating a dummy that I interact with the tax (*TaxRatePre1987* and *TaxRatePost1986*) and free cash flow focus variables (*FCF/SalesPre1987* and *FCF/SalesPost1986*). Other pertinent ex-ante explanatory variables include *DivTA*, *CashTA*, *Sales/Employee*, *ROE*, *IntanTA*, *R&D/Sales*, *Capex/Sales*, and a variable proxying for a hot LBO market (*LBOCount*). All regressions are performed using industry-adjusted financial variables, which are defined in Appendix A. Several specifications of the function below are reported.

$$\begin{aligned} &\textit{RLBOYears} = \text{f}(\textit{Assets}, \textit{Leverage}, \textit{DivTA}, \textit{CashTA}, \textit{Sales/Employee}, \textit{ROE}, \\ &\textit{IntanTA}, \textit{R\&D/Sales}, \textit{Capex/Sales}, \textit{FCF/SalesPre1987}, \textit{FCF/SalesPost1986}, \\ &\textit{MBO, TaxRatePre1987}, \textit{TaxRatePost1986}, \textit{LBOCount}, \textit{TermPremium}) \\ &\text{Where f(.) > 0} \end{aligned} \tag{3}$$

[26] See the study by Cao (2011).

2.4.3.2.1. Tobit Regressions of Private Period Duration

First, I find that higher levels of long-term debt lead to a shorter private period, as *Leverage* is negative and statistically significant in all models. One possible explanation is that excessive long-term debt leads to less flexibility and funding to complete required restructuring. An alternative but not mutually exclusive explanation is that higher leverage imposes greater risk on undiversified firm insiders, which is reduced through a public offering. If the first explanation applies, then the private period should lengthen with liquidity, and the results for *CashTA* provide limited evidence of this, as the variable is positive and statistically significant in Model 5, but insignificant in Model 4.

Kaplan (1989b) shows that tax effects play an important role in leveraged buyouts, and the evidence presented so far suggests that marginal rates are higher than industry pre-LBO. However, *TRA86* was an external event which lowered rates for all firms, which Newbould, Chatfield, and Anderson (1992) show reduces tax preferences resulting from LBOs.

At the same time, other studies document that the effect of free cash flow in LBOs varies across time periods. In one example, Bharath and Dittmar (2010) find that free cash flow is a determinant of LBO probability in the 1980s, but not in subsequent years. Since *FCF/Sales* is calculated on an after-tax basis, an alternative interpretation is that Bharath and Dittmar (2010) are actually detecting the impact of *TRA86*.

I investigate this possibility through two interaction terms (*FCF/SalesPre1987* and *FCF/SalesPost1986*) to account for a differing relationship with the private period across eras. Both variables are included in Models 1 and 2, and *FCF/SalesPost1986* is negative and highly significant, while *FCF/SalesPre1987* is not statistically different from zero. A joint hypothesis rejects the null that the interaction terms are equal. Holding all other variables constant, these

results suggest that post-*TRA86* free cash flow leads to a shorter private period than the same level pre-1987.

Models 1 and 2 also include pre-LBO intangible assets (*IntanTA*) as an independent variable, and the coefficients are negative and highly significant. One explanation for why firms with more intangibles spend less time restructuring is that buyers overpay at the LBO, leading to a greater write-up of assets.[27] Paying an excessive price then reduces internal resources available to restructure leading to a shorter private period.

If firms invest in capital expenditures unwisely before the LBO, reduced cash flows post-buyout should lead to a shorter private period. The findings when pre-LBO *Capex/Sales* is included in the specification are consistent with this, as the coefficient is negative and highly significant. Overall, this suggests that overinvestment leads to a shorter restructuring.

Cao (2011) examines whether ex-post macroeconomic variables impact the private period.[28] However, no previous study has investigated whether ex-ante economic conditions are relevant to the length of the private period. I test for the impact of hot buyout markets by including the number of LBOs in a month as an explanatory variable (*LBOCount*), and for the term structure of interest rates (*TermPremium*).[29]

Both variables are included in Model 5, and the coefficient on *TermPremium* is negative and significant at the 5 percent level. This implies that a steep yield curve reduces the private period, suggesting that LBOs occurring during high interest rates have less financial slack to restructure. Turning to hot LBO markets, the coefficient on *LBOCount* is negative and highly

[27] The amount paid over the market value of the assets is classified as intangibles.
[28] Cao (2011) includes variables proxying for hot IPO markets and average underpricing.
[29] Following the literature (see Barclay and Smith, 1995 and Guedes and Opler, 1996) the term premium is defined as the difference between a long-term t-bond (10 year) and a short-term t-bill (3 month).

significant, suggesting that "quick flips" are more likely during periods of high buyout activity. The other explanatory variables are not consistent determinants of private period duration.

2.4.3.2.2. OLS Regressions of Private Period Duration

While a Tobit regression is employed in Panel A to account for a truncated dependent variable, a concern with this approach is the requirement for normally distributed data. To test the robustness of this assumption, I follow Cao (2011) and use ordinary least squares regression with the natural logarithm of one plus *RLBOYears* as dependent variable. The results using this approach are reported in Panel B.

First, all coefficients maintain the same sign as before. The explanatory power of long-term debt and the macroeconomic variables are qualitatively the same as that using Tobit. The finding that the relationship between the private period and free cash flow is impacted by *TRA86* is as strong using OLS. Overinvestment before the LBO still leads to a shorter private period using OLS. The other independent variables are not consistently significant.

2.4.3.3. The Determinants of Free Cash Flow

The decision to use long-term debt to exit public equity markets is a momentous change in a firm's financing. A leveraged buyout alters the capital structure by substituting debt for equity, and discontinuing public trading of the remaining stock. The evidence indicates that preceding the LBO free cash flow and capital expenditures are above competitive levels, while growth options are no better than industry. Free cash flow in and of itself is not necessarily terrible, as it indicates that current operations are profitable. However, Jensen's (1986) theory suggests that free cash flow in combination with limited growth opportunities and a lack of management discipline incentivizes overinvestment.[30]

[30] Stulz (1990) models the issue and obtains results consistent with Jensen's (1986) predictions.

Once restructuring is complete, post-RLBO improvements in *MktBook* imply that the firm is facing a better set of investment opportunities. Further, reduced capital expenditures in combination with above industry levels of free cash flow indicate that management discipline increases as a result of restructuring. Consequently, I contend that these factors lead to higher valuations at the RLBO. Based on the above, the determinants of free cash flow after the RLBO will be substantively different from those before the leveraged buyout.

In order to investigate this issue, I use multivariate analysis to study how these determinants change from LBO to RLBO. Table 5 presents results where the dependent variable is *FCF/Sales*. All firm fundamental variables are adjusted by industry medians. I estimate various configurations of the following model:

$$\textit{FCF/Sales} = \text{f}(\textit{Assets}, \textit{MktBook}, \textit{DivTA}, \textit{TaxRate}, \textit{Capex/Sales}, \textit{Leverage}, \textit{Sales/Employee}, \textit{TaxRatePre1987}, \textit{MBO}, \textit{Delist}) \quad (4)$$

If firms select positive NPV projects, capital expenditures should lead to higher future cash flows. I first test this relationship at the LBO in Model 1, and find that the coefficient for *Capex/Sales* is insignificant, an indication that management is investing funds in projects that do not increase firm value. If private period restructuring leads to wiser investment behavior, I expect a positive relationship *FCF/Sales* and *Capex/Sales* after the RLBO. To test this I include *Capex/Sales* a full year before the RLBO as an independent variable in Model 3. As per my prediction, the coefficient on this variable is positive and highly significant suggesting investments generate post-restructuring positive cash flows, which contrasts with the insignificant relationship pre-LBO. As security prices are based on discounted future cash flows, this provides additional evidence supporting the valuation results reported previously.

Public-to-private reverse leveraged buyouts are in essence second IPOs. Yet, we do not fully understand how they differ from first IPOs. If going private transactions brings greater alignment of interests between managers and shareholders, then private period decisions regarding investment policy should differ from first IPOs. One way to test this is to create a matched sample of controls based on size and industry. Following previous studies, firms whose initial public offering has occurred within the last five years are designated as IPOs (*IPO*), otherwise they are considered seasoned (*Seas*). In Model 4 I define interaction terms for each class of firms, and test for significant differences between groups using a chi-squared statistic. [31]

First, *Capex/Sales(RLBO)* is positive, highly significant, and qualitatively the same as reported in Model 3. While the coefficient for *Capex/Sales(Seas)* is comparable to that for RLBOs, *Capex/Sales (IPO)* is negative and highly significant. Joint hypothesis tests reject the null that the three interaction variables are equal. This finding implies that going private transactions combined with highly concentrated ownership results in disciplined managerial decision-making with resources put to more efficient uses compared to first IPOs. This also provides a potential explanation for IPO long-run return underperformance, as stock returns are impacted by market expectations for a firm's future cash flows.[32]

While long-term debt obligations are one approach to control excess funds, dividend payments are an alternative mechanism to return cash to shareholders. However, the evidence in Model 1 suggests that pre-LBO management is not taking advantage of either approach, as I find that coefficients for *DivTA* and *Leverage* are not statistically different from zero. In contrast, the evidence in Model 3 suggests that post-RLBO dividend policy disburses excess cash to shareholders as *DivTA* is negative and highly significant.

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[31] Interactions terms for control firms are designated RLBO-1 when the variable is one year earlier than *FCF/Sales*.
[32] The articles by Ritter (1991) and Loughran and Ritter (1995) are examples.

If one outcome of restructuring is growth that leads to higher post-RLBO valuations, then a similar relationship should exist between growth and firm cash flows. As *MktBook* proxies for future investment opportunities, I include it as an explanatory variable in Models 1 and 3. While the coefficient does not differ statistically from zero in Model 1, it is positive and highly significant in Model 3. This provides additional evidence that restructuring that creates growth engenders higher post-RLBO valuations.

The evidence so far indicates that tax benefits encourage LBOs. I test this further by including *TaxRate* in Model 1, and the coefficient is positive and significant at the 10 percent level. However, as marginal tax rates are reduced by *TRA86*, I interact a dummy variable that is set to one for the pre-1987 years with *TaxRate* (*TaxRatePre1987*). The coefficient is negative, larger in magnitude than for *TaxRate*, and highly significant. A test for equality between the two variables finds that they differ at the 1 percent level, which suggests that the higher marginal tax rates before *TRA86* reduces free cash flow. This provides additional evidence that Bharath and Dittmar's (2011) finding that free cash flow spurred leveraged buyout transactions only before 1990 may actually be an artifact of higher marginal rates existing before *TRA86*.

Finally, the variable *log*(*Assets*) is positive and significant in Models 1 and 3, implying that larger firms generate above industry free cash flow. While at the LBO, employee productivity (*Sales/Employee*) increases free cash flow, as the coefficient is significant at 5 percent in Model 1.

I test the robustness of my pre-LBO findings by again applying the Heckman (1978) procedure, where equation (2) is employed in a first step Probit regression. The results presented in Model 2 suggest that the conclusions from the first specification are not an artifact of endogeneity. Coefficients retain the same sign, magnitude, and comparable levels of statistical

significance. I also test whether my post-RLBO results are robust to self-selection by expanding the sample in Model 4, and coefficients retain the same sign and significance. I then perform the robustness check used on Table 2 on results reported in the regressions of Tables 7, and the coefficients are qualitatively similar to those reported previously.

2.4.3.5. The Determinants of RLBO Long-run Independence

Why do RLBO firms experience such a high attrition rate after they return to public trading? Similar to prior studies, over 30 percent of this sample is delisted within five years of the RLBO.[33] Yet takeovers are not necessarily bad, as it is well documented that target shareholders earn substantial premiums at acquisition.[34] However, the literature has yet to achieve consensus on explaining the high percentage of post-RLBO takeovers.

If restructuring implements effective internal discipline, then external governance from the market for corporate control will not be necessary. The evidence so far suggests that effective restructuring requires a private period of sufficient duration. In order to determine if the private period impacts post-RLBO attrition, I group the sample by quartiles of time from LBO to RLBO. Consistent with this argument, firms in the quartile with the shortest private period have the highest attrition rate, while over 78 percent of the firms in quartile 2 are still publicly traded after five years. Yet there are also signs that takeover rate increases again at the longest private period durations.

To gain additional insights into the motivations behind post-RLBO takeovers, Table 8 presents several Logit regressions, where the dependent variable is set to one if a firm is publicly traded five years after the RLBO (*SurviveFlag*), otherwise it is zero. Explanatory variables test for relationships with growth opportunities, management discipline, capital structure,

[33] See the studies by Kaplan (1991), Mian and Rosenfield (1993), and Holthausen and Larcker (1996).
[34] Healy, Palepu, and Rubak (1992) report takeover premiums earned by target shareholders.

profitability, taxes, and cost structure. All firm fundamentals are industry-adjusted. As long-term debt is still a major source of financing post-offering, I include *TermPremium* to account for the possible impact of interest rates. Several configurations of the following model are used in the analysis, where all variables are defined in Appendix A.

$$\begin{aligned} \textit{Surviveflag} = f(&\textit{RLBOYears}, \textit{RLBOYearsSq}, \textit{MktBook}, \textit{Leverage}, \textit{ROA}, \textit{DivTA}, \\ &\textit{PPETA}, \textit{Sales/Employee}, \textit{SG\&A/Sales}, \textit{Capex/Sales}, \textit{R\&D/Sales}, \textit{LBO Count}, \\ &\textit{FCF/Sales}, \textit{Assets}, \textit{TermPremium}) \end{aligned} \tag{5}$$

The results provide additional evidence on the role played by private period duration, as coefficients for *RLBOYears* are positive, large in magnitude, and significant in all specifications. At the same time, a quadratic term (*RLBOYearsSq*) is negative and significant in five regressions. A quadratic function suggests that the relationship between restructuring length and post-offering success is more complicated than previously thought for public-to-private RLBOs. I also note that hot LBO markets also play a role in post-RLBO status, as *LBOCount* is positive and significant in Model 6.

I obtain additional evidence that restructuring which generates new growth leads to post-RLBO success, as *MktBook* is positive and statistically significant in all models. In contrast, above industry employee productivity (*Sales/Employee*) increases the likelihood of delisting, where the coefficient in Model 5 is negative and significant at 5 percent. This implies that aggressive downsizing leading to excessive personnel reductions leaves the firm vulnerable to the market for corporate control post-RLBO.

The results here provide additional support for the importance of taxes. Models 4 and 6 include *TaxRate* as an independent variable, and the coefficient is positive, large in magnitude, and significant in both specifications. This suggests that five year independence is positively

correlated with taxes, where one possible explanation is that low marginal rates attract potential suitors in the takeover market. None of the other explanatory variables are significant at conventional levels.

2.5. Conclusions

This essay sheds light on private period restructuring undertaken by public-to-private RLBOs. The analysis examines profitability, valuation, financial and operating restructuring, and cost structure during the private period. In contrast to the prior literature which relies on comingled samples, I compile a comprehensive sample of public-to-private RLBOs for the period 1978 to 2006. Using only public-to-private transactions enables comparing firm fundamentals from before and after the private period to discern restructuring activities taking place. This analysis is supplemented with data obtained from the private period.

The findings lead to several conclusions. First, free cash flow and capital expenditures are above industry pre-LBO, while growth options are at competitive levels. As these firms also have a below industry ownership concentration, this suggests that overinvestment exists. Second, increased leverage from the LBO leads to significant declines in free cash flow and capital expenditures during restructuring, while ownership concentration increases. These factors lead to reduced agency costs.

Third, after the RLBO employee productivity, gross margin, free cash flow, and growth options increase as leverage decreases, while capital expenditures continue at industry norms. These findings imply that RLBOs retain the benefits of restructuring once they return to public ownership.

Fourth, post-RLBO valuations are positively impacted by improved growth and reduced cost structure. While firm valuation benefits from concentrated ownership, equity values increase

with reduced overhead and increased investments in research and development. Overall, the evidence suggests that leveraged buyouts motivate management to act in the shareholder interests.

Fifth, firms are subject to marginal tax rates before the LBO that are greater than industry while high levels of long-term debt post-LBO lead to dramatic reductions in income taxes post-RLBO.

Sixth, the findings show that the private period is negatively correlated with leverage, intangible assets, and employee productivity. The evidence suggests that firms spend less time restructuring when the term structure of interest rates is steep, and during active leveraged buyout markets. In contrast, firms that pay out excess cash as dividends remain private longer.

Seventh, evidence helps explain the high post-RLBO attrition rate documented in the literature. Firms which develop new growth opportunities during restructuring have a higher probability of long-run independence post-RLBO, while a reverse relationship exists for excessive personnel reductions. I also find that active leveraged buyout markets and high marginal tax rates reduce post-RLBO takeover probability. Finally, the results suggest that the relationship between private period duration and the probability of remaining independent post-RLBO is nonlinear. Robustness checks ensure that results are not impacted by endogeneity or impacted by outliers.

Chapter 3: Determinants of Long-run Stock Price Performance Following Reverse Leveraged Buyouts

3.1. Introduction

Re-emergence of a once public corporation back into the public arena is an important landmark in the life of that enterprise. Reverse leveraged buyouts (RLBOs) are such transactions by which companies re-emerge into public existence. Recently, RLBOs have received increased attention from researchers due to their significant growth as a percentage of the U.S. buyout industry. Given the fundamental nature of these transactions, namely going public, it is logical to draw comparisons between initial public offerings (IPOs) and RLBOs that are typically second or subsequent, IPOs.

While a substantial body of research has accumulated on IPOs over the past few decades, in comparison, research on RLBOs still leaves much to be learned. Cao and Lerner (2009) document important facets of stock returns for highly levered first IPOs and equity carve outs, but not necessarily what I call *pure* RLBOs (namely, of firms that were once public), as their sample consists primarily of private-to-private and division-to-private RLBOs. The RLBO sample used in this analysis consists exclusively of public-to-private RLBOs that enables a unique opportunity to shed light on some intriguing, yet unaddressed, questions related to these increasingly important transactions.

This study compares the performance of first IPOs with RLBOs, which are typically second IPOs. Motivated by some of the determinants of post-IPO stock price performance and some factors unique to RLBOs, I provide evidence on the determinants of post-RLBO stock price performance. What makes this study interesting is that some of these factors are idiosyncratic to RLBOs, such as, the difference in the degree of information asymmetry between

the first IPO and RLBO, the type of restructurings that are typically executed during the private period (the period between LBO and RLBO) leading to improvements in some key performance metrics, the duration of the private period, and the high levels of long-term debt at the offering.

How do stock returns of public-to-private RLBOs perform relative to first IPOs and seasoned equity offerings (SEOs)? Loughran and Ritter's (1995) study shows that over a five year window IPOs and SEOs underperform relative to various benchmarks. On the surface, as RLBOs are second IPOs, it is reasonable to expect stock performance similar to results obtained by Loughran and Ritter (1995).

However, the findings in Chapter 2 demonstrate that private period restructuring which engenders sales growth and reduces cost structure leads to superior equity valuations post-RLBO. As stock value defines the market's expectations, stock returns are the realization of those projections based on actual firm performance. Chapter 3 investigates whether private period restructuring leads to stock performance superior to that of first IPOs and seasoned firms within the same industry.

When a firm offers stock to the public, the transaction is typically handled by an underwriter (investment banks such as J. P. Morgan and Credit Suisse handle these offerings) irrespective of whether it is an IPO, SEO, or RLBO. Prior research documents the certification role played by underwriters in IPOs, and shows that transactions handled by prestigious investment banks earn superior long-run stock returns.[35] Even if RLBO stock returns typically outperform those of IPOs, underwriter prestige may still be important if the firm was previously exchange listed. I investigate the role of underwriter certification in the long-run returns of RLBO firms.

[35] Carter, Dark, and Singh (1998) examine the relationship between underwriter reputation and stock returns for IPOs.

The results in Chapter 2 demonstrate that equity values at the offering are related to changes in fundamentals from LBO to RLBO. Market efficiency suggests that as returns are the realization of expectations, these same variables should influence post-RLBO stock performance. Therefore, I investigate whether long-run stock returns are determined by changes taking place from LBO to RLBO. These results are then compared to the same variables in the post-RLBO years to determine which is more relevant to post-event stock performance.

Several studies investigate how corporate governance determines post-IPO long-run stock returns. Examples in the literature include the role of venture capitalists, the composition of the board of directors, and ownership concentration (see Brav and Gompers, 1997, Morck, Shleifer, and Vishny, 1988, McConnell and Servaes, 1990, Klein, 1998, and Klein, 2002). Yet, research into the same governance variables for public-to-private RLBOs remains unexplored.

While prior articles scrutinize various aspects of board composition and their impact on equity returns, research into board committees is rare. Yet much of the real work in any board is performed by the executive committee. The executive committee is particularly interesting due to its power, the fact that it is still unregulated, and the absence of prior research on it. I therefore, examine how the existence of this committee impacts post-RLBO stock returns.

I find that public-to-private RLBOs earn superior long-run stock returns compared to IPOs, seasoned firms, or industry medians. However, when the benchmark is control firms matched on size and industry, abnormal returns are insignificant. This evidence suggests that superior stock performance is due to within industry firm characteristics such as size and growth opportunities. Little evidence is found of systemic market mispricing. Further, the positive abnormal returns peak at 36 months and wane thereafter. A battery of robustness checks ensures the validity of the results.

Second, sales growth from private period restructuring engenders positive stock returns after the RLBO. The growth in sales continues to be important post-RLBO. Improvements in sales during the two years after the RLBO lead to higher stock returns over the subsequent 24 months. Further evidence on the benefits of private period restructuring is the significant relationship between improved return on assets and post-RLBO stock performance. Growth in *ROA* post-RLBO also continues to be important to stock returns in the future years.

Third, restructuring disciplines managers to use firm resources for stockholder value creation, as increases in capital expenditures from LBO to RLBO lead to positive returns after the offering. The benefit of capital investments continues to bear fruit into the future years, as positive changes in capital expenditures during the 24 months after the RLBO lead to positive stock returns in the third and fourth year following the RLBO. In contrast, I find that higher than industry capital expenditures at the RLBO lower future stock returns over the next three years. This suggests that equity markets respond positively to higher capital expenditures only when the firm capital expenditure was below the industry norm.

Fourth, cost structure is important to stock returns after the RLBO. I find that a better than industry gross margin at the RLBO leads to higher stock returns over the next 12 months. Further, improvements in the same variable over the two-year period after the RLBO, lead to higher stock returns in years three and four. Lower overhead expenses at the RLBO have a similar beneficial effect on stock performance in the following year.

Fifth, examining the role of corporate governance in post-RLBO stock price performance indicates that executive committees are a sign of entrenchment. Firms with corporate boards that include an executive committee earn negative abnormal returns in the first year after the RLBO.

Additional evidence of entrenchment is that ownership concentration exceeding the industry norm at the time of the RLBO leads to negative stock returns during the next 36 months.

Sixth, while I find that RLBOs typically employ higher quality underwriters compared to IPOs, prestige investment banks still engender positive abnormal long-run stock returns. This relationship is robust to a variety of methodologies including buy-and-hold returns, the regressions of Carter, Dark, and Singh (1998), and the Carhart (1997) four factor model. The evidence also suggests that positive abnormal returns accruing from underwriter selection peak during the first 36 months after the offering, and decline thereafter.

3.2. Literature Background

This section presents the extant literature relevant to RLBO stock performance, IPO returns, insider ownership, and board committees. I begin with studies investigating first day underpricing of RLBOs and IPOs. Next, research into the long-run underperformance of IPOs is discussed, followed by a review of comparable studies of RLBOs. The relationship between underwriter quality and IPO stock performance is the next topic, followed by a summary of the extant literature on ownership structure. I conclude with a discussion of board committees.

Similar to RLBO studies using firm fundamentals, research into post-event stock performance uses samples that are largely private-to-private and division-to-private RLBOs. As these firms were not publicly traded before the LBO, their results cannot be generalized to the stock performance of public-to-private RLBOs.

3.2.1. IPO and RLBO First Day Performance

Rock's (1986) model for IPO underpricing, is predicated on asymmetric information between the investors and insiders. Benveniste and Spindt (1989) also model the new issue process, and show that abnormal first day returns are compensation to investors for revealing

their level of interest in the offer during the marketing process. In a related study, Welch (1989) theorizes that underpricing of high-quality firms create signaling costs inducing low-quality firms to reveal their true status, and permits the former to obtain higher prices for seasoned offerings.

Field and Sheehan (2004) study underpricing and its relationship to post-IPO ownership structure, and find that firms typically have outside blockholders at the offering, and that these holdings remain post-IPO. Field and Sheehan (2004) detect no relationship between underpricing and outside ownership, which conflicts with Booth and Chua's (1996) findings that post-IPO firms have a dispersed ownership structure.

The literature also includes several excellent surveys of IPO studies, including Ibbotson, Sindelar, and Ritter (1994), Ritter (1998), and Ritter and Welch (2002). Understanding abnormal first day returns is important due to an inverse relationship with long-run performance.

Ainina and Mohan (1991) examine first day returns of RLBOs hypothesizing that there is less uncertainty, and thereby a lower market discount compared to IPOs. Their findings are consistent with this contention. Similarly, Hogan, Kish, and Olson (2001) observe a mean excess first day return of 7.64 percent, which is lower than that earned by original IPOs.

3.2.2. IPO Long-Run Underperformance

Ritter (1991) establishes that there is an inverse relationship between first day underpricing and long-run stock returns. Loughran and Ritter (1995) study long-run stock returns of both IPOs and SEOs, and detect similar trends in issuing activity. Further, their findings are consistent with Ritter (1991), as both IPOs and SEOs underperform against a matched set of control firms. They interpret these results as indicating that firms take advantage of windows of opportunity when issuing new equity.

The role of venture-backing in IPOs is the topic examined by Brav and Gompers (1997). Their results are show that venture capital leads to superior performance using an equal-weighted index, but value-weighting leads to similar returns across groups. The sensitivity of findings to the benchmark used is also raised by Ritter and Welch (2002) in their survey of the literature on IPO long-run underperformance in the U.S.

The relationship between institutional ownership and post-IPO stock returns is investigated by Field and Lowry (2005), where they find that outside blockholders positively impact long-run stock returns. Field and Lowry's (2005) findings suggest that in the months immediately after the IPO, institutions can consistently identify firms with superior stock returns, while at longer horizons their advantage lies in the ability to avoid poor performers. As public-to-private RLBOs were previously listed, I expect less information asymmetry associated with RLBOs compared to IPOs. Datta, Iskandar-Datta and Patel (1997) examine initial-day and aftermarket price performance for debt IPOs. They argue that information asymmetry between investors and insiders is important in explaining the debt IPO price performance vis-à-vis that for equity IPOs.

3.2.3. RLBO Long-term Stock Performance

Do RLBOs suffer the same long-run underperformance that is characteristic of first IPOs?[36] Mian and Rosenfield (1993) investigate post-RLBO three-year stock returns, and obtain positive and significant results. In a more recent study, Cao and Lerner (2009) examine long-run stock performance after the RLBO, and obtain results superior to IPOs. They also find that positive returns are concentrated in transactions clustered during 1981 to 1995. In a follow-up article, Cao's (2011) results show that post-RLBO 36 month abnormal returns are negatively related to firm size, and positively related with buyout sponsor capital. By focusing on public-to-

[36] See Ritter (1991) and Loughran and Ritter (1995).

private RLBOs, I am able to investigate the role private period restructurings on future stock performance, and thereby extend previous work in the area.

3.2.4. IPOs and Underwriter Reputation

Carter and Manaster (1990) model the relationship between underwriter reputation and IPO underpricing, and similar to Rock (1986) they find that informed investor capital and IPO riskiness is positively related to first day returns. Their insight is that leaving money on the table is costly, which firms can avoid by signaling their quality to the market through underwriters with greater prestige. Empirical tests using a method they develop for rating underwriter prestige supports their predictions. Carter, Dark, and Singh (1998) provide additional evidence supporting Carter and Manaster (1990), by testing three alternative measures of underwriter reputation with first day and long-run returns. Carter, Dark, and Singh (1998) find that the Carter and Master (1990) method has a higher correlation with post-IPO stock performance than two other proxies, and a positive relationship exists with long-run returns.

3.2.5. Insider Ownership

Jensen and Meckling (1976) model the separation of ownership and control and the resulting impact on agency costs. Their study predicts that agency costs of equity (debt) increase (decrease) as insider ownership decreases, and by minimizing the sum of the two, determines an optimal capital structure. This article is particularly pertinent to RLBOs as Chapter 2 shows that long-term debt declines after the private period. If insider ownership also decreases post-RLBO, then Jensen and Meckling (1976) predict that the agency costs of equity will increase.

Morck, Shleifer, and Vishny (1988) study the relationship between management ownership and market values using a piecewise linear specification. Their findings suggest that management ownership has an initial positive relationship with value, which then becomes

negative, and finally turns positive again. Their results suggest that Jensen and Meckling's (1976) convergence-of-interests dominates first, followed by entrenchment that declines once ownership exceeds 25 percent.

McConnell and Servaes (1990) extend research into equity ownership and valuation using a nonlinear specification, and obtain a positive (negative) linear (quadratic) coefficient. Overall, their results are qualitatively similar to Morck, Shleifer, and Vishny (1988), where insider ownership determines firm value. Harjoto and Garen (2005) investigate this relationship for first IPOs and find that firm value declines with insider ownership.

3.2.6. Board Committees

Committees of the board of directors have received increased attention by regulators after a series of accounting scandals that led to the passage of SOX.[37] The audit committee received the greatest scrutiny, with current exchange rules requiring at least three directors that are all independent. While regulators have devoted a great deal of time and attention to board committees, the same is not true for finance researchers.

In the two studies to investigate committees, Klein (1998) finds no evidence that firm performance is positively correlated with a completely independent audit committee. In contrast, Klein's (2002) study did find evidence that audit committees where a majority of directors are independent have significantly less abnormal accruals. However, it is important to note that the one powerful committee receiving no attention from either regulators or financial economists is the executive committee.

3.3. Testable Hypotheses

While there is a large literature on the long-run stock performance of IPOs, we have only begun to increase our understanding of reverse leveraged buyouts. As those studies concentrate

[37] The two best known examples are Enron and Worldcom, which occurred in 2001.

on private-to-private and division-to-private transactions, a gap in the literature exists on the differences between public-to-private RLBOs and IPOs.

One characteristic that distinguishes RLBOs from IPOs is their high leverage at the offering. Cao and Lerner (2009) report a post-RLBO mean debt-to-assets of 30.7 percent. In addition, I find that public-to-private RLBOs are even more highly levered with a mean debt-to-assets of 41.8 percent.

Another distinguishing trait of RLBOs is their size. A comparison of studies on IPOs with my findings shows that RLBOs are composed of more assets and employ more people post-offering. Last but not the least, since public-to-private RLBOs were previously listed, they are more mature and subject to less information asymmetry than IPOs. These differences suggest that findings for IPOs and other RLBOs cannot be generalized to public-to-private transactions.

As discussed earlier, IPO stock returns are characterized by initial underpricing followed by long-run underperformance.[38] Ritter (1991) establishes that there is an inverse relationship between first day underpricing and long-run stock returns. Cao and Lerner (2009) find that underpricing exists for both RLBOs and IPOs, as they report first-day RLBO returns of 12.9 percent compared to 22.2 percent for IPOs. They also show that 36 and 60 month returns for their sample of private-to-private and division-to-private RLBOs are superior to those obtained for IPOs.

However, the RLBOs in their sample are not publicly traded before the LBO. In contrast, public-to-private RLBOs are in effect second IPOs, and were once publicly traded. I argue that one outcome of public-to-private RLBOs is lower information asymmetry between issuers and outsiders. Hence, I expect less underpricing (or more accurate valuation) of RLBOs vis-à-vis IPOs. This leads me to propose the following:

[38] See Ibbotson, Sindelar, and Ritter (1994), Brav and Gompers (1997), and Ritter (1998)

H1: Long-run stock price performance of RLBOs in the aftermarket will be superior to that of IPOs.

The results presented in Chapter 2 demonstrate that private period restructuring that accelerates growth leads to superior valuations at the RLBO. However, equity values represent market estimations of the discounted value of future cash flows, which are made up of capital gains and dividends. Stock returns represent the realization of these expectations in the form of dividends paid and actual price changes. If equity markets are efficient, then those private period factors that determine valuation at the RLBO should be as important to stock returns after the offering.

The analysis in Chapter 2 suggests that improved future growth opportunities will contribute to superior stock performance following the RLBO. These growth options manifest themselves as increased future cash flows and positive long-run returns. If restructuring that improves future investment opportunities is the key to success, then post-RLBO sales growth should also be correlated to stock performance in the ensuing years.

At the same time, Chapter 2 findings show that firm fundamentals at the RLBO are important to current valuations. Higher gross margins and lower overhead expenses engender superior valuations. Market efficiency implies that the relationship between firm fundamentals at the RLBO and realized stock returns will be similar. These arguments lead to the following hypotheses:

H2A: Sales improvement during the private period and after the offering is positively related to future long-run RLBO stock returns.

H2B: Reduction in the cost structure during the private period and after the offering engenders superior post-RLBO stock performance.

Studies by Morck, Shleifer, and Vishny (1988) and McConnell and Servaes (1990) show that insider ownership that entrenches management reduces firm value. However, entrenchment can occur for various reasons. One governance mechanism designed to oversee management and protect outside shareholders is the board of directors. Subversion of the oversight function of the board by insiders will result in entrenchment and value destructing behavior. Prior studies have investigated various ways that insiders can compromise the governance responsibility of the board of directors. Those articles examined various aspects of board composition including classification, the CEO serving as chair (CEO duality), and the number of directors.[39]

In contrast, the relationship between board committees and entrenchment has received limited attention from finance researchers in spite of increased scrutiny by regulators and the exchanges. This enhanced oversight has manifested itself in rules concerning the size and independence of the audit, compensation, and nominating committees. Yet, little attention has been paid to the executive committee in spite of the important role it plays. As a result, it remains untouched by the post-SOX regulations impacting other board functions. The role of the executive committee can best be illustrated by the quote below from the Bucyrus International 2005 proxy statement.[40]

"The Company's Executive Committee is comprised of Messrs. Chu (Chairman), Weidman and Jenkins. The Executive Committee is responsible for exercising all of the powers of the Board of Directors during intervals between meetings, except for those powers delegated to other committees of the Board of Directors and powers that may not be delegated to a committee of the Board of Directors under Delaware law."

In examining the function of the executive committee, it provides an avenue by which firm insiders can subvert board functions between meetings and operate outside of the

[39] Jensen (1993) and Yermack (1996) are examples of investigations into board size, while Brickley, Coles, and Jarrell (1997) study CEO duality. Board classification is the focus to Faleye's (2007) study..

[40] A good example illustrating the operation of the executive committee is found in the 2010 Wal-Mart proxy statement. In this case, the executive committee acted 16 times by written unanimous consent in fiscal 2009. Additionally, a review of committee members shows it is comprised exclusively of firm insiders.

mechanisms intended to protect the shareholders. As such, executive committees enhance the inherent conflicts of interest that exist between firm stakeholders. If executive committees protect firm insiders at the expense of outside shareholders, I argue that an efficient market will impound its existence into equity prices. The above arguments lead me to propose the following hypothesis:

H3: Long-run stock price performance of RLBO firms that have a board executive committee will be inferior to those RLBO firms that do not.

Carter, Dark, and Singh (1998), show that underwriter quality is negatively related to underpricing and positively associated with long-run stock performance. Both Carter and Manaster (1990) and Carter, Dark, and Singh (1998) argue that investment banks fulfill a certification role, where investors view offerings as superior when they are sponsored by more reputable underwriters. Based on previous research on the importance of underwriter certification on post-IPO stock price performance, I propose the following hypothesis for post-RLBO stock price performance:

H4: Underwriter quality is positively related to post-offering long-run stock returns of public-to-private RLBOs.

3.4. Sample Construction Process and Data Sources

3.4.1. Data Sources

While the sample of RLBOs is drawn from the 208 firms used in Chapter 2, additional data is required to test the hypotheses of this section. The Securities Data Company's (SDC) New Issues database provides information on the offering, including primary shares, secondary shares, and underwriters. Underwriter rankings and firm ages are obtained from Jay Ritter's website.[41]

[41] http://bear.warrington.ufl.edu/ritter/ipodata.htm

The first annual proxy statement (Form DEF14A) submitted after the private period to the Securities and Exchange Commission (SEC) is examined to obtain the required governance data. This information includes shares outstanding, ownership structure, board composition and committees, CEO tenure, and those firms claiming the "controlled firm exemption".

Since the sample spans the years 1978 to 2006, one resource is not sufficient to obtain the required forms. First, I use the Security and Exchange Commission's EDGAR system and the Mergent Online database to obtain proxy statements from 1996 to 2006. Next, three sources are used to obtain the remaining filings not available in EDGAR. Lexis/Nexis and Thompson Research contain proxy statements back to 1986. Filings not available online are then obtained through microfiche maintained by Q-Data Corp.

In one instance a firm is delisted so soon after the RLBO (Spectramed, Inc.) that a proxy statement is never submitted to the SEC. Therefore, the final sample size for tests conducted in Chapter 3 is 207 firms. Further, in some instances information not available in proxy statements is obtained from the annual 10-K filing, the prospectus, or the S-1 registration statement. Firm fundamentals are those used in Chapter 2, while equity returns are obtained from the Center for Research in Security Prices (CRSP) monthly files.

Five benchmarks are used to compute abnormal stock returns. First, a list of IPOs from 1978 to 2006 is obtained from Jay Ritter's website after excluding RLBOs from this sample as well as those used in Cao and Lerner (2009). I then calculate industry median monthly returns. Next, I compile a set of industry returns for seasoned firms based on the 2-digit SIC code by excluding RLBOs and IPOs from the CRSP monthly file.[42] Industry medians based on 2-digit SIC code are also computed using the combined IPO and seasoned firm lists.

[42] IPO returns are computed from non-RLBO firms within five years of a public offering.

Fourth, I create a sample of control firms using a selection procedure that minimizes the absolute difference between the assets of RLBOs and candidate control firms within the same 2-digit SIC code, and with proxy data available. If a match cannot be found from the initial candidates, the steps are repeated using a 1-digit SIC code. Using this process I obtain matches for the entire sample. Finally, abnormal returns are computed using the CRSP value-weighted index in testing underwriter certification.[43]

I then examine both sets of annual proxies and construct a subsample with more than one class of stock, and at least one has preferential voting rights owned exclusively by insiders.[44] Ownership percentages are calculated based on control and cash flow rights for both RLBOs and the matching firms.

Ownership percentages are hand calculated following the procedures recommended by Dlugosz, Fahlenbrach, Gompers, and Metrick (2006), which reduces the likelihood of the errors found in the Compact Disclosure database. As an example, if private equity firms have multiple board representatives, each director often beneficially owns redundant shares. I scrutinize the footnotes to avoid redundantly counting the same shares. The results using the cash flow percentages are qualitatively the same as those for the control shares and are not reported for conciseness. Appendix B contains a list of all databases used in the empirical work of Chapter 3.

3.5. Methodology

3.5.1. Long-run Stock Returns

Barber and Lyon (1997) recommend using buy-and-hold returns over cumulative abnormal returns at longer horizons. However, follow-up research has raised concerns over test statistics based on their approach. Cowan and Sergeant (2001) shows that buy-and-hold returns are highly

[43] This provides comparability with results reported by Carter, Dark, and Singh (1998).
[44] A typical example is where one share of privileged equity has voting rights equivalent to five shares of publicly traded stock.

non-normal due to skewness and kurtosis that increases with the time horizon.[45] Their empirical tests suggest that both are ameliorated by winsorizing at the third standard deviation, and I follow that process in this analysis.

A second concern with buy-and-hold returns is that they are constructed in event time, and suffer from cross-sectional correlation. This occurs due to market forces impacting all stocks at the same time, where the number of firms with overlapping months increases with the horizon. Test statistics that do no control for this issue may result in incorrect inferences. Cowan and Sergeant (2001) recommend using test statistics based on unpaired group differences to reduce the impact of cross-sectional correlation. One advantage to their approach is that it can be applied to medians as well as means. Therefore, I report both paired and unpaired statistics employing both means and medians.

An alternative approach to cross-sectional correlation is to employ a calendar time methodology. As a robustness check, I follow Brav and Gompers (1997) and compute mean calendar month returns for the RLBOs, the benchmarks, and the difference between the two. This typically creates a file of 270 time series observations, with each record containing the average returns for that date, which I input into a Carhart (1997) four factor model.[46] The sign and significance of the intercept indicates whether there are abnormal returns.

3.5.2. Univariate Tests

In examining stock returns by category such as underwriter rankings, sample firms are grouped by the critical values of the focus variables. I test for significant differences across group means (medians) using t-statistics (the Wilcoxon signed rank test). When employing the

[45] Buy-and-hold returns computed for both RLBOs and control firms have a skewness and kurtosis that is qualitatively similar to those found by Cowan and Sergeant (2001).
[46] Brav and Gompers (1997) used the Fama and French (1993) three factor model.

Carhart (1997) approach, the dependent variable is the difference in mean monthly returns between the groups.

3.5.3 Multivariate Tests

Multivariate tests of underwriter certification duplicate the regressions of Carter, Dark, and Singh (1998) using a value-weighted index. Following Barber and Lyon (1997), I also compute abnormal returns using control firms, IPO medians, seasoned firm medians, and industry medians. As the cross-sectional variation of RLBO underwriter rankings is lower than for IPOs, the focus variable is a dummy set to one if the Carter and Manaster (1990) value is at least 9.0.

Regressions test for the determinants of industry-adjusted buy-and-hold returns at 12 and 36 month intervals. One set of regressions employ fundamentals at the RLBO. Additional specifications investigate changes in fundamentals from LBO to RLBO and from RLBO to two years later.

3.6. Results

3.6.1. Long-run Stock Returns of RLBO Firms

3.6.1.1. Long-run Buy-and-hold Stock Returns of RLBO Firms

Table 9 presents the long-run stock returns of public-to-private RLBOs. Panel A summarizes buy-and-hold returns for 12, 36, and 60 months, while Panel B reports an analysis over 13 to 36, 37 to 60, and 13 to 60 months. Results using Carhart's (1997) model based on calendar time returns are reported in Panels C and D. In each panel, the first row reports raw unadjusted returns (*Raw Returns*). Subsequent rows test returns adjusted by IPO medians (*IPO Adjusted*), seasoned firm medians (*Seasoned Firm Adjusted*), industry medians (*Industry-Adjusted*), and control firms (*Control Firm Adjusted*).[47, 48]

[47] Seasoned industry results are calculated using the 2-digit SIC code medians.
[48] Firms are selected based on 2-digit SIC codes where possible, otherwise by using 1-digit SIC codes

Mean and medians are reported along with tests of significance based on parametric t-statistics and the Wilcoxon Signed Rank test. Test statistics in parentheses are computed using firm level paired means and medians, while unpaired group differences between RLBOs and the benchmarks are reported in brackets. The analysis focuses on medians in order to ameliorate the impact of outliers.

In Panel A of Table 9, raw cumulative long-run stock returns are positive and statistically significant at better than 1 percent at all horizons. Panel B results show that returns are positive and highly significant from 13 to 36 months. Yet, the evidence indicates that stock performance declines over the last 24 months, as median returns during months 37 to 60 are not statistically different from zero. This suggests that RLBOs suffer declining stock performance approximately three years after the returning to public trading.

The evidence in Table 9 supports Hypothesis H1, as *IPO Adjusted* returns are positive, economically substantive, and highly significant at all horizons using both paired and unpaired statistics. Similar to *Raw Returns*, there is evidence of a decline from 37 to 60 months.

Next, I compute *Seasoned Firm Adjusted* returns, and the results in Panel A are positive and significant at better than 1 percent at all horizons. As before, a pattern of declining stock performance over 37 to 60 months is observed. I also note that *Industry-Adjusted* returns are qualitatively the same as when they are *Seasoned Firm Adjusted*. Overall, contrary to the findings for IPOs, stocks for public-to-private RLBOs outperform their industry counterparts.

Finally, I report in Panel A that *Control Firm Adjusted* cumulative returns are small in magnitude and not statistically different from zero irrespective of the horizon. Additionally, the 13 to 36 month returns in Panel B are insignificant, while those over the last 24 months are negative and significant at the 5 percent level. Overall, I find little evidence that RLBO stock

returns suffer from market mispricing. Instead, these results in combination with those of Chapter 2 imply that after restructuring, above industry characteristics such a growth options and size lead to superior stock performance. These results support Hypothesis H1. Figure 5 shows buy-and-hold stock returns of each class of firms.

3.6.1.2. Cross-sectional Correlation of Buy-and-Hold Stock Returns

As the returns reported previously are calculated in event time, they may be affected by cross-sectional correlation. As a robustness check, following Brav and Gomper's (1997) calendar time approach I employ Carhart's (1997) model as follows:

$$r_t = f(\alpha_t, RMRF_t, SMB_t, HML_t, MOM_t) \quad (6)$$

The dependent variable is the mean monthly return less the risk-free rate of interest.[49] As in Panels A and B of Table 9, unadjusted and four sets of adjusted returns are reported in Panels C and D. Using this approach abnormal returns are measured by the sign and significance of the intercept (α). Panel C reports returns over 12, 36, and 60 month intervals, while Panel D summarizes intercepts for 13 to 36, 37 to 60, and 13 to 60 months. As the intercepts represent a monthly return, I report compounded returns in curly braces to provide comparability with the findings in Panels A and B.

First, intercepts for *Raw Returns* are insignificant irrespective of horizon, suggesting that once known market factors are controlled for RLBO returns are not the result of mispricing. However, when returns are *IPO Adjusted*, intercepts are significantly positive in all cases. Compounding obtains magnitudes qualitatively similar to the buy-and-hold returns reported earlier. This suggests that the results reported in Panels A and B do not suffer from cross-sectional correlation.

[49] The risk-free rate and the market factors are obtained from Wharton Research Data Services.

Seasoned Firm Adjusted calendar time returns are reported next, which demonstrate a pattern similar to those in event time, where regression intercepts are positive and highly significant at 12, 36, and 60 months. Yet, the magnitudes are smaller than those found for IPOs. The pattern of declining performance from 37 to 60 is again detected, where regression intercepts are not significant at conventional levels. The findings using *Industry-adjusted* returns are qualitatively the same as those found for *Seasoned Firm Adjusted* returns. Overall, the Carhart (1997) results reinforce the previous tests that RLBOs outperform firms in the same industry for the first 36 months after the offering. Stock returns more closely resemble industry norms beginning approximately three years post-RLBO.

The last row of Panel C reports Carhart (1997) *Control Firm Adjusted* intercepts, which are small and insignificant at all horizons, and qualitatively similar to those reported in Panel A. Intercepts in Panel D do not differ statistically from zero, which contrasts with the negative and significant findings at 37 to 60 months reported in Panel B. In summary, the results of this analysis support Hypothesis H1, as RLBO stock returns outperform those of IPOs in the same industry, but with little evidence that stock prices deviate from fundamental value.

3.6.2. Corporate Governance of RLBO Firms

If private period restructuring is effective in minimizing agency issues, then post-RLBO corporate governance should protect the interests of outside shareholders. Table 10 reports summary statistics of corporate governance measures for both RLBOs and matching control firms. Paired differences in means (medians) are tested using t-statistics (z-statistics). The

analysis focuses on post-RLBO differences, as changes in governance practices and regulations over time could confound an analysis of pre-LBO compared to post-RLBO.[50]

RLBOs have a highly concentrated ownership, where officers and directors own on average 47 percent (median of 51 percent), compared to a mean of 24 percent (median of 12 percent) for the controls. The two groups differ statistically at the 1 percent level using both tests. Private equity ownership is the primary reason as these firms average a 33 percent stake post-RLBO.[51] In contrast, I find insignificant differences between CEO ownership of RLBOs and the matching controls. Finally, stock held by outside blockholders differs between RLBOs and the control firms, where RLBOs average less than 10 percent (median of 5.5 percent) ownership, compared to 13 percent (median of 9 percent) for matching control firms. The differences are highly significant in both mean and median tests.

Private equity board representation is likely responsible for substantive differences in the types of directors. I find that a mean (median) 34 (33) percent of directors are classified as outside independent for RLBO firms, compared to 61 (63) percent for the controls. The differences are significant at better than 1 percent. At the same time, board domination by private equity firms results in an average of 39 percent grey directors, which compares to 13 percent for the benchmarks, and the differences are highly significant using t-statistics and z-statistics. RLBO boards are smaller than their controls by one member on average, and the results using medians are qualitatively the same. In both cases the differences are highly significant.

RLBOs average over one less board meeting a year than their peers, and the differences are highly significant using means and medians. I find additional differences in governance for

[50] One example is a classified board, where in unreported results I find that the percentage of firms using staggered elections increases significantly from before the LBO to after the RLBO. However, the difference between the RLBOs and a matching set of controls does not differ statistically from zero.

[51] In unreported results, private equity firms also represent mean (median) of 31 (33) percent of board members.

those RLBOs where Gompers, Ishii, and Metrick's (2003) G-Index, and Bebchuk, Cohen, and Farrell's (2009) E-Index can be calculated. The results show that RLBOs are more "democratic" and less entrenched than their controls, and the differences are highly significant. The other governance variables exhibit insignificant differences between RLBOs and the control firms.

Table 10 results show that RLBO firms typically emerge from restructuring with a different CEO than in the pre-LBO years. Mean (median) CEO tenure is 4.3 (3.0) years for RLBO firms and 8.4 (6.0) years for the controls, and the differences are highly significant employing t/z-statistics. As it was reported in Chapter 2 that the median private period duration is 4.5 years, this suggests that over one-half of the CEOs were not on the job at the LBO.

RLBO firms also maintain less board committees than their competition, where the differences are significant at better than 1 percent. In examining which committees exist, it is apparent that the primary difference is that few RLBOs have a nominating committee. While only 28 percent of RLBOs maintain this committee, matching firms have over a 49 percent occurrence. Both means and medians differ statistically from zero at the 1 percent level.

Pearson correlations indicate that private equity ownership is strongly related to insider shareholdings (the Pearson correlation is 0.679).[52] Even more noteworthy is the strong inverse relationship (the Pearson correlation is -0.361) between ownership by blockholders and private equity. I contend that even if private equity ownership has a beneficial relationship with stock returns, the positive impact is likely offset by correspondingly less oversight by institutional investors.

3.6.3. Linking Private Period Restructuring to Post-RLBO Stock Returns

Table 11 reports regressions relating industry-adjusted buy-and-hold returns after the RLBO to changes in firm fundamentals during the private period. The salient explanatory factors

[52] Not reported for brevity.

are sales growth (*Growth)*, change in profitability (Δ*ROA)*, changes in cost structure variables (Δ*R&D/Sales* and Δ*SG&A/Sales*) and change in capital expenditures (Δ*Capex/Sales*). I also include change in shares per owner (Δ*Shares/Owner)* to capture the effect of ownership concentration on stock performance. All firm fundamentals are adjusted by industry medians.

I include the following control variables: book value of assets (*Assets*), leverage (*Leverage*), tangible assets (*PPETA*), private period length (*RLBOYears*), a delisting dummy (*Delist*), and a variable proxying for the term structure of interest rates (*TermPremium*). All firm fundamentals are adjusted by industry medians. Panel A of Table 11 uses buy-and-hold returns over a 12 month horizon as the dependent variable, while 36 month returns are employed in Panel B. I use the following regression specification:

$$BHR_t = f(Assets, Leverage, PPETA, Growth, \Delta R\&D/Sales, \Delta Shares/Owner, \Delta SG\&A/Sales, \Delta ROA, RLBOYears, Delist, \Delta Capex/Sales, TermPremium) \quad (7)$$

The focus explanatory variable is sales growth from LBO to RLBO (*Growth*), and I obtain a positive coefficient in Panel A, Model 1 that is highly significant. Profitability improvements from restructuring also benefit stock returns after the RLBO, as the variable Δ*ROA* is positive and significant at the 5 percent level in Models 2 and 3. Increases in capital expenditures lead to higher stock returns over the first twelve months after the RLBO, as the coefficient for Δ*Capex/Sales* in Model 3 is positive and significant at the 5 percent level.

Regressions using 36 month returns are reported in Panel B of Table 11. The coefficient for *Growth* in Model 1 is positive and highly significant. Profitability improvements during the private period lead to positive abnormal stock returns over a 36 month horizon. The coefficients

for Δ*ROA* are positive and significant at the 5 percent level in Models 2 and 3. Δ*Capex/Sales* also emerges as positive and statistically different from zero at the 5 percent level in Model 3.

Although I control for the length of the private period, due to the possibility that the results may be affected by the duration of the restructuring, I check for robustness of the results in Table 11 by re-estimating the regressions using yearly averages for firm fundamentals and for 36 month buy-and-hold returns. I obtain qualitatively similar results. The results in Table 11 are also robust to using raw unadjusted buy-and-hold returns. Finally, the conclusions continue to hold after excluding firms de-listed due to bankruptcy or insufficient capital,

Overall, the evidence supports Hypothesis H2A by showing that sales growth during the private period leads to positive long-run returns following the RLBO. Similarly, profitability measured by Δ*ROA* and Δ*Capex/Sales* during the private period restructuring are also strong positive determinants of post-RLBO stock price performance.

3.6.4. Linking Firm Characteristics at the RLBO to Long-run Stock Returns

In this section I examine how salient firm fundamentals at the time of the RLBO determine post-RLBO stock price performance. The results of the analysis are reported in Table 12. Panel A presents findings using 12 month returns, while results in Panel B are over a 36 month horizon. The relevant explanatory variables are sales growth (*Growth)*, sales productivity (*Sales/Employee*), cost structure variables (*COGSSl* and *SG&A/Sales*), research and development (*R&D/Sales*), capital expenditures (*Capex/Sales*), dual class stocks (*DualClass*), board committees (*TotComm*), and executive committees (*ExecComm*). I also include shares per owner (*Shares/Owner)* to capture the effect of ownership concentration on stock performance.

I include the following control variables: book value of assets (*Assets*), leverage (*Leverage*), tangible assets (*PPETA*), private period length (*RLBOYears*), a delisting dummy

(*Delist*), ownership of outside blockholders (*Block*), and a variable proxying for the term structure of interest rates (*TermPremium*). Panel A of Table 12 uses buy-and-hold returns over a 12 month horizon as the dependent variable, while 36 month returns are employed in Panel B. Several configurations of the following model are estimated:

$$BHR_t = f(Assets, Leverage, PPETA, Growth, COGSSl, R\&D/Sales \\ Shares/Owner, SG\&A/Sales, EBITDA/Sales, RLBOYears, Sales/Employee, \\ Capex/Sales, DivTA, CashTA, MktBook, Delist, TermPremium, \\ ExecComm, DualClass, TotComm, Block) \quad (8)$$

I find that gross margin is a significant determinant of post-RLBO stock returns, as the coefficient for *COGSSl* in Model 2 is negative and significant at the 1 percent level. I find that overhead is inversely related to stock performance as the coefficient for *SG&A/Sales* is negative and highly significant. In Models 3 and 4 I include employee productivity, *Sales/Employee,* which is positive and differs statistically from zero at the 5 percent level.

Cost structure is one component of returns on invested capital. In Panel B, I include *ROA* in Model 2 to test for a relationship with 36 month returns, and the coefficient is positive and significant at the 5 percent level. The importance of overhead in determining post-RLBO stock returns wanes after 12 months, as the coefficient for $\Delta SG\&A/Sales$ is insignificant.[53] In conclusion, findings presented in Table 12 provide evidence in support of Hypothesis H2B, as cost structure at the RLBO is a significant determinant of post-RLBO stock returns.

I find that the coefficient for *ExecComm* is negative and highly significant in Model 1 of Table 12 (Panel A). This is in support of Hypothesis H3, as the existence of executive committee of the board is a sign of entrenchment. In contrast, the number of committees on the board (*TotComm*), and whether the firm has more than one class of stock (*DualClass*) are insignificant.

[53] The model is not reported for conciseness.

Above industry capital expenditures at the RLBO have a negative effect on future stock returns, as coefficients for *Capex/Sales* in Model 3 of Panels A and B are significantly negative. In contrast, equity markets value investment in research and development post-RLBO, as *R&D/Sales* is positive and significant in Models 3 and 4. *MktBook* in Model 5 of Panel A, is positive and highly significant. Overall, this suggests that higher growth opportunities at the RLBO lead to positive stock returns over the next 12 months. Finally, the evidence in Panel B suggests that above industry ownership concentration is a sign of entrenchment, as coefficients for *Shares/Owner* in Models 1 and 2 are significantly negative.

To check the robustness of the results I re-estimate the regressions in Panel A, Model 1 by substituting other traditional board composition variables for *TotComm* and *DualClass*.[54] The coefficient for *ExecComm* is consistently negative and significant, while the other board variables are insignificant. I run a diagnostic check for multicollinearity to verify that the results are not affected by correlation with other determinants of stock returns.

The results in Table 12 continue to hold when using unadjusted stock returns. The findings are also robust to the exclusion of firms that are delisted for financial distress. In summary, the findings reported in Table 12 are robust and support hypotheses H2B and H3. Equity markets react favorably to better than industry margins, overhead, and returns at the RLBO, and the absence of an executive committee.

3.6.5. Post-RLBO Changes in Firm Fundamentals and Long-run Stock Returns

The trends reported in Figures 1 to 4 suggest that the benefits of private period restructuring continue into the future years. If that is so, then the variables in equation (7) that are relevant should continue to be significant in the post-RLBO years. To test this, I compute

[54] The board variables include size, meeting frequency, classification, CEO duality, and independent directors.

changes in firm fundamentals over the first two years after the RLBO to relate to the buy-and-hold stock returns for the third through fourth years.

Table 13 presents regressions using equation (9) below to examine how changes in firm fundamentals after the RLBO determine future stock performance. The relevant variables are sales growth (*Growth)*, change in profitability (Δ*ROA)*, changes in cost structure variables (Δ*COGSSls* and Δ*SG&A/Sales*), change in employee productivity (Δ*Sales/Employee*), and change in capital expenditures (Δ*Capex/Sales*). I also test the impact of changes in ownership concentration (Δ*Shares/Owner)*.

I include as control variables the book value of assets (*Assets*), leverage (*Leverage*), tangible assets (*PPETA*), private period length (*RLBOYears*), a delisting dummy (*Delist*), and a variable proxying for the term structure of interest rates (*TermPremium*). Several configurations of the following model are estimated:

$$BHR_t = f(Assets, Leverage, PPETA, Growth, \Delta Sales/Employee, \Delta Shares/Owner, \Delta SG\&A/Sales, \Delta COGSSls, \Delta ROA, RLBOYears, \Delta Capex/Sales, Delist, TermPremium) \quad (11)$$

The focus variable is *Growth*, as the evidence so far suggests that restructuring that creates growth leads to positive stock returns after the RLBO. In this analysis I test whether that relationship continues over the next four years by including *Growth* in Model 2, and obtain a positive coefficient that is significant at the 5 percent level. This finding implies that if firms maintain the changes implemented during the private period into the post-RLBO years, they continue to improve long-run stock performance.

I include Δ*COGSSl* as an explanatory variable in Model 2 of Table 13. This variable is negative and significant at the 1 percent level. The change in return on assets (Δ*ROA*) is included

in Models 3 and 4, and the coefficient is positive and highly significant. The fact that improving gross margin and return on assets determines future stock returns suggests that cost structure continues to be important well beyond the RLBO. In contrast, the insignificant coefficient for Δ*SG&A/Sales* suggests that reductions in overhead costs are not important for future stock price performance.

Δ*Capex/Sales* is included in Model 3 and is significantly positive. Overall, the evidence suggests that sales growth and cost structure improvement in the post-RLBO period continue to be major determinants of post-RLBO stock returns.

Finally, the coefficient for private period length is negative and significant at the 10 percent level. I contend that limiting the sample to public-to-private RLBOs shows that the relationship between the length of the private period and post-RLBO stock performance is more complicated than the business media advice to avoid the "quick flip". In fact these findings suggest that extremely long private periods more closely resemble a first IPO. Again, the findings in Table 13 are robust to the use of unadjusted returns and to the exclusion of firms delisted for bankruptcy.

3.6.6. Underwriter Reputation and Long Run Returns of RLBO Firms

The extant literature finds that underwriter reputation is positively related to IPO stock returns.[55] However, prior research has yet to determine whether a similar relationship exists for RLBOs. As RLBO firms were once publicly traded, these firms are expected to be associated with less information asymmetry between insiders and outside investors as compared to IPO firms. Therefore, while I expect to find a positive coefficient for underwriter reputation, the magnitude of the impact on stock returns is likely to be less for RLBOs as compared to that for IPOs.

[55] See Carter and Manaster (1990) and Carter, Dark, and Singh (1998).

The work of Carter, Dark, and Singh (1998), shows that the modified Carter-Manaster (*CM*) system provides the strongest relationship between underwriter reputation and stock returns. *CM* rankings are based on the listing position of underwriter names in the "tombstone" announcements of stock offerings, and based on their work I adopt the *CM* system for this analysis. I obtain the updated rankings from Professor Jay Ritter's website.[56]

Table 14 presents descriptive statistics for the variables used in this analysis, where Panel A duplicates Table II of Carter, Dark and Singh (1998) for RLBOs. Firm betas (*Beta*) and stock return standard deviations (*StdDevRet*), are computed using the CRSP daily file for offer date +6 through offer date +260. *Size* is the gross proceeds from the offering, and is also restated to the year 2000 (*Inflation Adjusted Size*) using the consumer price index.[57] Similar to underwriter rankings, firm ages (*Age*) are obtained from Professor Jay Ritter's website, while the percentage of secondary shares in the offering (*Second*) is extracted from the Securities Data Company's New Issues database.

The mean (median) *Beta* for RLBO firms is 0.958 (0.891), not surprisingly, is less than for the IPOs of Carter, Dark and Singh (1998) sample. I obtain qualitatively similar results for *StdDevRet*, where RLBOs have a mean (median) *StdDevRet* of 0.031 (0.029) compared to the 0.034 (0.031) reported for IPOs.

The most distinguishing characteristic of RLBOs are their high underwriter rankings, where the mean (median) *CM* is 8.600 (9.001), which contrast with those for IPOs of 6.97 (8.00). In Panel B, I report firm counts by *CM* score, and over 50 percent of the sample have the highest ranking of 9.001.

[56] http://bear.warrington.ufl.edu/ritter/ipodata.htm
[57] The consumer price index is obtained from the Bureau of Labor Statistics website http://www.bls.gov

3.6.6.1. Underwriter Reputation and Buy-and-hold Stock Returns of RLBO Firms

I investigate the role of underwriter certification by classifying rankings as *Low* when they are less than 9.0 otherwise they are designated as *High*. Table 15 reports the results of an analysis by underwriter reputation where Panel A summarizes returns by group (*Low* versus *High*). In addition to the five sets of returns reported in Table 9, I report results using the CRSP value-weighted index.[58] I also compute returns over 12, 36 and 60 month horizons, to determine if the effect varies over time.

I find that 36 month buy-and-hold returns of *High* underwriters consistently exceed those rated *Low* irrespective of the adjustment methodology. The differences are both economically and statistically significant. I also find that underwriter reputation determines 12 month returns in all cases.

When the horizon is lengthened to 60 months, median buy-and-hold returns for *High* underwriters are statistically greater than those ranked as *Low* in all six cases. Overall, the evidence in Panel A indicates that underwriter reputation is positively related to the long-run stock performance of RLBO firms, with the maximum benefit occurring at 36 months. These findings support Hypothesis H4. Relatedly, Brav and Gompers's (2003) findings show that offerings by higher quality underwriters have shorter lockups and a greater probability of an early release. Figure 6 graphs buy-and-hold returns by underwriter reputation.

3.6.6.2 Multivariate Analysis: Underwriter Reputation and Post-RLBO Stock Price Performance

To further validate the role of underwriter certification in RLBOs, Panel B reports OLS regressions that duplicate those of Carter, Dark, and Singh (1998). In this analysis the dependent variable is the 36 month buy-and-hold return. While the previous study only reports results using

[58] While Barber and Lyon (1997) document the biases inherent in a reference index, value-weight adjusted returns provide comparability to the findings of Carter, Dark, and Singh (1998).

a value-weighted index, I employ the six sets of returns used in Table 15 (Panel A). Due to the lower cross-sectional variation in underwriter rankings, a dummy variable is employed (*High Rank Dummy*), which is set to one if *CM* is at least nine, otherwise it is zero. Standard errors are calculated using White's (1980) correction for heteroskedasticity. Six configurations of the following model are reported in Table 15, Panel B:

$$\text{BHR} = f(\textit{High Rank Dummy}, \log(\textit{Size}), \log(\textit{Age}), \textit{Second}, \textit{RetStdDev}) \quad (10)$$

Model 1 uses *Raw Unadjusted* returns as the dependent variable, and obtains a coefficient for *High Rank Dummy* which is positive and significant at better than 5 percent. Model 2 duplicates the Carter, Dark, and Singh (1998) regressions employing a value-weighted index, and the coefficient on *High Rank Dummy* is again significantly positive at the 5 percent level. Four additional specifications document that *High Rank Dummy* is positive and statistically significant at 5 percent when *IPO Adjusted*, *Seasoned Firm Adjusted*, *Industry-Adjusted*, and *Control Firm Adjusted* returns are employed. These findings provide additional evidence that underwriters fulfill a certification role for RLBOs, and supports Hypothesis H4.

3.6.6.3. Four Factor Model Regressions of Underwriter Reputation

To ensure that my findings are not the result of cross-sectional correlation, I perform a calendar time analysis using Carhart's (1997) model, which is reported in Panel C. In these regressions, the mean monthly *Raw Unadjusted* return is the dependent variable. Panel C summarizes findings for rankings that are *High*, *Low*, and *Low-High* over 12, 36, and 60 months. Compounded returns are reported in curly braces.

Consistent with the findings of Panels A and B, underwriters with a *High* ranking earn positive and significant 36 month returns, while those classified as *Low* generate negative returns that statistically differ from zero. When the dependent variable is the difference *Low-High*, the

intercept is highly significant, which supports the argument that underwriter reputation is important to the stock performance of RLBOs.

When 60 months returns are employed, the *Low-High* effect is still significant, but with a smaller magnitude. When using returns over a 12 month horizon, the *Low-High* intercept is negatively significant. Overall, the findings of Table 15 suggest that underwriters perform a certification function similar to that for IPO firms. Offerings handled by higher quality underwriters lead to positive abnormal stock returns, which supports Hypothesis H4.

3.7. Conclusions

This chapter explores those factors that determine the long-run stock performance of public-to-private RLBOs. I first benchmark RLBO returns against those of IPOs, seasoned firms, industry medians, and a matched set of control firms. I then investigate whether private period restructuring that creates sales growth and a better than industry cost structure leads to superior stock performance after the RLBO. I also contribute to the literature by examining whether boards that include an executive committee, are negatively related to stock returns after the RLBO. Finally, I extend previous research into underwriter certification to public-to-private RLBOs.

First, I find that public-to-private RLBO stock returns outperform comparable within industry IPOs at 12, 36, and 60 month horizons. Extending the analysis to seasoned firms obtains qualitatively similar results, though differences decline after approximately 36 months. Consistent with results obtained for seasoned firms, RLBOs outperform industry medians over the first 36 months after the offering. In contrast, abnormal stock returns calculated using control firms selected by size and industry obtains insignificant results. The evidence suggests that the

larger and more mature RLBOs do not suffer the underperformance documented for IPOs. No evidence is found of systematic market mispricing post-RLBO.

Second, private period restructuring that increases growth leads to positive abnormal returns after the RLBO, and the relationship remains important into the post-RLBO years. I also find that equity markets respond favorably after the RLBO to improved cost structure from restructuring. In addition, cost structure continues to drive positive stock returns three and four years after the RLBO.

Third, equity markets respond favorably to increased investment in capital expenditures. However, investments in capital assets post-RLBO beyond what is normal for a firm's industry engender negative stock returns. Overall, the evidence suggests that equity markets value increases in capital expenditures when there are no signs of overinvestment.

This is the first study to document the negative impact of executive committees on stock returns. I find that those RLBOs whose board includes this committee consistently earn lower stock returns than their industry peers even when other board composition variables are included in the regressions. Finally, the same underwriter certification role detected for IPOs also holds for public-to-private RLBOs, and the relationship is maximized at 36 months.

I ensure the validity of my conclusions with multiple robustness checks. The analysis of buy-and-hold returns controls for excessive skewness and cross-sectional correlation. I use both means and medians to ameliorate the impact of outliers. Finally, I employ a Carhart (1997) model and calendar time returns as an additional robustness check against cross-sectional correlation. Finally, when testing the relationship between firm fundamentals and future stock returns, I use several approaches to test the validity of my results ensuring that they are robust.

Chapter 4: Conclusions

This dissertation investigates and closes gaps in the literature on public-to-private reverse leveraged buyouts. Unlike prior research that uses samples primarily made up of private-to-private and division-to-private RLBOs, I create a sample of exclusively public-to-private transactions. Chapter 2 begins with an analysis of restructuring activities undertaken during the private period, by comparing firm fundamentals at the LBO to the same variables after the RLBO. Next, I examine the determinants of post-RLBO valuation and whether restructuring leads to a more disciplined investment policy by management. This chapter also investigates those pre-LBO factors that are related to private period length. Finally, I examine the determinants of the high post-RLBO attrition rate documented in the literature. I validate the findings with multiple robustness tests.

The analysis leads to several conclusions. First, I find that free cash flow and capital expenditures are above competition leading up to the LBO, while growth options are industry norms. I contend that these factors combined with low ownership concentration incentivize overinvestment. Second, increased leverage reduces free cash flow and capital expenditures during the private period, while ownership concentration increases.

Third, after the RLBO, employment, free cash flow, and growth options increase as leverage decreases, while capital expenditures continue at industry levels. I argue that management remains disciplined once the firm returns to public ownership, as capital expenditures lead to positive future cash flows. Fourth, I show that restructuring that improves growth leads to higher valuations post-RLBO. The evidence suggests that growth enables the firm to survive the market for corporate control over five years after the RLBO. I also find that lower gross margins at the RLBO engender superior equity and firm values.

Finally, by limiting the sample to public-to-private RLBOs, I obtain evidence that the relationship between private period length and post-RLBO success is more complicated than first thought. While I obtain findings that support the business media advice to avoid "quick flips", the evidence suggests that firms with extremely long private periods more closely resemble a first IPO.

Chapter 3 investigates the long-run stock performance of public-to-private RLBOs which are second IPOs. This study tests whether empirical regularities observed for IPOs is also found in RLBOs. I then build on the work in Chapter 2 by examining the relationship between firm fundamentals during the private period and at the RLBO with long-run stock performance. Next, in the vein of corporate governance studies of IPOs, I analyze board characteristics that determine stock returns after the RLBO.

First, the results suggest that RLBOs earn long-run stock returns superior to IPOs in the same industry at all horizons. Further, I obtain results using seasoned firms and industry medians that are qualitatively similar, though differences decline after 36 months. Insignificant abnormal returns using control firms selected by size and industry, suggests that RLBO stock returns do not suffer from market mispricing.

Next, I find that private period restructuring that engenders growth is as important to long-run stock returns as to valuations. I also find that continued growth after restructuring leads to superior stock performance up to four years after the RLBO. In addition, RLBOs with a lower cost structure at the RLBO consistently earn higher returns in the post-RLBO months. I also obtain evidence suggesting that executive committees lead to negative abnormal stock returns post-RLBO. Finally, analysis shows that higher quality underwriters are positively correlated to stock returns after the RLBO, and the relationship is maximized at 36 months.

Overall, this dissertation demonstrates that public-to-private RLBOs differs substantively from the division-to-private and private-to-private types common in the literature. I argue that asymmetric information is lower at a public offering when a firm was previously exchange listed.

APPENDIX A: VARIABLE DEFINITIONS

Definition of Firm Characteristics

Assets – The book value of total assets (item #6) in real 2000 dollars

Sales – Net sales (item #12) in real 2000 dollars

Capex/Sales – Capital expenditures (item #128) divided by sales (item #12)

CashTA – Cash (item #1) divided by total assets (item #6)

COGSSls – Cost of goods sold (item #41) divided by sales (item #12)

DivDummy – Set to one if dividends (items #19 + #21) are not equal to zero

DivTA – Dividends (items #19 + #21) divided by total assets (item #6)

EBITDA/Sales – Operating income before depreciation (item #13) divided by sales (item #12)

Employees – The number of employees (item #29)

FCF/Sales – Earnings before interest, taxes, and depreciation (item #13) minus interest expense (item #15) minus taxes (item #16) minus dividends (items #9 + #21) divided by sales (item #12)

IntanTA – Intangible assets (item #33) to total assets (item #6)

InterestTA – Interest expense (item #15) divided by total assets (item #6)

Leverage – Long-term debt (items #9 + #44) divided by total assets (item #6)

MktBook – Total Assets (item #6) – common equity (item #60) plus market value of equity (items #199 * #25) divided by total assets (item #6)

PSlsRatio – Market value of equity (items #199 * #25) divided by sales (item #12)

PPETA – Net property, plant, and equipment (item #8) divided by total assets (item #6)

RetTA – Retained earnings (item #36) divided by total assets (item #6)

ROA – Earnings before interest (items #172 + #15) divided by total assets (item #6)

ROE – Net income (item #172) divided by stockholders' equity (item #216)

R&D/Sales – Research and development expenses (item #46) divided by sales (item #12)

Sales/Employee – Sales (item #12) divided by employees (item #29)

APPENDIX A (continued)

SG&A/Sales – Selling, general, and administrative expense (item #189) divided by sales (item #12)

Shares/Owner – Equity shares (item #25) divided by common shareholders (item #100) in thousands

TaxRate – Income taxes (item #16) divided by earnings after interest and depreciation (item #178)

Tunover – Shares traded (item #28) divided by shares outstanding (item #25)

Definition of Equity Variables

StockPrice – Stock price at the end of the last trading day of the month.

Beta – Firm beta based on stock returns from offer date + 6 through offer date + 260

BHR12 – Twelve month buy-and-hold return

BHR36 – Thirty-six month buy-and-hold return

BHR60 – Sixty month buy-and-hold return

BHR1336 – Buy-and-hold return from the 13^{th} to 36^{th} month

BHR3760 – Buy-and-hold return from the 37^{th} to 60^{th} month

BHR1360 – Buy-and-hold return from the 13^{th} to 60^{th} month

HML – Carhart (1997) high minus low factor

MOM – Carhart (1997) momentum factor – Monthly stock return

SMB – Carhart (1997) small minus big factor

StdDevRet – Standard deviation of daily stock return from offer date + 6 through offer date + 260

RLBO Transaction Variable Definitions

RLBOYearse – The time from the LBO until the RLBO

RLBOYearsSq – Years in the private period squared

Surviveflag – A binary variable set to one if an RLBO firm survives five years

MBO – Dummy set to one if LBO was through a management buyout.

Delist – Dummy set to one if firm is delisted from CRSP due to bankruptcy or insufficient capital

Age – Firm age in years

APPENDIX A (continued)

Second – Percentage of secondary shares in the public offering

Size – Proceeds of the public offering

LBOCount – Count of leveraged buyouts occurring in a month

TermPremium – The difference between 10 year T-bond and 3 mo. T-bill rates for a given month

Governance Variables

BlockPct – Voting percentage of outside blockholders of at least 5 percent

CEOPct – Voting percentage of the chief executive officer

P/EPct – Voting percentage of the private equity firm

TotalPct – Voting percentage of officers and directors of the firm

UndwRank – Updated Carter and Manaster underwriter ranking

High – Carter and Manaster underwriter ranking of at least 9.0

Low - Carter and Manaster underwriter ranking of less than 9.0

APPENDIX B: FILES AND DATABASES

Compustat Name file

Compustat Fundamentals table

Compustat Daily Segments file

CRSP Stockname file

CRSP Daily Price file

CRSP Monthly Price file

CRSP Monthly Stock Index file

SDC New Issues database

SDC Mergers and Acquisitions database

Gale Business and Company Resource center

SEC EDGAR database

Mergent Online

Lexis/Nexis Academic

Thompson Research

Federal Reserve Bank 3 month T-bill table of interest rates

Federal Reserve Bank 10 year T-bond table of interest rates

APPENDIX C: TABLES

Table 1
Descriptive Statistics of Reverse Leveraged Buyout Firms

The table presents summary statistics of sample firms. Firms by year of the LBO and RLBO are documented in Panel A. Panel B reports RLBOs by years in the private period. Panel C summarizes the mean and quartiles of private period duration. Panel D classifies sample firms by 2-digit SIC code.

Panel A: RLBOs by Year

Year	LBO Count	RLBO Count
1978	2	0
1979	6	0
1980	3	0
1981	7	0
1982	1	0
1983	5	0
1984	11	0
1985	10	0
1986	22	8
1987	17	10
1988	34	3
1989	22	2
1990	9	5
1991	3	29
1992	5	33
1993	4	24
1994	3	14
1995	0	9
1996	4	4
1997	8	12
1998	6	1
1999	4	4
2000	4	2
2001	4	6
2002	4	5
2003	6	4
2004	4	11
2005	0	10
2006	0	12
Total	**208**	**208**

Panel B: RLBOs by Years Private

Years Private [b]	Firm Count	Percent of Total	Cumulative Percent
0.0 – 0.9	24	11.5%	11.5%
1.0 – 1.9	27	13.0%	24.5%
2.0 – 2.9	22	10.6%	35.1%
3.0 – 3.9	23	11.1%	46.2%
4.0 – 4.9	28	13.5%	59.6%
5.0 – 5.9	19	9.1%	68.8%
6 .0 – 6.9	14	6.7%	75.5%
7.0 – 7.9	8	3.8%	79.3%
8.0 – 8.9	6	2.9%	82.2%
9.0 – 9.9	8	3.8%	86.1%
10.0 – 10.9	2	1.0%	87.0%
11.0 – 11.9	4	1.9%	88.9%
12.0 – 12.9	4	1.9%	90.9%
13.0 – 13.9	1	0.5%	91.3%
14.0 – 14.9	2	1.0%	92.3%
15.0 – 15.9	3	1.4%	93.8%
16.0 – 16.9	4	1.9%	95.7%
17.0 – 17.9	4	1.9%	97.6%
19.0 – 19.9	3	1.4%	99.0%
20.0 – 20.9	1	0.5%	99.5%
23.0 – 23.9	1	0.5%	100.0%
Total	**208**	**100.0%**	

Panel C: RLBO Private Period Statistics

Statistic	Days Private	Years Private[a]
Mean	1,992.06	5.458
1st Quartile	734.00	2.011
Median	1,600.00	4.384
3rd Quartile	2,520.50	6.905

Table 1 (Continued)

Panel D: Reverse Leveraged Buyouts by 2-Digit SIC Code

SIC Code	SIC Code Description	Firms	% of Total
07	Agricultural services	1	0.48%
12	Coal mining	1	0.48%
13	Oil and gas extraction	3	1.44%
14	Mining and quarrying	1	0.48%
15	Building construction	3	1.44%
17	Special trade contractors	1	0.48%
20	Food	5	2.40%
21	Tobacco	2	0.96%
22	Textiles	6	2.88%
23	Apparel	3	1.44%
24	Lumber products	3	1.44%
25	Furniture	4	1.92%
26	Paper products	2	0.96%
27	Printing and publishing	3	1.44%
28	Chemicals	7	3.37%
29	Petroleum refining	1	0.48%
32	Stone, clay, glass, and concrete	2	0.96%
33	Primary metal products	5	2.40%
34	Fabricated metal products	6	2.88%
35	Machinery and computer equip.	13	6.25%
36	Electronic equipment	17	8.17%
37	Transportation equipment	7	3.37%
38	Instruments, watches and clocks	4	1.92%
39	Miscellaneous manufacturing	5	2.40%
40	Railroad transportation	2	0.96%
41	Ground transportation	1	0.48%
42	Warehousing and transportation	3	1.44%
44	Water transportation	2	0.96%
45	Air transportation	2	0.96%
47	Transportation services	1	0.48%
48	Communications	7	3.37%
49	Energy and sanitary services	2	0.96%
50	Wholesale trade – durables	6	2.88%
51	Wholesale trade – nondurables	1	0.48%
52	Building materials	2	0.96%
53	General merchandise stores	2	0.96%
54	Food stores	10	4.81%
55	Automotive dealers and service	1	0.48%
56	Apparel stores	8	3.85%
57	Home furniture	4	1.92%
58	Eating and drinking businesses	4	1.92%
59	Miscellaneous retail	8	3.85%
72	Personal services	2	0.96%
73	Business services	9	4.33%
75	Automotive repair	2	0.96%
78	Motion pictures	3	1.44%
79	Recreation services	2	0.96%
80	Health services	12	5.77%
82	Education services	2	0.96%
87	Engineering services	5	2.40%
Total		**208**	**100.00%**

[a] RLBO – Defined as a public firm that first becomes private and then public again

[b] Years Private – Interval between the LBO and RLBO where a firm remains private.

Table 2
Financial Characteristics of RLBO Firms Surrounding the Private Period

This table reports a paired Wilcoxon z-test of medians at the LBO and RLBO. The sample data includes all public to private RLBOs from 1978 to 2006. Panel A summarizes results for unadjusted variables. Panel B documents variables adjusted by the industry median (based on the 2-digit SIC code). Industry-adjusted values are tested for statistical difference from zero. LBO-0 is the median value immediately preceding the LBO. Values after the RLBO are designated by RLBO+0. RLBO-LBO is the median value of paired differences before (after) the LBO (RLBO). All variables are defined in Appendix A. [a], [b], and [c] denotes statistical significance at the 1%, 5%, and 10% level respectively.

	Panel A: Financial Characteristics			Panel B: Industry-Adjusted Financial Characteristics		
Variable	**LBO-0**	**RLBO+0**	**RLBO-LBO**	**LBO-0**	**RLBO+0**	**RLBO-LBO**
Profitability and Valuation						
ROA	0.077	0.077	0.001	0.014[a]	0.018[a]	0.004
MktBook(Q)	1.254	1.488	0.246[a]	-0.031	0.109[a]	0.104[a]
PSlsRatio	0.448	0.671	0.087[a]	-0.081	-0.041	0.078[c]
FCF/Sales	0.059	0.059	0.001	0.013[a]	0.011[a]	-0.001
EBITDA/Sales	0.119	0.136	0.019[a]	0.119[a]	0.048[a]	-0.065[a]
RetTA	0.248	-0.016	-0.255[a]	0.117[a]	-0.098[a]	-0.214[a]
Financial Restructuring						
Leverage	0.227	0.418	0.150[a]	0.043[a]	0.228[a]	0.147[a]
InterestTA	0.027	0.050	0.023[a]	0.001	0.025[a]	0.025[a]
TaxRate	0.328	0.181	-0.133[a]	0.091[a]	-0.008[c]	-0.095[a]
CashTA	0.048	0.031	-0.005[c]	-0.006	-0.021[a]	-0.011[b]
DivTA	0.010	0.000	-0.003[a]	0.008[a]	0.000[a]	-0.003[a]
Shares/Owner(000)	3.020	47.666	37.622[a]	-0.547	39.493[a]	34.181[a]
Operating Restructuring						
Assets	463.895	493.278	20.850	331.293[a]	305.064[a]	9.307
Sales	678.859	522.376	6.723	468.748[a]	299.044[a]	-13.729[a]
Employees	6.462	3.590	-0.312[a]	4.748[a]	1.872[a]	-0.934[a]
Sales/Employee	97.042	131.686	33.583[a]	-0.995	6.059[a]	10.210[a]
PPETA	0.300	0.244	-0.042[a]	0.023[a]	-0.011	-0.025[a]
Capex/Sales	0.041	0.032	-0.008[a]	0.000[c]	-0.004	-0.004[b]
Cost Structure						
COGSSls	0.708	0.687	-0.019[a]	0.008	-0.009	-0.012[b]
SG&A/Sales	0.182	0.179	-0.005	-0.043[a]	-0.049[a]	-0.004
R&D/Sales	0.000	0.000	0.000	0.000	-0.000[b]	-0.000[c]
Number of Observations	208			208		

Table 3
Financial Characteristics of Firms Surrounding the LBO and RLBO

This table reports a paired Wilcoxon z-test of medians before and after the LBO and RLBO. The sample data includes all public to private RLBOs from 1978 to 2006 for which data exists after the LBO and before the RLBO. Panel A summarizes industry-adjusted results for the time surrounding the leveraged buyout. Panel B documents variables preceding and following the RLBO also industry-adjusted. Median values based on the 2-digit SIC code are employed to industry-adjust variables. Industry-adjusted values are tested for statistical difference from zero. LBO-0 is the median value immediately preceding the LBO. Firm fundamentals after the LBO are designated as LBO+1. Pre-RLBO variables are reported under RLBO-1. Values after the RLBO are designated by RLBO+0. Paired differences before (after) the LBO are summarized under LBO-0 – LBO+1. RLBO+0 – RLBO-1 documents paired differences before and after the RLBO. All variables are defined in Appendix A. [a], [b], and [c] denotes statistical significance at the 1%, 5%, and 10% level respectively.

	Panel A: Before and After the LBO			Panel B: Before and After the RLBO		
Variable	**LBO-0**	**LBO+1**	**LBO-0 – LBO+1**	**RLBO-1**	**RLBO+0**	**RLBO+0 - RLBO-1**
Profitability						
ROA	0.008[b]	-0.004	0.006[a]	0.026[a]	0.023[a]	-0.001
FCF/Sales	0.013[a]	0.004	0.006[a]	0.004[b]	0.015[a]	0.008[a]
EBITDA/Sales	0.034[a]	0.116[a]	-0.082[a]	0.122[a]	0.050[a]	-0.072[a]
RetTA	0.062[a]	-0.111[a]	0.116[a]	-0.125[a]	-0.094[a]	0.010[a]
Financial Restructuring						
Leverage	0.099[a]	0.427[a]	-0.214[a]	0.359[a]	0.219[a]	-0.143[a]
InterestTA	0.005[a]	0.023[a]	-0.015[a]	0.041[a]	0.025[a]	-0.009[a]
TaxRate	0.047[b]	-0.094[a]	-0.116[a]	-0.040[a]	-0.001	0.017[b]
CashTA	-0.012	-0.025[a]	0.005[a]	-0.026[a]	-0.025[a]	0.000
DivTA	0.007[a]	0.001[a]	0.000[a]	0.008[a]	0.000[a]	0.000
Shares/Owner(000)	-0.452	3.596[a]	-0.190[a]	44.151[a]	39.998[a]	0.000[c]
Operating Restructuring						
Assets	340.770[a]	537.540[a]	-20.004[a]	279.065[a]	298.783[a]	4.790[a]
Sales	534.442[a]	548.971[a]	0.000[b]	242.757[a]	299.436[a]	23.933[a]
Employees	4.274[a]	4.014[a]	0.004	1.482[a]	1.724[a]	0.029[b]
Sales/Employee	4.095[c]	6.623[a]	-0.000	4.402[c]	4.691[a]	3.616[a]
PPETA	0.043[a]	0.010	0.015[a]	-0.010	-0.018	0.000
Capex/Sales	0.000	-0.002	0.000	-0.007[b]	-0.002	0.002[a]
Cost Structure						
COGSSls	0.008	0.006	0.000	-0.008	-0.014[b]	0.000
SG&A/Sales	-0.053[a]	-0.038[a]	0.000	-0.048[a]	-0.051[a]	-0.002[c]
R&D/Sales	0.000[b]	0.000[b]	0.000	0.000[b]	-0.000[b]	0.000
Number of Observations	128			193		

Table 4
Financial Characteristics of RLBO Firms by Time Spent in the Private Period

This table summarizes median firm fundamental variables for the first (shortest) and fourth (longest) quartiles of time in the private period of RLBOs occurring from 1978 to 2006. Variables are adjusted by the industry median (based on the 2-digit SIC code). Industry-adjusted values are tested for statistical difference from zero. LBO-0 is the median value immediately preceding the LBO. Values after the RLBO are designated by RLBO+0. RLBO-LBO is the median value of paired differences before (after) the LBO (RLBO). Unpaired difference of medians is reported between quartile 1 and 4. All variables are defined in Appendix A. [a], [b], and [c] denotes statistical significance at the 1%, 5%, and 10% level respectively using the Wilcoxon Signed Rank Test.

	Private Period Quartile 1			Private Period Quartile 4			Quartile 1 – Quartile 4		
Variable	**LBO-0**	**RLBO+0**	**RLBO-LBO**	**LBO-0**	**RLBO+0**	**RLBO-LBO**	**LBO-0**	**RLBO+0**	**RLBO-LBO**
Profitability and Valuation									
ROA	0.018[c]	0.023[c]	0.000	0.014[b]	0.029[a]	0.025[a]	0.003	-0.006	-0.022[b]
ROE	0.054[c]	-0.017	-0.133[a]	0.045[b]	0.028[c]	0.018	0.009	-0.046[b]	-0.151[a]
EBITDA/Sales	0.122[a]	0.058[a]	-0.065[a]	0.103[a]	0.037[a]	-0.059[a]	0.019	0.021	-0.007
FCF/Sales	0.010[b]	0.017	0.002	0.005[b]	0.016[a]	0.012[b]	0.004	0.001	-0.010
PSlsRatio	-0.164[b]	-0.141	0.052	0.014	0.008	0.078	-0.178[b]	-0.149	-0.026
MktBook(Q)	-0.088[c]	-0.062	-0.012	0.091[c]	0.265[a]	0.322[a]	-0.180[b]	-0.327[b]	-0.334
Financial Structure									
Leverage	0.123[a]	0.280[a]	0.091[b]	-0.058	0.252[a]	0.288[a]	0.181[a]	0.028	-0.197[a]
InterestTA	0.012[a]	0.029[a]	0.019[a]	-0.008[a]	0.031[a]	0.042[a]	0.020[a]	-0.002	-0.023[a]
TaxRate	0.014	-0.003	-0.027	0.095[a]	-0.074[b]	-0.162[a]	-0.081	0.071	0.135[c]
CashTA	-0.018[c]	-0.027[c]	0.004	0.002[c]	-0.016[b]	-0.025[a]	-0.020[a]	-0.011	0.029[a]
DivTA	0.000[a]	0.000[a]	0.000	0.016[a]	0.001[a]	-0.009[a]	-0.016[a]	0.000	0.009[b]
Shares/Owner(000)	0.695[c]	49.531[a]	45.092[b]	-0.451[b]	32.280[a]	31.723[a]	1.146	17.250	13.369
Operating Restructuring									
Assets	453.894[a]	411.744[a]	15.197	594.997[a]	769.543[a]	101.747[c]	-141.103	-357.799	-86.551[b]
Sales	568.553[a]	414.537[a]	3.973	944.618[a]	806.154[a]	-1.489	-376.065	-391.617[a]	5.462
Employees	4.003[a]	1.142[a]	-1.650[a]	5.374[a]	4.082[a]	-0.931[c]	-1.371	-2.940[b]	-0.719
Sales/Employee	9.589[c]	15.671[a]	18.672[a]	-0.746	22.005[b]	6.479[b]	10.334	-6.334	12.283
PPETA	0.012[c]	-0.024	-0.030[b]	0.005	-0.009	-0.020	0.006	-0.016	-0.010
Capex/Sales	0.000	-0.005	-0.008[b]	-0.003	-0.006[c]	-0.005	0.003	0.001	-0.003
Cost Structure									
COGSSls	0.034	-0.001	-0.022[b]	0.014	-0.008	-0.025[b]	0.020	0.006	0.003
SG&A/Sales	-0.081[a]	-0.070[a]	0.000	-0.022[c]	-0.039[b]	-0.004	-0.059[b]	-0.031	0.004
R&D/Sales	0.000	0.000	0.000	0.000[b]	0.000	0.000[b]	0.000[b]	0.000	0.000
Num. of Observations	52			52			104		

Table 5
Regression of Valuation Following the RLBO

This table summarizes the results of OLS regressions where the dependent variable is industry-adjusted *PSlsRatio* (Panel A) or *MktBook* (Panel B) after the RLBO. All independent variables are industry-adjusted. The sample consists of RLBOs from 1986 to 2006. Variables as of immediately after the RLBO are designated RLBO+0. The time in the private period is designated as LBO to RLBO. Five years after the RLBO is defined as RLBO+5. P-values are reported in parenthesis. All variables are defined in Appendix A. [a], [b], and [c] denote statistical significance at the 1%, 5%, and 10% level respectively. All variables are industry-adjusted with the median of the 2-digit SIC code.

Panel A: OLS regression of post-RLBO price to sales ratio for RLBO firms

Explanatory Variable	**Time Period**	**Model 1**	**Model 2**	**Model 3**
Intercept		0.093 (0.74)	0.201 (0.58)	-0.036 (0.91)
Log(Assets)	RLBO+0	-0.026 (0.65)	-0.126 (0.15)	-0.058 (0.37)
Leverage	RLBO+0	-0.236 (0.42)	-0.121 (0.66)	-0.328 (0.24)
PPETA	RLBO+0	0.095 (0.87)	-0.316 (0.61)	-0.307 (0.61)
COGSSls	RLBO+0	-3.825[a] (0.00)	-3.711[a] (0.00)	-4.972[a] (0.00)
Growth	LBO to RLBO	0.059[a] (0.00)	0.035[a] (0.00)	0.054[a] (0.00)
Δ*R&D/Sales*	LBO to RLBO	12.024[a] (0.00)		14.239[a] (0.00)
Δ*Capex/Sales*	LBO to RLBO			0.298 (0.74)
Δ*Shares/Own*	LBO to RLBO		0.000[b] (0.03)	0.000[c] (0.07)
Δ*SG&A/Sales*	LBO to RLBO			-2.798[a] (0.01)
RLBOYears	LBO to RLBO	0.020 (0.44)	-0.004 (0.89)	0.007 (0.74)
Delist	RLBO+5	-0.162 (0.43)	-0.199 (0.41)	-0.176 (0.46)
TermPremium	RLBO+0	1.771 (0.80)	4.450 (0.57)	8.898 (0.25)
F-Statistic		9.06[a]	5.42[a]	8.59[a]
Adjusted R^2		0.307	0.221	0.424
Year Dummies		No	No	No
Number of observations		165	141	125

Table 5 (continued)

Panel A (continued)

Explanatory Variable	Time Period	Model 4	Model 5	Model 6
Intercept		0.021 (0.93)	0.157 (0.60)	-0.137 (0.63)
Log(Assets)	RLBO+0	-0.040 (0.46)	-0.134 (0.11)	-0.083 (0.17)
PPETA	RLBO+0	0.015 (0.98)	-0.352 (0.56)	-0.421 (0.48)
COGSSls	RLBO+0	-3.765[a] (0.00)	-3.681[a] (0.00)	-4.751[a] (0.00)
Growth	LBO to RLBO	0.060[a] (0.00)	0.036[a] (0.00)	0.054[a] (0.00)
Δ*R&D/Sales*	LBO to RLBO	11.974[a] (0.01)		13.841[a] (0.00)
Δ*Capex/Sales*	LBO to RLBO			0.288 (0.75)
Δ*Shares/Own*	LBO to RLBO		0.000[b] (0.03)	0.000[c] (0.05)
Δ*SG&A/Sales*	LBO to RLBO			-2.607[a] (0.01)
RLBOYears	LBO to RLBO	0.020 (0.40)	-0.003 (0.91)	0.008 (0.71)
Delist	RLBO+5	-0.182 (0.39)	-0.221 (0.36)	-0.206 (0.39)
TermPremium	RLBO+0	3.438 (0.60)	5.739 (0.43)	11.334 (0.11)
F-Statistic		10.75[a]	6.77[a]	9.80[a]
Adjusted R^2		0.316	0.242	0.431
Year Dummies		No	No	No
Number of observations		170	146	129

Table 5 (continued)

Panel B: OLS regression of post-RLBO market-to-book ratio for RLBO firms

Explanatory Variable	**Time Period**	**Model 1**	**Model 2**	**Model 3**
Intercept		-0.231 (0.40)	-0.262 (0.37)	-0.200 (0.55)
Log(Assets)	RLBO+0	-0.125[b] (0.01)	-0.158[a] (0.01)	-0.158[b] (0.01)
Leverage	RLBO+0	0.990[a] (0.00)	0.994[a] (0.00)	0.887[a] (0.00)
PPETA	RLBO+0	-0.468 (0.34)	-0.791 (0.14)	-0.654 (0.27)
COGSSls	RLBO+0	-2.017[a] (0.01)	-2.053[a] (0.01)	-2.940[a] (0.00)
Growth	LBO to RLBO	0.028[a] (0.00)	0.020[b] (0.01)	0.028[a] (0.01)
Δ*R&D/Sales*	LBO to RLBO	4.042[c] (0.06)		4.105 (0.11)
Δ*Capex/Sales*	LBO to RLBO			1.310[a] (0.01)
Δ*Shares/Own*	LBO to RLBO		0.000[a] (0.00)	0.000[b] (0.01)
Δ*SG&A/Sales*	LBO to RLBO			-0.853 (0.37)
RLBOYears	LBO to RLBO	0.044[c] (0.05)	0.032 (0.12)	0.027 (0.19)
Delist	RLBO+5	-0.328[c] (0.05)	-0.405[b] (0.02)	-0.433[b] (0.01)
TermPremium	RLBO+0	9.949 (0.12)	14.521[b] (0.02)	15.700[b] (0.03)
F-Statistic		6.30[a]	6.41[a]	5.57[a]
Adjusted R^2		0.225	0.258	0.307
Year Dummies		No	No	No
Number of observations		165	141	125

Table 5 (continued)

Panel B (continued)

Explanatory Variable	Time Period	Model 4	Model 5	Model 6
Intercept		0.030 (0.91)	-0.004 (0.99)	0.029 (0.92)
Log(Assets)	RLBO+0	-0.089[c] (0.08)	-0.114[b] (0.05)	-0.107[c] (0.08)
PPETA	RLBO+0	-0.136 (0.78)	-0.447 (0.41)	-0.394 (0.51)
COGSSls	RLBO+0	-2.461[a] (0.00)	-2.597[a] (0.00)	-3.587[a] (0.00)
Growth	LBO to RLBO	0.026[b] (0.01)	0.019[b] (0.02)	0.027[b] (0.02)
Δ*R&D/Sales*	LBO to RLBO	3.987[c] (0.07)		4.767[c] (0.07)
Δ*Capex/Sales*	LBO to RLBO			1.355[a] (0.00)
Δ*Shares/Own*	LBO to RLBO		0.000[b] (0.02)	0.000[b] (0.03)
Δ*SG&A/Sales*	LBO to RLBO			-1.203 (0.23)
RLBOYears	LBO to RLBO	0.044[c] (0.06)	0.033 (0.13)	0.027 (0.21)
Delist	RLBO+5	-0.290[c] (0.05)	-0.329[b] (0.05)	-0.369[b] (0.03)
TermPremium	RLBO+0	6.482 (0.33)	10.724 (0.11)	11.834[c] (0.09)
F-Statistic		5.09[a]	5.17[a]	4.98[a]
Adjusted R^2		0.162	0.187	0.255
Year Dummies		No	No	No
Number of observations		170	146	129

Table 6
Regression of Time in the Private Period

This table summarizes regressions of pre-LBO factors impacting private period duration. The sample consists of RLBOs between 1986 and 2006. Panel A employs a Tobit specification with *RLBOYears* as dependent variable, while Panel B utilizes an OLS regression where the regressand is the natural logarithm of one plus *RLBOYears*. A prefix of LBO-0 indicates that the value is immediately before the LBO, while LBO-1 precedes a variable when it indicates that the value is for one year earlier. All variables are defined in Appendix A. P-values are reported in parenthesis. [a], [b], and [c] denotes statistical significance at the 1%, 5%, and 10% level respectively. All variables are industry-adjusted by 2-digit SIC code medians.

Panel A: Tobit regressions

Explanatory Variables	Time Period	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept		-9.481[c] (0.07)	-12.994[b] (0.04)	-6.821 (0.25)	14.608[a] (0.00)	5.900[b] (0.02)
Log(Assets)	LBO-0	0.912[b] (0.01)	0.998[b] (0.02)	-0.157 (0.67)	0.448 (0.21)	1.295[b] (0.01)
Leverage	LBO-0	-11.087[a] (0.01)	-9.342[a] (0.00)	-9.462[a] (0.00)	-6.154[b] (0.04)	-13.371[a] (0.01)
FCF/Sales (Pre1987)	LBO-0	24.437 (0.40)	31.038 (0.36)			
FCF/Sales (Post1986)	LBO-0	-31.696[a] (0.00)	-33.096[a] (0.00)			
IntanTA	LBO-0	-20.926[a] (0.00)	-19.609[a] (0.00)			
CashTA	LBO-0				8.750 (0.12)	17.710[b] (0.03)
Sales/Employee	LBO-0				-0.001 (0.81)	
DivTA	LBO-0	51.675 (0.14)	58.221 (0.15)	90.810[a] (0.01)	16.440 (0.60)	14.533 (0.73)
Proceeds/Sales	LBO-0				-0.003 (0.93)	
ROA	LBO-0		9.182 (0.33)			
ROE	LBO-0	-1.205 (0.69)				
Capex/Sales	LBO-1			-10.354[a] (0.00)		
R&D/Sales	LBO-0			44.848[c] (0.09)		
TaxRate (Pre1987)	LBO-0			4.327[c] (0.08)		
TaxRate (Post1986)	LBO-0			-1.596 (0.40)		
MBO	LBO-0	3.022[b] (0.05)	2.625 (0.12)	4.243[b] (0.02)	-1.408 (0.38)	
LBOCount	LBO-0					-0.267[a] (0.00)
TermPremium	LBO-0					-168.050[b] (0.01)
FCF/Sales (χ^2)		3.31[c]	3.24[c]	N/A	N/A	N/A
TaxRate (χ^2)		N/A	N/A	3.61[c]	N/A	N/A
Year Dummies		No	No	No	Yes	No
Num. of Observations		136	148	165	159	172

Table 6 (continued)

Panel B: OLS regressions

Explanatory Variables	Time Period	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept		0.716[a] (0.00)	0.672[a] (0.01)	1.064[a] (0.00)	2.630[a] (0.00)	1.835[a] (0.00)
Log(Assets)	LBO-0	0.094[b] (0.01)	0.085[b] (0.03)	-0.021 (0.45)	0.015 (0.64)	0.093[a] (0.00)
Leverage	LBO-0	-0.994[a] (0.01)	-0.537[b] (0.05)	-0.578[b] (0.02)	-0.335[b] (0.05)	-0.439[a] (0.01)
FCF/Sales (Pre1987)	LBO-0	3.318 (0.27)	3.829 (0.22)			
FCF/Sales (Post1986)	LBO-0	-2.497[a] (0.00)	-2.049[a] (0.00)			
IntanTA	LBO-0	-1.696[a] (0.00)	-1.343[a] (0.01)			
CashTA	LBO-0				0.634 (0.25)	1.600[a] (0.00)
Sales/Employee	LBO-0				-0.001 (0.23)	
DivTA	LBO-0	5.521 (0.10)	5.727 (0.11)	7.520[b] (0.02)	2.919 (0.28)	2.999 (0.33)
Proceeds/Sales	LBO-0				-0.000 (0.45)	
ROA	LBO-0		0.074 (0.93)			
ROE	LBO-0	-0.184 (0.66)				
Capex/Sales	LBO-1			-0.592[a] (0.01)		
R&D/Sales	LBO-0			2.904 (0.19)		
TaxRate (Pre1987)	LBO-0			0.301 (0.19)		
TaxRate (Post1986)	LBO-0			-0.013 (0.95)		
MBO	LBO-0	0.196 (0.26)	0.109 (0.58)	0.219 (0.12)	-0.169 (0.24)	
LBO Count	LBO-0					-0.010[b] (0.02)
TermPremium	LBO-0					-12.113[a] (0.00)
F-Statistic		3.86[a]	2.85[a]	3.29[a]	3.37[a]	8.33[a]
FCF/Sales (χ^2)		3.37[c]	3.51[c]	N/A	N/A	N/A
TaxRate (χ^2)		N/A	N/A	1.00	N/A	N/A
Adjusted R^2		0.372	0.262	0.281	0.298	0.205
Year Dummies		No	No	No	Yes	No
Num. of Observations		136	148	165	159	172

Table 7
Regression of Free Cash Flow

This table summarizes the results of regressions where the dependent variable (FCF/Sales) is free cash flow. The sample consists of RLBOs between 1986 and 2006. Models 1, 2, and 3 include only RLBO firms. Control firms matched on size and industry are included in Model 4. A prefix of LBO-0 indicates that the value is for the year of the LBO, while RLBO+0 is at the RLBO. Independent variables with no prefix are from the same time as the dependent variable. A prefix of LBO-1 or RLBO-1 indicates that it is for one year earlier than for the dependent variable. The time in the private period is designated as LBO to RLBO. Model 2 is the second stage of Heckman's (1978) two-step process. In Model 4 interaction terms with (RLBO) in parenthesis, are for RLBO firms. Variables with either (IPO) or (Seas) in parenthesis are interaction terms for controls that either are IPOs or seasoned firms. P-values are reported in parenthesis. Chi-squared statistics test hypotheses that variables are jointly zero. All variables are defined in Appendix A. [a], [b], and [c] denotes statistical significance at the 1%, 5%, and 10% level respectively. Standard errors are calculated using White's (1980) correction for heteroskedasticity. All variables are industry-adjusted with the median of the 2-digit SIC code.

Dependent Variable	**FCF/Sales at the LBO**			**FCF/Sales at the RLBO**		
Explanatory Variables	**Time Period**	**Model 1**	**Model 2**	**Time Period**	**Model 3**	**Model 4**
Intercept		0.001 (0.91)	-0.116 (0.57)		0.035 (0.23)	0.159[c] (0.08)
Log(Assets)	LBO-0	0.014[a] (0.01)	0.016[a] (0.00)	RLBO+0	0.012[b] (0.02)	0.014[a] (0.00)
MktBook	LBO-0	0.038 (0.13)	0.036 (0.16)	RLBO+0	0.022[a] (0.00)	0.029[a] (0.00)
DivTA	LBO-0	-0.665 (0.14)	-0.679 (0.13)	RLBO+0	-1.496[a] (0.00)	-1.030[a] (0.00)
Leverage	LBO-0	-0.035 (0.41)	-0.034 (0.42)	RLBO+0	-0.024 (0.16)	-0.030 (0.22)
TaxRate	LBO-0	0.047[c] (0.10)	0.045 (0.13)			
TaxRatePre1987	LBO-0	-0.087[b] (0.03)	-0.087[b] (0.03)			
Sales/Employee	LBO-1	0.000[b] (0.02)	0.000[b] (0.03)			
Capex/Sales	LBO-1	0.012 (0.89)	0.008 (0.93)			
Capex/Sales(RLBO)				RLBO-1	0.310[a] (0.00)	0.322[a] (0.00)
Capex/Sales(IPO)				RLBO-1		-1.182[a] (0.00)
Capex/Sales(Seas)				RLBO-1		0.294[a] (0.00)
Delist				RLBO+5	0.027 (0.12)	-0.024 (0.30)
RLBOYearsSq				LBO to RLBO	0.000 (0.42)	
MBO				LBO-0	0.008 (0.65)	
Mills	LBO-0		0.035 (0.56)			
F-Statistic		3.76[a]	3.38[a]		6.10[a]	16.58[a]
TaxRate (χ^2)		4.53[b]	4.17[b]		N/A	N/A
Capex (χ^2)		N/A	N/A		N/A	7.31[a]
Adjusted R^2		0.125	0.121		0.447	0.482
Year Dummies		No	No		Yes	Yes
Num. of observations		156	156		178	369

Table 8
Regression of Five Year Survival Probability Following the RLBO

This table summarizes the results of a Logit regression where the dependent variable (*Surviveflag*) is set to one for firms still publicly listed in CRSP five years after the RLBO. The sample consists of RLBOs from 1986 to 2006. A prefix of LBO-0 indicates that the value is for the year of the LBO, while RLBO+0 is immediately after the RLBO. The time in the private period is designated as LBO to RLBO. P-values are reported in parenthesis. All variables are defined in Appendix A. [a], [b], and [c] denote statistical significance at the 1%, 5%, and 10% level respectively. All variables are industry-adjusted with the median of the 2-digit SIC code.

Explanatory Variable	**Time Period**	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Intercept		-0.117 (0.76)	-0.155 (0.70)	-0.256 (0.54)	-0.225 (0.68)	-0.077 (0.85)	-0.551 (0.27)
Log(Assets)	RLBO+0	0.049 (0.70)	0.076 (0.57)	0.144 (0.32)	0.053 (0.68)	0.142 (0.28)	0.066 (0.60)
RLBOYears	LBO to RLBO	0.208[b] (0.04)	0.210[b] (0.04)	0.234[b] (0.03)	0.200[c] (0.05)	0.210[b] (0.04)	0.207[b] (0.05)
RLBOYearsSq	LBO to RLBO	-0.009[c] (0.09)	-0.010[c] (0.08)	-0.010[c] (0.07)	-0.008 (0.12)	-0.010[c] (0.08)	-0.009[c] (0.10)
MktBook	RLBO+0	0.490[b] (0.01)	0.512[b] (0.01)	0.602[a] (0.01)	0.361[b] (0.04)	0.377[b] (0.03)	0.445[b] (0.02)
ROA	RLBO+0			-2.342 (0.32)			
Leverage	RLBO+0	-0.741 (0.22)	-0.778 (0.21)	-0.778 (0.27)	-0.418 (0.49)	-0.359 (0.55)	-0.626 (0.30)
PPETA	RLBO+0					-1.343 (0.17)	
Δ*Sales/Employee*	LBO to RLBO					-0.002[b] (0.05)	
SG&A/Sales	RLBO+0			-0.660 (0.65)			
Capex/Sales	RLBO+0	2.065 (0.29)					
R&D/Sales	RLBO+0	-5.468 (0.29)					
Div/TA	RLBO+0		7.299 (0.24)				
FCF/Sales	RLBO+0		1.191 (0.60)				
TaxRate	RLBO+0				1.015[c] (0.07)		1.031[c] (0.07)
TermPremium	RLBO+0				7.600 (0.61)		
LBOCount	LBO-0						0.025[c] (0.09)
Pseudo R^2		0.090	0.102	0.109	0.101	0.111	0.120
Sample Size		197	193	178	197	195	197

Table 9
Long-run Stock Returns after the RLBO

This table summarizes long-run stock returns. Abnormal returns are adjusted by IPO firms in the same industry, seasoned firms in the same industry, all firms in an industry, and control firms. IPO adjusted returns are based on the 1-digit SIC code median. The median 2-digit SIC code is used to adjust RLBO firm buy-and-hold returns in the other cases. Control firms are the closest in size in the same industry. The 2-digit SIC code is used to determine the industry unless no matches are found. The remaining matching firms are based on the 1-digit SIC code. Buy-and-hold returns are winsorized at the 3rd standard deviation. All variables are defined in Appendix A. [a], [b], and [c] denotes statistical significance at the 1%, 5%, and 10% level respectively. Panels A and B p-values in parenthesis are based on paired differences, while brackets indicate unpaired group tests. Curly braces in Panels C and D represent compounded monthly intercepts over the sample time period.

Panel A: Cumulative 12, 36, and 60 month buy-and-hold returns

	12 Month Returns		36 Month Returns		60 Month Returns	
	Mean	**Median**	**Mean**	**Median**	**Mean**	**Median**
Raw Returns	0.155[a]	0.111[a]	0.446[a]	0.233[a]	0.642[a]	0.161[a]
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
IPO Adjusted	0.221[a]	0.174[a]	0.597[a]	0.355[a]	0.872[a]	0.399[a]
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	[0.00][a]	[0.00][a]	[0.00][a]	[0.00][a]	[0.00][a]	[0.00][a]
Seasoned Firm Adjusted	0.159[a]	0.120[a]	0.467[a]	0.213[a]	0.704[a]	0.251[a]
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	[0.00][a]	[0.00][a]	[0.00][a]	[0.00][a]	[0.00][a]	[0.01][s]
Industry-Adjusted	0.161[a]	0.125[a]	0.479[a]	0.256[a]	0.722[a]	0.259[a]
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	[0.00][a]	[0.00][a]	[0.00][a]	[0.00][a]	[0.00][a]	[0.00][a]
Control Firm Adjusted	-0.010	0.002	0.027	-0.051	-0.358	-0.076
	(0.84)	(0.82)	(0.82)	(0.93)	(0.23)	(0.24)
	[0.83]	[0.93]	[0.97]	[0.89]	[0.17]	[0.12]

Panel B: Cumulative 12 to 36, 36 to 60, and 12 to 60 month returns

	13 to 36 Month Returns		37 to 60 Month Returns		13 to 60 Month Returns	
	Mean	**Median**	**Mean**	**Median**	**Mean**	**Median**
Raw Returns	0.219[a]	0.115[a]	0.122[c]	0.032	0.325[a]	0.022[b]
	(0.00)	(0.00)	(0.06)	(0.65)	(0.00)	(0.03)
IPO Adjusted	0.314[a]	0.208[a]	0.244[a]	0.116[a]	0.501[a]	0.231[a]
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	[0.00][a]	[0.00][a]	[0.01][a]	[0.03][b]	[0.00][a]	[0.00][a]
Seasoned Firm Adjusted	0.233[a]	0.111[a]	0.166[a]	0.066[c]	0.376[a]	0.113[a]
	(0.00)	(0.00)	(0.01)	(0.08)	(0.00)	(0.00)
	[0.00][a]	[0.01][b]	[0.04][b]	[0.37]	[0.00][a]	[0.05][b]
Industry-Adjusted	0.244[a]	0.132[a]	0.122[c]	0.032	0.325[a]	0.022[b]
	(0.00)	(0.00)	(0.06)	(0.65)	(0.00)	(0.03)
	[0.00][a]	[0.01][a]	[0.09][c]	[0.29]	[0.00][a]	[0.59]
Control Firm Adjusted	0.030	0.015	-0.205[b]	-0.087[b]	-0.211	-0.039
	(0.68)	(0.70)	(0.04)	(0.03)	(0.18)	(0.49)
	[0.87]	[0.84]	[0.21]	[0.02][b]	[0.12]	[0.16]

Table 9 (continued)

Panel C: Intercepts from four factor model regressions

	12 Month	36 Month	60 Month
Raw Returns	-0.004 (0.38) {-0.050}	-0.002 (0.51) {-0.067}	-0.003 (0.34) {-0.143}
IPO Adjusted	0.009[b] (0.04) {0.110}	0.012[a] (0.00) {0.534}	0.011[a] (0.00) {0.948}
Seasoned Firm Adjusted	0.006[b] (0.01) {0.077}	0.008[a] (0.00) {0.340}	0.008[a] (0.00) {0.591}
Industry-Adjusted	0.006[a] (0.01) {0.079}	0.008[a] (0.00) {0.349}	0.008[a] (0.00) {0.622}
Control Firm Adjusted	-0.007 (0.23) {-0.084}	-0.004 (0.32) {-0.119}	-0.005 (0.11) {-0.259}

Panel D: Intercepts from four factor model regressions

	13 to 36 Month	37 to 60 Month	13 to 60 Month
Raw Returns	-0.002 (0.58) {-0.048}	-0.003 (0.52) {-0.078}	-0.002 (0.46) {-0.108}
IPO Adjusted	0.012[a] (0.00) {0.344}	0.010[b] (0.03) {0.263}	0.012[a] (0.00) {0.744}
Seasoned Firm Adjusted	0.008[b] (0.03) {0.197}	0.006 (0.19) {0.167}	0.008[b] (0.01) {0.437}
Industry-Adjusted	0.008[b] (0.03) {0.216}	0.007 (0.15) {0.185}	0.008[a] (0.01) {0.481}
Control Firm Adjusted	-0.001 (0.85) {-0.019}	-0.005 (0.43) {-0.110}	-0.003 (0.48) {-0.115}

Table 10
Corporate Governance Summary Statistics

This table reports corporate governance summary statistics for both RLBO and matched control firms. Control firms are the closest in book value of assets in the same industry where proxy statements are available. The 2-digit SIC code is used to determine the industry unless no matches are found. The remaining control firms are selected using the 1-digit SIC code. RLBO firm proxy statements are the first submitted after the public offering. Private equity firm directors are classified as Grey. All variables are defined in Appendix A. Statistical differences in means and medians are reported. [a], [b], and [c] denotes statistical significance at the 1%, 5%, and 10% level respectively.

	Means			**Medians**		
Variable	**RLBO**	**Control**	**RLBO – Control**	**RLBO**	**Control**	**RLBO – Control**
Inside Percent	0.471	0.242	0.229[a]	0.513	0.120	0.268[a]
CEO Percent	0.068	0.077	-0.009	0.023	0.014	0.003
P/E Percent	0.330	0.000	N/A	0.350	0.000	N/A
Block Percent	0.096	0.130	-0.036[a]	0.055	0.090	-0.036[a]
Directors	7.694	8.729	-1.049[a]	7.000	8.000	-1.000[a]
%Outside Directors	0.341	0.608	-0.269[a]	0.333	0.625	-0.275[a]
%Inside Directors	0.274	0.264	0.011	0.250	0.222	0.017
%Grey Directors	0.388	0.127	0.263[a]	0.429	0.111	0.278[a]
CEO Duality	0.676	0.705	-0.029	1.000	1.000	0.000
Meetings	5.540	6.686	-1.188[a]	5.000	6.000	-1.000[a]
Classified Board	0.522	0.522	0.000	1.000	1.000	0.000
Dual Class Stock	0.122	0.140	-0.020	0.000	0.000	0.000
G-Index	7.024	8.933	-1.913[a]	7.000	9.000	-2.000[a]
E-Index	1.788	2.288	-0.667[a]	2.000	2.000	-1.000[a]
CEO Age	52.069	53.903	-1.750[b]	51.500	53.000	-2.000[b]
CEO Tenure	4.275	8.449	-3.975[a]	3.000	6.000	-3.000[a]
Committees	2.892	3.198	-0.296[a]	3.000	3.000	0.000[a]
Comp Comm	0.946	0.961	-0.015	1.000	1.000	0.000
Nom Comm	0.281	0.493	-0.217[a]	0.000	0.000	0.000[a]
Exec Comm	0.414	0.415	0.000	0.000	0.000	0.000
Sample Size	207			207		

Table 11
Private Period Restructuring and Stock Returns Following the RLBO

This table summarizes the results of OLS regressions where the dependent variable is 12 month returns (Panel A) or 36 month returns (Panel B) after the RLBO. All independent variables are industry-adjusted. The sample consists of RLBOs from 1986 to 2006. P-values are reported in parenthesis. All variables are defined in Appendix A. [a], [b], and [c] denote statistical significance at the 1%, 5%, and 10% level respectively. All variables are industry-adjusted with the median of the 2-digit SIC code.

Panel A: OLS regression of post-RLBO industry-adjusted 12 month buy-and-hold returns

Explanatory Variable	**Time Period**	**Model 1**	**Model 2**	**Model 3**
Intercept		0.266[b] (0.03)	0.095 (0.39)	0.248[c] (0.05)
Log(Assets)	RLBO+0		0.038 (0.20)	0.014 (0.68)
Leverage	RLBO+0	0.279[c] (0.05)	0.234 (0.12)	0.249[c] (0.10)
PPETA	RLBO+0	-0.147[c] (0.09)		
Growth	LBO to RLBO	0.009[a] (0.01)		
Δ*Shares/Owner*	LBO to RLBO	0.000 (0.32)		0.000 (0.86)
Δ*R&D/Sales*	LBO to RLBO		0.488 (0.43)	
Δ*Capex/Sales*	LBO to RLBO			0.365[b] (0.02)
Δ*ROA*	LBO to RLBO		0.737[b] (0.04)	1.030[b] (0.02)
RLBOYears	LBO to RLBO	-0.007 (0.29)	-0.006 (0.36)	-0.010 (0.19)
Delist	RLBO+5	-0.682[a] (0.00)	-0.481[a] (0.00)	-0.610[a] (0.00)
TermPremium	RLBO+0	-1.420 (0.69)	0.386 (0.90)	-1.421 (-0.69)
F-Statistic		3.22[a]	3.15[a]	3.40[a]
Adjusted R^2		0.099	0.085	0.122
Year Dummies		No	No	No
Number of observations		148	164	139

Table 11 (continued)

Panel B: OLS regression of post-RLBO industry-adjusted 36 month buy-and-hold returns

Explanatory Variable	**Time Period**	**Model 1**	**Model 2**	**Model 3**
Intercept		0.229 (0.35)	0.088 (0.70)	0.197 (0.47)
Leverage	RLBO+0	0.676[c] (0.07)	0.855[b] (0.02)	0.023 (0.74)
PPETA	RLBO+0	-0.519 (0.35)	-0.135 (0.81)	0.814[b] (0.03)
Growth	LBO to RLBO	0.002[a] (0.01)		
Δ*R&D/Sales*	LBO to RLBO		-0.952 (0.64)	
Δ*Capex/Sales*	LBO to RLBO			0.734[b] (0.03)
Δ*Shares/Owner*	LBO to RLBO			-0.000 (0.64)
Δ*SG&A/Sales*	LBO to RLBO	0.322 (0.49)		
Δ*ROA*	LBO to RLBO		1.783[b] (0.02)	2.471[b] (0.02)
RLBOYears	LBO to RLBO	-0.018 (0.19)	-0.016 (0.25)	-0.022 (0.15)
Delist	RLBO+5	-1.223[a] (0.00)	-1.117[a] (0.00)	-1.222[a] (0.00)
TermPremium	RLBO+0	10.243 (0.12)	13.673[b] (0.03)	12.833[c] (0.07)
F-Statistic		3.07[a]	4.52[a]	4.18[a]
Adjusted R^2		0.090	0.131	0.156
Year Dummies		No	No	No
Number of observations		148	164	139

Table 12
Firm Fundamentals at the RLBO and Long-run Stock Returns

This table summarizes regressions of firm fundamentals at the RLBO and long-run stock returns. The sample consists of RLBOs between 1986 and 2006. Panel A reports 12 month returns, while Panel B presents 36 month returns. All variables are defined in Appendix A. P-values are reported in parenthesis. [a], [b], and [c] denotes statistical significance at the 1%, 5%, and 10% level respectively. All variables are industry-adjusted by 2-digit SIC code medians.

Panel A: 12 month buy-and-hold returns

Explanatory Variables	**Time Period**	**Model 1**	**Model 2**	**Model 3**
Intercept		0.088 (0.54)	0.234[c] (0.06)	0.155 (0.11)
Log(Assets)	RLBO+0	0.060[b] (0.03)		0.036 (0.21)
Leverage	RLBO+0			0.169 (0.24)
PPETA	RLBO+0	-0.280 (0.14)	-0.454[b] (0.05)	
COGSSls	RLBO+0		-0.925[b] (0.02)	
Growth	LBO to RLBO		0.001[b] (0.04)	
R&D/Sales	RLBO+0			1.854[b] (0.05)
Capex/Sales	RLBO+0			-0.383[b] (0.04)
SG&A/Sales	RLBO+0		-1.067[a] (0.00)	
Sales/Employee	RLBO+0			0.000[b] (0.05)
ExecComm	RLBO+0	-0.194[a] (0.01)		
DualClass	RLBO+0	-0.143 (0.11)		
TotComm	RLBO+0	0.043 (0.32)		
Inside	RLBO+0		-0.147 (0.31)	
Block	RLBO+0			-0.298 (0.20)
RLBOYears	RLBO+0		-0.005 (0.41)	-0.005 (0.41)
Delist	RLBO+0	-0.566[a] (0.00)	-0.470[a] (0.00)	-0.525[a] (0.00)
TermPremium	RLBO+0	0.190 (0.95)	-1.408 (0.64)	0.952 (0.75)
F-Statistic		3.41[a]	2.75[a]	2.85[a]
Adjusted R^2		0.077	0.082	0.079
Year Dummies		No	No	No
Num. of Observations		203	158	196

Table 12 (Continued)

Panel A (Continued)

Explanatory Variables	Time Period	Model 4	Model 5
Intercept		0.127 (0.23)	0.082 (0.40)
Log(Assets)	RLBO+0	0.029 (0.30)	0.066[b] (0.03)
Leverage	RLBO+0	0.103 (0.45)	0.077 (0.61)
R&D/Sales	RLBO+0	1.998[b] (0.04)	
Shares/Owner	RLBO+0	-0.000[c] (0.07)	
Div/TA	RLBO+0	2.397[b] (0.05)	
Sales/Employee	RLBO+0	0.000[b] (0.05)	
Cash/TA	RLBO+0		0.323 (0.49)
MktBook	RLBO+0		0.125[a] (0.01)
RLBOYears	RLBO+0	-0.006 (0.38)	-0.007 (0.25)
Delist	RLBO+0	-0.532[a] (0.00)	-0.461[a] (0.00)
TermPremium	RLBO+0	1.999 (0.53)	0.101 (0.97)
F-Statistic		3.22[a]	5.06[a]
Adjusted R^2		0.097	0.127
Year Dummies		No	No
Num. of Observations		187	196

Table 12 (Continued)

Panel B: 36 month buy-and-hold returns

Explanatory Variables	Time Period	Model 1	Model 2	Model 3
Intercept		0.178 (0.35)	0.213 (0.28)	0.171 (0.40)
Log(Assets)	RLBO+0	0.037 (0.50)	0.025 (0.64)	0.074 (0.25)
Leverage	RLBO+0	0.525[c] (0.10)	0.475 (0.17)	0.487 (0.20)
Capex/Sales	RLBO+0			-0.958[a] (0.01)
Shares/Owner	RLBO+0	-0.000[a] (0.01)	-0.000[a] (0.00)	
Div/TA	RLBO+0	4.913[c] (0.07)	4.483[c] (0.06)	
ROA	RLBO+0		2.026[b] (0.04)	
Cash/TA	RLBO+0			-0.479 (0.61)
MktBook	RLBO+0			0.145 (0.18)
RLBOYears	RLBO+0	-0.018 (0.10)	-0.026[b] (0.04)	-0.021 (0.12)
Delist	RLBO+0	-1.187[a] (0.00)	-1.114[a] (0.00)	-1.109[a] (0.00)
TermPremium	RLBO+0	13.350[b] (0.03)	12.123[b] (0.05)	8.993 (0.13)
F-Statistic		5.06[a]	5.48[a]	3.83[a]
Adjusted R^2		0.132	0.162	0.127
Year Dummies		No	No	No
Num. of Observations		188	186	196

Table 13
Changes in Firm Fundamentals and Stock Returns Following the RLBO

This table summarizes regressions of firm fundamentals the first two years after the RLBO and long-run stock returns over months 25 to 48. The sample consists of RLBOs between 1986 and 2006. All variables are defined in Appendix A. P-values are reported in parenthesis. [a], [b], and [c] denotes statistical significance at the 1%, 5%, and 10% level respectively. All variables are industry-adjusted by 2-digit SIC code medians.

Explanatory Variables	**Time Period**	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Intercept		0.165 (0.21)	0.251[b] (0.05)	0.240[c] (0.10)	0.267[c] (0.07)
Log(Assets)	RLBO+0			-0.019 (0.54)	-0.015 (0.64)
Leverage	RLBO+0	0.378[c] (0.07)	0.313 (0.11)	0.394[b] (0.03)	0.399[b] (0.03)
PPETA	RLBO+0	0.432 (0.16)	0.575[b] (0.05)		
Δ*COGS/Sls*	RLBO to RLBO+2		-1.114[a] (0.01)		
Growth	RLBO to RLBO+2		0.123[b] (0.03)		
Δ*Shares/Owner*	RLBO to RLBO+2	0.000[c] (0.07)			
Δ*Capex/Sales*	RLBO to RLBO+2			1.594[b] (0.04)	
Δ*SG&A/Sales*	RLBO to RLBO+2	-0.035 (0.95)			
Δ*Sales/Employee*	RLBO to RLBO+2				-0.000 (0.25)
Δ*ROA*	RLBO to RLBO+2			0.997[a] (0.00)	0.957[a] (0.01)
RLBOYears	LBO to RLBO	-0.015[c] (0.09)	-0.014[c] (0.09)	-0.015[c] (0.06)	-0.015[c] (0.08)
Delist	RLBO+5	-0.861[a] (0.00)	-0.713[a] (0.00)	-0.671[a] (0.00)	-0.706[a] (0.00)
TermPremium	RLBO+0	3.908 (0.35)	-0.302 (0.94)	1.327 (0.74)	0.202 (0.96)
F-Statistic		4.49[a]	6.24[a]	5.59[a]	4.54[a]
Adjusted R^2		0.151	0.183	0.166	0.138
Year Dummies		No	No	No	No
Num. of Observations		138	165	162	156

Table 14
Underwriter Ranking Descriptive Statistics

This table summarizes descriptive statistics for variables employed in Carter, Dark, and Singh (1998) underwriter ranking regressions. *Beta* and the standard deviation of returns (*RetStdDev*) are estimated from a daily time series of raw returns using the offer date +6 through offer date +260. *Size* is the gross proceeds from the offering. *Size* is standardized in dollars of the year 2000 using the annual inflation rate (*CPI*). *Age* is the age of the issuing firm at the time of the offer. *UWRank* is the Carter and Manaster (1990) underwriter rankings as updated by Carter, Dark, and Singh (1998).

Panel A: Mean, standard deviation, and median

Variable	Mean	Standard Deviation	Median
Beta	0.958	0.558	0.891
StdDevRet	0.0310	0.012	0.029
Size($ millions)	189.209	362.822	87.460
Inflation Adjusted Size ($ millions)	199.515	375.566	100.084
Age (years)	44.951	32.195	39.500
Second (%)	13.20	24.59	0.00
UWRank	8.600	0.835	9.001

Panel B: Firm counts by underwriter ranking

Underwriter Ranking	Count	Percent	Cumulative Percent
3.001	1	0.49	0.49
5.001	1	0.49	0.98
5.167	1	0.49	1.47
6.001	5	2.45	3.92
7.001	6	2.94	6.86
8.001	38	18.63	25.49
8.750	5	2.45	27.94
8.833	4	1.96	29.90
8.875	8	3.92	33.82
9.000	15	7.35	41.18
9.001	120	58.82	100.00
Total	204	100.00	

Table 15
Long-run Stock Returns by Underwriter Ranking

This table summarizes long-run stock returns by underwriter ranking. Abnormal returns are adjusted by IPOs, seasoned firms, industry medians, and control firms. IPO returns are based 1-digit SIC codes, while other adjustments employ 2-digit SIC codes. Control firms are selected based on size and industry, where 2-digit SIC codes are first used to determine industry, with remaining control firms based on 1-digit SIC codes. Underwriter rankings are based on the updated Carter and Manaster methodology. Rankings are on a scale of 0 to 9. A ranking is classified as low if it is less than 9. Rankings of 9 or higher are considered to be high. Buy-and-hold returns are winsorized at the 3rd standard deviation. All variables are defined in Appendix A. P-values are in parenthesis. [a], [b], and [c] denotes statistical significance at the 1%, 5%, and 10% level respectively. Curly braces in Panel C represent compounded monthly intercepts over the sample time period.

Panel A: Cumulative 12, 36, and 60 month buy-and-hold returns

	12 Month Returns		36 Month Returns		60 Month Returns	
	Mean	**Median**	**Mean**	**Median**	**Mean**	**Median**
Raw Returns						
Low Ranking	0.028	0.050	0.158	-0.093	0.421[c]	-0.224
	(0.64)	(0.89)	(0.21)	(0.84)	(0.06)	(0.60)
High Ranking	0.221[a]	0.141[a]	0.600[a]	0.317[a]	0.755[a]	0.273[a]
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Low - High	-0.193[a]	-0.091[a]	-0.442[a]	-0.410[a]	-0.335[c]	-0.497[a]
	(0.01)	(0.01)	(0.00)	(0.01)	(0.10)	(0.00)
VW Index Adjusted						
Low Ranking	-0.092	-0.108[c]	-0.218[c]	-0.424[b]	-0.361[c]	-0.670[a]
	(0.13)	(0.10)	(0.07)	(0.01)	(0.08)	(0.00)
High Ranking	0.107[b]	0.044	0.249[b]	0.008	0.120	-0.087
	(0.02)	(0.12)	(0.01)	(0.24)	(0.43)	(0.33)
Low - High	-0.199[a]	-0.152[a]	-0.466[a]	-0.432[a]	-0.481[b]	-0.573[a]
	(0.01)	(0.01)	(0.00)	(0.00)	(0.03)	(0.00)
IPO Firm Adjusted						
Low Ranking	0.113[c]	0.028	0.332[a]	0.119	0.650[a]	0.091[c]
	(0.05)	(0.16)	(0.01)	(0.12)	(0.00)	(0.10)
High Ranking	0.275[a]	0.214[a]	0.735[a]	0.531[a]	0.976[a]	0.522[a]
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Low - High	-0.162[b]	-0.186[b]	-0.403[a]	-0.412[a]	-0.326[c]	-0.431[a]
	(0.01)	(0.01)	(0.01)	(0.00)	(0.10)	(0.00)
Seasoned Firm Adjusted						
Low Ranking	0.049	0.044	0.241[c]	0.052	0.495[b]	-0.035
	(0.43)	(0.69)	(0.05)	(0.54)	(0.02)	(0.74)
High Ranking	0.218[a]	0.130[a]	0.591[a]	0.291[a]	0.810[a]	0.303[a]
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Low - High	-0.169[b]	-0.086[b]	-0.351[b]	-0.238[a]	-0.315	-0.339[a]
	(0.01)	(0.02)	(0.01)	(0.00)	(0.11)	(0.00)
Industry-Adjusted						
Low Ranking	0.057	0.45	0.254[b]	0.050	0.514[b]	-0.041
	(0.36)	(0.59)	(0.04)	(0.41)	(0.02)	(0.57)
High Ranking	0.217[a]	0.154[a]	0.604[a]	0.327[a]	0.828[a]	0.335[a]
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Low - High	-0.160[b]	-0.109[b]	-0.350[b]	-0.277[a]	-0.314	-0.376[a]
	(0.02)	(0.02)	(0.01)	(0.00)	(0.11)	(0.00)
Control Firm Adjusted						
Low Ranking	-0.116	-0.046	-0.368[c]	-0.324[c]	-0.995	-0.324[b]
	(0.21)	(0.27)	(0.08)	(0.06)	(0.11)	(0.01)
High Ranking	0.046	0.008	0.250[c]	0.157	-0.034	0.044
	(0.46)	(0.52)	(0.08)	(0.15)	(0.92)	(0.83)
Low - High	-0.162[c]	-0.054[c]	-0.618[a]	-0.481[b]	-0.961[c]	-0.368[b]
	(0.07)	(0.10)	(0.01)	(0.01)	(0.10)	(0.02)

Table 15 (continued)

Panel B: OLS regression of 36 month buy-and hold returns

Explanatory Variable	Model 1 (Raw)	Model 2 (VW Adj)	Model 3 (IPO Adj)	Model 4 (Seas Adj)	Model 5 (Ind Adj)	Model 6 (Ctl Firm)
Intercept	1.535[b]	2.372[a]	1.073[a]	1.253[a]	1.221[a]	1.377[a]
	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
High Rank Dummy (Rank >= 9)	0.326[b]	0.034[b]	0.124[b]	0.113[b]	0.114[b]	0.211[b]
	(0.02)	(0.03)	(0.03)	(0.05)	(0.05)	(0.03)
Log(Size)	-0.084	0.001	-0.007	-0.026	-0.024	0.001
	(0.21)	(0.95)	(0.79)	(0.39)	(0.42)	(0.98)
Log(Age)	-0.113	-0.014	-0.019	-0.039	-0.035	0.074
	(0.25)	(0.14)	(0.56)	(0.25)	(0.31)	(0.16)
SecondPct	-0.050	-0.007	-0.057	-0.066	-0.071	-0.005
	(0.82)	(0.84)	(0.62)	(0.59)	(0.57)	(0.97)
RetStdDev	-31.091[a]	-1.331[b]	-5.452[b]	-7.711[a]	-7.283[a]	-2.578
	(0.00)	(0.03)	(0.02)	(0.00)	(0.00)	(0.26)
F-Statistic	12.670[a]	2.650[b]	2.580[b]	2.840[b]	2.720[b]	1.940[c]
Adjusted R^2	0.127	0.039	0.038	0.044	0.041	0.023
Sample Size	204	204	204	204	204	204

Panel C: Intercepts from four factor model regressions

Raw Returns	12 Month	36 Month	60 Month
Low Ranking	-0.008	-0.018[b]	-0.011[c]
	(0.41)	(0.01)	(0.06)
	{-0.087}	{-0.471}	{-0.484}
High Ranking	0.008	0.006[c]	0.002
	(0.21)	(0.07)	(0.42)
	{0.098}	{0.232}	{0.159}
Low - High	-0.015[c]	-0.023[a]	-0.013[b]
	(0.06)	(0.00)	(0.03)
	{-0.169}	{-0.573}	{-0.556}

APPENDIX D: FIGURES

Figure 1
Median Industry-Adjusted Free Cash Flow / Sales
Pre-LBO and Post-RLBO

This figure plots the median ratio of capital expenditures to total assets (*FCF/Sales*) from five years before the LBO to five years after the RLBO. *FCF/Sales* is industry-adjusted by the 2-digit SIC code median value. The graph on the left describes years prior to the LBO. The right graph plots years since the RLBO. The private period encompasses the years from LBO-0 through RLBO+0. All variables are defined in Appendix A.

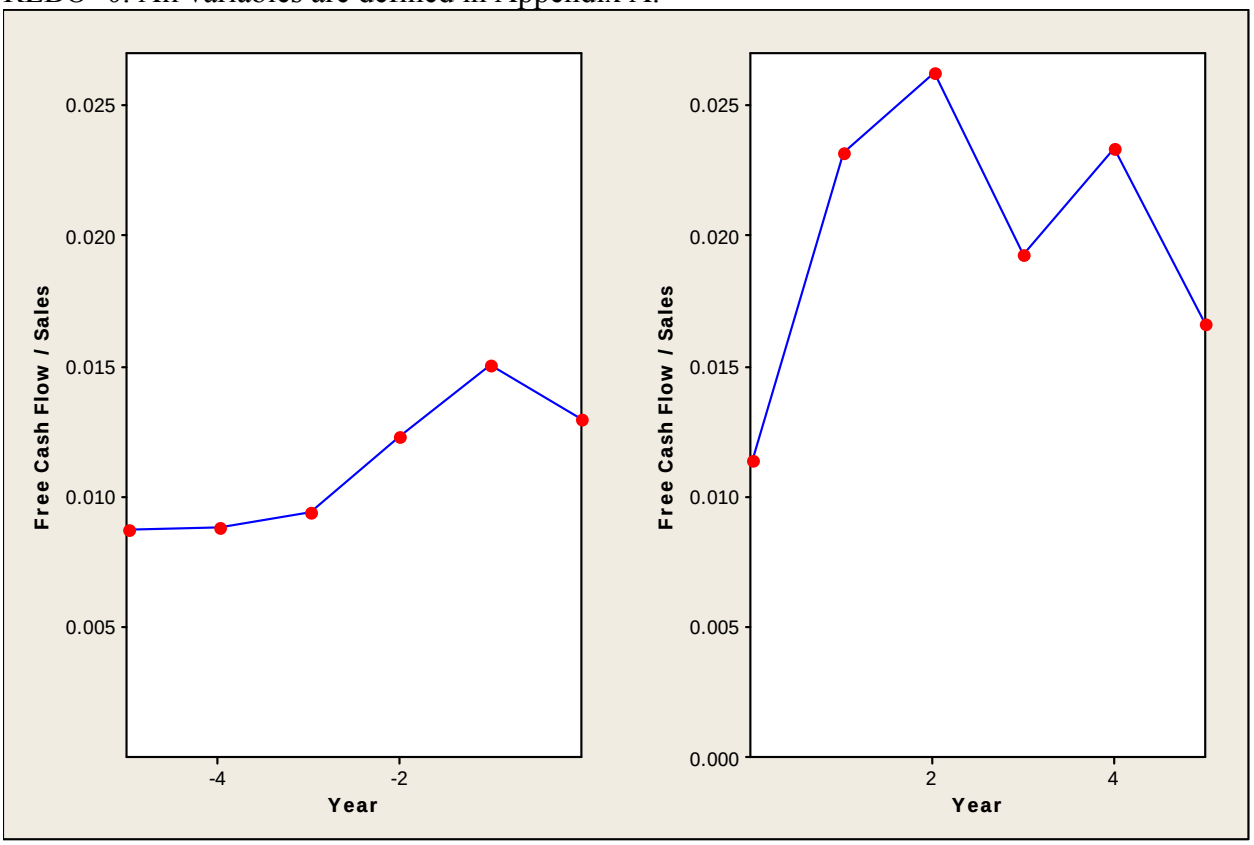


Figure 2
Median Industry-Adjusted Long-term Debt to Total Assets
Pre-LBO and Post-RLBO

This figure plots the median ratio of long-term debt to total assets (*Leverage*) from five years before the LBO to five years after the RLBO. *Leverage* is industry-adjusted by the 2-digit SIC code median value. The graph on the left describes years prior to the LBO. The right graph plots years since the RLBO. The private period encompasses the years from LBO-0 through RLBO+0. All variables are defined in Appendix A.

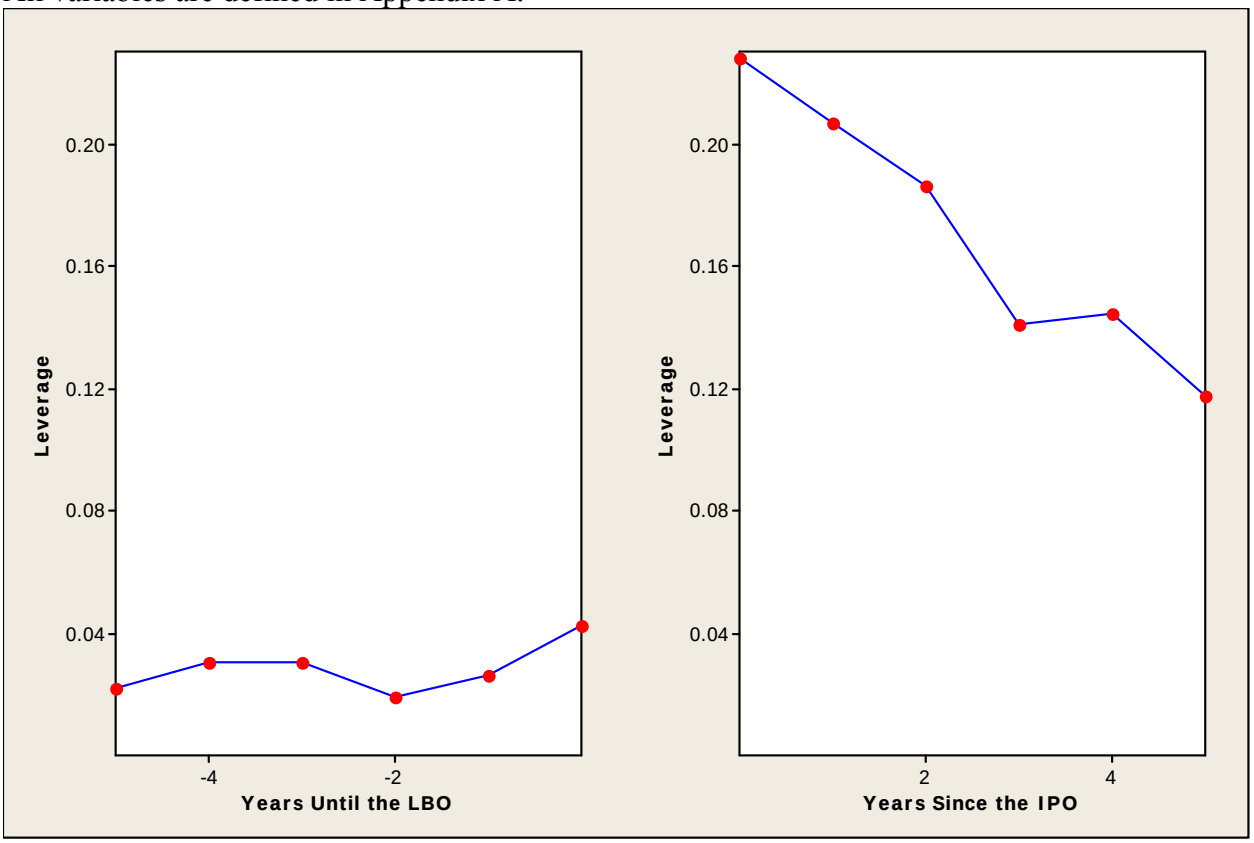


Figure 3
Median Industry-Adjusted Sales / Employee
Pre-LBO and Post-RLBO

This figure plots the median ratio of sales per employee (*Sales/Employee*) from five years before the LBO to five years after the RLBO. *Sales/Employee* is industry-adjusted by the 2-digit SIC code median value. The graph on the left describes years prior to the LBO. The right graph plots years since the RLBO. The private period encompasses the years from LBO-0 through RLBO+0. All variables are defined in Appendix A.

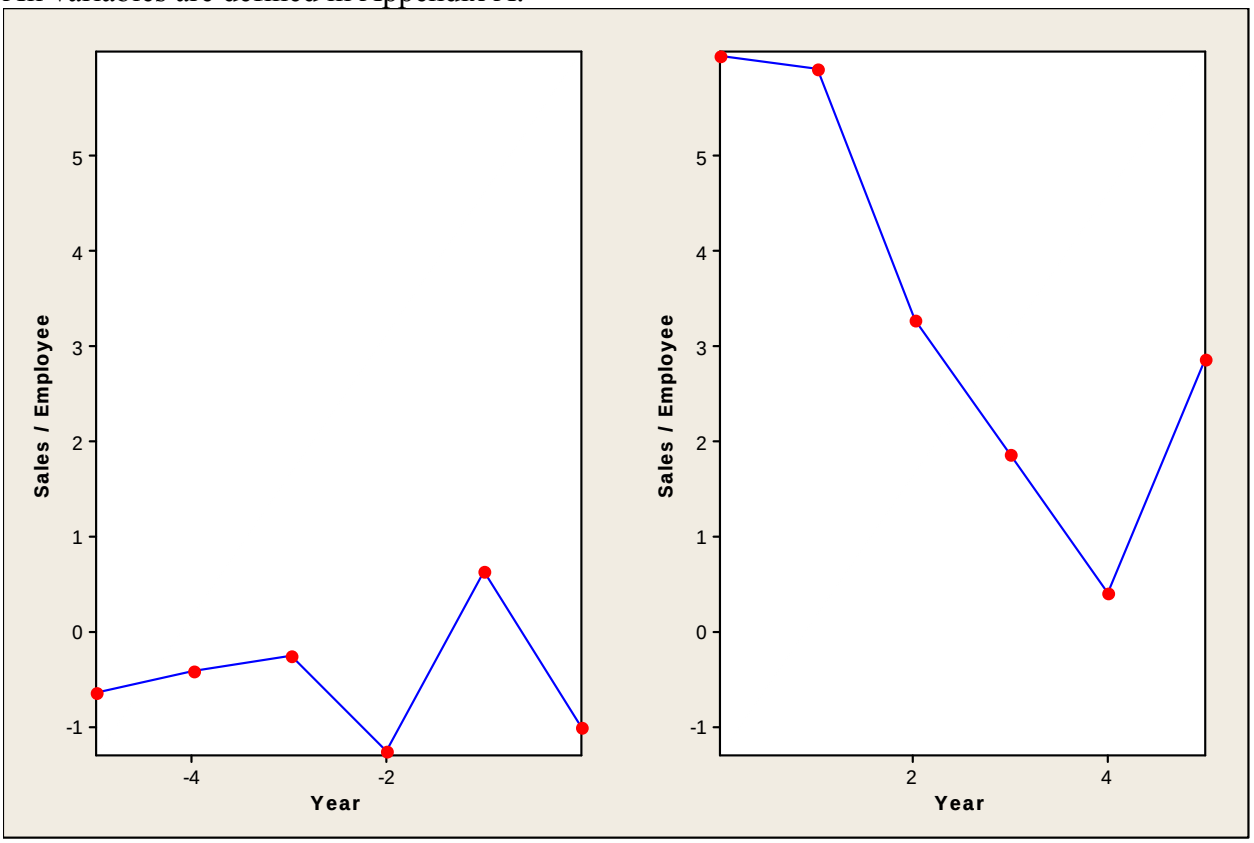


Figure 4
Median Industry-Adjusted Capital Expenditures / Sales
Pre-LBO and Post-RLBO

This figure plots the median ratio of capital expenditures to total assets (*Capex/Sales*) from five years before the LBO to five years after the RLBO. *Capex/Sales* is industry-adjusted by the 2-digit SIC code median value. The graph on the left describes years prior to the LBO. The right graph plots years since the RLBO. The private period encompasses the years from LBO-0 through RLBO+0. All variables are defined in Appendix A.

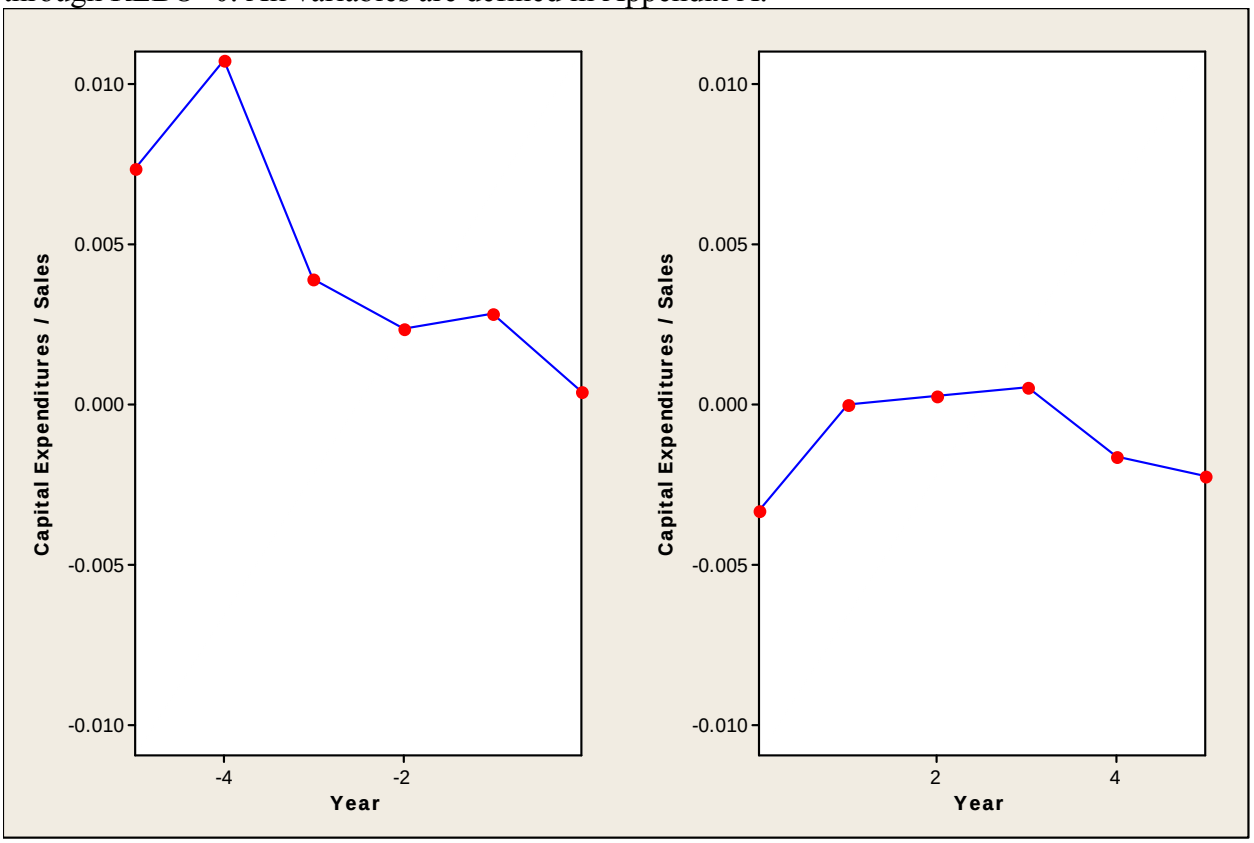


Figure 5
Median Buy-and-Hold Returns

This figure plots the median buy-and-hold returns at 12, 36, and 60 month intervals. Buy-and-Hold returns are winsorized at the 3rd standard deviation following the procedures of Cowan and Sargeant (2001). Returns are plotted for RLBO, IPO, seasoned, and control firms.. *RLBO* indicates returns for sample RLBO firms. *IPO* represents IPO firm median returns by 1-digit SIC code. *Seas* designates medians of seasoned firms within industry based on 2-digit SIC codes. *Cntrl* indicates returns of matching control firms selected based on size (book value of assets) and industry (based on 2-digit SIC codes). All variables are defined in Appendix A.

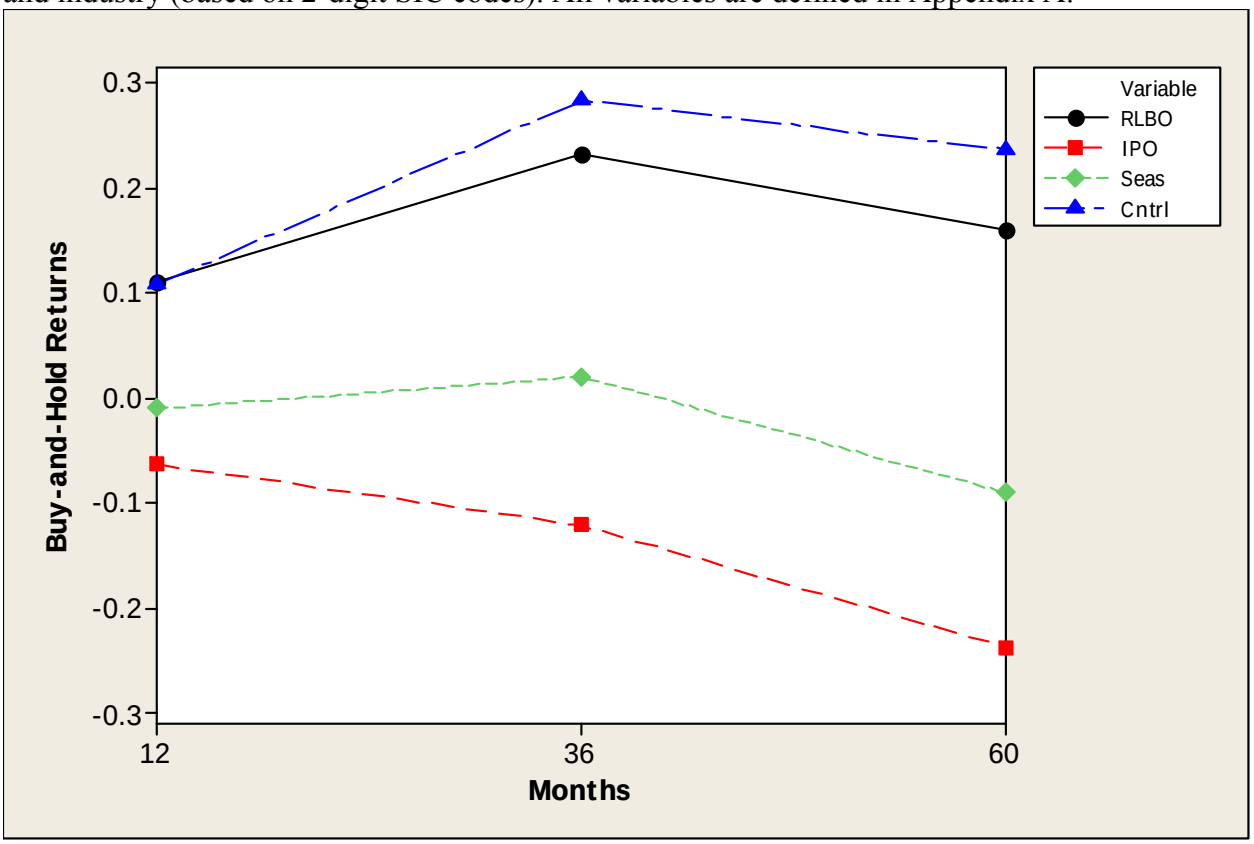
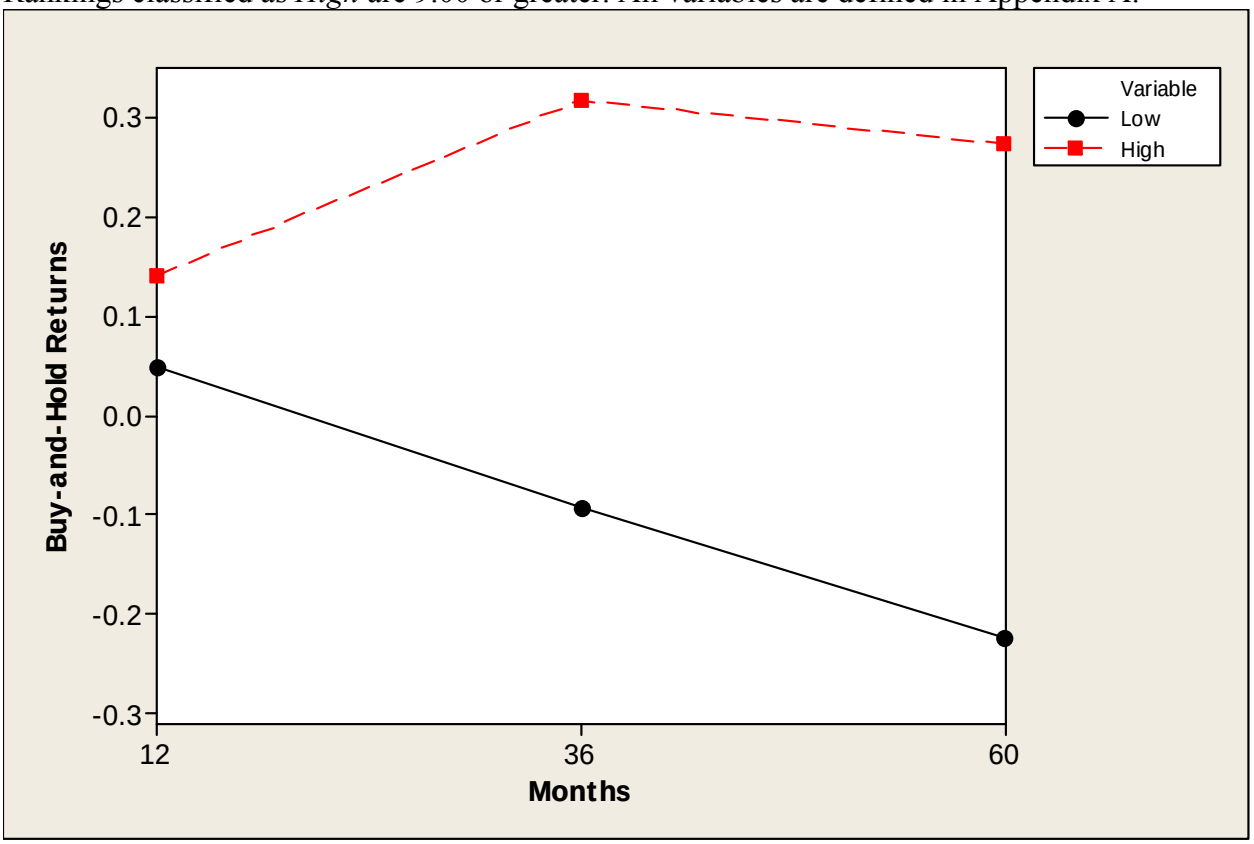


Figure 6
Median Buy-and-Hold Returns by Underwriter Ranking

This figure plots the median buy-and-hold returns at 12, 36, and 60 month intervals. Buy-and-Hold returns are winsorized at the 3rd standard deviation following the procedures of Cowan and Sargeant (2001). Returns are plotted for underwriters ranked as *Low* or *High*. Rankings are based on the methodology of Carter and Manaster (1990). *Low* indicates a ranking less than 9.00. Rankings classified as *High* are 9.00 or greater. All variables are defined in Appendix A.



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ABSTRACT

ESSAYS ON REVERSE LEVERAGED BUYOUTS

by

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August 2011

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Major: Business Administration (Finance)

Degree: Doctor of Philosophy

This dissertation is the first study to investigate public-to-private reverse leveraged buyouts (RLBOs). The first essay measures changes in profitability, financial structure, operations, and cost structure to detect actions taken during the private period. Results show that approaching the leveraged buyout there is an above industry level of free cash flow and capital expenditures, while growth options are at competitive levels. These factors in the presence of low ownership concentration suggest the existence of overinvestment.

Increased leverage in the private period leads to significant declines in free cash flow and capital expenditures, while ownership concentration increases, which I contend incentivizes management to avoid overinvestment. I find that private period restructuring that improves growth and reduces cost structure leads to superior post-RLBO valuations. Further, even though free cash flow increases as leverage decreases, management retains the discipline to invest in projects that generate positive future cash flows.

The second essay investigates long-run stock returns of public-to-private RLBOs. First, I examine whether RLBOs suffer from the same long-run underperformance characteristic of IPOs. Then, following up on the results in Chapter 2 that identifies the determinants of post-

RLBO valuation, I investigate what firm characteristics are related to stock returns after the offering. Finally, I investigate whether underwriters perform the certification role found for first IPOs.

The findings demonstrate that public-to-private RLBOs earns stock returns that outperform IPOs in comparable industries, with little evidence of market mispricing. As these RLBOs were previously exchange listed, I argue that reduced information asymmetry ameliorates the underperformance found for IPOs. The evidence suggests that restructuring that creates growth has the same beneficial impact on stock performance as for valuation. I also find that private period actions that reduce cost structure lead to positive stock returns after the RLBO.

I find that executive committees of the board of directors are discounted by the market, leading to lower stock returns. Further, underwriter quality of RLBOs is generally higher than that of IPOs, and is positively correlated with stock performance. Public offerings by higher quality underwriters earn positive abnormal stock returns over long horizons.

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