

# Horse picker or right jockey? An examination of private equity value creation through the lens of withdrawn leveraged buyouts

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## **Abstract**

This paper examines the consequences of leveraged buyout (LBO) transactions through the lens of subsequently withdrawn transactions. Using the reason for LBO withdrawal and the unfavorable credit market movements during the period when the deal is in play to address the endogenous withdrawal decision, I create a sample of LBOs withdrawn for reasons not related to target firm fundamentals. This paper documents the following facts. First, target firms of failed LBO transactions experience upward revaluation by the stock market. Such results are stronger for target firms with more information asymmetry problems. The evidence in my paper indicates that private equity investors are able to identify undervalued firms in the stock market. Second, I document improvements in operating performance of firms after LBO transactions compared to target firms that fail to go through the LBO process. Third, private equity investors adjust the capital structure of target firms to exploit the tax benefit of interest deductions. Fourth, private equity investors also tend to reshuffle the management of target firms shortly after the LBO transactions. Overall, the evidence suggests that private equity creates value by exploiting the undervaluation of target firms, and also by improving their operational performance and financial structure.

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*"They [KKR]'ve been very active in helping shape the disposition strategy—what to sell and how to sell it . . . We've ended up with a smaller company, but one making more operating income on a \$13.5 billion sales base than it was on \$20 billion [before the buyout]."*

*Peter A. Magowan, Chairman and Chief executive, Safeway  
Co.,  
New York Times, October 21, 1988*

*"For years, private equity firms like Blackstone have been viewed as financial alchemists who buy undervalued companies, rejigger their balance sheets and sell them for quick gain."*

*Kevin Roose,  
Financial journalist and author  
New York Times, July 11, 2012*

## **1. Introduction**

The last 30 years have revealed exponential growth in the private equity industry despite some cyclical setbacks<sup>1</sup>. The prominence of private equity industry in capital markets is justified by its track record of strong performance. Recent studies have found that private equity funds outperform their public equity counterparts, even after accounting for fees and other expenses (see, e.g., Higson and Strucke, 2012; Harris, Jenkinson and Kaplan, 2014; Robinson and Sensoy, 2013)<sup>2</sup>.

The superior performance of the private equity industry raises a natural and important question: What is the propelling force behind such strong performance? One view, referred to as “cherry-picking channel”, is that private equity funds consist of savvy investors that “cherry-pick” undervalued target firms, load them with high debt level, and sell them for capital gains, either through secondary buyout or through public offering (DeAngelo, DeAngelo and Rice, 1984;

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<sup>1</sup> As of 2012, the global private equity industry has grown to reveal influential financial clout, with 4,800 active private equity firms with 1 trillion dollar dry powders in the pockets. Source: Bain and Company global private equity report, 2013.

<sup>2</sup> Specifically, Harris, Jenkinson and Kaplan (2014) document a sizable outperformance of 20% to 27% in higher returns as compared to the S&P 500 Index stocks through a fund’s life, or more than 3% annually. On the deal level, Guo, Hotchkiss and Song (2011) document a hefty increase in firm value from pre-buyout level to the exit of the private equity firm.

Kaplan Stromberg, 2009; Dittmar, Li and Nain, 2012). A second view, which has been confirmed by the literature, is that private equity firms create economic value by improving operating performance of target firms. This can be achieved by operational engineering, in which private equity funds help the firm cut operating costs (Kaplan, 1989b), and allocate labor and capital to more efficiently (Smith, 1990; Davis, Haltiwanger, Jarmin, Lerner and Miranda, 2014).

Differentiating between private equity investors' ability to identify undervalued target firms from the private equity investors' capabilities in improving the target firms' performance is an empirically challenging task. For example, the market reaction to a private equity buyout could reflect both the undervaluation as well as the expected economic value of the target firm created by the private equity investor if the deal goes through. Even a simple examination of the stock returns of target firms during the period the deal is in play for unsuccessful buyouts may present problems in correct interpretation, in that the reason for the withdrawal of the deal in itself could contain information that could simultaneously affect the fundamentals of the target firms. On the other hand, uncovering the change in operating performance and corporate governance practices depends crucially on the control group for comparison purposes, since a recent study has shown that the target firms of financial acquirers are different from those of other firms (Gorbenko Malenko, 2014).

This paper overcomes the above-mentioned empirical difficulties by collecting a sample of unsuccessful LBO transactions sponsored by private equity investors and by using the sample to examine the cherry-picking hypothesis. The sample is also used as a baseline to check whether the firms that go through LBOs enjoy operating performance improvements compared to firms that failed in the LBO process. One drawback of this approach, seen in previous studies as well, is that the reason for the failure in the deal going through could simultaneously depress the stock price and undermine the future operating performance of the target. For example, new negative information about the target firm's prospects could be uncovered during the due diligence process. Moreover, firm performance could fall below the private equity forecast on which the bid valuation is based. I use two empirical strategies to show that private equity bids for target firms result in increases in the value of their stock as well as improvements in their operation. In the first approach, I search through LexisNexis for the reasons behind each unsuccessful LBO and create an

“exogenously withdrawn” sample by carefully excluding cases in which the failure of the deal is due to disagreement over the bid price; to new information uncovered regarding firm fundamentals; or to the evolution in the conditions of the firm, all of which could affect target firm value<sup>3</sup>. To reduce subjectivity in this process, and to address the concern that some targets or acquirers might lie about the reason that the deal failed<sup>4</sup>, I use an objective measure that classifies an unsuccessful LBO as a “LBO failure due to unfavorable credit market movement” if the change in high-yield bond market index since the deal announcement falls within the bottom quarter of that of all the leveraged buyouts announced during the same year.

Overall, I find that, on average, the target stock experiences an 11.9% market-adjusted buy-and-hold return, and a 10.6% buy-and-hold abnormal return against a benchmark portfolio matching on Fama-French industry, capitalization and book-to-market ratio, from a period starting from 25 trading days before the deal announcement to 25 trading days after the deal withdrawal (“deal active period”). Similar buy-and-hold abnormal returns are present for the “exogenously withdrawn” sample and for “LBO failures due to unfavorable credit market movement”. For example, during the same holding period as the full sample, the target firms, on average, yield a 13.4% cumulative abnormal return against market portfolio and a 16.5% cumulative abnormal return against the matching portfolio for the “exogenously withdrawn” sample. Since each deal has a different length of time from announcement to failure, I also report an average standardized daily buy-and-hold abnormal return to gauge the economic significance of the abnormal returns. The resulting daily buy-and-hold abnormal return is economically significant. For example, for deals that fail due to unfavorable credit market movements, the target stock, on average, generates a 15 basis points daily buy-and-hold return against the market portfolio, and a 16 basis points daily buy-and-hold abnormal return compared to the matching portfolio. Similar results hold for all the withdrawn deals, whether or not they are withdrawn for reasons unrelated to target stock price. Overall, the evidence so far suggests that private equity funds are capable of identifying undervalued companies, and that the stock market recognizes their abilities. As a result, even if

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<sup>3</sup> I also exclude cases in which the private equity investors withdraw from the deal because another acquirer offered a higher bid. As in these cases, the stock price also incorporates the value premium of the competing bid.

<sup>4</sup> I thank Joshua Pollet for pointing out this possibility.

the leveraged transaction does not eventually go through, the stock price is still higher than at the pre-announcement level, reflecting a market revaluation of target firms.

A natural follow-up question would be: What makes private equity firms savvy about valuation? To explore potential channels through which private equity firms identify the undervalued targets, first I split the sample into two halves according to the information asymmetry. Using three measures for information asymmetry common in the literature—number of analysts that cover the firm, analyst forecast dispersion, and analyst forecast accuracy—I found that the abnormal returns during the period when the deal was in play was concentrated within target firms suffering from greater information asymmetry, both statistically and economically. This is consistent with the hypothesis that private equity firms have more and better information than average investors, information they rely on to help cherry-pick the targets<sup>5,6</sup>.

In what follows, I examine the second view regarding the value created by private equity investors—that is, whether they improve the operating performance by overhauling the investment as well as the financial policies of the firms in their portfolio. The empirical results confirm the positive effect of private equity buyouts on the operating performance of the target firms after the LBO transactions. For example, firms that fail LBOs do not display any improvement in earnings and operating cash flow, while firms that are successfully bought by private equity firms through LBO transactions enjoy increases in both earnings and operating cash flow by 0.031 and 0.035 of the value of their assets, respectively.

Moreover, I use two empirical strategies to address the concern that the withdrawal of the deal might be associated with information that are detrimental to the performance of the target firms after the LBO transaction. First, I compare the evolution of the operating performance of the target

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<sup>5</sup> However, in un-tabulated analysis, for the period the deal was in play, I failed to find any difference in abnormal returns between unsuccessful LBO transactions with management participation and unsuccessful LBO transactions without management participation. Moreover, I failed to find any robust difference in abnormal returns between failed deals that occurred before and after the enactment of “Regulation FD”. All these pieces of evidence point to the fact that the information advantage possessed by private equity firms does not mainly come from target management insiders or the board of directors of the target firms.

<sup>6</sup> Recent anecdotal evidence shows that top private equity firms now hire former industry professionals, in addition to dealmakers with financial background. For example, former GE CEO Jack Welch joined Clayton, Dubilier & Rice and Lou Gerstner, once at the helm of RJR Nabisco and IBM, is affiliated with Carlyle (Kaplan and Stromberg, 2009). It would be interesting to see if those industry professionals help private equity firms choose the right targets.

firms following both successful and unsuccessful LBO transactions due to reasons exogenous to target fundamentals. Again, I found similar results. While the successful LBOs always enjoy improvements in earnings and operating cash flow—measured against their assets—by an economically significant amount of 0.031 and 0.035, respectively. The target firms in failed LBO samples, on the other hand, do not show any meaningful change in their operating measures. In the following analysis, instead of using actual failed LBO transactions, I use, as explanatory variable, a predicted withdrawn probability for each LBO transaction from a linear probability regression that forecasts deal withdrawal probability based on deal characteristics, target pre-announcement financial conditions, as well as the change in high yield bond market index since announcement<sup>7</sup>. This empirical strategy yields similar results as mentioned above: After controlling for deal characteristics, pre-deal financial conditions, and the industry fixed effects, the target firms with higher probability of LBO success display higher earnings following the closure of the transaction.

Overall, I was able to confirm that private equity firms are not just financial alchemists but also operational experts, in that they create economic value for the target firms by improving their operating performance. A further analysis reveals that the improvement in operating performance is not due to cuts in investment spending after the LBO transaction, since both completed and withdrawn LBO targets exhibit similar changes in capital expenditures after the LBO transactions. Lastly, I examine the change in capital structure following the LBO transactions. As expected, the results hold for all different samples of withdrawn transaction in my study: Successful LBO targets show higher levels of debt in their balance sheets. More interestingly, the unsuccessful targets also indicate an increase in leverage ratio of 8% to 15% after the LBO attempts.

The last two parts of the paper explore other ways that private equity firm could create value for the firms in their portfolios. Extant research state that the economic value creation through private equity LBOs can also be achieved by increasing tax benefits of interest expense (Kaplan, 1989a), and reforming corporate governance practices by offering, for example, more powerful managerial

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<sup>7</sup> The results are similar if I use Probit model instead of the linear probability model.

incentives and enhanced board monitoring (Acharya, Gottschalg, Hahn and Kohoe, 2013)<sup>8</sup>. Correspondingly, the next part of this paper examines whether the private equity firms adjust the capital structure of their target firms in a way that increases tax benefit of interest expense. In particular, I compare the change in probability that a firm's marginal tax rate (MTR) after interest expense lies on the downward sloping part of interest deduction-MTR graph ("Graham's Kink", Graham, 2000), between completed LBO target firms and withdrawn LBO target firms. If private equity investors exploit tax deductions in interest, I should be able to observe interest expenses of more successful LBO target firms exceed those inferred by "Graham's Kink" after the LBO transaction, compared to that of unsuccessful LBO targets. The empirical results confirm my hypothesis and are economically significant. For instance, in the three-year period after the completion of the LBO transaction, 23% more target firms maintain their leverage ratios, to the point where the MTR after interest expense starts to decrease. At the same time, for the unsuccessful LBO target firms, the probabilities do not show any meaningful statistical or economic change. In general, the results of the paper confirm that tax benefits associated with optimized capital structure is one way that private equity investors create value through LBO transactions.

The last part of the analysis examines the change in corporate governance following LBO transactions. In particular, I focus on one important channel that is well documented in the corporate governance literature: the probability of CEO replacements following LBO transactions. Previous literature document an increase in CEO turnovers following successful LBOs by private equity investors (e.g., Acharya, Gottschalg, Hahn and Kehoe, 2013). Consistent with extant studies, I find that, compared to unsuccessful LBO targets, the target firms that actually go through the LBO transactions have a 18% to 30% higher probability of replacing their CEOs during the one-year period after the completion of the deal. This result holds when I use the change in the high yield bond market index to instrument the potentially endogenous LBO withdrawal decision and conduct a two-stage least square regression. Interestingly, the unsuccessful LBO targets exhibit stronger turnover-performance sensitivity compared to successful LBO targets, which is consistent

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<sup>8</sup> A recent study on private equity investments in the restaurant industry reveals that private equity firms create value through instituting better management practices, such as better food quality, more sanitary environment, and more reasonable menu prices (Bernstein and Sheen, 2013). However, this channel is beyond the scope of this study.

with recent literature that show that private equity firms use private information to evaluate the CEO performance of target firms over a longer period of time relative to their publically traded counterparts (Cornelli and Karakas, 2013).

Overall, I find that private equity firms are savvy investors in stock market, in that they are able to identify undervalued target firms (“horse picker”). At the same time, the findings in this paper challenge accusations in the literature that claim that private equity firms adhere to a “buy-strip-flip” strategy and privilege short-term profits over long-term value<sup>9</sup>. Under the management of private equity firms, the target firms—as compared to those that failed the LBO processes (“right jockey”)—exhibit improvements in operations, optimization in capital structure, and positive organizational changes.

This paper contributes to several strands of the literature in the field. First of all, the empirical findings of this paper confirm the superior performance of private equity industry documented in the literature (e.g., Higson and Strucke, 2012; Harris, Jenkinson and Kaplan, 2014; Robinson and Sensoy, 2013). Specifically, by comparing the LBO target firms against carefully designed control firms—i.e., target firms that failed LBO transactions for exogenous reasons—this paper provides clean empirical evidence that private equity managers create value for their limited partners by carefully picking undervalued target firms, and reengineering them through operational, tax, and organizational lenses. Extant evidence in the literature on private equity firms’ cherry-picking abilities is limited and indirect. For example, Dittmar, Li and Nain (2002) find that strategic acquirers purchasing target firms by competing with financial buyers earn an 8.80% higher CAR during -20 to +180 window compared with corporate buyers competing against other corporate buyers. The authors conclude that financial buyers are able to identify target firms with higher potential for value improvement that are also valuable to other acquirers. This paper employs a different empirical strategy and confirms the cherry-picking ability of private equity investors through stock market reaction during the period in which the deal is in play of unsuccessful LBOs. Moreover, I further document the operational engineering of private equity firms, which they do through a turnaround in the operating performance of target firms. I document as well not only the financial engineering conducted by private equity firms through capital structure optimization, but

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<sup>9</sup> For example, *Buy it, Strip it then Flip it*. Bloomberg BusinessWeek Magazine, August 6, 2006.



also the governance engineering performed by reshuffling the corporate management of target firms.

Moreover, this paper contributes to the literature on the driving forces behind value improvement in target firms following buyout transactions in general. There are two hypotheses that can explain the observed improvement in operating performance after LBO transactions. The first—the organizational change hypothesis—states that organizational changes following buyouts enhance operating performance of target firms. These changes include providing more incentives to management, promoting better monitoring by corporate boards, as well as mitigating agency cost of free cash flows via high leverage and more interest expenses (Jensen, 1989). The other popular hypothesis is private information hypothesis, which states that buyout acquirers identify undervalued targets that have great economic potential. Thus the improvement in operating performance could occur even without the LBO transaction. Empirical evidence on the latter hypothesis focus on management buyouts of their own firms. Studies providing such evidence are generally based on small samples and offer mixed conclusions. DeAngelo, DeAngelo and Rice (1984) document that, for a sample of 20 unsuccessful private transactions, the target stock has, on average, a 25% market-adjusted abnormal return for the period from 40 trading days before the announcement of the deal to 40 trading days after the withdrawal of the deal. Those studies acknowledge that without knowing the reason behind the failure of the deal, it is impossible to distinguish between target undervaluation and the future takeover probability that drive the observed returns. Marais, Schipper and Smith (1989) find a much smaller rate of return for a sample of 15 buyout transactions. Smith (1990) cites no change in operating performance following LBO proposals that were either rejected by target firms or withdrawn by the acquirers as evidence against private information hypothesis. However, as mentioned above, change in operating performance is not the only source of economic value creation. Moreover, reasons for withdrawal of LBOs are not specified for more than half of her sample deals. This confounds the causality since, more often than not, the reason behind the deal being withdrawn might contain useful information about firm fundamentals that simultaneously affects the future performance of the target firms. More recently, Lee (1992) and Ofek (1994) use a larger sample of management buyouts and find that for unsuccessful buyouts without subsequent takeover proposals, the stock prices of target firms fall back to pre-buyout level. They also fail to find any improvement in

operating performance following failed management buyout attempts. The authors claim that the empirical findings reject the private information hypothesis. This paper uses a comprehensive sample of all LBO transactions sponsored by private equity firms from 1979 to 2012 and uses news sources as well as change in LBO funding environment to address the endogeneity problems that confound the conclusions of previous literature. I document a robust positive revaluation of target stocks following failed LBO attempts. Moreover, I also examine channels other than operational improvement, such as tax benefits and organizational change, as potential sources of economic value creation by private equity firms.

Lastly, this paper also contributes to the empirical literature on the value implications of merger and acquisitions. For example, Malmendier, Opp and Saidi (2016) find that much of the market reaction to merger announcement are attributable to the revaluation of target firms if the acquisition is paid in cash. This paper adds to this strand of literature by showing that a part of value gains from private equity buyouts comes from the undervaluation of firms targeted by private equity firms.

The rest of the paper is organized as follows. The following section, Section 2, presents sample and data information. Section 3 expounds on the empirical results, which comprise of three subsections. Subsection 3.1 focuses on the examination of the abilities of private equity firms to explore undervaluation in stock markets. Subsection 3.2 compares operating performance and policy changes of LBO target firms following successful LBOs against failed LBO attempts. Subsections 3.3 and 3.4 test other channels that private equity investors employ in value creation, using failed LBO target firms as baseline. This includes tax benefits of higher leverage, as well as the reshuffling of management of the target firms. The paper concludes with directions for future research.

## **2. Sample and Data**

### 2.1 Sample construction

My starting point of sample collection is all the merger and acquisition transactions termed as “Leveraged buyouts” in SDC Platinum. SDC covers 10,042 leveraged buyout deals from 1979 to 2012. Then I use the following criteria to screen the sample. Firstly, I require the target firms have public equity outstanding before the announcement of the LBO transactions and will become privately owned firms if the deal goes through. Secondly, I require that the target firms do not receive any leveraged buyout bids during three year period before the current transaction. Thirdly, I drop deals that are classified as “Rumors” or “Pending”. Moreover, I exclude transactions in which the acquiring parties acquire less than 50% of shares. Finally, I erase deals in which the acquiring parties acquire “remaining assets” of the target firms. This yield a LBO sample of 1,159 deals. In the following step, I search for each deal in LexisNexis and SEC filings surrounding the deal announcement and ending dates to verify the acquirer identities, the eventual outcome of the deal, and the announcement as well as the ending dates<sup>10</sup>. Similar to Lerner, Sorenson and Stromberg (2011), I exclude buyouts that do not involve a financial sponsor (i.e., private equity firms). Those deals are typically buyout transactions by target managements using their own resources and bank debt, which are not the focus of this study<sup>11</sup>. The final sample consists of 610 LBOs sponsored by private equities from 1979 to 2012, of which 126 deals fail, and 484 deals eventually succeed. Table 1 present the distribution of deal cohorts according to their announcement years.

[Insert Table 1 here]

## 2.2 Withdrawn reasons

The main goal of this paper is to examine the four channels through which private equity funds could generate investment returns for their limited partners: undervaluation channel, operational engineering, tax engineering and governance engineering. The announcement of a leveraged

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<sup>10</sup> I eliminate deals in which I could not verify the deal closing dates.

<sup>11</sup> Similar to Lerner, Sorenson and Stromberg (2011), I also erase the buyout transactions that are done by traditional early-stage venture capital funds. Those deals are typically venture capital investments and have much lower leverage in buyout capital structure.

buyout is concomitant with large market reaction<sup>12</sup>, which reflects market assessment of the undervaluation channel, the probability of deal success, as well as the target firm value enhancement via the three other channels, which are conditional on deal success. In order to disentangle the undervaluation channel from the other channels, I look at the stock market reaction during the period when the deal is in play, which is 25 trading days before the deal announcement and 25 trading days after the withdrawal of the deal. The choice of 25 trading days is consistent with previous findings concerning stock price run-up occurrences before deal announcements (Schwert, 1996; Malmendier, Opp and Saidi, 2016). The basic logic is as follows: since the deal does not eventually go through, the stock price after the deal withdrawal does not reflect operational engineering, tax engineering and governance engineering and all other value creation channels which are conditional on deal success. Any remaining abnormal returns reflect the undervaluation of targets before the private equity bids and the consequent market revaluation.

I also examine the operating performance change for the sample of successful LBO targets using a sample of unsuccessful LBO targets as the control group. Previous studies show that mergers and acquisitions market is segmented and targets of financial acquirers are special. Thus, a comparison of operating performance and firm policies between successful and unsuccessful LBO firms will shed light on whether or not private equity funds add value to their portfolio firms through tax engineering, operational engineering, and governance engineering.

Unfortunately, not all of the withdrawn samples are eligible for inclusion in this analysis. An essential criteria for a valid unconsummated LBO is that the reason for a LBO failure is not related to the target firm's valuation as well as the target firm's operating performance and policies in the future. For example, if the private equity investors walk away due to material adverse changes in the target firms after the deal announcement, then the stock price of the target will plummet and the operating performance will deteriorate afterwards even if the proposed LBO transaction never occurs. This is by no means a theoretical possibility. In order to address the endogeneity problem mentioned above, I check the LexisNexis and target SEC filings surrounding the deal withdrawal date. This was done in order to determine the reasons behind each unconsummated deal. I carefully

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<sup>12</sup> The average three day announcement returns are 19% for both deals that eventually succeed and deals that are eventually snapped.

screen out all of the LBO transactions which are withdrawn for explicit reasons that have the potential to affect the target firm's valuation and future operating performance, and the remainder is deemed to be an "exogenously withdrawn" sample<sup>13</sup>. Table 2 presents the detailed withdrawal reasons for the sample LBOs in this study.

[Insert Table 2 here]

In order to reduce subjectivity in the determination process of "exogenously withdrawn" samples, and to address the concern that some targets or acquirers might misrepresent the reasons why the deal is called off, I use another objective approach to analyze deals which are withdrawn for reasons other than fundamentals of target firms. Previous literature has documented that the junk bond market affect LBO pricing, capital structure and deal volume. For example, Axelson, Jenkinson, Stromberg, Weisbach (2013) document that "mezzanine debt" and "junior bonds" account for 19.2% capital of an average LBO deal, and that the high yield bond market conditions dominate target characteristics in determining buyout capital structure. Kaplan and Stein (1993) also find that "demand push" in the junk bond market leads to aggressive pricing of LBOs, higher leverage in LBO capital structures, and high LBO volume. Motivated by these studies, I use the change in the average logarithm Merrill-Lynch high yield bond market index between the quarter period before the deal announcement and the period from deal announcement to deal ending, as an instrument for the possibility of deal failure. The logic is that while an individual LBO transaction is unlikely to affect the change in the high yield bond market condition, the turbulences in the high yield bond market elevate the estimated financing costs of an individual LBO, thereby increasing the possibility that the private equity investors will walk away from the targets. I classify a withdrawn deal as a "LBO failure due to unfavorable credit market movement" if the difference in average logarithm Merrill-Lynch high yield bond market index between the quarterly period before the deal announcement and the period from the deal announcement to the deal ending falls

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<sup>13</sup> Some people might be concerned because the announced withdrawal reasons are not the underlying reasons behind the deal failure. For example, a stated reason of "deal withdrawal because of the target management's resistance" might cloud the underlying fact that the target management might possess some positive information about the prospects of target firms, which propels them to retain control. My assumption is that published news articles about the deal reflect all of the public information that is available regarding the deal. Therefore any other private information is not incorporated into stock prices and does not confound my analysis in a systematic manner.

within the bottom quarter of the universe of leverage buyout transactions<sup>14</sup> announced during the same year.

### 2.3 Detecting abnormal stock performance

I use two benchmarks to detect abnormal stock performance. Firstly, I use a simple CRSP value-weighted market portfolio the same nature as Fama and French use to calculate market excess returns. Moreover, in a manner similar to Barber and Lyon (1997) and Savor and Lu (2009), I use a matching portfolio strategy. More specifically, I first identified all of the firms that operate in the same Fama-French 49 industry and have market values of equity between 50% and 150% of the market equity of the failed LBO target firm. I then pick the firm with the book-to-market ratio closest to the ratio of the failed LBO target. The selection processes are repeated 3 times in order to generate 3 control firms. The matching portfolio is an equally weighted portfolio consisting of these 3 control firms. If there are fewer than 3 matching firms for the LBO target in question (because there is an insufficient number of firms in the same industry that satisfy the size criterion), the matching portfolio contains fewer than 3 control firms. If one control firm disappears from CRSP before the end of the holding period, it is replaced by the next-best match<sup>15</sup>. The market value of equity is calculated as of the market close 30 trading days before the deal announcement. The book value of equity of the most recent fiscal year before the date used to calculate the market value of equity, which is defined following Cohen, Polk and Vuolteenaho (2003) and Savor and Lu (2009). The detailed procedure is outlined on page 613 of Cohen, Polk and Vuolteenaho (2003) and omitted here for the sake of brevity. Buy-and-hold abnormal return (*BHAR*), cumulative abnormal return (*CAR*) and standardized daily buy-and-hold abnormal return (*DBHAR*) over the holding period  $t$  is defined as follows:

$$BHAR_{i,t} = \prod_{j=1}^t (1 + ret_{i,j}) - \prod_{j=1}^t (1 + ret_{p,j}) \quad (1)$$

$$CAR_{i,t} = \sum_{j=1}^t (ret_{i,j} - ret_{p,j}) \quad (2)$$

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<sup>14</sup> The universe of LBO transactions includes all of the leveraged buyout transactions of U.S. public firms, private firms and subsidiaries.

<sup>15</sup> My results are qualitatively similar if I use a matching portfolio consisting of 1 control firm or 5 control firms.

$$DBHAR_{i,t} = \sqrt[t]{\prod_{j=1}^t (1 + ret_{i,j})} - \sqrt[t]{\prod_{j=1}^t (1 + ret_{p,j})} \quad (3)$$

where  $ret_{i,j}$  and  $ret_{p,j}$  denote firm  $i$ 's stock return and the benchmark portfolio return at day  $j$ , respectively.

## 2.4 Operating performance and firm policy

Target firms in LBO transactions become private firms after the deals are consummated, and are often no longer required to file financial reports with the Security and Exchange Commission (SEC). I am thus only able to retrieve measures of operating performance and firm policies for successful LBO targets should those targets continue to file public reports with SEC. Those LBO targets typically have public debts outstanding, or have filed for public offerings again after the buyout, and must disclose accounting information for the three years prior to the public offering filing. I use *COMPUSTAT* and *Capital IQ* to retrieve accounting information concerning LBO targets whenever such are available. I employ two measures for operating performance: profitability and operating cash flow. Profitability is defined as earnings before interest, depreciation and amortization (EBITDA) over total assets, whereas operating cash flow is defined as the difference between EBITDA minus capital expenditures over total assets. Investment policy is measured as follows: capital expenditures over total assets. Financial leverage is measured as the sum of debts in current liabilities and long-term debt over total assets<sup>16</sup>. Marginal tax rates both before and after interest expenses are derived from Blouin, Core and Guay (2010). Those tax rates are based on forecasted 22 years' taxable income and take into consideration the carryforwards and carrybacks. The tax rates measure the expected additional taxes a firm must pay during current years as well as future years as a result of one dollar increase in taxable income<sup>17</sup>.

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<sup>16</sup> One problem is that the asset value of successful LBO targets inflates exponentially at the end of the fiscal year during which the LBO occurs and afterwards. This is the case because existing accounting rules require acquired assets and liabilities to be recorded in terms of fair market value, which is typically much higher than the book value recorded beforehand since target firms are bought using large premiums in LBO transactions (Custódio, 2014). Therefore, following Cohn, Mills and Towery (2014), I use total assets for the fiscal year during which the LBO is completed as the scale factor for all of the years prior to the LBO completion year. This method accounts for any accounting adjustments that are related to the LBO transaction.

<sup>17</sup> I thank the authors for sharing the data via Wharton Research Data Services.

## 2.5 Other control variables

In this paper, I use the following variables to control for deal characteristics, financial conditions of target firms, and stock performance of target firms, in different sections of the analyses. The financial conditions of the target firms are obtained from *COMPUSTAT* annual tapes for the most recent fiscal year ending before the deal announcement. *Target cash flow* is defined as the sum of *COMPUSTAT* Item *IB* and Item *DP* over Item *AT*. *Target financial leverage* is defined as the sum of Item *DLTT* and Item *DLC* over Item *AT*. *Target Q* is defined as the market value of assets over the book value of assets, where the market value of the assets is equal to Item *AT* plus the market value of equity minus Item *TXDB* minus Item *CEQ*. The market value of equity is Item *PRCC* multiplied by Item *CSHO*. *Target cash holdings* is defined as Item *CHE* over Item *AT*. *Target stock performance* is defined as the abnormal buy-and-hold return against the market portfolio for a one-year period ending 11 days before the deal announcement. I obtain deal characteristics from *SDC Platinum* database. *Log(deal value)* is the logarithm of deal value. *Hostile deal* is equal to one if the LBO is classified as being hostile. *LBO duration* is the logarithm of the number of days between the deal announcement and the deal ending. *LBO announcement return* is defined as the three-day cumulative abnormal return surrounding the LBO announcement dates. *Competing deals* is equal to one if there are multiple bidders for the target. Table 3 reports the summary of the deal and the target characteristics of successful deals, withdrawn deals and “exogenously withdrawn” deals. Compared with successful deals, withdrawn deals are smaller, and are more likely to involve competing bidders.

[Insert Table 3 here]

## 3. Empirical results

This section presents the empirical results of this paper. Firstly, I answer the question of whether private equity investors are able to identify undervalued targets in the market by examining the stock returns during the deal active period for the unsuccessful LBO sample. The following section examines whether private equity investors improve the operating performance of their portfolio firms using failed LBO targets as a control group. The last two parts of the analyses deal with the



channels through which private equity investors ameliorate operating performance. More specifically, I investigate the tax benefits channel and corporate governance engineering.

### 3.1 Does private equity identify undervalued targets?

This section examines the target stock performance of target firms during the deal active period, which is 25 trading days before the deal announcement up through 25 trading days after the deal withdrawal. The logic behind this empirical strategy is as follows: Assuming the stock market is at least semi-efficient, then the stock price at the time of the announcement of LBO transactions should incorporate market revaluation of the previously undervalued target (if any), the probability of deal success, and the value enhancement of the target firm brought about by the private equity investors, which is conditional on the deal's success. After the deal failure, the stock price should drop compared to the announcement level since the value creation associated with the transaction has not been realized. However, if the stock price remains above the pre-deal level, that indicates that the stock market has revalued the target stock's value. The stock market revaluation thus provides evidence that the target was undervalued before, and the buyout proposal and the bid from private equity signals to the stock market what the target's fair value actually is. Empirically speaking, any abnormal returns during the deal active period for withdrawn LBOs reflect the undervaluation of targets before the private equity bids and the consequent market revaluation.

More specifically, I analyze the stock market reaction during the deal active period, which is 25 trading days before the deal announcement and 25 trading days after the deal withdrawal<sup>18</sup>. The choice of 25 trading days is consistent with previous findings concerning target stock price run-up starts from about one month before deal announcements (Schwert, 1996). Figure 1A and Figure 1B present some graphic evidence. I plot the cumulative abnormal return against the market portfolios for withdrawn LBO targets starting 25 days before the deal announcement through 25

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<sup>18</sup> The abnormal stock returns continue to hold for the “exogenously withdrawn” sample if I examine a longer period after a deal failure, say, 100 trading days after a deal withdrawal. The abnormal buy-and-hold return against market portfolio and matching portfolio for the “exogenously withdrawn deals” are economically and statistically significant, and are more than 9% and 11% on average, respectively. The abnormal stock buy-and-hold return against market portfolio and matching portfolio for the failed LBOs is due to unfavorable credit market movement continue economically large, 11% and 8%, respectively, but cease to be statistically significant due to explosive standard errors brought about by small sample size.

days after the deal withdrawal. I standardize deal length in the same manner as Malmendier, Opp and Saidi (2016). There is a large jump in stock prices upon deal announcements. At the time of the deal withdrawal announcement, the stock price nosedives. However, the stock price remains higher than its pre-LBO level. Table 4 presents the empirical results. For each panel, I report the buy-and-hold abnormal return, the cumulative abnormal return and the standardized daily abnormal return against market portfolios and the three-firm portfolio matched on industry, size and book-to-market ratio. Panel 4A reports the stock returns for the full sample of withdrawn LBOs. During the deal active period, the target firms for withdrawn LBO transactions yield an average 11.9% buy-and-hold abnormal return against the CRSP value-weighted market return, and a 10.6% buy-and-hold abnormal return against the matching portfolio. Both results are statistically significant below the 5% two-tail significance level. In order to gauge the economic significance of the buy-and-hold abnormal returns, I standardized the buy-and-hold abnormal returns for each deal according to equation (3). On average, the target firms involved in withdrawn LBO transactions generate 8 basis points of abnormal buy-and-hold returns per day against the matching portfolio, and there are similar results for returns against market portfolios. Both standardized daily abnormal buy-and-hold returns are statistically significant below the 1% significance level.

One concern is that some LBOs are unconsummated for reasons that might simultaneously affect the targets' stock returns. For example, about 30% of the withdrawn LBOs fail because the private equity acquirers are outbid by another strategic acquirer. In this case, the stock price after the deal is withdrawn by the private equity investors incorporates the future takeover and value premium associated with the new offer. In order to address these endogeneity issues, I include only deals that are "exogenously withdrawn", i.e., deals that fail for reasons not directly related to target firm fundamentals. Detailed criteria for the construction the "exogenously withdrawn" sample are presented in Table 2. The results are tabulated in Panel 4B. Again, the abnormal returns for target firms during the deal active period are both statistically and economically significant. For example, over the deal active period, the target firms of LBO transactions that are terminated exogenously generate on average abnormal buy-and-hold returns of 9.9% and 13.4% against the market portfolio and matching portfolio, respectively, which is statistically significant below the 10% significance level. Similar results hold for standardized abnormal returns.

It is inevitable that the construction of “exogenously withdrawn” samples depends on some form of subjective judgment. Moreover, targets and acquirers might misrepresent the identity of the culprit behind the deal failures. In order to address these issues, I use an objective criteria to construct a withdrawn sample for which the reasons are largely unrelated to an individual target’s or acquirer’s characteristics. More specifically, I use change in the average logarithm Merrill-Lynch high yield bond market index between the quarter before the deal announcement and the period from the deal announcement to the deal ending, as an instrument for the possibility of deal failure. Previous research shows that high-yield bond market conditions play vital roles in buyout activities, e.g., capital structure (Axelson, Jenkinson, Stromberg and Weisbach, 2013) and deal pricing (Kaplan and Stein, 1993). An unsuccessful deal is classified as a “LBO failure due to unfavorable credit market movement” if the difference in the average logarithm Merrill-Lynch high yield bond market index between the quarter before the deal announcement and the period from the deal announcement to the deal ending falls within the bottom quarter of the universe of leverage buyout transactions announced during the same year. The argument is that if the high-yield credit market index deteriorates, private equity investors become more likely to walk away from the targets due to the heightened financing costs. More importantly, those deals are withdrawn as a result of the systematic downturn in the credit market, which is unlikely to be affected by any individual LBO transaction. Panel 4C presents the results. Again, the results are both quantitatively and qualitatively similar to the results exhibited in Panel 4A and Panel 4B. For example, in the case of deals that are withdrawn due to unfavorable credit market movements, the buy-and-hold abnormal return is 18% and 20.3% against the market portfolio and matching portfolio, respectively. Another challenge to the empirical findings so far is that the higher stock price compared with the pre-deal level might reflect a higher future takeover probability that the target may face. In order to rule out this possibility, I repeat the analyses using a set of unsuccessful LBO transactions in which the target firms do not receive takeover bids for a period of at least one year after the deal withdrawal. The results exhibited in Panel 4D, are qualitatively similar to the unrestricted sample and the two “exogenously withdrawn samples”.

[Insert Table 4 here]

Overall, I find that private equity investors are savvy about undervaluation in the stock market. The stock market recognizes private equity investors' "serendipity" and revalues firms targeted by private equity investors. Other information leakage during the deal active period and future takeover probability do not undermine my empirical findings.

A natural follow-up question would concern the extent to which the information advantage possessed by private equity investors facilitates their ability to identify undervalued targets. In order to address this issue, I split the sample into halves according to the information asymmetry of target firms. I follow existing literature by using three measures of information asymmetry (e.g., Duchin, Matsusaka and Ozbas, 2010; He and Tian, 2013): the number of analyst who cover the firm, analyst forecast dispersion scaled by firm assets, and analyst forecast accuracy, which is measured by the absolute difference between the consensus forecasted EPS and actual EPS scaled by stock price. Table 5 presents the results. I find that the abnormal returns during the deal active period are concentrated in target firms suffering from greater information asymmetry, both statistically and economically. For example, exogenously withdrawn LBO targets with analyst forecast errors above the sample median display buy-and-hold abnormal returns of 20.5% and 16.4% against the market portfolio and matching portfolio, respectively. On the contrary, exogenously withdrawn LBO targets with analyst forecast errors below the sample median do not display any abnormal returns during the deal active periods. Similar results are found when using the other two measures of information asymmetry. The empirical findings in Table 5 provide indirect evidence of the information advantage possessed by private equity investors. This information advantage is more noticeable when public equity investors of target firms suffer additional information asymmetry problems. However, in un-tabulated analysis, I fail to find differences in abnormal returns between LBO transactions with and without management participation. Moreover, I fail to find robust differences in abnormal returns between deals that occurred before and after the enactment of "Regulation FD". All of these pieces of evidence point out that the information advantages possessed by private equity investors do not primarily come from target insiders. Target insiders are not the only potential source from which private equity investors could glean information that is typically not available to ordinary public equity investors. Recent anecdotal evidence shows that the top private equity firms now hire former industry professionals in addition to dealmakers with financial backgrounds. For example, former GE CEO Jack Welch joined

Clayton, Dubilier & Rice, and Lou Gerstner, formerly the head of RJR Nabisco and IBM, is affiliated with Carlyle (Kaplan and Stromberg, 2009). It would be interesting to examine the relationship between the backgrounds of general partners and the ability of private equity funds to identify undervaluation, and determine whether the ability to identify undervalued firms is most pronounced in industries in which the investment personnel in private equity firms have substantial industrial experience. This is beyond the scope of this study due to the issue of data availability.

[Insert Table 5 here]

### 3.2 Does LBO improve operating performance?

This section examines whether private equity investors have operational engineering capacities. Given that the data on the day-to-day operations of private companies are limited, I gauge operational engineering by comparing changes in the operating performance of successful LBO targets against changes in respective measure of failed LBO targets, during the three years before and after LBOs end. Most of my sample of successful LBO targets cease public trading status after the transaction and no longer file financial reports with the SEC. Meanwhile, Table 2 shows that about one third of my sample of unsuccessful transactions are unconsummated because the private equity firms are overbid and the targets are often bought out by another acquirer after the private equity investors pulled out from the deal. As a result, only a subset of my LBO sample has at least one year of financial data during both the three-year periods before and after the LBO transaction. I end up with 115 completed LBOs, and 68 unconsummated LBOs, 25 of which are classified as LBOs withdrawn for “exogenous reasons”. I employ standard difference-in-difference analyses in Table 6 and Table 7, and multivariate regression analyses in Table 8.

Table 6 presents the results using the full sample of withdrawn LBOs as the control group. The results show that successful LBO transactions drastically increase the profitability of target firms compared with firms that fail in LBO transactions. For example, Panel 6A and Panel 6C indicate that, firms which experienced failed LBOs do not exhibit any improvements in earnings and the operating cash flow, while the firms going through LBOs enjoy earnings and operating cash flow increases of 0.031 and 0.035 of their asset values, respectively. The differences in changes of

operational earnings and cash flows between successful and unsuccessful LBO targets are significant below 1% significance level and are economically noticeable. Similar operation improvements are documented when I compare the respective operating measure against the industry median, as indicated in Panel 6B and Panel 6D. Previous research has found that private equity investors increase the operating performance of target firms through cost cutting, streamlining capital expenditures and sales of assets (Kaplan, 1989; Lichtenberg and Siegel, 1990). Correspondingly, I examine capital expenditure changes in target firms after successful and failed LBO transactions. I do not find any evidence that private equity firms pump up short-term profits by disposing assets or slowing down capital expenditures. Panel 6E and Panel 6F show that both successful LBO targets and failed LBO targets do not exhibit economically and statistically differences in capital spending before and after LBO transactions. My results cast doubt on previous claims that private equity ownership is associated with asset disposals. Panel 6G and Panel 6H show that, as expected, successful LBO targets experience large hikes in their leverage ratios after deal completions, compared with those of unsuccessful LBO targets. Interestingly, the failed LBO targets also increase their leverage ratio by 0.077 after failed LBO transactions.

[Insert Table 6 here]

One concern, similar to that raised in section 3.1, is that deal withdrawals might be concomitant with changes in targets' fundamentals that could affect target firms' performance afterwards. I again compare the evolution of operating performance following successful LBO transactions and unsuccessful LBO transactions for reasons exogenous to target quality. I find similar results which are exhibited in Table 7. Successful LBOs always enjoy improvements in earnings and operating cash flow scaled by assets, by economically significant amount of 0.031 and 0.035, respectively. However, the targets in failed LBO samples do not exhibit any meaningful changes in their operating performance measures. The results are qualitatively similar to the results reported Table 6 for capital expenditure and leverages<sup>19</sup>.

[Insert Table 7 here]

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<sup>19</sup> My results in Table 6 and Table 7 remain qualitatively similar if I use the same model specifications as those used in Table 8.

In the analysis below, instead of using actual deal failures, I use as an explanatory variable a predicted withdrawn probability from a linear probability regression which forecast the deal withdrawal probability using deal characteristics, target pre-announcement financial conditions, industry fixed effects, and changes in the high yield bond market index since deal announcement. Table 8 shows the results. Column (1) and Column (2) of Panel 8B show that the change in the average logarithm Merrill-Lynch high yield bond market index between the one quarter period before the deal announcement and the period from the deal announcement to the deal ending is negatively correlated with deal success probability. One standard deviation drop in the high-yield bond market index reduces the deal success rate by 2% and 3%, depending on which alternative estimation model is used. Moreover, using predicted withdrawal probabilities instead of actual withdrawal cases yields similar results for difference in the operational changes between successful and failed LBO targets before and after the LBO transactions. The target firms with higher deal success probabilities exhibit improvements in earnings after controlling for deal characteristics, pre-LBO target financial conditions, and the industry fixed effects. Similar results are found for firm investment policy and capital structure changes. Overall, the empirical results show that private equity investors are able to increase target firms' operating performance. The improvements in operating performance are not driven by changes in the targets' fundamentals, since exogenously failed LBO targets do not exhibit similar operational improvements. In addition, the improvements do not appear to be driven by cost cutting and asset disposals. Interestingly, the withdrawn LBO targets appear to emulate post-LBO capital structures by adding more debt on their balance sheets<sup>20</sup>.

[Insert Table 8 here]

### 3.3 Does LBO transactions lower the target firms' marginal tax rate?

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<sup>20</sup> One concern is that because I only observe the operating performance of targets after the LBO transactions that have available SEC filings, and those firms might be of better quality since they have public debts outstanding, or return to public stock markets, my results for changes in operating performance of successful LBO targets might not represent the universe of LBO target firms. Unfortunately, I could not address this problem due to data availability problems. For more discussion on this issue, please refer to Cohn, Mills and Towery(2013).

One debatable consequence of LBO transactions is that LBO transactions transfer government income to post-LBO equity owners and debt holders. For example, Kaplan (1989b) estimate that reduced tax payments increase firm value by 4% to 40% among target firms. The lower boundary assumes that LBO debt is paid off within eight years and personal taxes on interest income offset the corporate debt benefits from interest expenses. The upper boundary assumes that the debt is permanent and that there is no offset from personal debt. Empirically an accurate estimate of the tax benefit of LBO transactions is difficult (Kaplan and Stromberg, 2009), given that marginal tax rates of one dollar additional income depends on current income and forecasted future incomes, as well as carryforwards and carrybacks (Graham, 2000; Blouin, Core and Guay, 2010). This section does not attempt to estimate the value implications of tax reductions, instead I offer empirical evidence concerning whether the target firms are more inclined to efficiently adjust their capital structures from the tax benefits perspective.

Table 9 reports the results. The dependent variable is equal to one if the target firm's marginal tax rate after interest expenses is at least 50 basis points lower than the marginal tax rate before interest expenses, zero otherwise. Panel 9A uses the entire withdrawn sample as the control group. After LBO transactions, target firms are 23.1% more likely to employ a capital structure that enables the marginal tax rate after interest expenses to be at least 50 basis points lower than the marginal tax rate before interest expenses, which indicates that private equity, after LBO transactions, is more likely to employ a capital structure that enables the target firm to aggressively exploit the tax benefits of debt. As regards the sample of withdrawn LBO targets, I do not observe a similar pattern. Panel 9B uses "exogenously withdrawn" LBOs as control group and yields similar conclusions. Overall, I find that private equity investors take more consideration of the tax benefits brought about by interest payments when designing the capital structures of their portfolio firms<sup>21</sup>.

[Insert Table 9 here]

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<sup>21</sup> One question would be whether or not the documented tax benefit results are concentrated in the initial year after the buyout completion when there is large LBO debt on the balance sheet. Over the time, the difference in tax benefits between completed and withdrawn LBO targets diminishes as the completed LBO targets pay down the buyout debt. I address this issue by comparing the probability that target firms' marginal tax rates after interest expenses is at least 50 basis points lower than the marginal tax rates before interest expenses during the third year after the buyout transactions and the three-year period before transactions, across successful and unconsummated LBO targets. I still find economically and statistically significant differences between completed and withdrawn LBO targets.



### 3.4 CEO turnovers after the LBO transaction

Another potential effect brought about by private equity investors is that drastic changes in the ownership structures of target firms facilitates the reshuffling of management teams. However, recent evidence has shown that private equity investors tend to preserve the management teams of target firms, and CEO turnover is less sensitive to target performance (Cornelli and Karakas, 2013). In this part, I examine the CEO turnover rate of target firms during the one-year period after the LBO transaction, using failed LBO targets as a control group. The results are presented in Table 10. In the first two columns, I use Probit model to link the CEO turnover probability with deal outcomes. Withdrawn LBO targets are 17.8% less likely to change their CEOs after deal withdrawals, compared with successful LBO targets. Using “exogenously withdrawn” LBOs as the control group, as shown in column (2), does not change the results. In the following two columns, I use a two-stage-least-square estimation approach, in which the first step uses the change in the average logarithm Merrill-Lynch high yield bond market index between the one quarter period before the deal announcement and the period from the deal announcement to the deal ending, as an instrument for deal withdrawal. The F-statistic in the first step is above 10, as shown in column (3), which indicates the strong power of the instrument. Again, the results are qualitatively similar. The effects of the other control variables are as expected. For example, target CEOs are more likely to step down if the target stock performance before the LBO announcement is worse and the LBO is hostile. The last column examines differences in CEO turnover sensitivity to firm performance by comparing successful and failed LBO targets. Consistent with recent literature (Cornelli and Karakas, 2013), the CEO turnover in target firms for successful LBOs is less sensitive to stock performance compared with unconsummated LBO transactions, as indicated by the negative coefficient on the interactive term between the deal withdrawal and the target firm performance, which is -0.353 and statistically significant below the 5% significance level. Overall, I find that LBO transactions facilitates the reshuffling of top management teams of target firms. Nevertheless, private equity firms rely more on private information over long horizon to evaluate the performance of target CEOs.

[Insert Table 10 here]

#### 4. Conclusion

This paper examines the economic consequences of LBO transactions sponsored by private equity investors. Firstly, I find that the stock market revaluates target firms that have been subjected to unsuccessful LBOs by private equity firms. This result is not driven by new information releases or fundamental firm changes during LBO withdrawals, and are concentrated in target firms that suffer from greater information asymmetry problems. Overall, the empirical finding is consistent with the view that private equity firms are savvy investors in public equity markets that are able to identify undervalued companies. Moreover, using withdrawn LBO targets as a benchmark group, this paper documents increases in profitability and the operating cash flow of firms that experienced successful LBO transactions. The operational improvements remain similar when using “exogenously withdrawn” LBO targets as the control group, and when using predicted withdrawn probability due to the adverse movements of the high yield bond market instead of the actual deal withdrawals. These tests rule out the possibility that the reasons behind deal failures drive the observed operational improvements. I further demonstrate that private equity firms leverage up the target firms after the LBO transactions, compared with target firms that are not bought out by private equities. Private equities adjust the capital structures of targets in a manner consistent with the tax benefits of leverage, and ownership changes in target firms facilitate the reshuffling of management teams based on private information about managers’ quality. As a result, the turnover sensitivity to performance decreases for successful LBO target firms, compared with unconsummated LBO target firms.

The findings of this paper pave the way for further studies of the economic consequences of private equity investments. Firstly, detailed examinations of the channels through which the private equity identify undervalued targets would be beneficial. In un-tabulated results, I do not find the targets’ abnormal returns to be systematically different between deals with and without management participation. Moreover, the abnormal returns do not reflect any difference between deals announced before or after the enactment of Regulation FD. Insider information does not appear to play a vital role in private equity investors’ target identification processes. Recent anecdotal evidence shows that top private equity firms now hire former industry professionals in addition to dealmakers with financial backgrounds. For example, former GE CEO Jack Welch joined Clayton,

Dubilier & Rice and Lou Gerstner, once at the helm of RJR Nabisco and IBM, is affiliated with Carlyle (Kaplan and Stromberg, 2009).

One promising way to examine the target identification process used by private equity investors would be to link the general partners' backgrounds with the investment choices and investment performance of private equity transactions. The paper offers some preliminary evidence that target firms from withdrawn LBOs emulate LBO capital structures by leverage-up themselves. A detailed examination of the financial and real policy changes following LBO failures would provide useful guidance for the top managements of corporate America.

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Figure 1 Cumulative abnormal returns for withdrawn LBOs

Figure 1A Cumulative abnormal returns for all withdrawn deals

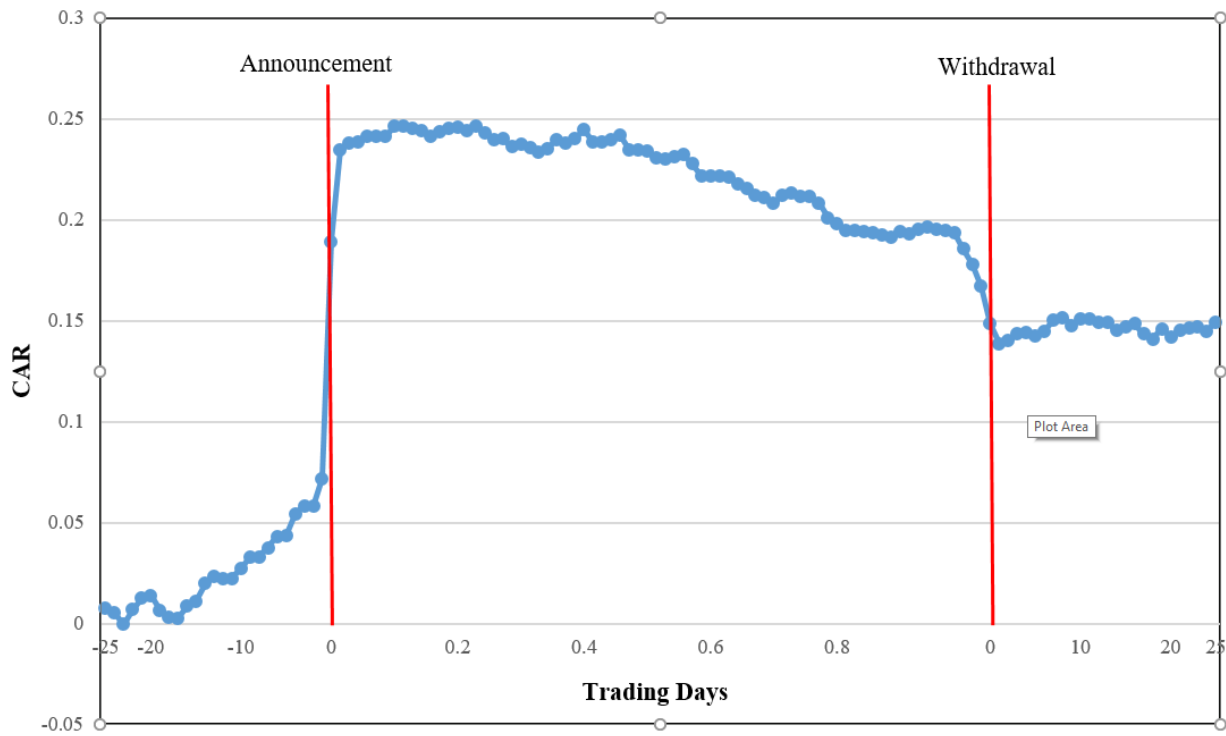
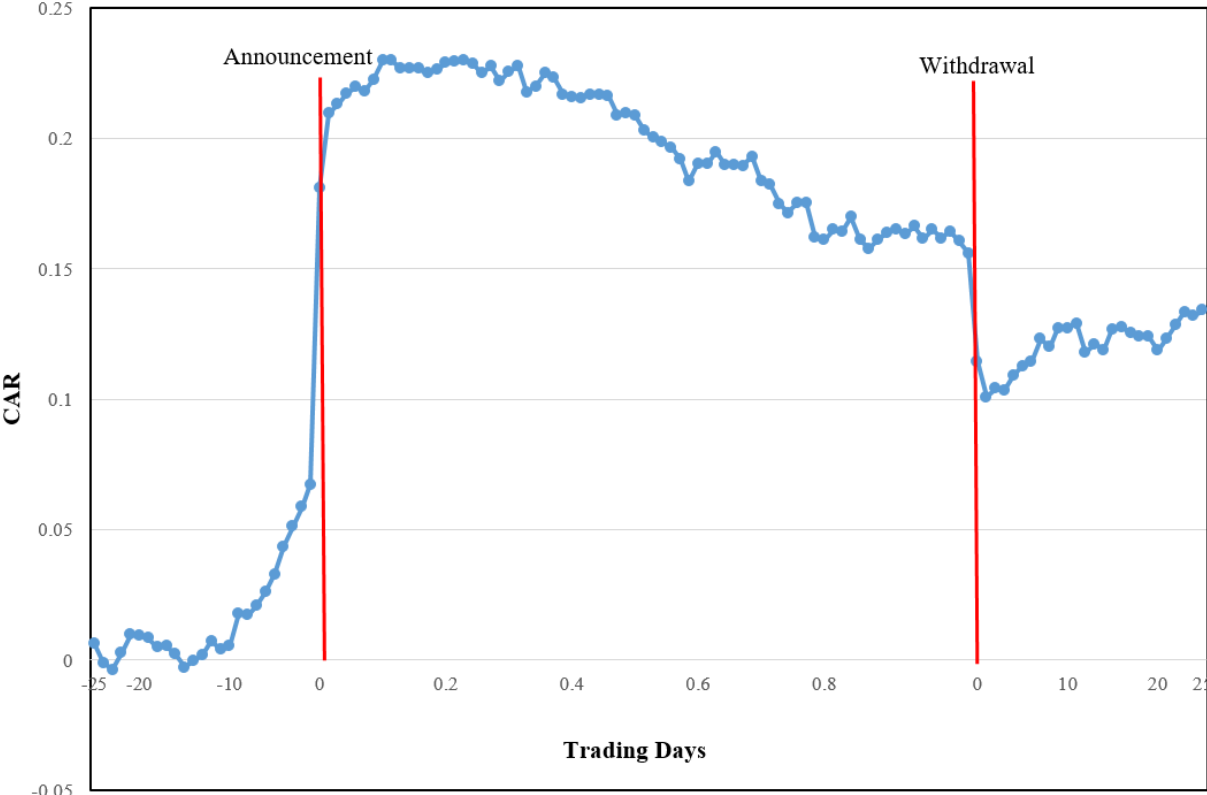


Figure 1B Cumulative abnormal returns for exogenously withdrawn deals





### Table 1 Annual distribution of leveraged buyouts with private equity participation

Table 1 reports the annual distribution of number of total LBOs with private equity participation, as well as number of the successful deals and withdrawn deals according to deal announcement year.

Announcement year	Total LBOs	Successful LBOs	Withdrawn LBOs
1979	1	0	1
1984	9	4	5
1985	22	12	10
1986	25	22	3
1987	26	18	8
1988	53	41	12
1989	15	9	6
1990	4	4	0
1991	2	1	1
1992	3	1	2
1993	4	4	0
1994	5	4	1
1995	5	4	1
1996	10	9	1
1997	17	14	3
1998	17	13	4
1999	36	28	8
2000	33	28	5
2001	9	9	0
2002	12	9	3
2003	12	9	3
2004	23	18	5
2005	39	33	6
2006	64	55	9
2007	64	50	14
2008	21	14	7
2009	19	13	6
2010	37	35	2
2011	23	23	0
<b>Total</b>	<b>610</b>	<b>484</b>	<b>126</b>

Table 2 Distribution of deal withdrawn reasons

Table 2 presents the reason behind each withdrawn deal. I search for news articles around deal withdrawal dates from LexisNexis for withdrawal reasons. The 40 deals withdrawn for reasons specified in bold and italic letters are the ones withdrawn without disclosing any information with regard to target performance or target stock price during the deal outstanding period (“exogenously withdrawn” sample thereafter).

Withdrawal reason	# cases
<i>Adverse change in capital market and economic conditions</i>	7
<i>Favorable change in public equity market</i>	1
<i>Lack of finance</i>	5
Target's high leverage	1
Negotiation failed due to price disagreement	19
<i>Negotiation failed due to reasons other than bid price issue, target news or target performance</i>	24
Negative target news (material adverse change of the target) /poor performance	17
Outbid by another acquirer	37
Positive target news/strong performance	3
<i>Rejected by regulatory government agency</i>	3
Withdrawn reason not specified	9
<b>Total cases</b>	<b>126</b>

Table 3 LBO characteristics

Table 3 reports the mean, median and standard deviation of characteristics for successful LBOs, Withdrawn LBOs, as well as “exogenously withdrawn” LBOs. The definitions of variables are present in section 2.5

Panel 3A Successful LBOs				
	N	Mean	Median	S.D.
deal value (\$ million)	473	1622.56	344.5	4493
hostile bid dummy	484	0.01	0	0.1
target cash flow	429	0.07	0.09	0.16
target financial leverage	439	0.29	0.27	0.26
target market-to-book ratio	433	4.19	1.23	57.71
target cash holdings	439	0.12	0.06	0.15
target stock performance	457	0	-0.02	0.41
deal length (days)	484	125.35	113	76.12
announcement return	422	0.2	0.17	0.23
competing deal	484	0.11	0	0.32
Panel 3B All withdrawn LBOs				
deal value (\$ million)	117	1297.97	378.85	2965.71
hostile bid dummy	126	0.06	0	0.23
target cash flow	120	0.07	0.08	0.11
target financial leverage	122	0.3	0.28	0.23
target market-to-book ratio	122	6.19	1.17	53.62
target cash holdings	122	0.11	0.04	0.15
target stock performance	122	-0.08	-0.1	0.41
deal length (days)	126	130.72	106.5	107.85
announcement return	120	0.18	0.15	0.16
competing deal	126	0.33	0	0.47
Panel 3C "Exogenously withdrawn" LBOs				
deal value (\$ million)	34	1171.54	468.64	1983.71
hostile bid dummy	35	0.09	0	0.28
target cash flow	34	0.09	0.09	0.07
target financial leverage	35	0.28	0.29	0.2
target market-to-book ratio	35	1.25	1.08	0.53
target cash holdings	35	0.08	0.03	0.12
target stock performance	35	-0.03	-0.07	0.4
deal length (days)	35	125.06	102	115.58
announcement return	35	0.17	0.14	0.18
competing deal	35	0.06	0	0.24

Table 4 Stock returns for withdrawn leveraged buyouts

For each LBO deal, I calculate the abnormal buy-and-hold return, cumulative abnormal return, and standardized daily abnormal return for the target stock in question, from 25 trading days before the deal announcement date till 25 trading days after the deal withdrawn date. The benchmark portfolios are value-weighted market portfolio for “Market portfolio” column and a three-firm portfolio matching on Fama-French 49 industry, size and book-to-market ratio, similar to Barber and Lyon (1997), in the “Matching portfolio” column. LBOs withdrawn for exogenous reasons are defined in Table 2. I classify LBOs withdrawn due to adverse change in high-yield bond market since announcement if the change in average log high-yield bond market index between one quarter before the announcement and the LBO period are among the worst 25% among all LBOs announced during that year. Withdrawn LBOs without subsequent bids are withdrawn deals without any subsequent acquisition bids at least one year thereafter. T-statistics are in parenthesis. \*\*\*, \*\*, \* denotes statistically significant below 1%, 5%, 10% level, respectively.

Panel 4A All withdrawn private equity LBOs			
		Market portfolio	Matching portfolio
		105 cases	
Raw buy-and-hold return	0.173*** (4.212)		
Raw cumulative return	0.203*** (5.833)		
Abnormal buy-and-hold return		0.119*** (2.987)	0.106** (2.385)
Cumulative abnormal return		0.149*** (4.434)	0.135*** (3.640)
Standardized daily abnormal buy-and-hold return	0.0011*** (4.071)	0.0008*** (3.122)	0.0008*** (2.922)
Panel 4B Leveraged buyouts withdrawn for "exogenous" reasons			
		Market portfolio	Matching portfolio
		35 cases	
Raw buy-and-hold return	0.145** (2.692)		
Raw cumulative return	0.181*** (3.794)		
Abnormal buy-and-hold return		0.099* (1.980)	0.134*** (3.086)
Cumulative abnormal return		0.134*** (3.040)	0.165*** (3.960)
Standardized daily abnormal buy-and-hold return	0.0011** (2.317)	0.0009** (2.267)	0.0012*** (2.968)

(Table 4 continued)

Panel 4C Withdrawn leveraged buyouts with adverse change in high-yield bond market since announcements			
		Market portfolio	Matching portfolio
		21 cases	
Raw buy-and-hold return	0.105 (1.219)		
Raw cumulative return	0.161* (1.986)		
Abnormal buy-and-hold return		0.180** (2.251)	0.203*** (3.078)
Cumulative abnormal return		0.227*** (2.993)	0.253*** (4.038)
Standardized daily abnormal buy-and-hold return	0.0008 (1.171)	0.0015** (2.678)	0.0016*** (3.099)
Panel 4D Withdrawn leveraged buyouts without subsequent bids one year thereafter			
Abnormal buy-and-hold return		Market portfolio	Matching portfolio
Full sample		79 cases	
		0.179*** (3.620)	0.145** (2.526)
LBOs withdrawn for "exogenous" reasons		23 cases	
		0.174** (2.759)	0.202*** (4.052)
LBOs withdrawn due to adverse change in high-yield bond market		14 cases	
		0.281** (2.740)	0.281*** (3.255)

Table 5 Relationship between target firm information asymmetry and target firm stock return

Table 5 reports the relationship between stock returns during LBO periods and the information asymmetry of target firms. I use three measures for information asymmetry, obtained from I/B/E/S database of analyst forecasts on firm annual EPS: absolute difference between analyst consensus forecasted EPS and actual EPS over fiscal year-end stock price (Panel 5A), standard deviation of analyst forecasted EPS over firm assets for the month before the deal announcement (Panel 5B), and number of analysts covering the target firms during past 12 months ending in one month before the deal announcement (Panel 5C). "Exogenously withdrawn" LBOs are defined in Table 2. Measures of stock returns are the same as in Table 4. T-statistics are in parenthesis. \*\*\*, \*\*, \* denotes statistically significant below 1%, 5%, 10% level, respectively.

	Opaque targets		Transparent targets	
Panel 5A $ \text{consensus forecasted EPS} - \text{actual EPS}  / \text{stock price}$				
	Analyst forecast error > sample median		Analyst forecast error <= sample median	
BHAR	Market portfolio	Matching portfolio	Market portfolio	Matching portfolio
Full sample	40 cases		41 cases	
	0.205*** (3.393)	0.164** (2.548)	0.016 (0.353)	0.048 (1.049)
"Exogenously withdrawn" LBOs	14 cases		14 cases	
	0.257*** (3.941)	0.201** (2.940)	-0.038 (0.637)	0.077 (1.244)
Panel 5B Analyst forecast standard deviation/total assets				
	Analyst forecast dispersion > sample median		Analyst forecast dispersion <= sample median	
BHAR	Market portfolio	Matching portfolio	Market portfolio	Matching portfolio
Full sample	40 cases		41 cases	
	0.136** (2.294)	0.131** (2.316)	0.059 (1.052)	0.038 (0.565)
LBOs withdrawn for "exogenous" reasons	14 cases		14 cases	
	0.138 (1.649)	0.165** (2.314)	0.049 (0.623)	0.107 (1.481)
Panel 5C Analyst coverage				
	Analyst coverage < sample median		Analyst coverage >= sample median	
BHAR	Market portfolio	Matching portfolio	Market portfolio	Matching portfolio
Full sample	49 cases		54 cases	
	0.105 (1.583)	0.147** (2.117)	0.129** (2.595)	0.070 (1.214)
LBOs withdrawn for "exogenous" reasons	20 cases		15 cases	
	0.069 (1.135)	0.175*** (3.358)	0.138 (1.632)	0.080 (1.084)

Table 6 Operating performance and firm policy following LBO transactions: All withdrawn sample

Table 6 compares the operating performance, investment and capital structure, for successful and withdrawn LBOs three years before and after the LBO closing. I exclude the year during which the LBO ends. Operating cash flow is defined as EBITDA minus capital expenditure. Financial leverage is defined as the sum of debt in current liabilities and long-term debt. Panel 6A, 6C, 6E, 6G reports raw measures, and Panel 6B, 6D, 6F, 6H report raw measures minus median value for all firms in the sample 4 digit SIC industry in the year. Robust T-statistics are in parentheses. \*\*\*, \*\*, \* denotes statistically significant below 1%, 5%, 10% level, respectively.

Panel 6A EBITDA/Total assets			
	Before	After	After-Before
Withdrawn deals	0.126	0.124	-0.002 (0.253)
Successful deals	0.095	0.125	0.031*** (6.303)
Withdrawn-successful	0.031*** (5.504)	-0.001 (0.137)	-0.032*** (-3.574)
Panel 6B EBITDA/Total assets - 4 digit SIC industry median			
	Before	After	After-Before
Withdrawn deals	0.012	0.013	0.000 (0.064)
Successful deals	-0.027	0.011	0.038*** (7.239)
Withdrawn-successful	0.039*** (6.705)	0.001 (0.209)	-0.038*** (-4.228)
Panel 6C Operating cash flows/Total assets			
	Before	After	After-Before
Withdrawn deals	0.06	0.065	0.005 (0.493)
Successful deals	0.05	0.085	0.035*** (7.260)
Withdrawn-successful	0.010 (1.563)	-0.020** (2.409)	-0.030*** (2.856)
Panel 6D Operating cash flows/Total assets - 4 digit SIC industry median			
	Before	After	After-Before
Withdrawn deals	0.02	0.012	-0.008 (1.026)
Successful deals	-0.002	0.026	0.028*** (5.744)
Withdrawn-successful	0.023*** (3.903)	-0.013* (1.864)	-0.036*** (3.929)

(Table 6 continued)

Panel 6E CAPEX/Total assets			
	Before	After	After-Before
Withdrawn deals	0.066	0.057	-0.009 (1.473)
Successful deals	0.045***	0.040	-0.005 (-1.472)
Withdrawn-successful	0.021*** (4.475)	0.017*** (3.559)	-0.004 (0.598)
Panel 6F CAPEX/Total assets - 4 digit SIC industry median			
	Before	After	After-Before
Withdrawn deals	0.000	0.008	0.007 (1.640)
Successful deals	-0.015	-0.008	0.008*** (2.700)
Withdrawn-successful	0.016*** (4.381)	0.015*** (3.895)	-0.000 (0.047)
Panel 6G Financial leverage/Total assets			
	Before	After	After-Before
Withdrawn deals	0.319	0.396	0.077*** (2.646)
Successful deals	0.222	0.686	0.464*** (22.216)
Withdrawn-successful	0.097*** (5.330)	-0.290*** (9.361)	-0.387*** (10.771)
Panel 6H Financial leverage/Total assets - 4 digit SIC industry median			
	Before	After	After-Before
Withdrawn deals	0.039	0.142	0.103*** (4.083)
Successful deals	-0.036	0.376	0.412*** (21.580)
Withdrawn-successful	0.075*** (4.989)	-0.234*** (8.383)	-0.309*** (9.747)



Table 7 Operating performance and firm policy following LBO transactions: “Exogenously withdrawn” sample

Table 7 repeats the analyses presented in Table 6, with the exception that only LBOs withdrawn for “exogenous” reasons are included in the withdrawn deal sample. “Exogenously withdrawn” LBOs are defined in Table 2. Robust T statistics are in parentheses. \*\*\*, \*\*, \* denotes statistically significant below 1%, 5%, 10% level, respectively.

Panel 7A EBITDA/Total assets			
	Before	After	After-Before
Withdrawn deals	0.126	0.126	-0.001 (0.043)
Successful deals	0.095	0.125	0.031*** (6.299)
Withdrawn-successful	0.031*** (3.699)	0.000 (0.030)	-0.031** (2.285)
Panel 7B EBITDA/Total assets - 4 digit SIC industry median			
	Before	After	After-Before
Withdrawn deals	0.020	0.012	-0.008 (0.625)
Successful deals	-0.027	0.011	0.038*** (7.234)
Withdrawn-successful	0.046*** (5.372)	0.000 (0.020)	-0.046*** (3.385)
Panel 7C Operating cash flows/Total assets			
	Before	After	After-Before
Withdrawn deals	0.060	0.067	0.007 (0.449)
Successful deals	0.050	0.085	0.035*** (7.256)
Withdrawn-successful	0.010 (0.954)	-0.018 (1.426)	-0.028* (1.707)
Panel 7D Operating cash flows/Total assets - 4 digit SIC industry median			
	Before	After	After-Before
Withdrawn deals	0.033	0.021	-0.013 (0.999)
Successful deals	-0.002	0.026	0.028*** (5.740)
Withdrawn-successful	0.036*** (4.108)	-0.005 (0.477)	-0.041*** (2.982)

(Table 7 continued)

Panel 7E CAPEX/Total assets			
	Before	After	After-Before
Withdrawn deals	0.067	0.054	-0.012
			-1.217
Successful deals	0.045	0.040	-0.005
			-1.471
Withdrawn-successful	0.022***	0.014**	-0.008
	(2.757)	(2.023)	(0.722)
Panel 7F CAPEX/Total assets - 4 digit SIC industry median			
	Before	After	After-Before
Withdrawn deals	-0.006	-0.003	0.003
			(0.353)
Successful deals	-0.015	-0.008	0.008***
			(2.698)
Withdrawn-successful	0.009	0.004	-0.005
	(1.402)	(0.714)	(0.514)
Panel 7G Financial leverage/Total assets			
	Before	After	After-Before
Withdrawn deals	0.287	0.434	0.148***
			(2.735)
Successful deals	0.222	0.686	0.464***
			(22.202)
Withdrawn-successful	0.065**	-0.252***	-0.317***
	(2.558)	(4.836)	(5.468)
Panel 7H Financial leverage/Total assets - 4 digit SIC industry median			
	Before	After	After-Before
Withdrawn deals	0.031	0.180	0.149***
			(3.061)
Successful deals	-0.036	0.376	0.412***
			(21.566)
Withdrawn-successful	0.068***	-0.196***	-0.264***
	(3.085)	(4.132)	(5.047)

## Table 8 Operating performance and firm policy following LBO transactions: Full control and predicted withdrawal

Table 8 repeats analyses presented in Table 6 and Table 7, but with more controls. *Log (deal value)* is logarithm of deal value. *Hostile deal* is equal to one if the LBO is classified as hostile. Target financial conditions before the LBO announcement are obtained from COMPUSTAT annual tapes. Target cash flow is defined as the sum of *COMPUSTAT* Item *IB* and *DP* over *AT*. Target financial leverage is defined as sum of *DLTT* and *DLC* over *AT*. Target *Q* is defined as market value of assets over book value of assets, where market value of assets is equal to *AT* plus market value of equity minus *TXDB* minus *CEQ*, and market value of equity is *PRCC* multiplied by *CSHO*. Target cash holdings is defined as *CHE* over *AT*. *Target stock price performance* is defined as abnormal buy-and-hold return against market portfolio for one year period ending in 11 days before deal announcement. *LBO duration* is logarithm of number of days between deal announcement and deal close. *LBO announcement return* is defined as the three-day cumulative abnormal return surrounding the LBO announcement dates. *Competing deal* is equal to one if there are multiple bidders for the target. Changes in average Log high-yield bond market index is defined as change in average log high-yield bond market index between one quarter period before the announcement and the period from deal announcement to deal ending. Industry fixed effects are included in the regressions. Standard errors are robust and clustered by industry. T statistics are in parentheses. \*\*\*, \*\*, \* denotes statistically significant below 1%, 5%, 10% level, respectively.

Panel 8A Actual withdrawn LBOs

	EBITDA/Total assets	Operating cash flow/Total assets	Capital expenditure/Total assets	Financial leverage/Total assets
	(1)	(2)	(3)	(4)
After	0.030*** (8.138)	0.034*** (8.244)	-0.004* (-1.681)	0.479*** (24.260)
<b>After × Withdrawn</b>	-0.033*** (-4.358)	-0.032*** (-3.471)	-0.003 (-0.534)	-0.394*** (-12.498)
Withdrawn	0.029*** (4.454)	0.015* (1.679)	0.014** (2.255)	0.095*** (3.521)
Log(deal value)	-0.002 (-1.034)	0.005** (2.059)	-0.008*** (-4.190)	0.022** (2.060)
Hostile deal	0.034** (2.027)	0.013 (0.765)	0.023** (2.249)	-0.002 (-0.029)
Target cash flow before LBO	0.389*** (4.316)	0.173 (1.469)	0.205*** (2.893)	0.046 (0.303)
Target financial leverage before LBO	0.104*** (3.363)	0.130*** (3.192)	-0.029 (-1.186)	0.657*** (5.195)
Target Q before LBO	0.003 (0.305)	0.005 (0.389)	-0.004 (-0.834)	0.066 (1.488)
Target cash holdings before LBO	0.084** (1.979)	0.129*** (2.820)	-0.055** (-2.002)	-0.007 (-0.044)
Target stock price run-up before LBO	-0.013 (-1.552)	-0.004 (-0.389)	-0.008 (-1.265)	-0.075* (-1.780)
LBO time length	0.002 (0.439)	-0.001 (-0.188)	0.004 (0.922)	-0.016 (-0.796)
LBO announcement return	-0.012 (-0.498)	-0.009 (-0.246)	-0.004 (-0.158)	-0.146* (-1.776)
Competing deals	0.004 (0.562)	-0.004 (-0.478)	0.008 (1.423)	-0.062* (-1.858)
Industry fixed effects	Yes	Yes	Yes	Yes
Observations	929	929	929	929
R-squared	0.555	0.502	0.562	0.631

Panel 8B Predicted withdrawal probabilities

	=1 if LBO is withdrawn		EBITDA	Operating CF	Capital expenditure	Financial leverage
	OLS	Probit				
	(1)	(2)	(3)	(4)	(5)	(6)
After			0.031*** (5.140)	0.034*** (4.759)	-0.004 (-1.182)	0.415*** (11.496)
<b>After × Predicted withdrawn probability</b>			-0.052** (-1.994)	-0.046 (-1.477)	-0.008 (-0.530)	-0.372** (-2.260)
Predicted withdrawn probability			-0.152* (-1.784)	0.017 (0.147)	-0.160** (-2.139)	-0.916** (-2.085)
<b>Changes in average Log high-yield bond market index</b>	-0.850*** (-3.242)	-0.902*** (-3.821)				
Log(deal value)	-0.007 (-0.645)	-0.006 (-0.579)	-0.005* (-1.951)	0.006** (2.008)	-0.011*** (-5.488)	0.030*** (2.662)
Hostile deal	0.375** (2.705)	0.390** (2.548)	0.125*** (3.274)	0.022 (0.452)	0.102*** (3.323)	0.372* (1.944)
Target cash flow before LBO	0.216 (1.046)	0.162 (0.793)	0.439*** (4.509)	0.174 (1.395)	0.251*** (3.556)	0.197 (0.928)
Target financial leverage before LBO	0.135** (2.243)	0.120* (1.742)	0.134*** (4.516)	0.136*** (3.857)	-0.007 (-0.316)	0.930*** (5.566)
Target Q before LBO	-0.057* (-2.129)	-0.060* (-1.753)	-0.009 (-0.736)	0.003 (0.200)	-0.015* (-1.793)	0.051 (0.989)
Target cash holdings before LBO	0.101 (1.095)	0.070 (0.630)	0.116*** (2.685)	0.131*** (3.044)	-0.026 (-0.985)	0.118 (0.589)
Target stock price performance before LBO	-0.183*** (-5.264)	-0.183*** (-4.302)	-0.047** (-2.251)	-0.002 (-0.078)	-0.042** (-2.396)	-0.249** (-2.477)
LBO duration	-0.062** (-2.221)	-0.049** (-2.146)	-0.011 (-1.397)	0.000 (0.031)	-0.009 (-1.483)	-0.076** (-2.252)
LBO announcement return	-0.153* (-2.056)	-0.173** (-2.090)	-0.033 (-1.361)	-0.012 (-0.399)	-0.020 (-1.021)	-0.339*** (-2.867)
Competing deals	0.234*** (3.975)	0.244*** (4.333)	0.038** (2.030)	-0.007 (-0.287)	0.044*** (2.672)	0.144 (1.599)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	469	469	844	844	844	844
R-squared	0.135	0.13	0.544	0.497	0.574	0.571

Table 9 Tax policies following LBO transactions

Table 9 examines whether target firms make more use of tax benefit of interest deductions after the LBO transaction. The dependent variable is equal to one if the difference between marginal tax rate before and after interest expenses is greater or equal to 50 basis points (“Graham's Kink”, Graham, 2000). Panel 9A uses all withdrawn sample as control group, while Panel 9B uses only LBOs withdrawn for “exogenous” reasons as the control sample. “Exogenously withdrawn” LBOs are defined in Table 2. Robust T-statistics are in parentheses. \*\*\*, \*\*, \* denotes statistically significant below 1%, 5%, 10% level, respectively.

Panel 9A Full sample			
	Before	After	After-Before
Withdrawn deals	0.711	0.756	0.045 (0.952)
Successful deals	0.576	0.807	0.231*** (5.982)
Withdrawn-successful	0.135*** (3.047)	-0.051 (-1.232)	-0.187*** (-3.066)
Panel 9B Exogenously withdrawn sample			
	Before	After	After-Before
Withdrawn deals	0.716	0.679	-0.038 (-0.453)
Successful deals	0.576	0.807	0.231*** (5.977)
Withdrawn-successful	0.140** (2.243)	-0.129* (-1.908)	-0.269*** (-2.925)

### Table 10 CEO turnovers after leveraged buyouts

Table 10 compares the probability of CEO turnovers between completed and withdrawn LBOs. Turnover is equal to one if the CEO of target firm steps down within one year period after the deal ends, and zero otherwise. Column (1) include all withdrawn LBOs; Column (2) includes only withdrawn LBOs due to “exogenous” reasons, which are defined in Table 2; Column (3) and (4) use two-stage least square regressions to address the endogeneity of deal withdrawal. All variables are defined in the same manner as in Table 8. Industry fixed effects are included in the regressions. Standard errors are robust and clustered by industry. T statistics are in parentheses. \*\*\*, \*\*, \* denotes statistically significant below 1%, 5%, 10% level, respectively.

	All withdrawn LBOs	Exogenously Withdrawn LBOs	2SLS regression		Turnover sensitivity
	=1 if turnover	=1 if turnover	First stage =1 if withdrawn	Second stage =1 if turnover	=1 if turnover
	(1)	(2)	(3)	(4)	(5)
<b>Withdraw</b>	-0.178*** (-7.066)	-0.291*** (-4.592)		-1.232* (-1.837)	-0.210*** (-8.673)
<b>Withdraw × Target stock performance before LBO</b>					-0.353*** (-2.754)
Log(deal value)	0.034** (2.320)	0.039*** (3.533)	-0.005 (-0.49)	0.029 (1.542)	0.036** (2.496)
Hostile deal	0.315*** (4.453)	0.476*** (5.995)	0.374** (2.68)	0.696** (2.092)	0.298*** (3.923)
Target cash flow before LBO	-0.718 (-1.524)	-0.919* (-1.689)	0.224 (1.07)	-0.368 (-0.668)	-0.753 (-1.642)
Target financial leverage before LBO	-0.029 (-0.411)	-0.072 (-1.339)	0.137** (2.30)	0.112 (0.999)	-0.037 (-0.554)
Target Q before LBO	-0.007 (-0.154)	-0.005 (-0.115)	-0.058** (-2.23)	-0.085* (-1.647)	-0.003 (-0.069)
Target cash holdings before LBO	0.053 (0.383)	0.098 (0.492)	0.101 (1.09)	0.178 (1.099)	0.047 (0.338)
Target stock performance before LBO	-0.148** (-2.568)	-0.115* (-1.911)	-0.184*** (-5.21)	-0.332* (-1.815)	-0.091 (-1.405)
LBO duration	-0.074** (-2.462)	-0.143*** (-3.818)	-0.072** (-2.68)	-0.168*** (-4.440)	-0.084*** (-2.659)
LBO announcement return	-0.189* (-1.741)	-0.247* (-1.833)	-0.148 (-1.72)	-0.391 (-1.567)	-0.201* (-1.914)
Competing deals	0.119 (1.606)	0.070 (0.543)	0.234*** (3.96)	0.377** (2.002)	0.117 (1.505)
<b>Changes in average Log high-yield bond market index</b>			-0.812*** (-3.28)		
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
F statistic on excluded IV			10.77***		
Observations	506	432	469	469	506
R-squared	0.076	0.098			0.076