After The Mega-Buyout Era: Do Public-to-Private Transactions Still Outperform?

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Abstract

This thesis contributes to existing knowledge of the private equity asset class by examining whether public-to-private leveraged buyouts outperform public peers before and after the mega-buyout era (2005 – 2007). This paper considers the impact of four groups of value drivers on both market- and peer-adjusted returns. These value drivers include operational improvements, leverage, multiple expansion and market timing, and management and corporate decision making. I analyze how these factors change over time, aiming to determine whether public-to-private target firms improve profitability, return on assets, and investment more than peers. I also examine how employment changes at target firms relative to peers. Multivariable regression analysis is used to quantify the impact of operating performance changes, leverage, multiple expansion, credit market conditions, GDP growth, and management and corporate decisions on market- and peer-adjusted returns. The paper constructs a sample of 227 public-to-private transactions from 1996 – 2013 and analyzes 74 transactions with post-buyout financial information available. Results suggest that private equity ownership post-buyout does not lead to significant operational improvements relative to peers, but that improving profitability and ROA are crucial to outperforming the market and peers.

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I. Introduction

In the last decade, private equity has outperformed every other private market asset class and public market equivalents (PMEs) while experiencing less volatility. To date, median funds in every private equity vintage since 2009 have returned at least 1.06 times the returns of PMEs ("McKinsey Global Private Markets Review 2022"). The most common private equity strategy, a leveraged buyout (LBO), is unique due to the degree of leverage it involves. In an LBO, a private equity firm (also known as a sponsor) acquires a public or private company using a significant amount of debt to fund the purchase. As a result, the target company's debt rises on its balance sheet and the private equity sponsor can contribute less equity (cash) to complete the purchase. Private equity sponsors strive to make operational improvements, such as increasing sales growth or profitability margins, to help generate enough free cash flow to pay down the debt during the sponsor's holding period. Reducing the debt on the balance sheet essentially increases the private equity firm's equity ownership, allowing it to achieve an attractive return.

In theory, an LBO is an efficient corporate financing option that effectively aligns the interests of owners and operators. Private equity sponsors are incentivized to make operational improvements to help pay down the debt and increase their returns. However, many would argue that these incentives are not strong enough, and that private equity sponsors extract value from the target firms through financial engineering alone. A common critical narrative posits that private equity firms routinely overleverage target firms and, as a consequence, make deep cuts in employment, investment, and research and development to make interest payments. As bankruptcy risk climbs to dangerous levels, private equity firms may also be compelled to sell off company assets to help make interest payments. Despite the downward spiral of the target firm that results from such measures, private equity sponsors may still make a profit because of

how little cash they invested up front. Many sponsors also receive contractual management fees and dividends regardless of the target's performance. Massachusetts Democratic Senator Elizabeth Warren has proposed limiting management fees and other restrictions that, she argues, would prevent private equity firms from "ransacking businesses that provide powerfully important services and leaving just heaps of junk behind" (Warren, "Elizabeth Warren on Twitter"). Senator Warren and several other Senate Democrats reintroduced the Stop Wall Street Looting Act in October 2021. This act would reclassify management fees and carried interest as ordinary income rather than investment income and bar takeover target firms from paying dividends or making buybacks for two years (Franck, 2021).

Public-to-private LBOs, transactions in which sponsors acquire a publicly traded company and take it private, are viewed even more cynically. Public companies tend to be much larger than private company targets, and thus require more debt to finance the transaction, leading to a higher bankruptcy risk. Although public-to-private deals are less common than private-to-private transactions, their impacts are typically felt by greater numbers of employees and pre-existing shareholders. The impact of such transactions have increasingly gained the attention of prominent figures both in media and academia, many of whom echo Senator Warren's critiques. Public-to-private deals were largely responsible for 2021's record-setting private equity deal value of $1.12 trillion, which shattered the previous asset class record of $804 billion in 2006 (MacArthur, 2022). Global Public-to-private buyout deal value skyrocketed 57% to $469 billion, accounting for 42% of the increase in the private equity asset class deal value (MacArthur, 2022). This sharp increase in take-private transactions was second only to that of 2006-2007 in the run up to the Global Financial Crisis (GFC), which accounted for 91% of the increase in overall deal value. Record levels of dry powder, committed but unallocated capital,

have reignited the spark in take-private transactions. However, the opportunity (and pressure) to put capital to work may not always be beneficial. The increase in public-to-private deals may be cause for concern if history were to repeat itself. Buyouts in 2005-2007 were bigger than ever before, leading to some of the largest and most disastrous bankruptcies in financial history. For example, TXU, a 2007 deal and the largest LBO in history, filed for bankruptcy in 2014 saddled with $49.7 billion in debt (Brown and Cheung, 2014). Bain Capital and Thomas H. Lee Partner's 2006 acquisition of Clear Channel for $27 billion quickly unraveled, leading the company to restructure itself and lay off 1,500 employees, or 7% of its workforce, in 2010 (McBride, 2009). The smaller scale of buyouts in 2021 is reassuring, as the largest deal (valued at $15.4 billion) pales in comparison to the mega-buyout era of 2006-2007, in which all top 10 deals surpassed $24 billion (MacArthur, 2022).

As public-to-private deals reemerge as a primary driver in the private equity class, I return to the question posed earlier: do LBOs serve as an efficient and effective corporate financing option or do sponsors simply extract value at the expense of the target company and its workers? Is there truth in both narratives, and if so, which is more applicable in recent years? One must also ask whether these narratives are mutually exclusive. In theory, operational improvements and increasing leverage complement each other in boosting investor returns. I explore these questions by comparing the financial performance and investor returns of 74 public-to-private buyouts from 1996 – 2013 to publicly traded peer companies. My research builds off existing academic research to create a comprehensive model to measure public-to-private LBO performance and outperformance over peers. My dataset includes deals that extend past most datasets, allowing me to capture the full effect of the mega-buyout era from 2005-2007, as well as the post GFC slowdown.

My empirical findings reveal that investor returns and transaction volume have an inverse relationship during the mega-buyout era. Returns plunged as transaction volume soared from 2005 to 2007, and they remained low in the subsequent cooldown after the GFC. My thesis largely confirms conventional theories that LBO target firms tend to experience similar operating performance changes as peers, but that improving operating performance is crucial in generating strong returns. Some of my findings support the notion that private equity investors do not add substantial value, but others demonstrate that private firms do not destroy value either. Although target firms do not improve profitability or ROA more than peers, they outperform the overall market and tend to increase the size of their workforce. I discredit the notion that public-to-private transactions cause financial instability and excessive leverage, finding that target firms do not add a substantially greater percentage of debt than peer firms over the sponsor's investment horizon.

II. Literature Review

In addition to public and political scrutiny, the private equity asset class has also become the subject of a substantial body of academic research. Most research can be divided into two categories: (1) the financial performance of private equity-owned companies and their associated investment returns and (2) the impact of private equity on employment, wages, and the broader economy. Given the lack of publicly available data on private-to-private transactions, most empirical research relies on public-to-private transactions. Firm-level employment and wage data are also rarely published. I report on employment changes among my sample and peer firms; however, I lack more specific data needed to explore potential wealth transfers from employees to investors.

Research centered on target firms' financial performance and investor returns has categorized value creation sources into four main groups: operating improvements, multiple expansion, leverage effects, and management and corporate decisions. Operating improvements can be defined as enhancements in the way a company does business, and can be measured in several ways, such as sales growth, profitability margins, capital expenditure spending, inventory turnover, and research and development. Multiple expansion refers to the increase in a valuation multiple (typically EV/EBITDA) relative to the original multiple paid. Transaction-specific multiples are hard to observe due to a paucity of public data, so industry-level mean and median EV/EBITDA multiples can be used to measure the valuation growth one would expect for a company in the industry. Leverage effect aims to measure the impact of an increase in debt on returns and business risk. Leverage effects may be measured in several ways, such as the percentage increase in debt, Debt / EBITDA, Debt / Equity, and other leverage ratios. Management and corporate decisions refer to potential changes in the target firm's leadership and the private equity sponsor's oversight and ownership over the portfolio company. Management is a broad term and encompasses both the concentration of ownership (such as multiple private equity sponsors working together or management equity contribution), while corporate decisions refer to acquisitions and asset sales. Although I categorize private equity value drivers into these four buckets, it is important to note that operating improvements, multiple expansion, leverage, and corporate decision making are all interconnected. For instance, overleverage can lead to declining operating performance, while acquisitions carried out and funded by private equity sponsors may boost a company's operating metrics as it obtains more customers.

Operating Improvements:

Kaplan (1989) pioneered research on the relationship between operating performance and the value created by management buyouts. His study of 76 management buyouts completed between 1980 – 1986 focuses on the operational improvements of 48 firms with post-buyout data available. He measures three cash flow variables: operating income (EBITDA); Capital Expenditures; and Net Cash Flow (NCF), which equals EBITDA minus capital expenditures. He finds that median increases in profitability (both EBITDA / Sales and NCF / Sales) and return on assets (ROA: EBITDA / Assets and NCF / Assets) in the three years post-buyout are statistically significantly greater than those of firms in the same industry.

By contrast, capital expenditures fall each year in the three years post-buyout, and the industry-adjusted changes in capital expenditures are negative and statistically significant. Kaplan's (1989) findings are consistent with Jensen's (1988) reduced-agency-cost hypothesis, which argues public-to-private buyouts lead to a reduction in capital expenditures as sponsors stop investing in negative net present value (NPV) projects. Thus, reductions in capital expenditures may increase profitability, overall firm value, and investor returns. Another consideration is that capital expenditures could also decrease due to a greater proportion of cash flows being used to pay interest expense, preventing the firm from investing more heavily in positive NPV projects. Kaplan (1989) also estimates the market value for 25 deals and finds that 22 deals returned positive market-adjusted returns for investors who invested at the time of the buyout. His rank and parametric correlations are somewhat supportive of the hypothesis that industry-adjusted post-buyout operating changes have effects on target firm market-adjusted returns. Cumming, Siegel, and Wright (2007) summarize additional empirical studies on

leveraged buyouts from 1984 – 2004 and conclude there "is a general consensus across different methodologies, measures, and time periods regarding a key stylized fact: LBOs [leveraged buyouts] and especially MBOs [management buyouts] enhance performance and have a salient effect on work practices" (Cumming, Wright, and Siegel, 2007, page 17).

Guo et al. (2011) built on Kaplan's work, studying 94 public-to-private leveraged buyouts between 1990 – 2006 with post-buyout data available. They study similar changes in operating performance and find that none of the median industry- or peer-adjusted changes in profitability or ROA are statistically significant, except for industry-adjusted ROA. Despite this finding, they conclude that mean and median market- and risk-adjusted returns are large, positive, and statistically significant. Furthermore, their regressions show that industry-adjusted profitability and ROA are important predictors of market- and risk-adjusted returns. Similarly, Leslie and Oyer (2009) do not find that private equity-owned firms are more successful than comparable public companies in improving operating metrics such as ROA or operating income in their sample of 144 leveraged buyouts from 1996 – 2004. Acharya et al. (2013) analyzed target firms' "abnormal performance," a measure of peer outperformance after removing the effects of financial leverage, in a sample of 395 deals from 1991 – 2007 in Western Europe. These deals, all executed by large private equity firms, resulted in positive and statistically significant abnormal performance even during periods of low sector returns. They found that profitability growth is a significant determinant of abnormal performance, but sales growth is not. Research on whether buyout targets operationally outperform their public counterparts has been inconclusive, as has research on whether operating improvements are a significant determinant of investor returns.

Multiple Expansion:

Existing literature does not consistently show that buyout targets outperform their public peers in terms of EBITDA and profitability growth. However, such improvements are unnecessary for the valuation of a target firm, and thus investor's returns, to increase. When industry valuation multiples rise, a firm's implied enterprise value increases, even when holding EBITDA constant. Research has shown that changes in industry valuation multiples may have similar economic explanatory power as the change in EBITDA itself. Guo et al. (2011) found that changes in industry valuation multiples and operating performance each account for approximately 20% of investors' returns. The change in industry multiple was a statistically significant indicator of market-adjusted returns at the 10% level. The median EV/EBITDA industry multiple increased by 0.91 from the time of the buyout to the investment outcome, compared to an increase of 0.68 for the S&P 500 multiple. This suggests that private equity firms selected well-performing industries compared to the overall market. Acharya et al. (2013) similarly found that industry multiples were a significant predictor of investor returns measured in terms of internal rate of return (IRR). The deal buyout multiple grew 16% more than the sector median from the target firm's leveraged buyout to its subsequent secondary sale or re-IPO. Lakhotia (2019) found that the contribution of multiple expansion to increases in equity value for reverse leveraged buyouts (RLBO) varied across different credit cycles. From 1980 – 1989 industry multiple expansion accounted for 15.6% of the increase in median equity value for 38 RLBOs; however, multiple expansion had a negligible effect from 1990 – 1999 and 2000 – 2007. He found that industry multiples declined from 2008 to 2018, detracting 13.6% from median equity value in five RLBOs.

Interestingly, Lakhotia's (2019) findings do not mirror the relative performance of U.S. buyout multiples and the S&P 500 multiples. The S&P 500 multiple grew faster than the median U.S. buyout deal EV/EBITDA multiple from 1990 – 1999, at which time buyout multiples continued to increase while the S&P 500 gradually fell until 2009. Buyout multiples increased from 2009 until 2019, but the S&P 500 accelerated faster (Mauboussin and Callahan, 2020). One would expect that multiple expansion positively affects market-adjusted investor returns when buyout multiples grow faster than the S&P 500 multiples. This would suggest that buyouts are increasing in value faster than the market. However, as buyout multiples have risen, leverage levels and equity contributions have grown out of necessity. Higher equity contributions make deals more reliant on multiple expansion upon exit, and increased leverage elevates bankruptcy risk. With a greater equity investment at the outset of the deal, a higher final equity value is needed to achieve the same multiple-on-invested capital. To achieve a higher equity value while still maintaining a relatively high level of leverage, the company must be valued at a greater enterprise value at exit. Typically, most high valuations are achieved through both EBITDA growth and multiple expansion. Since EBITDA growth is quite finite within a typical 3 – 5-year investment holding period, multiple expansion is increasingly necessary for a high valuation as the equity contribution rises. As a result, higher purchase prices translate to lower returns. Kaplan and Brown (2019) found a strong correlation between high purchase-price multiples and low public market equivalent (S&P 500) outperformance. The relationship between multiple expansion and investor returns appeared positive and direct in the 1980s and 1990s but has been confounded by greater leverage and equity contributions.

Leverage:

Previous research has shown that leverage levels play an important role in financing and pricing a public-to-private LBO and in monitoring post-buyout. However, there is limited research on the impact of financial engineering on investor returns. Greater leverage allows investors to contribute less equity at the time of the buyout and thus should enhance their returns. Using more debt also increases the size of tax shields. Greater leverage may also have a beneficial disciplining effect. Jensen (1989) argued that debt is crucial to management discipline and making effective decisions about how to allocate free cash flow. He contended that LBOs are effective because they force management to take on efficient levels of risk and align the interest of owners and managers. However, significant leverage can also leave buyout companies cash-constrained, unable to reinvest as heavily in the business, or even unable to make interest payments. Excessive leverage can become particularly dangerous when interest rates rise. But LBOs are most attractive when interest rates are low and it is easy to borrow. Leverage levels used to finance the transactions, as measured by Debt / EBITDA, have generally risen since 2000 and reached their peak of over 6x in 2007 (Mauboussin and Callahan, 2020). In their full sample of 192 buyouts, Guo et al. (2011) found that the median Debt / EBITDA level increased from 1.8x pre-buyout to 6.0x post-buyout. Kaplan (1989) similarly found that the average debt ratio (long-term debt as a percentage of debt plus equity) skyrocketed from 20% pre-buyout to 85% post-buyout.

It is important to note that the target company typically takes on the debt used to finance the buyout. Therefore, private equity firms capture upside by minimizing their equity contribution but are shielded from much of the financial risk of overleverage. The most a private equity firm can lose is the equity it invested (assuming they do not lend to the target company).

Cotter and Peck (2001) concluded that buyout specialists that control most of the post-LBO equity have less debt and thus are less likely to experience financial distress. Private equity firms with more board seats tend to use less debt, signaling that active monitoring can substitute some of the disciplinary effects of leverage. Overall, there is not enough research to determine if greater leverage helps discipline managers or prevents them from investing in innovative projects. Quantifying the effect of debt on investor returns is also challenging. Guo et al. (2011) focused on the benefits of tax shields rather than the impact of total debt on investor returns. They quantified the positive contribution of increasing debt by estimating its realized annualized tax benefits. Their tax benefit variable yielded the largest coefficient in their regressions predicting investor returns, but it was only significant at the 10% level. Lakhotia (2019) found that an increase in net debt has mixed effects on nominal equity value. Net debt positively contributes 34.5% and 41.8% to increases in equity values for deals from 1990 – 1999 and 2000 – 2007, respectively, but drags equity value down by 21.4% from 2008 – 2018. Kaplan and Andrade (1998) found that overleverage is the primary source of distress in 31 highly levered transactions in the 1980s, rather than poor pre-buyout performance or poor industry performance. The sample firms all have positive operating income in the years they are distressed, and the median operating margin of the typical firm exceeds the median for its industry. They concluded that "without their high leverage, our sample firms would appear healthy relative to other firms in the industry … they are largely financially distressed, not economically distressed" (Kaplan and Andrade, 1998, page 3).

Kaplan and Andrade (1998) demonstrated that overleverage may destroy the most value at the outset of the deal rather than deteriorating operating performance over the target firm's life. Indeed, Axelson et al. (2013) suggested that easy access to credit causes private equity

buyers to bid up the purchase price and can lead to lower returns. They found a strong relationship between buyouts and credit market conditions. Deal pricing varies positively with leverage for public-to-private buyouts, but there is no relationship between leverage and EV/EBITDA multiples for public buyouts over the same period. Instead, firm-level fundamentals are more influential in pricing public buyouts. Kaplan and Stein (1993) hypothesized this "overheated buyout market hypothesis" in 1993, after realizing that 37.9% of their sample deals completed during the easy-credit period of 1986 – 1988 later underwent a debt default, restructuring, or Chapter 11 bankruptcy. By contrast, a mere 2.4% of their sample deals experienced financial distress during the tight-credit conditions of 1980 – 1984. Kaplan and Schoar (2005) connected the link of leverage and overpricing to lower fund-level returns. They found that easier credit conditions lead to greater inflows into funds and partnerships and that these funds are subsequently less likely to raise follow-on funds, suggesting weak performance. Davis et al. (2019) extend support for the overheated market hypothesis to private-to-private buyouts and divestitures. Their study of 9,794 PE-led public- and private-to-private LBOs 1980 – 2013 demonstrated that buyout activity rises when high-yield credit spreads are narrower than average. Furthermore, they showed that periods with high buyout volume are associated with rising credit spreads over the next two years. This trend was particularly pronounced for public-to-private buyouts. This suggests that private equity firms are often very opportunistic in public-to-private buyouts and that the low cost of debt may be a primary incentive in completing the transaction. However, the potential reliance on the low cost of debt to make the economics of the LBO succeed is dangerous because most of the bank debt associated with LBOs is issued through floating-rate instruments.

Management and Corporate Decisions:

Proponents of private equity argue that LBOs effectively realign the incentives of owners and managers such that majority-owners can make operational changes. Some believe that private equity firms positively alter corporate governance and create operational value. However, others believe private equity firms earn profit through financial engineering rather than implementing long-lasting operational improvements. Several researchers have aimed to answer whether private equity firms add operational value (as we explored above) and how management changes, additional monitoring, or other activities influence operational value. Jensen (1988) argued that larger equity ownership gives managers incentives to pay off the debt and improve operations. Kaplan's (1989) results favor Jensen's (1988) hypothesis as Kaplan found that equity holdings of the management team increase substantially from 5.88% to 22.63%. He noted that the increase in equity holdings is greater for managers outside of the top two executives, indicating that the incentivization extends to all managers. Guo et al. (2011) found that management contributes some fraction of the equity in 58 of the 94 deals with post-buyout data available, and they contribute a substantial 12.8% of the equity on average (Guo et al., 2011). The CEO is replaced in 37.2% of target firms within one-year post-buyout, but there are relatively few directors on the board appointed by the private equity sponsor(s). They also note that 50% of firms make significant (greater than $10 million) acquisitions in the three years post-buyout and 36.2% sell significant assets.

However, Guo et al. (2011) found that incentive realignment has a much greater impact on operational improvements than financial decisions such as asset sales. Changing management and the CEO becoming the chairperson are statistically significant predictors of profitability and

return on asset improvements, but do not predict overall returns. Guo et al. (2011) also found that whether there are one or more sponsors (i.e., a club deal) is a statistically significant predictor of investor returns, but that their proxy for pre-buyout competition is not. This suggests that club deals may add value through improved monitoring amongst more private equity firms rather than signal that the firm was a particularly good target pre-buyout. Leslie and Oyer (2009) similarly found that their matched RLBO and public firms have similar pre-buyout characteristics. However, unlike Guo et al. (2011) they did not find that managerial incentives predict changes in operating metrics. Although private-equity ownership leads to greater incentive alignment, with approximately twice as large of a share in the firm for managers and 12% less in base pay, it does not spur any operational outperformance (Leslie and Oyer, 2). The incentives keep private-equity managers operating their companies at average profitability and ROA, but they do not outperform their peers. It is possible that management incentivization and improved corporate decision-making leads to operational improvements, but it is concentrated among well-performing private equity firms. Acharya et al. (2013) found evidence that certain managers are effective in increasing returns via inorganic growth, which is created through mergers, acquisitions, takeovers, or through opening new locations. Their results suggest that the private equity partners' backgrounds correlate strongly with deal-level abnormal performance. Former management consultants or industry managers appear to drive returns via internal operational improvements or new strategies (for example expanding into a new region), whereas former bankers and accountants are more likely to follow mergers and acquisitions (M&A) driven strategies to boost returns.

As evident from the empirical research summarized above, the effects of private equity ownership on operating performance, leverage, and corporate governance are quite

heterogeneous. Company- and fund-level empirical evidence suggests that LBOs create value, but investor returns differ by buyout type. Private-to-private transactions tend to create more value and result in higher investor returns than public-to-private buyouts (Davis et al., 2019). Furthermore, more established private equity funds with greater assets under management and a longer history achieve higher returns (Kaplan and Schoar, 2005). Funds that invest in fewer companies per fund manager also achieve greater returns, suggesting smaller portfolio sizes per manager allows for greater oversight (Cumming et al., 2007). Public-to-private LBOs are usually larger, involve greater leverage, and carry more bankruptcy risk than public investments or private-to-private transactions. Despite this risk, research shows that public-to-private LBOs outperformed the public markets from the 1980s to the early 2000s. Kaplan (1989) found that the median nominal return for 25 public-to-private LBOs from 1980 – 1986 was 220.3% over the entire investment. The median market-adjusted return from two months pre-buyout to the manager's exit was 77.0%, and only one LBO underperformed the return of an asset with the same level of systematic risk in the market. However, research from Guo et al. (2011) did not find that public-to-private LBOs sustained that level of outperformance from 1990 to 2006. They found that the median market-adjusted return to investors at the time of the buyout is 40.9%. This 40.9% return is statistically significant at the 1% level, but only translates to an estimated median 10.44% IRR given that the median deal reached its outcome in 47 months. The public-to-private buyout outperformed the market in 68 of 94 transactions. Cao and Lerner (2008) studied 496 RLBOs between 1980 and 2002 and found that they outperformed various market benchmarks and other IPOs over the same period. Once Cao and Lerner (2008) controlled for the (larger) size of the RLBOs, they found that the RLBOs performed at least as well as the market and better than other IPOs, but the effects are muted. A substantial amount of the market

outperformance is associated with larger RLBOs, and the positive returns are sustained for at least five years post-buyout. Kaplan and Schoar (2005) demonstrated that private-equity returns are not only heterogeneous on the company level, but also on the fund level. The median IRR net of management fees for 746 funds in 1985 – 2001 was only 80% of the S&P 500 return. Large and mature private equity returns that have operated for at least five years perform much better, with a median return of 150% of the S&P 500 return. Overall, empirical evidence suggests that public-to-private buyouts outperform the market, but additional research is needed on whether that trend has persisted past the early 2000s.

Employment & Wages:

Private equity critics may subscribe to Shleifer and Summers' (1998) hypothesis that buyouts transfer wealth to investors by laying off employees or reducing their wages. They suggested that operating income increases post-buyout at the expense of employees. However, evidence is mixed as to whether public-to-private buyouts have any meaningful impact on employment or wages. Kaplan (1989) found that the median change in employment for 48 buyout companies is 0.9%. When companies that make large post-buyout divestitures are excluded, the median employment increase is 4.5%. Although headcount increases at post-buyout companies, it does not grow by as much as the industry median, though the difference is not statistically significant. Amess and Wright (2006) studied 533 LBOs from 1993 – 2004 in the United Kingdom and found that the target firms did not experience significantly different employment changes compared to a control sample of firms. However, the real wage rate growth slightly lags that of peers, post-buyout. Davis et al.'s 2014 and 2019 studies help differentiate between employment changes among public-to-private and private-to-private buyouts. In their

2014 study, Davis et al. found that target employment fell more than 10% relative to controls in the two-years post-buyout, whereas private-to-private deals spur 10% employment growth relative to controls. Public-to-private deals make up 12% of their sample and cover 25% of employees, meaning private equity has a net positive effect on employment relative to controls. In 2019, they found that public-to-private deals result in large job losses, typically through facility closures. In their sample of 9,794 LBOs from 1980 – 2013, employment for public-to-private firms shrank 13% in the two years post-buyout, whereas employment expanded 13% in buyouts of private firms, both relative to the outcomes at control firms. Labor productivity, defined as real revenue per employee, increases in both private-to-private and public-to-private buyouts, but in the case of public buyouts it may be primarily due to a reduction in employment. Although Davis et al. (2019) found that employment falls in public buyouts, wage growth is not statistically significantly different from that of control firms. Employees at public firms enjoy a modest pre-buyout wage premium of roughly 2.5% relative to the control firms, but roughly 70% of that premium is erased in the two years after the buyout (Davis et al., 2019). Davis et al. (2014) explained that buyouts instigate "creative destruction," as some target firms are downsized more dramatically relative to controls while others grow more aggressively than controls. Target firms see more job losses in existing location shutdowns but also experience more job growth in new location openings. Similarly, public-to-private target firms experience more employment volatility since they experience greater job losses through divestment and greater job gains through acquisitions. Overall, it appears public-to-private buyouts experience slower job growth than peers within the same industry, but there is not sufficient evidence that wage growth differs from counterparts.

III. Model Review & My Contribution

Although current literature spans several topics surrounding private equity returns and value creation sources, there is little evidence on whether returns have persisted past the early 2000s. I primarily rely on Kaplan (1989) and Guo et al.'s (2011) models, which were used to study the performance of LBOs from 1980-1986 and 1990 – 2006, to extend this research to the mega-buyout and post-GFC era. I follow Kaplan (1989) and Guo et al.'s (2011) methodology because they use SDC Platinum and public SEC reports to find data. By contrast, several other researchers use data from The Longitudinal Business Data (LBD) from the U.S. Census Bureau, which I am unable to access. Although my model is quite similar to Guo et al.'s (2011), my thesis advances research on public-to-private LBOs in three major ways: extending the dataset, studying peer-adjusted outperformance, and by accounting for macroeconomic changes.

Guo et al. (2011) performs a cross-sectional analysis of determinants of returns, using the market- and risk-adjusted return to pre- and post-buyout capital as the dependent variable in two separate regressions. The pre-buyout return is the return to pre-buyout shareholders who held shares of the company when it was publicly traded, whereas the post-buyout return is the return for investors (typically the private equity sponsors) at the time of the buyout. I focus on their regression using post-buyout returns because I aim to measure the return to private equity firms, rather than pre-buyout equity shareholders who receive a set amount per share. The independent variables include metrics that measure operating improvements, multiple expansion, leverage effects, and management and corporate decisions. Guo et al.'s (2011) model is as follows:

$$Return_{post\text{-}buyoutinvestors} = \alpha_0 profitabilitychange_{PA} + \alpha_1 ROAchange_{PA} + \alpha_2 IndustryMultipleChange + \alpha_3 Sum(annualtaxbenefits)/Capital + \alpha_4 Assetsales/Capital + \alpha_5 Acquisitions/Capital + \alpha_6 Year + \alpha_7 ln(Capital) + \alpha_8 EBITDA/Capital_{industry\text{-}adjusted} + \alpha_9 ClubDeal + \alpha_{10} Competition$$

Where profitabilitychange$_{PA}$ and ROAchange$_{PA}$ are operating performance variables that measure the target firm's change in profitability and ROA relative to peers. These variables will be defined in Section VI. IndustryMultipleChange measures valuation multiple expansion from the pre-buyout to post-buyout date. Guo et al. (2011) estimated the annual tax benefits due to larger tax shields with their Sum(annualtaxbenefits)/Capital variable. They captured management activities through several variables such as Assetsales/Capital and Acquisitions/Capital which measure the scale of the firm's asset sales and acquisitions relative to the enterprise value of the firm. ClubDeal and Competition serve as proxies for the sponsor's potential collaboration with other private equity firms and the necessity to outbid other firms.

Guo et al.'s (2011) model includes the (suspected) primary drivers of private equity returns, including peer-adjusted operating metrics, multiple expansion, and proxies for leverage (tax benefits) and management and corporate decisions. However, as I discuss below, it is necessary to use an updated dataset and model to measure the effect of these value drivers on returns.

Extending the Dataset:

A vast majority of research has centered on the 1980s buyout market, which is remarkably different than that of the 1990s and 2000s. Leverage levels reached then-record highs in the 1980s, as Drexel Burnham became the first investment bank to sell junk bonds to finance LBOs in 1981. The Federal Reserve estimates that $6.5 billion, or 41% of 1984's total junk bond issuance was related to M&A (Auerbach, 1987). Debt was used to finance roughly 85% of each public-to-private LBO, and thus even marginal improvements in operating performance could yield high investor returns (Cao and Lerner, 2008). Fewer private equity firms operated in the

U.S. buyout market and take-private transactions were typically identified through close personal contacts, as the sponsor was oftentimes already a significant investor in the target firm. The newly ample access to high-yield debt led to lax credit market conditions and helped propel the "Golden Age of LBOs" in the 1980s. As mentioned earlier, Kaplan (1989) found that the median market-adjusted return for 25 public-to-private LBOs was 77.0%.

However, as the public buyout market attracted more private equity firms, purchase prices soared. Private equity firms also began viewing leveraged financing as riskier when the U.S. entered a recession in the early 1990s. Drexel Burnham was forced into bankruptcy in 1990 and the junk bond market crashed shortly thereafter. Financing LBOs using an excess of 80% debt did not appear sustainable. Large public-to-private transactions became less favorable than private-to-private transactions, which could be completed at lower valuation multiples and with less debt. While public-to-private buyouts slowed dramatically, the demand for private targets continued growing. By 1998, fundraising by U.S buyout funds was six times greater than it was in 1987. In 2005, it was nine times the level in 1987 (Cao and Lerner, 2008). The increased competition for buyout targets led to greater EV/EBITDA multiples and returns weakened. Cao and Lerner (2008) estimate that the average buyout fund established between 1980 and 1985 earned an IRR of 47%, compared to less than 10% for those between 1986 and 1999 (Cao and Lerner, 2008). Competition for public buyouts continued in the early 2000s and reached an all-time high leading up to the financial crisis in 2007 as interest rates declined and lending standards relaxed. The Sarbanes-Oxley Act inadvertently incentivized privatization by increasing regulatory costs for public companies (Carney, 2005). Extreme leverage levels returned as consortiums of private equity firms teamed up to take massive public companies private.

Despite the record-high buyout activity and leverage levels during the mega-buyout era, empirical research has not fully explored the effect of this era and the financial crisis on investor returns. Few studies have captured the entirety of the mega-buyout era from 2004 to 2007, which saw an average of 15 public-to-private buyouts closed per quarter (Davis et al., 2019). This contrasts with an average of 2.81 deals per quarter between 2000 – 2003 (Guo et al., 2011). During the financial crisis, the average number of public-to-private buyouts per quarter fell to five, before climbing back up to nine from 2010 – 2013. My sample spans from 1996 to 2013 to fill this void and determine whether earlier patterns of outperformance persist during and after the financial crisis. Although Guo et al. (2011) studied public buyouts announced between January 1990 and July 2006, they narrowly excluded some of the largest, most transformative buyouts of the mega-buyout boom, such as KKR's $29.4 billion acquisition of First Data Corp, which was announced in April 2007. My sample also includes Texas Pacific Group and GS Capital Partners' 2007 joint acquisition of Alltel for $27.5 billion. My sample includes 16 transactions completed in 2007 with an average enterprise value of $6.40 billion. I conclude that at least 44.6% of the deals in my sample are unique because 33 of the deals occur outside of the time frame Guo et al. (2011) studied.

Table I: Recent Studies on Public-to-Private LBO Returns and Operating Changes

Authors	Country / Region	Research Focus	Time Horizon
Guo et al. (2011)	U.S.	Market-adjusted returns and firm-level operating changes	1990 – 2006
Kaplan (1989)	U.S.	Market-adjusted returns and firm-level operating changes	1980 –1986
Cao and Lerner (2008)	U.S.	Market-adjusted returns for RLBOs	1990 - 2002
Lakhotia (2019)	U.S.	Contribution of value drivers in RLBOs	1980 - 2018
Leslie and Oyer (2009)	U.S.	Operating changes relative to peers for RLBOs	1996 - 2004
Kaplan and Andrade (1998)	U.S.	Operating changes for highly levered and distressed management buyouts	1980 - 1989
Acharya et al. (2013)	Western Europe	Operating changes and management incentivization in RLBOs	1991 - 2007

As seen in Table I above, there have been relatively few studies focused on investor returns and operating changes in public-to-private LBOs. Only Lakhotia's (2019) sample includes the entire mega-buyout era and post-GFC. However, Lakhotia's (2019) sample only consists of RLBOs, and thus results are heavily skewed by selection bias. Target firms that later re-IPO tend to perform better than those that remain private or are sold in a strategic sale or secondary LBO (see section VII). Furthermore, Lakhotia (2019) only includes five deals from 2008 – 2018 in his sample, which makes it very difficult to draw any conclusions about post-GFC buyout performance. Leslie and Oyer (2009) and Cao and Lerner (2008) provide interesting insights about market-adjusted returns and operating changes in public-to-private buyout targets relative to peers, but their sample ends before the mega-buyout era began and is similarly upward biased as it only includes RLBOs. Unfortunately, it is difficult to extrapolate Acharya et al.'s

(2013) findings about the Western European market to the U.S. market for the mega-buyout era. European public-to-private buyout deal value grew modestly from 2003 – 2007 before slowly declining, whereas the U.S. market experienced extreme volatility, nearly doubling every year during the mega-buyout era (MacArthur, 2011). My extended dataset fills a current gap in the literature, with 33.8% of the deals occurring from 2005 – 2007 and 20.3% of the deals occurring in the aftermath of the GFC from 2008 – 2013.

Studying Peer-Adjusted Outperformance:

In addition to asking whether public buyout firms outperform the market, I aim to answer whether they outperform well-matched peer companies that remain publicly traded over the same investment horizon. Existing literature primarily explores how target firms outperform peers in terms of operating performance and efficiency. Guo et al. (2011) concluded that peer-adjusted operating measures, such as profitability and ROA, are significant predictors of market-adjusted returns, but they do not calculate peer-adjusted returns. Leslie and Oyer (2009) studied the relative changes in operating metrics between public-to-private buyout targets and public peers but did not estimate investor returns.

Very few studies have explored how investor returns compare for public-to-private buyout targets and peers, and those that have are exclusively focused on RLBOs. Only 14.1% of the 227 buyouts in my full subsample result in a re-IPO, thus prompting the question whether the entire universe of public-to-private buyouts outperform peers. Even after isolating the results of RLBOs, which typically have strong returns, it is unclear whether public-to-private buyouts outperform their public peers. DeGeorge and Zeckhauser (1993) concluded that their sample of 62 RLBOs operationally outperform (in terms of Operating Income / Assets) their public peers

for a short period after re-IPOing. However, their performance deteriorates thereafter and the RLBO stock prices do not perform differently than peers' stocks. Holthausen and Larcker (1996) studied RLBOs from 1983 – 1988 and found that sample firms' accounting performance is significantly better than industry peers for at least four years post re-IPO. But there is no evidence that the sample firms' stocks perform better or worse than peers. Mian and Rosenfeld (1993) examined 85 RLBOs from 1983 – 1988 and found that sample firms' stocks had statistically significant (but relatively low) outperformance over peers. Cao and Lerner (2008) explored how RLBOs perform relative to the market, other IPOs, and peer firms. They found RLBOs significantly outperform other IPOs and the overall market but have no evidence that RLBOs perform better or worse than their peers. This prompts the question, do public-to-private buyouts outperform their peers like they tend to outperform the market? Peers serve as a better, more robust point of comparison than the overall market. Outperformance over the market could be largely attributed to good industry selection and market timing, rather than improvements in operating performance or the effects of leverage. By comparing the target firms to public peers who are comparable in size and profitability, I can better isolate the effects of private-equity ownership on returns. Furthermore, peer returns better represent the true opportunity cost of a private equity buyout investment since investors could simply invest in the stock of a public peer with significantly less risk. I report on both market and peer outperformance and use regressions to determine which of the four proposed sources of value creation predict performance. My research on peer-outperformance builds on the existing literature summarized above by including both RLBOs and target firms that remain private, rather than just RLBOs. My thesis not only reports peer-adjusted performance for all investment outcomes, but also provides insight into what factors drive peer-adjusted performance.

Accounting for Macroeconomic Variables:

Although the main differentiating factors between my thesis and existing literature are the years in focus and the addition of peer-adjusted returns, I also make minor adjustments to Guo et al.'s (2011) model. As explained above, Guo et al.'s (2011) regression model uses measurements of operating performance, leverage effects, and multiple expansion as independent variables. It does not include any macroeconomic variables that measure economy-wide phenomena impacting virtually every business. As detailed in Section II, existing literature suggests that there is a direct relationship between credit market conditions and leverage levels. There is also a well-documented connection between credit market conditions and purchase prices. By extension, credit market conditions may influence market- and peer-adjusted returns, as easier access to credit leads to greater competition for public-to-private targets, resulting in a higher purchase price and lower returns. Credit market conditions also may influence operational performance as lower rates for corporate debt could spur greater investment in new projects, or conversely prevent firms from borrowing for acquisitions. Real GDP also has the potential to impact company-level operational performance since it impacts the growth prospects for target businesses. Furthermore, some target firms in my sample are very cyclical, such as restaurant firms like Buffets Inc. and home improvement retailers like Wilmar Industries (now known as Home Depot), and thus their performance may be more heavily influenced by changes in GDP. By controlling for changes in real GDP and credit market conditions, I am also attempting to better isolate the effects of company-level operating performance, since it is possible that some portion of operating performance is only improving since the entire economy is growing. I add variables to my model to measure the effect of credit market tightness and real GDP growth on company-level returns. This approach differs from existing literature that primarily explores the

effects of these variables on private equity fund-level returns. For example, Axelson et al. (2013) and Kaplan and Schoar (2005) examined the impact of credit-market conditions on fund-level returns. Only Davis et al. (2019) connects credit-market condition variables and GDP growth to transaction-level returns. I follow Davis et al.'s methodology (2019) to comprehensively study what drives market and peer outperformance (or the lack thereof). In Section VI, I introduce these variables, pre-buyout credit spread and GDP growth.

IV. Sample Description

I use SDC Platinum to identify leveraged public-to-private buyouts of U.S. firms with deal values of at least $100 million between August 1996 and August 2013. My initial screening of deals classified as either leveraged buyouts (LBO) or privatizations only includes public target firms and private acquirers. This search yielded 244 possible buyouts; however, I eliminate 16 deals in which the target firm is subsequently merged with another operating portfolio company or information regarding the deal structure is not available in Securities and Exchange Commission (SEC) filings. This final sample of 227 LBOs from 1996 to 2013 has a mean enterprise value of $2.28 billion dollars and a median enterprise value of $607.62 million. The most well represented industries in the final sample include Business Services, Health Services, Textile and Apparel and Industrial Products with 21, 13 and 13 deals respectively. Electronic and Electrical Equipment (12), Investment and Real Estate (10), Medical Supplies (10) and Metal and Metal products (10) also made up a significant share of deals.

To study the performance of firms pre- and post-buyout, I focus my attention on a subsample of firms that have post-buyout data available from SEC filings. Private firms are not required to file reports with the SEC unless they meet at least one of the two following conditions: have more than $10 million in assets whose stock is held by more than 500 owners,

or have made a public debt offering. Using SEC EDGAR's Company Search Tool, I determined that 74 of the 227 possible buyouts had sufficient pre- and post-buyout data available. To be deemed "sufficient," the firm's financial statements must be available within 18 months of both the firm's effective acquisition and the outcome associated with the buyout. Outcomes include a subsequent IPO, acquisition by another company, a secondary LBO, or Chapter 11 bankruptcy or restructuring. If the company remained private, only firms with financial information available at least three years post-buyout were included in the sample because private equity firms typically hold portfolio companies for a minimum of three years. 73 unique firms were acquired in the 74 buyouts.[1] The 73 firms in the subsample either have widely held public debt outstanding or provide financial statements after the investors' exit. Pre-buyout data is collected from the last 10-K published by the target firm before being acquired. Tables II and III describe mean and median size and pricing characteristics of the full sample and subsample with post-buyout data available. I describe the total purchase price (enterprise value (EV)) relative to the firm's earnings before interest, taxes, depreciation, and amortization (EBITDA) in the last full year prior to the buyout.

[1] BWAY Corporation, a metal and plastic packaging company, is represented twice within the final sample and subsample. Kelso & Co purchased BWAY Corporation in 2003 and sold approximately half of their 85.6% stake in the company when BWAY made a second initial public offering in 2007. Kelso & Co sold its remaining stake to Madison Dearborn Partners in 2010, making BWAY a private company once again.

Table II: Annual Means for Deal Pricing

The significance of the difference of means is based on a two-sample *t*-test assuming unequal variances, which allows our test to be more conservative given that the sample size in each group differ substantially (77 vs. 153). ***, ** and * denote significance at the 1%, 5% and 10% level, respectively. I use the natural logarithm of the Enterprise Values and EV/EBITDA values to test the difference of the means of ln(EV) and ln(EV/EBITDA) because the distributions are relatively right skewed beforehand. Taking the natural logarithm helps pull in extremely large values and allows me to use an approximately normal distribution for my *t*-test.

Year	No. of LBOs	Enterprise Value ($M)	EV/EBITDA[2]	Premium (%)[3]
1996 – 1997	10	1,429.66	11.80	32.45%
1998	17	623.15	10.28	27.47%
1999	20	619.12	9.63	39.61%
2000	23	439.18	6.24	41.11%
2001 – 2003	21	593.83	8.38	38.47%
2004	10	1,335.70	26.60	27.64%
2005	14	2,872.77	12.89	27.08%
2006	21	7,142.19	15.85	27.04%
2007	30	5,768.16	15.20	23.90%
2008	8	920.66	13.81	30.32%
2009	8	331.25	11.50	33.79%
2010	16	1,444.02	8.14	32.72%
2011	15	1,321.23	10.51	32.29%
2012	13	705.83	9.55	37.61%
2013	1	24,400.00	6.85	31.44%
Total, 1996 – 2013	227	2,283.95	11.81	31.90%
Subsample with post-buyout data available				
1996 – 1997	2	1,071.25	12.23	16.04%
1998	4	1,337.75	11.09	13.16%
1999	6	350.48	8.76	23.12%
2000	6	546.02	8.58	26.11%
2001 – 2003	10	683.07	8.29	34.06%
2004	6	1,672.70	12.83	26.18%
2005	4	4,681.68	18.24	34.95%
2006	5	4,258.20	12.30	29.62%
2007	16	6,404.61	15.64	25.17%
2008	3	10,517.33	15.54	36.35%

[2] In 15 cases, five of which were in the subsample with post-buyout data available, pre-buyout adjusted EBITDA figures were utilized to calculate the EV/EBITDA multiple because pre-buyout EBITDA is negative.

[3] The premium paid could not be calculated for 18 LBOs, five of which belong to the subsample with post-buyout data available. In these cases, either the price paid per share could not be accurately calculated due to the conversion of preferred stock or the stock price one month prior to the buyout announcement was not available via SDC Platinum, Yahoo Finance, 10Ks, or other SEC filings.

2009	1	3,650.00	14.84	17.41%
2010	3	2,274.96	9.14	43.74%
2011	5	2,109.66	14.37	20.19%
2012	2	1,256.00	5.90	75.09%
2013	1	24,400.00	6.85	30.21%
Total, 1996 – 2013	74	3,421.19	12.12	28.46%
Total (1996 – 2013)	227	2,264.95	11.81	31.90%
(1) Without post-buyout data	153	1,726.73	11.64	33.31%
(2) With post-buyout data	74	3,421.19	12.12	28.46%
Difference in Means		(+)***	(+)	(-)

Table III: Annual Medians for Deal Pricing

The significance of the difference of medians is based on a two-sample Wilcoxon rank-sum (Mann-Whitney) test. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

Year	No. of LBOs	Enterprise Value ($M)	EV/EBITDA	Premium (%)[4]
1996 – 1997	10	544.58	7.93	31.82%
1998	17	479.41	10.06	24.97%
1999	20	526.00	7.56	25.94%
2000	23	448.96	5.97	37.50%
2001 – 2003	21	312.47	6.08	37.52%
2004	10	780.00	9.60	27.32%
2005	14	1,208.00	10.67	37.25%
2006	21	1,724.00	12.55	23.48%
2007	30	1,106.00	12.94	20.64%
2008	8	455.06	14.87	20.00%
2009	8	380.00	13.63	22.60%
2010	16	900.94	7.66	33.07%
2011	15	496.87	9.10	20.88%
2012	13	612.00	8.65	28.09%
2013	1	24,400.00	5.28	31.44%
Total, 1996 – 2013	227	607.62	9.27	28.13%
Subsample with post-buyout data available				

[4] The premium paid could not be calculated for 18 LBOs, five of which belong to the subsample with post-buyout data. Financial terms were not disclosed in these deals.

1996 – 1997	2	1,071.25	12.23	16.04%
1998	4	1,431.50	11.62	12.04%
1999	6	339.64	7.56	28.13%
2000	6	509.45	8.30	23.11%
2001 – 2003	10	685.89	6.19	36.01%
2004	6	1,240.00	13.77	22.68%
2005	4	3,530.84	16.79	33.41%
2006	5	2,391.00	11.95	22.30%
2007	16	4,196.55	15.42	23.33%
2008	3	3,385.00	15.43	38.46%
2009	1	3,650.00	14.84	17.41%
2010	3	1,800.00	8.93	41.57%
2011	5	1,876.80	15.36	32.29%
2012	2	1,256.00	5.90	75.09%
2013	1	24,400.00	6.85	30.21%
Total, 1996 – 2013	74	1,186.75	10.72	29.17%
Total (1996 – 2013)	227	607.62	9.27	28.13%
(1) Without post-buyout data	153	444.34	8.55	27.94%
(2) With post-buyout data	74	1,186.75	10.72	29.17%
Difference in Medians		(+)***	(+)	(+)

As seen in Tables II and III above, the subsample with post-buyout data available has statistically significantly higher mean and median enterprise values. However, the means and medians of the EV/EBITDA multiple paid and premium paid are not statistically significantly different between the full sample and subsample. The premium paid is calculated using the price paid per share and the stock price of the target one month prior to the buyout announcement. The EV/EBITDA multiple is calculated using the target firm's last twelve months (LTM) EBITDA prior to the effective buyout date. If LTM EBITDA was not provided by SDC Platinum, I calculated EBITDA using the most recent 10K filing prior to the buyout. Unsurprisingly, the mean and median enterprise values are larger for the subset of deals with post-buyout data available. A substantial portion (33.8%) of target firms later re-IPO and many also issue public

debt, signaling that the firms are large and need to raise capital from the public to invest in new projects or service their existing debt. In their study of LBOs from 1990 – 2006, Guo et al. (2011) found that firms with post-buyout data available were significantly more likely to have public debt outstanding than those who did not (70.2% vs 45.3%), and that a vast majority of that public debt was issued after being taken private.

While the subsample with post-buyout data includes larger deals, they are not more aggressively priced than those without data available, which suggests that the returns calculated using the post-buyout data should not be downward biased due to higher premiums paid. The median premium paid for the samples with and without post-buyout data are 29.17% and 27.94% respectively, which are in line with Guo et al.'s (2011) comparable medians of 28.9% and 31.3% for 1990 – 2006. The median premium paid between 1996 – 2013 is low compared to the median premium of 42.3% during the "Golden Age of LBOs" from 1980 – 1986 found by Kaplan and Stein (Kaplan and Stein, 1993). As expected, the LBOs were primarily financed with debt. The mean and median equity contributions to the total purchase price are 38.50% and 35.92%, respectively. Existing literature suggests that most debt used in public-to-private LBOs is publicly issued in the institutional 144A market. Guo et al. (2011) found that public debt was used to finance 45% of the 192 LBOs in their sample. In all but three of these deals high yield bonds were issued in the 144A market. Firms with post-buyout data are significantly more likely to have public debt financing than firms without post-buyout data available, with 70.2% of those with post-buyout data available utilizing the public markets compared to only 16.7% of those without post-buyout data available (Guo et al., 2011). The prevalence of public debt financing within the post-buyout subsample suggests that not only are the deals with post-buyout data available larger, but also perhaps riskier and more highly levered. Guo et al. (2011) found that

pay-in-kind (PIK) or discount debt financing was used in 23.4% of deals with post-buyout data available and over half of the deals financed with public debt included some PIK or discount debt (Guo et al., 2011). In the subsequent section I discuss the highly levered nature of the subsample of 74 firms with post-buyout data relative to their public counterparts. Table IV below demonstrates that the subsample with post-buyout data available is also representative of the industries involved in LBOs from 1996 – 2013. It also suggests that there is not significant fluctuation in deal size from industry to industry, except for larger deals in the hotel and casinos, media, and telecommunications subsectors.

Table IV: Industry Analysis

Industry	No. of LBOs	% of Sample	Avg. EV	Median EV
Full Sample				
Health Services	13	5.73%	782.02	526.00
Medical Supplies	10	4.41%	2,596.30	837.50
Electronic and Electrical Equipment	12	5.29%	1,845.44	357.37
Media	9	3.96%	4,280.11	1463.00
Business Services	21	9.25%	3,001.35	800.00
Metal and Metal Products	10	4.41%	660.80	327.54
Miscellaneous Manufacturing	8	3.52%	500.66	350.84
Retail Trade	6	2.64%	2,668.83	780.50
Restaurant	9	3.96%	733.11	292.16
Investment & Real Estate	10	4.41%	7,603.79	989.36
Drugs	5	2.20%	1,349.84	718.36
Auto	8	3.52%	917.46	509.22
Publishing	4	1.76%	1,119.87	781.74
Education	4	1.76%	1,007.99	248.97
Telecommunications	7	3.08%	6,237.27	1,510.00
Transportation	9	3.96%	697.93	437.75
Computers/Peripherals	6	2.64%	5,690.61	941.08
Furniture/Home Products	6	2.64%	497.26	293.75
Natural Resources: Oil and Gas, Mining	9	3.96%	4,835.42	446.25
Financial Services	1	0.44%	800.03	800.03
Healthcare Information	2	0.88%	2,879.50	2,879.50
Food and Kindred Products	4	1.76%	1,612.95	577.86
Retail (Special Lines)	7	3.08%	726.45	343.43

Insurance	1	0.44%	660.95	660.95
Industrial Products	12	5.29%	627.75	453.50
Personal & Professional Services	5	2.20%	683.39	651.05
Textile and Apparel Products	13	5.73%	1,360.70	874.88
Software & Information Technology	9	3.96%	629.97	382.36
Hotels and Casinos	7	3.08%	5,891.06	3,100.00
Total, 1996 – 2013	227	100%	2,283.65	607.62
Subsample with post-buyout data available				
Health Services	6	8.11%	1,229.44	1,183.75
Medical Supplies	4	5.41%	4,406.25	2,925.00
Electronic and Electrical Equipment	4	5.41%	416.31	434.56
Media	3	4.05%	1,624.67	1,463.00
Business Services	8	10.81%	7,449.80	4,627.55
Metal and Metal Products	3	4.05%	1,015.57	986.87
Miscellaneous Manufacturing	2	2.70%	706.58	706.58
Retail Trade	5	6.76%	3,322.20	1,550.00
Restaurant	2	2.70%	412.80	412.80
Investment & Real Estate	2	2.70%	3,178.81	3,178.81
Drugs	4	5.41%	1,821.59	1,348.50
Auto	3	4.05%	416.15	365.02
Publishing	2	2.70%	1,501.50	1,501.50
Education	1	1.35%	3,385.00	3,385.00
Telecommunications	3	4.05%	13,594.00	8,400.00
Transportation	3	4.05%	476.705	179.62
Computers/Peripherals	1	1.35%	24,400.00	24,400.00
Furniture/Home Products	3	4.05%	278.69	274.37
Natural Resources: Oil and Gas, Mining	2	2.70%	251.73	251.73
Financial Services	1	1.35%	800.00	800.00
Healthcare Information	2	2.70%	2,869.00	2,869.00
Food and Kindred Products	1	1.35%	769.34	769.336
Retail (Special Lines)	3	4.05%	1,138.67	1106
Insurance	0	0.00%	N/A	N/A
Industrial Products	1	1.35%	1,548.84	1,548.843
Personal & Professional Services	0	0.00%	N/A	N/A
Textile and Apparel Products	2	2.70%	2,450.00	2,450.00
Software & Information Technology	0	0.00%	N/A	N/A
Hotels and Casinos	3	4.05%	11,242.64	5,400.00
Total with Post-Buyout Data Available	74	100%	3,421.19	1,186.75

Business Services is heavily represented in both the subsample with post-buyout data available and the full sample, making up 10.81% and 9.25% of the subsample and full sample respectively. Healthcare also represents a significant portion, making up 16.22% of the subsample and 11.01% of the full sample. Healthcare services and medical supplies comprise most of these deals. Healthcare private equity deal flow experienced substantial growth in the early and mid 2000s as healthcare boasted the largest growth factor of any industry from 2003-2007 relative to 1995-1999 ("Global Private Equity Report 2011"). The industrial sector also grew at a substantial factor of 3.2x and is similarly well represented in the full sample with 11 deals. However, industrials, along with software and information technology, are underrepresented within the subsample with one and zero deals, respectively. Many deals were also completed in the retail sector from 1997 - 2013, making up 10.81% and 5.73% of the subsample and full sample, respectively. While the industries within the subsample appear sufficiently representative of the full sample, it is important to note that public-to-private buyouts are more heavily concentrated in certain industries than private-to-private LBOs and divestitures. Healthcare deals are overrepresented in public-to-private deals, making up 12.0% of these deals from 1980 – 2013 but only 10.1% of private-to-private LBOs (Davis et al., 2019). Consumer staple companies, such as 99 Cent Stores, Dollar General, and Travel Centers of America, account for a disproportionate share of public-to-private deals (24.6%) compared to private-to-private LBOs (18.6%).

V. Peer Selection

Once the subsample of deals with post-buyout data was finalized, target firms were matched with comparable firms that remained public during the entire duration of the sponsors'

investment. Target firms were matched with firms in the same industry based using pre-buyout revenue as the primary metric and EBITDA secondarily. I used Mergent Online's Comparison Report Builder to return the top 50 domestic peers (based upon revenue) classified by the most similar four-digit SIC codes. If there were no suitable peers within that search, I expanded the search to include global peers or used the company's pre-buyout 10Ks or news publications (such as Reuters, Business Wire, Wall Street Journal, etc.) to identify possible peers. Mergent Online provides information on both public and private peers, so I also ensured that any potential peer was publicly traded throughout the duration of the investment. In two cases, foreign companies were used as peer firms. BWAY Company was matched with Canadian packaging machinery manufacturing company Winpak Ltd, and Dell Inc was matched with Lenovo Group Limited, a Chinese American computer hardware company. Table XXII in the Appendix reports the sample firms, their public peers, the investment period, and the investment outcome.

VI. Data Collection on Explanatory Variables

Following the selection of the peers, I assembled a dataset composed the sample and peer firms' financial information. Company-specific financial information was used to analyze performance differences between the target firms, their peers, and the overall market. Financial information also revealed pre-existing differences between sample and peer firms, which may have impacted investor returns and company performance. I found revenue, EBITDA, capital expenditures (CapEx), total assets, total debt, shareholder's equity, EBIT, interest expense, noncontrolling interest, preferred stock, cash and cash equivalents, net income, research and development (if applicable), selling, general, and administrative costs, and the total number of employees for each firm in both the pre-buyout and post-buyout year. The pre-buyout year is the last fiscal year with public information available (typically via a 10K) before the company

becomes private. Post-buyout data was typically found in 10Ks issued within 18 months of the investment outcome or in future financial statements with historical data available. I used Mergent Online's Custom Report builder to find most financial metrics for the sample and peer companies. However, I directly used the pre- and post-buyout 10Ks and 10Qs for the sample and peer firms to calculate EBITDA, find the number of employees, and determine the status of various indicator variables used to measure corporate decision making and management. In 20 deals the sample and peer firms' fiscal years did not end at the same time. In these cases, I used income and cash flow statements on quarterly reports to manually calculate LTM financial metrics using the filing periods closest to the pre-buyout and post-buyout dates.

I follow Guo et al. (2011) and Kaplan (1989) and select measures of profitability, returns on assets, and leverage to track changes in the sample and peer companies' operating performance. I use the same measures as Guo et al. (2011) and Kaplan (1989) to directly compare changes in operating performance in my sample to that of previous studies. These measures include profitability (EBITDA / Sales) and return on assets (EBITDA / Total Assets). Profitability is a preferred metric because it is not influenced by how heavily levered a company is or how much capital it owns, and thus can help determine how the company's operating performance, rather than leverage or size, influences investor returns. Return on assets (ROA) adjusts for the company's economic resources and size, and thus allows us to track how profitable the company is in relation to its assets. I also include CapEx / Sales to measure investment by the buyout and peer firms. CapEx / Sales better reflects changes in capital expenditures than CapEx / Assets because buyout accounting frequently leads to a write-up in the book value of assets. Assets are typically inflated by the difference between the market value of equity and the book value, thus causing changes in CapEx / Assets to be downward biased and

less pronounced. Kaplan (1989) found that the industry-adjusted changes for CapEx / Sales were statistically significant at the 5% level in first and second-year post-buyout, but industry-adjusted changes for CapEx / Assets were not. I also find that using CapEx / Sales results in a higher R^2 value in all regressions. Profitability, ROA, and CapEx / Sales all isolate operating performance from leverage effects since they are calculated before taxes.

I use Guo et al.'s (2011) methodology in measuring leverage (Total Debt / EBITDA). Leverage may boost returns by minimizing the equity contribution at the time of the buyout and increasing tax shields. Larger tax shields result in greater cash flows available to reinvest. However, greater leverage also means greater bankruptcy risk for the firm and greater principal risk for equity-holders. I also measure macroeconomic factors that may influence investor returns, such as GDP growth and credit market conditions. GDP growth is an indicator of economic conditions and may influence investor returns as consumer spending fluctuates and input and labor costs change. Credit market tightness also may play a role in investor returns as narrower spreads between LIBOR and high-yield corporate bonds could incentivize leveraged buyouts that may otherwise not be financially attractive. I follow Davis et al.'s (2019) methodology in defining GDP growth and credit market conditions. I also report industry enterprise value multiple expansion over each sample firm's investment horizon. A firm's enterprise value (and by extension the investor's equity value) could increase solely due to its industry's multiple rising, even while holding cash flows constant.

I also report numerous indicator variables introduced by Guo et al. (2011) that aim to represent the sponsor's degree of management and corporate decision making. I include a variable to measure whether one or more private equity firm is involved in the deal. One may

expect that target firms involved in club deals may perform better, given monitoring from several different sponsors. Targets may also be attractive firms that spurred competition and interest from several private equity sponsors. Similarly, targets may be large firms that required investments from several private equity firms for privatization. Other variables measure managements participation and strategic decisions. The "Management Buyout" (MBO) indicator variable reports whether the existing management team contributes additional equity at the time of the buyout, whereas the "CEO Change" variable is used to account for whether the CEO of the target firm is replaced by the new majority owners within 18 months of the buyout. Another indicator variable reports whether the firm made significant acquisitions during the investment horizon. Finally, I also collect data on the number of employees in the pre- and post-buyout years. I calculate employee growth to study if private equity ownership has any influence on firm-level employment relative to public peers.

Table V: Variable Definitions

Variable	Definition	Source
Annualized Profitability Change	$\left(\frac{\frac{EBITDA_t}{Sales_t}}{\frac{EBITDA_0}{Sales_0}}\right)^{1/n} - 1$	Mergent Online, 10K Reports via SEC Edgar
Annualized ROA Change	$\left(\frac{\frac{EBITDA_t}{Assets_t}}{\frac{EBITDA_0}{Assets_0}}\right)^{1/n} - 1$	Mergent Online, 10K Reports via SEC Edgar
Annualized CapEx / Sales Change	$\left(\frac{\frac{CapEx_t}{Sales_t}}{\frac{CapEx_0}{Sales_0}}\right)^{1/n} - 1$	Mergent Online, 10K Reports via SEC Edgar
Annualized Leverage Change	$\left(\frac{\frac{Debt_t}{EBITDA_t}}{\frac{Debt_0}{EBITDA_0}}\right)^{1/n} - 1$	Mergent Online, 10K Reports via SEC Edgar

Annualized Industry Multiple Change	$\left(\frac{Multiple_t}{Multiple_0}\right)^{1/n} - 1$	Value/EBITDA Multiples by Industry Sector by Damodaran Online (NYU Stern)
Pre-Buyout Credit Spread	The mean spread between high-yield corporate debt (ICE BofA US High Yield Index Effective Yield) and 1-Month LIBOR over the 6 months leading up to the effective buyout date	Federal Reserve Economic Data, Federal Reserve Bank of St. Louis
Pre-Buyout GDP Growth	The mean real GDP growth rate over the 9 months leading up to the effective buyout date	Federal Reserve Economic Data, Federal Reserve Bank of St. Louis
Club Deal	Indicator variable reporting there are two or more private equity sponsors involved in the transaction	SDC Platinum
Management Buyout (MBO)	Indicator variable that equals 1 if the target's management contributes additional equity in the buyout	SDC Platinum, 10K Reports via SEC Edgar
Significant Acquisitions (SigAcq)	Indicator variable that equals 1 if the firm makes an acquisition worth at least $10 million during the investment horizon	10K Reports via SEC Edgar
CEO Change	Indicator variable reporting there is a CEO change within 18 months of buyout completion	10K Reports via SEC Edgar
Employee Growth	$\frac{Employees_t - Employees_0}{Employees_0}$	10K Reports via SEC Edgar
Risk-free Rate (R_f)	The 3-Month Treasury Bill Secondary Market Rate	Federal Reserve Economic Data, Federal Reserve Bank of St. Louis
Market Return (R_m)	The annualized percentage change of the adjusted closing price of the S&P 500 Index	Yahoo Finance
Beta (β^E)	Pre-buyout year beta, which is a measure of a company's volatility compared to the market	Center for Research in Security Prices (CRSP) via Wharton Research Data Services

Dependent variables, including the market- and peer- adjusted returns, will be defined in section VI. Table VI below displays the descriptive characteristics for each independent variable used in regressions.

Table VI: Descriptive Characteristics

The significance of the difference of medians for the annualized profitability, ROA, Capex / Sales, and leverage changes are based on a two-sample Wilcoxon signed-rank test. ***, ** and * denote the significance at the 1%, 5% level and 10% level, respectively.

	Median	Mean	High	Low	Standard Deviation
Annualized Profitability Change (EBITDA / Sales)					
Sample	0.57%	-0.32%	89.21%	-92.95%	24.32%
Peer	-2.04%	-7.18%	81.68%	-394.60%	50.10%
Difference	2.10%	6.86%	449.49%	-112.34%	60.99%
Annualized ROA Change (EBITDA / Assets)					
Sample	-4.49%	560.48%	41,636.54%	-85.75%	4,840.48%
Peer	-2.79%	-5.14%	99.44%	-173.60%	26.74%
Difference	-0.30%	565.62%	41,648.72%	-73.00%	4,841.31%
Annualized Capex / Sales Change					
Sample	-4.35%	1.41%	358.36%	-64.26%	47.83%
Peer	-3.01%	-7.08%	61.23%	-173.60%	26.80%
Difference	-0.80%	8.48%	375.51%	-68.23%	56.06%
Annualized Leverage Change[5]					
Sample	17.82%	68.98%	1176.05%	-57.91%	173.03%
Peer	2.07%	162.99%	6645.75%	-70.27%	845.09%
Difference	13.81%*	-94.01%	1223.23%	-6615.23%	872.14%
Annualized Industry Multiple Expansion					
Sample & Peer	-0.60%	-0.27%	32.61%	-42.08%	11.87%
Pre – Buyout Credit Spread					
Sample & Peer	5.51%	5.44%	15.15%	2.09%	2.65%
Pre-Buyout GDP Growth					
Sample & Peer	0.61%	0.64%	1.26%	-0.73%	0.39%

The descriptive characteristics reveal information about the distribution of the sample and peer financial metrics. The standard deviations for changes in most operating performance variables are relatively low and suggest that a majority of sample and peer firms experience modest changes in these variables. The mean and median annualized changes in profitability and CapEx / Sales are less than 10% per year. However, changes in ROA are more extreme, primarily being driven by one outlier, with Express-1 Expedited Solutions (now known as XPO

[5] In the regressions the annualized percentage change of Debt / EBITDA is used as an independent variable. This regression term is not peer-adjusted, but peer information was included within this table as a reference point.

Logistics) growing from $56.67 million in assets to $16.17 billion in just 10 years. Overall, sample and peer firms have similar variation in changes in operating performance, except for ROA. The mean annualized leverage changes are extreme for both the sample and peer firm, which is the result of a few firms holding nearly zero debt on the balance sheet during the pre-buyout year. Thus, any meaningful increase in debt translates to a huge percentage gain. Similarly, some firms experience massive changes in CapEx / Sales due to extremely low levels of capex in the pre-buyout year. While these outliers slightly skew the averages, the median changes in operating measures (profitability, ROA, and CapEx / Sales) from pre-buyout to outcome date are not statistically significantly different between sample and peer firms.

However, the median leverage change for the sample firms is noteworthy, as Debt / EBITDA grows almost 18% year over year. By contrast, debt / EBITDA levels only increase by approximately 2% year over year. Finally, we see that the industry multiples do not change substantially on an annualized basis, with the median and mean values falling on either side of zero. There are a few extreme outliers amongst industry multiple changes, including the Hotel / Gaming industry multiple nearly doubling from 6.64 to 12.04 in two years from 1999 to 2001 and the telecommunications industry multiple falling by a multiple of three from 2007 to 2009. The distribution of real GDP growth data is quite uniform, with mean and median growth rates of 0.64% and 0.61%, respectively. Mean real GDP falls to a low of -0.731% in the first nine months of 2008 and reaches a high of 1.256% in late 1999 into early 2000. The credit market tightens and loosens dramatically from 1996 – 2013, resulting in a standard deviation of 2.65% for the average spread in the six months leading up to the buyout. The high-yield spread is low until it begins rises rising dramatically in 1998, reaching its peak in 2003. It begins falling back down in 2004 and subsequently skyrockets in 2007 during the financial crisis. Following peer

selection and data collection, I analyzed the pre-buyout mean and median financial characteristics for the sample firms and peer firms.

Table VII: Pre-Buyout Sample & Peer Mean Financial Characteristics

	Sales ($M)	EBITDA ($M)	EBITDA / Sales	Net Cash Flow / Sales	EBITDA / Assets	Net Cash Flow / Assets	EBITDA / Interest	Total Debt ($M)	Debt / Equity	Debt/ EBITDA	CapEx/ Sales
Full Sample (Peer & Sample Firms)	2,490.43	271.52	0.217	0.130	0.156	0.094	9,8046.33	874.82	0.938	3.01	0.075
Peers	2,577.72	275.53	0.175	0.088	0.174	0.109	139,266.88	655.16	0.569	2.17	0.065
Sample Firms	2,403.15	267.50	0.258	0.173	0.139	0.078	56,825.78	1,094.48	1.31	3.85	0.085

Table VIII: Pre-Buyout Sample & Peer Median Financial Characteristics

The significance of the difference of medians is based on a two-sample Wilcoxon signed-rank test. ***, ** and * denote the significance at the 1%, 5% level and 10% level, respectively.

	Sales ($M)	EBITDA ($M)	EBITDA / Sales	Net Cash Flow / Sales	EBITDA / Assets	Net Cash Flow / Assets	EBITDA / Interest	Total Debt ($M)	Debt / Equity	Debt/ EBITDA	CapEx/ Sales
Full Sample (Peer & Sample Firms)	902.98	115.14	0.140	0.077	0.154	0.100	9.44	198.53	0.471	1.505	0.040
Peers	881.89	122.98	0.147	0.082	0.177	0.121	12.55	123.41	0.215	0.891	0.048
Sample Firms	970.53	111.45	0.130	0.073	0.132	0.073	6.08	270.71	0.758	2.56	0.034
Difference in Medians	(+)	(-)	(-)	(-)	(-)***	(-)**	(-)**	(+)***	(+)*	(+)***	(-)

Tables VII and VIII demonstrate that the sample and peer firms are well matched financially. The Full Sample refers to the 148 combined sample firms and peer firms. Mean and median revenue and EBITDA for the sample and peer firms are very similar. The sample firms have slightly lower, but not statistically significantly different, revenue and EBITDA compared to their peers. The sample and peer firms also have comparable profitability margins (EBITDA / Revenue) with medians of 0.130 and 0.147 respectively. The sample and peer firms only are significantly different in two areas: leverage and ROA. On average, the sample firms have $1.09 billion outstanding in debt at the time of their buyout, compared to $655.16 million for their counterparts who remain publicly traded. By extension, the median Debt / EBITDA and EBITDA / Interest Expense ratios are also significantly different between the sample and peer firms. Sample firms have a median Debt / EBITDA ratio of 2.56, compared to just 0.891 for peer firms. Sample firms' interest coverage ratios pale in comparison to those of public peers, with medians of 6.08 and 12.55 respectively. The greater leverage amongst sample firms may be explained by a few factors.

First, firms with pre-existing high debt may be a more attractive target given that they have shown that they are able to service their debt. This may suggest that they are strong cash-flow businesses capable of paying interest and principal, which increases the effective equity for private equity investors. Jiang's (2019) analysis of 781 LBO target firms and public counterparts supports this notion. He found that the stability of free cash flows, rather than cash flow levels, are a greater predictor of LBO transactions. He used the trailing three-year standard deviation of free cash flows as an indicator of the stability of cash flows. He also found that greater debt-loads (as measured by Debt / Assets) are a predictor of LBO transactions, supporting the theory that private equity firms are interested in target firms with large debt capacities and strong debt

servicing abilities (Jiang, 2019). Although the sample firms have significantly greater leverage pre-buyout, their median NCF is not statistically significantly different than that of peers.

Second, firms with higher leverage may be priced at a discount and thus could be more attractive for private equity buyers. Sample firm equity holders have more risk than counterparts holding stock of peer firms, so a guaranteed return may be more attractive. Thus, they may be more willing to sell their stock than equity holders at peer companies with less leverage. The correlation between the premium paid and pre-LBO Debt / Assets ratio for the sample of 69 firms whose premium is available is -0.146. This suggests that there is a small inverse relationship between pre-LBO leverage levels and how much of a premium equity holders will accept. It appears that equity holders of highly levered firms are willing to accept a lower premium, which in turn suggests that relatively highly levered firms may be more attractive and affordable targets for private equity firms. Furthermore, when a target firm has greater leverage, it reduces the necessary cash equity contribution or shares an acquirer needs to obtain majority ownership. Covrig et al. (2017) theorize that for highly levered firms the takeover premium paid is spread over relatively more assets, thus reducing the premium paid relative to the enterprise value of the firm (Covrig et al., 2017). Therefore, firms with greater debt loads are more affordable targets as private equity buyers can pay less than peer firms with similar asset levels.

My finding that sample firms have greater pre-LBO leverage than their public counterparts' is consistent with that of Datta et al. (2012), who found that firms who engage in an RLBO between 1986 – 2006 hold significantly more pre-buyout debt than industry counterparts. However, my finding contrasts with that of Axelson et al. (2013), who found no discernible relation between pre-LBO leverage in buyout firms and median leverage of public firms in the same industry-region-year (Axelson et al., 2013). In addition, Axelson et al. (2013)

did not find a relationship between buyout leverage and pre-LBO leverage, suggesting that private equity firms are at least not deterred by the higher leverage amongst their targets.

It is also possible that increased leverage amongst sample firms is a function of sample bias because many sample firms are only included in the sample because they issued public debt, making their financial statements public. However, this sample bias is an unlikely primary explanation, as Guo et al. (2011) found that even though firms in deals with post-buyout data available are more likely to issue public debt, they are not more heavily levered than firms in deals without post-buyout data available. None of the median pre-buyout leverage characteristics they measure, including Debt / EBITDA, EBITDA / Interest Expense, and Debt / EV, are statistically significantly different for the samples with and without post-buyout data available (Guo et al., 2011).

VII. Returns to Private-Equity Invested Capital

For each deal with post-buyout data available, I estimate the return to capital invested by the sponsor(s) from the time of the buyout to the transaction outcome. I estimate the return to equity by finding the Multiple on Invested Capital (MOIC) and corresponding estimated internal rate of return (IRR) for the investment. The "IRR" proxy is calculated as follows:

$$IRR = \left(\frac{Equity\ Value_t}{Equity\ Investment}\right)^{1/n} - 1$$

Where *equity investment* is the initial cash equity investment into the private equity company and significant (>$50 million) subsequent investments into the company discounted back to the initial year, using the company's return on equity as a conservative measure for their discount rate. *N* is the number of years in between the buyout date and investment outcome. *Equity Value*$_t$ is the estimated equity value of the company at the time of the outcome. In cases in

which *Equity Investment* was not explicitly stated within a post-buyout SEC report, it was estimated to be the total enterprise value less any debt issued within one year of the buyout (typically within a senior credit facility). *Equity Value$_t$* estimations differed based upon outcome type. For IPOs, *Equity Value$_t$* was calculated by multiplying the sponsor(s)' equity stake by the company's market capitalization at the first fiscal year end post-IPO. For secondary LBOs or Acquisitions, *Equity Value$_t$* was either explicitly stated in SEC reports as the cash equity contribution from the new buyer or was assumed to be the total enterprise value minus outstanding debt and newly issued debt. In cases of Chapter 11 Bankruptcy, I calculated IRR after including management and transaction-related fees paid to sponsors. For nine deals in which financial terms of the investment outcome were not disclosed or reported on, I estimated the equity value at the time of the outcome (*t)* as follows:[6]

$$Equity\ Value_t = (EBITDA_t * Industry\ Multiple_t) + Cash\ and\ Cash\ Equivalents_t - (Debt_t + Non - Controlling\ Interest_t + Pref.Stock_t)$$

Given the limited time and scope of this thesis, I assumed that intermediate cash flows investors receive, such as fees paid by target companies to private equity firms, have a negligible effect on the MOIC and the resulting IRR proxy. In cases of significant (>$10 million) dividend recapitalizations or Chapter 11 Bankruptcies, I included intermediate cash flows and calculated IRR using excel. Research from Guo et al. (2011) supports the assumption that intermediate cash flows to equity and debt investors, including fees, cash interest paid, dividends, net debt principal

[6] Equity Value was calculated using this methodology for buyouts involving Integrated Circuit Systems Inc, Delco Remy International Inc, Quintiles Transnational Corp, Del Laboratories Inc, Insurance Auto Auctions Inc, Radiation Therapy Services Inc, 99 Cents Only Stores, Winsloew Furniture Inc and iPayment Inc. Research from Guo et al. (2011) suggests that these estimated returns are likely slightly downward biased, meaning the estimates are conservative. Guo et al. (2011) compared 59 cases of realized returns and estimated returns using an industry EBITDA multiple and found that mean and median returns using terminal values estimated from multiples rather than the observed value were somewhat lower, but the difference was not statistically significant (Guo et al., 2011).

paid, and net equity repurchased, have a very minor impact on returns to post-buyout capital. Guo et al. (2011) report that on average only 2.2% of the realized return to post-buyout capital is due to the hypothetical interim cash flows (Guo et al., 2011, Internet Appendix Table IA.IX.1). However, since most cases of Chapter 11 Bankruptcy in our sample result in no recovery to equity holders, fees paid by the target company to the private equity firm can be quite beneficial in cushioning massive losses to the sponsor. For instance, one transaction in my sample made headlines over exuberant fees paid to private equity firms. Toys R Us creditors sued Bain Capital and KKR executives over the $18 million in fees paid from 2013 – 2017. Thus, fees paid by targets were included in IRR calculations in cases of Chapter 11 Bankruptcies to mitigate downward bias.

As discussed above, returns were calculated on an annualized basis. This contrasts with Guo et al. (2011) and Kaplan (1989), who find aggregate returns over the entire investment horizon. Annualized returns are more useful in determining how returns differ by outcome type given that they have varying lengths. For instance, returns for target firms that remain private are determined over a shorter investment horizon given the lack of public information in post-buyout years, whereas Chapter 11 bankruptcies take longer to reach an outcome given court petitions and proceedings.

I also estimate annualized market- and risk-adjusted returns using the methodology of Kaplan and Stein (1989). I adjust the nominal proxy IRR by the return of an investment with same systematic risk over the same period. This is calculated as follows:

$$Return_{MA} = Return_{buyout\ firm} - (R_f + \beta^E * (R_{m\ (over\ the\ same\ period)} - R_f))$$

Where R_f and R_m are the annualized 3-Month Treasury Bill and annualized S&P 500 return from the effective buyout date to the exit date. The S&P 500 return is the percentage change of the adjusted closing price of the S&P 500 Index reported by Yahoo Finance. I found the pre-buyout year beta (β^E) for each sample and peer firm using CRSP via Wharton Research Data Services. Table IX displays the unadjusted and market- and risk-adjusted returns by investment outcome type.

Table IX: Returns by Investment Outcome Type

		Unadjusted Return		Market- and Risk-Adjusted Return	
Outcome	N	Mean	Median	Mean	Median
Acquired	16	29.42%	16.52%	25.89%	12.38%
IPO	25	38.66%	16.57%	35.28%	8.77%
2nd LBO	16	17.50%	13.66%	14.20%	9.16%
Chapter 11	10	-39.37%	-26.76%	-43.82%	-34.33%
Still Private or Unknown	7	-20.87%	-0.61%	-21.51%	-7.70%
Total	74	15.91%	10.96%	12.63%	5.81%

On average, acquisitions and IPOs outperform other investment types, both in terms of unadjusted returns and market- and risk-adjusted returns. While the median IPOs and acquisitions have essentially equivalent median unadjusted returns (16.57% and 16.53% respectively), acquisitions have greater market- and risk-adjusted returns, suggesting that IPOs were completed over periods in which the market was performing better. It is not surprising that acquisitions and IPOs perform better than other outcome types. In acquisitions, strategic buyers pay a premium for the synergies they expect to receive. IPOs are almost exclusively reserved for well-performing companies with growth trajectories. Management teams often choose to shelve an IPO rather than proceed if the projected IPO price drops dramatically. The mean market-

adjusted IPO return is significantly greater than the median IPO return (35.28% vs. 8.77%), suggesting that there are extremely well performing IPOs boosting the average.

The subsample composition by investment type is important given that returns differ by investment outcome. Investment horizon, deal size, and unadjusted and market- and risk-adjusted returns are all related to investment outcome type. Table X shows the investment outcomes for the full sample and subsample with post-buyout data available, while Table XI shows the deal size and duration by investment outcome type.

Table X: Post-Buyout Deal Outcomes

This table reports post-buyout outcomes for the full sample of 227 buyouts as well as the 74 deals with post-buyout data available. The number of observations is reported, followed in parentheses by the number of those observations having post-buyout data.

Outcome Year:	Acquired	IPO	2nd LBO	Chapter 11	Still Private or Unknown	Total
1996 – 1997	2 (0)	2 (2)	3 (0)	2 (0)	1 (0)	10 (2)
1998	8 (1)	2 (1)	0 (0)	5 (2)	2 (0)	17 (4)
1999	5 (2)	2 (1)	4 (1)	4 (0)	5 (2)	20 (6)
2000	7 (1)	4 (2)	3 (2)	5 (1)	3 (0)	22 (6)
2001 – 2003	2 (0)	4 (4)	8 (5)	1 (0)	6 (1)	21 (10)
2004	2 (2)	3 (2)	4 (2)	1 (0)	1 (0)	11 (6)
2005	6 (2)	0 (0)	1 (0)	3 (1)	3 (1)	13 (4)
2006	9 (1)	1 (0)	2 (1)	5 (2)	4 (1)	21 (5)
2007	10 (3)	8 (8)	4 (3)	4 (1)	3 (1)	29 (16)
2008	4 (0)	2 (2)	3 (0)	1 (1)	0 (0)	10 (3)
2009	5 (1)	0 (0)	0 (0)	2 (0)	0 (0)	7 (1)
2010	5 (0)	1 (1)	7 (1)	2 (1)	1 (0)	16 (3)
2011	3 (2)	2 (1)	3 (0)	4 (1)	4 (1)	16 (5)
2012	6 (1)	0 (0)	5 (1)	0 (0)	2 (0)	13 (2)
2013	0 (0)	1 (1)	0 (0)	0 (0)	0 (0)	1 (1)
Total (1996-2013):	74 (16)	32 (25)	47 (16)	39 (10)	35 (10)	227 (74)
% of Deals N/227 (*N/74*)	32.6% (21.6%)	14.1% (33.8%)	20.7% (21.6%)	17.2% (13.5%)	15.4% (9.5%)	100% (100%)

Table XI: Deal Size & Duration by Investment Outcome Type

		Deal Size		Months to Outcome	
Outcome	N	Mean	Median	Mean	Median
Acquired	16	4,859.58	1,888.40	63.03	60.21
IPO	25	3,916.15	1,267.50	69.31	60.23
2nd LBO	16	891.94	783.17	64.72	60.21
Chapter 11	10	5,822.78	2,745.50	77.68	81.28
Still Private or Unknown	7	715.99	653.43	54.73	48.16
Total	74	3,421.19	1,186.75	68.38	65.34

IPOs are heavily overrepresented in the subsample with post-buyout data available, with 25 deals that make up 33.8% of the subsample, compared to only 21.6% of the full sample. By contrast, acquisitions are substantially underrepresented in the subsample, composing only 21.6% of the subsample but 32.6% of the full sample. Strategic buyers rarely disclose the stand-alone financial statements of acquired business. Similarly, companies that remain private or have an unknown outcome make up a disproportionately small percentage of the sample given the lack of public disclosures post-privatization. Secondary LBOs are approximately equally represented in the subsample and full sample, making up 21.6% and 20.7% of the samples, respectively. Chapter 11 bankruptcies are slightly underrepresented, making up 13.5% of the subsample but 17.2% of the full sample. Guo et al.'s (2011) subsample is also not entirely representative of their full sample. IPOs are similarly heavily overrepresented (making up 15% of the full sample but 30% of the subsample), and still private or unknown transactions are also underrepresented (making up 21% of the sample but 47% of the full sample). In contrast to my subsample and full sample composition, Guo et al.'s (2011) subsample slightly overrepresents acquisitions and Chapter 11 bankruptcies. Compared to Guo et al.'s (2011) subsample with post-buyout data available, my subsample has a greater percentage of secondary LBOs (21.6% vs.

15%) and significantly fewer companies that remain private or have an unknown outcome (9.5% vs. 21%).

The combination of the outperformance and overrepresentation of IPOs in the subsample results in an upward bias in overall returns. The upward bias is exacerbated by the underrepresentation of Chapter 11 bankruptcies and still private / unknown outcomes, which drastically underperform other investment outcome types in the subsample. However, this upward bias is dampened by the underrepresentation of acquisitions, the best performing investment outcome type, in the subsample. Guo et al. (2011) similarly found that IPOs outperform most other investment outcome types, with a median (aggregate) return of 66.9%. However, Guo et al. (2011) found that Secondary LBOs have the second highest median return. More notably, Guo et al. (2011) concluded that the still private / unknown investment outcome type has positive and sizeable returns, with a median of 43.1%. They found that acquisitions are the second worst performing investment outcome type (only surpassing Chapter 11 bankruptcies), with a median aggregate return of 22.2%.

Although the sample is only composed of 10 Chapter 11 bankruptcies, Table XI shows that deals resulting in bankruptcy are the largest, reinforcing the narrative that public-to-private buyouts are a high-risk investment. My sample includes well-publicized and criticized Chapter 11 bankruptcies such as Toys R Us, Harrah's (now known as Caesar's) Entertainment, and J. Crew Group, Inc. As expected, larger buyouts tend to result in future IPOs as the target firms are large and want to access the public market. Large firms involved in buyouts are also often acquired later as part of strategic acquisitions. Unsurprisingly, the smallest buyouts, with a median size of $653.43 million, remain private.

To determine whether private ownership adds value above and beyond management and public market accountability, I also calculate returns adjusted by public peer performance. Peer-adjusted performance is calculated as follows:

$$Return_{PA} = Return_{buyout\ firm} - \left(\frac{P_t + D}{P_0}\right)^{\frac{1}{n}} - 1$$

Where P_t and P_0 represent the peer's stock price at the outcome date and buyout date, respectively. D represents all dividends paid to common stockholders during the investment period. In cases in which companies did not publish dividend distributions in their 10Ks, I used the adjusted closing price on Yahoo Finance. The private equity IRR ($Return_{buyout\ firm}$) and peer return are measured over the same investment horizon, and thus their simple difference accounts for the variation between private and public ownership. For this term neither sample nor peer returns are market- and risk-adjusted. Market returns are calculated over the same investment horizon for both the sample and peers, thus the only variable driving variation in market- and risk-adjusted returns is the beta of the sample and peer firms. The beta values are unlikely to explain any variation between peer and sample returns given that the sample and peer betas are extremely similar. The sample and peer firms have median betas of 0.77 and 0.74, respectively and mean betas of 0.81 and 0.86, respectively. Thus, adjusting sample and peer returns by the market returns only adds noise to the regression. OLS and quantile regressions using market-adjusted returns for sample and peer firms yielded a lower adjusted R^2 value than using unadjusted sample and peer returns. Furthermore, while the interpretation of independent variables in the regression did not change, regressions using unadjusted sample and peer returns resulted in lower p-values for variables of statistical significance.

Table XII: Realized Annualized Returns to Invested Capital

This table reports unadjusted, market- and risk-adjusted, and peer-adjusted returns for the 74 deals with post-buyout data available, as well as the 64 deals within the sample that do not result in bankruptcy. Significance levels are based on a two-tailed *t*-test for means and a Wilcoxon signed-rank test for medians. In the case of unadjusted returns, the *t*-test assumes a null hypothesis that returns equal zero. In the case of market-adjusted returns and peer-adjusted returns, the null hypothesis assumes that the difference between realized returns to invested capital and market- and peer-adjusted returns equal zero. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

	Unadjusted Returns	Market-Adjusted Returns	Peer-Adjusted Returns
Full Sample with Post-Buyout Data			
Mean	15.91%**	12.63%**	6.90%
Median	10.96%***	5.81%**	2.54%
Sample Excluding Chapter 11			
Mean	24.55%***	21.45%***	15.00%***
Median	15.66%***	9.18%***	7.18%***

Table XII demonstrates that mean and median returns are positive. The mean and median unadjusted returns are 15.91% and 10.96%, respectively. Mean and median market- and risk-adjusted returns are positive and statistically significant. However, while mean and median peer-adjusted returns are positive, they are not statistically significant. These results suggest that although value is created for buyout investors, a significant driver may be the industry they invest in rather than the company itself. While the target firms outperform the market, they do not outperform their peers, so it is possible that market timing and industry selection are more valuable than companies outpacing peers. Although public-to-private transactions involve greater leverage and bankruptcy risk than investing in a peer public company, they do not offer a significant financial advantage. However, the lack of peer-adjusted outperformance could be attributed to sample selection issues. By design, peer firms are publicly traded during the entire duration of the investment horizon, and thus they are maintaining sufficient financial performance to remain listed. Thus, there are no cases of Chapter 11 bankruptcies among the peer firms because companies that file for bankruptcy generally do not meet the listing standards to continue to trade on the Nasdaq or NYSE. This selection bias likely contributes to

insignificant median peer-adjusted returns when including bankruptcies in the sample, but statistically significant outperformance when the bankruptcies are excluded. The 10 transactions resulting in Chapter 11 bankruptcies significantly skew the overall public-to-private investor returns, with annualized mean and median market-adjusted losses of 43.82% and 34.33%. Excluding the Chapter 11 bankruptcies results in statistically significant outperformance over both the market and peers. The median market- and risk-adjusted and peer-adjusted outperformance are 9.18% and 7.18%, which are both significant at the 1% level.

Overall, the outperformance of public-to-private leveraged buyouts over the market is substantial, while the outperformance over peers is marginal. This prompts analysis of what drives buyout returns and what drives buyout outperformance over peers (or the lack thereof). Before analyzing the important sources of value creation (or destruction) including operating performance, leverage, management and corporate decisions, and multiple expansion, I review the most important findings from my data collection and preliminary analysis.

Sample Bias & Unique Characteristics of Public-to-Private Targets:

First, it is important to note that my sample of public-to-private buyouts is upward biased given the sheer volume of RLBOs. RLBOs account for nearly a third of my subsample with post-buyout data available, and their returns and they have the largest average market-adjusted return at 35.28%. RLBOs must perform well enough to successfully re-IPO, and thus on average they perform better than all other investment outcomes. My sample also underrepresents Chapter 11 bankruptcies, which significantly drag down overall public-to-private returns since they typically result in zero equity recovery for the private equity sponsors. Chapter 11 bankruptcies are larger on average, with a mean enterprise value of $5.82 billion in my sample, compared to the overall

mean of $3.42 billion. These large deals also tend to be more heavily levered, and thus carry more bankruptcy risk. In general, public-to-private deals carry greater bankruptcy risk than private-to-private deals, but lead to weaker financial returns, in part because they are likely to improve management practice (Davis et al., 2019). Thus, one cannot generalize the effects of private equity ownership by only observing public-to-private buyouts as I do. It is also challenging to determine the extent to which the buyout itself is responsible for bankruptcy and overleverage risk amongst my sample firms. My sample firms hold significantly more debt on their balance sheet than their public peers' pre-buyout. As explained above, it is possible that firms with high levels of preexisting leverage are more attractive to private equity sponsors because they have shown an ability to service their debt.

Public-to-Private Returns Have Varied Across Market Cycles:

Private equity sponsors are rewarded for taking on greater risk with public-to-private buyouts, as research shows they have outperformed the market over various market cycles. Kaplan (1989) showed their strong outperformance in the mid 1980s, while Guo et al. (2011) showed they performed relatively well from 1990 – 2006. I find that public-to-private buyouts outperform the market from 1996 - 2014 by 12.63% on average. The median market-adjusted performance is 5.81%. The outperformance is significantly larger once Chapter 11 bankruptcies are excluded – leading to a median market-adjusted return of 9.18%. As shown in Table XIII below, the mean and median returns vary significantly across market cycles. Public-to-private buyouts have mirrored the cyclical private equity asset class transaction and fundraising volume patterns. Transaction values peaked in 1988, before dropping in the early 1990s and rising in the mid-to-late 1990s. Private equity buyout activity fell again in the early 2000s, before

skyrocketing from 2004 to 2007. From January 2005 to June 2007, CapitalIQ recorded 5,188 buyouts transactions, combining for an estimated $1.7 trillion dollars (in 2007 dollars) (Kaplan and Strömberg, 2009). Those two and a half years alone accounted for 30% of the transactions from 1984 – 2007, and 43% of the total real transaction value (Kaplan and Strömberg, 2009). Public-to-private buyouts experienced a similar uptick, accounting for 34% of total buyout activity from 2005 – 2007, compared to 18% from 2000 – 2004 and 15% from 1995 – 1999 (Kaplan and Strömberg, 2009). The large shifts in transaction volume and value are associated with shifting returns for public-to-private equity deals. Although 2001 – 2004 was a quiet period for public-to-private buyouts, it delivered the strongest market- and peer-adjusted returns, with means of 43.00% and 22.76% respectively. Public-to-private buyouts also performed well from 1996 – 2000, with the strongest median peer-adjusted returns of any period. However, the returns take a significant downturn beginning in 2005. The mean and median market- and peer-adjusted returns hover near zero. It appears the extremely lax credit conditions leading up to the GFC fueled this mega-buyout era boom. The median high-yield credit spread in 2005 – 2007 was 3.21%, the lowest of any period. In the next section, I explore whether these credit spreads are related to the market- and peer-adjusted returns, which could help explain the poor performance in the mega-buyout era. Although lending conditions tightened from 2008 – 2013, market- and peer-adjusted returns remained weak as public-to-private buyouts fell out of favor.

Table XIII: Returns Across Time

	N	Credit Spread	GDP Growth	Unadjusted Returns	Market-Adjusted Returns	Peer-Adjusted Returns
1996 - 2000						
Mean	18	4.69%	1.09%	14.52%	12.91%	6.18%
Median		5.19%	0.99%	18.06%	12.27%	18.54%
2001 - 2004						
Mean	16	8.51%	0.53%	44.36%	43.00%	22.76%
Median		8.68%	0.57%	21.22%	19.39%	6.05%
2005 – 2007						
Mean	25	3.31%	0.64%	0.94%	-0.83%	-0.53%
Median		3.21%	0.60%	4.20%	1.86%	-0.86%
2008 – 2013						
Mean	15	8.53%	0.22%	12.18%	2.33%	3.25%
Median		7.35%	0.45%	15.30%	3.89%	-3.52%

A Wilcoxon rank sum test shows that the 34 transactions completed from 1996 – 2004 have statistically significantly higher unadjusted and market-adjusted returns, (at the 5% and 1% levels, respectively) than those completed between 2005 – 2013. But peer-adjusted returns between 1996 – 2004 and 2005 – 2013 do not qualify as statistically significantly different, with a p-value just above the 10% level. There is a seismic shift in both public-to-private buyout transaction volume and returns beginning in 2005. The outperformance of public-to-private buyouts over the market was virtually erased, as neither median market-adjusted nor peer-adjusted returns from 2005 – 2013 are significantly different than zero. My findings, along with Guo et al.'s (2011), demonstrate that public-to-private buyouts performed relatively well leading up to the GFC. Public-to-private buyouts did not consistently improve their operating performance (measured by profitability and ROA) more than peers, and subsequently did not return more money to their investors than public peers did. However, they did outperform the market, at least until 2005. In the next section, I aim to uncover the most important value drivers in public-to-private buyouts, as well as determine what leads to the outperformance (or lack

thereof) of buyouts relative to the overall market and their peers. I analyze the effect of operating performance, leverage, management and corporate decisions, and multiple expansion on returns.

VIII: Empirical Specification & Results

This thesis uses multivariable regressions to examine the relationship between operating performance, leverage, management and corporate decisions, and market timing on public-to-private buyout market- and risk-adjusted returns and outperformance over public peers. I estimate the relationship between the dependent variables (described in Table V) and $Return_{MA}$ and $Return_{PA}$ (specified in the section above), using both the full subsample and the subsample excluding Chapter 11 bankruptcies. The first regression (equation 1) estimates the market- and risk-adjusted return ($Return_{MA}$) and the second estimates peer outperformance ($Return_{PA}$).

(1) $Return_{MA} = \beta_0 + \beta_1 \text{profitabilitychange}_{PA} + \beta_2 \text{ROAchange}_{PA} + \beta_3 \text{CapEx/saleschange}_{PA} + \beta_4 \text{leveragechange} + \beta_5 \text{multipleexpansion} + \beta_6 \text{creditspread} + \beta_7 \text{prebuyoutGDP} + \beta_8 \text{clubdeal} + \beta_9 \text{MBO} + \beta_{10} \text{SigAcq} + \beta_{11} \text{CEOchange}$

(2) $Return_{PA} = \delta_{0+} \delta_1 \text{profitabilitychange}_{PA} + \delta_2 \text{ROAchange}_{PA} + \delta_3 \text{CapEx/saleschange}_{PA} + \delta_4 \text{leveragechange}_{PA} + \delta_5 \text{clubdeal} + \delta_6 \text{MBO} + \delta_7 \text{SigAcq} + \delta_8 \text{CEOchange}$

Operating performance variables with the subscript PA denote peer-adjusted variables. I follow Guo et al. (2011) and define these variables as the difference between the change for the buyout company and the change for the peer company. I use PA operating variables to isolate the effect of private equity ownership on investor returns. By subtracting peer firms' operating improvements, I aim to separate operational improvements due to the sponsor's involvement and improvements that would have continued if the firm remained public. I assume that the target firm would have experienced the same operational improvements as their public peer if the buyout had not occurred. Table VIII supports this assumption as I find that no pre-buyout

operating performance metrics are statistically significantly different between sample and peer firms.

Several market timing variables are excluded from the second regression because peer outperformance already captures the impact of market timing on that specific industry. For example, the annualized industry multiple expansion is the same for the target and peer firms, so it does not add any explanatory power to our model. Credit market conditions and overall GDP growth are also not indicative of value added by a private equity sponsor that would otherwise not be achieved. For instance, public peer firms will similarly benefit by narrowing credit market conditions as they can borrow more easily to finance projects. Given that the sample and peer firms operate in the same industry, we expect that GDP growth will also benefit sample and peer firms by the same magnitude. Note that the leverage change variable in the first regression is unadjusted, while it is peer-adjusted in the second regression. I predict that firm level leverage increases should boost private equity market- and risk-adjusted returns through financial engineering (i.e., minimizing the equity contribution and increasing the size of tax shields). However, since peer firms' may also increase their debt load to benefit from larger tax shields, I adjust the leverage change when estimating peer-outperformance.

The results of the first regression are displayed in Table XIV below. Table XV reports the results for the same regression model but excludes deals that resulted in Chapter 11 bankruptcy. I run quantile regressions (QR) in addition to ordinary least squares (OLS) regressions since it provides greater flexibility in samples that contain extreme outliers.

Table XIV: Regressions Showing the Effect of Operating Performance, Industry Valuation Multiple, and Management on Private Equity Returns

This table reports the OLS and QR estimates for returns to post-buyout invested capital for the subsample of 74 deals that have reached an outcome and have post-buyout data available. The dependent variable is the market- and risk-adjusted return to post-buyout capital, which is capital invested by the sponsors at the time of the buyouts. P-values are reported under the coefficients in parentheses and standard errors are reported in brackets. Coefficients that are significantly different than zero are indicated in bold. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

	Dependent Variable:	
	OLS: Market-and-Risk Adjusted Return to Post-Buyout Capital	QR (Median Regression): Market-and-Risk Adjusted Return to Post-Buyout Capital
Independent Variables:		
PA change in profitability (EBITDA / Sales)	**0.2296443****	**0.2074502****
	(0.045)	(0.015)
	[0.1122754]	[0.0825886]
PA change in ROA (EBITDA / Assets)	**0.2312622***	0.1281884
	(0.072)	(0.173)
	[0.1263974]	[0.0929766]
PA change in CapEx / Sales	**.0099924*****	**0.0100919*****
	(0.001)	(0.000)
	[0.0028019]	[0.002061]
Leverage Change (Debt / EBITDA)	0.0197106	-0.0375439
	(0.569)	(0.143)
	[0.0344218]	[0.0253203]
Change in Industry Multiple	**-1.008647****	**-0.6656862***
	(0.048)	(0.076)
	[0.5007302]	[0.3683321]
Pre-Buyout Credit Spread	**0.0415881***	0.0150814
	(0.072)	(0.371)
	[0.0227342]	[0.0167231]
Pre-Buyout GDP Growth	16.05855	2.727562
	(0.282)	(0.803)
	[14.80631]	[10.89137]
Club Deal	0.0291802	0.0528841
	(0.790)	(0.512)
	[0.1089115]	[0.0801142]
Management Buyout	-0.042779	0.0272819
	(0.744)	(0.777)
	[0.1306339]	[0.0960929]
Significant Acquisitions	0.1223125	0.0510218
	(0.352)	(0.597)
	[0.1290856]	[0.095966]
CEO Change	0.0726236	0.0212514

	(0.611)	(0.839)
	[0.1419197]	[0.1043947]
Constant	-0.3799186	-0.1320279
	(0.110)	(0.433)
	[0.2272932]	[0.1671946]
Observations	74	74
(Pseudo) Adjusted R^2	0.288	0.245

Table XV: Regressions Showing Effect of Operating Performance, Industry Valuation Multiple, and Management on Private Equity Returns Excluding Chapter 11 Bankruptcies

This table reports the OLS and QR estimates for returns to post-buyout invested capital for the subsample of 64 deals that have post-buyout data available and did not file for Chapter 11 bankruptcy. The dependent variable is the market- and risk-adjusted return to post-buyout capital, which is capital invested by the sponsors at the time of the buyouts. P-values are reported under the coefficients in parentheses and standard errors are reported in brackets. Coefficients that are significantly different than zero are indicated in bold. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

	Dependent Variable:	
Independent Variables:	OLS: Market-and-Risk Adjusted Return to Post-Buyout Capital	QR (Median Regression): Market-and-Risk Adjusted Return to Post-Buyout Capital
PA change in profitability (EBITDA / Sales)	**0.2289447****	**0.2310627*****
	(0.042)	(0.001)
	[0.1095742]	[00.064942]
PA change in ROA (EBITDA / Assets)	0.1786133	0.0975402
	(0.55)	(0.189)
	[0.1237416]	[0.0577691]
PA change in CapEx / Sales	**0.0101216*****	**0.0097029*****
	(0.001)	(0.000)
	[0.0027073]	[0.0016045]
Leverage Change (Debt / EBITDA)	0.0088085	0.0136449
	(0.813)	(0.537)
	[0.0370459]	[0.0219562]
Change in Industry Multiple	-0.5849103	-0.3129616
	(0.233)	(0.281)
	[0.4845791]	[0.2871985]
Pre-Buyout Credit Spread	0.0146959	0.0035694
	(0.490)	(0.777)
	[0.0211445]	[0.0125318]
Pre-Buyout GDP Growth	9.318698	-0.2666154
	(0.516)	(0.975)
	[14.23467]	[8.436553]
Club Deal	0.0988953	0.0306724
	(0.387)	(0.650)
	[0.1133642]	[0.0671882]
Management Buyout	-0.0901684	0.031689
	(0.503)	(0.691)
	[0.1335906]	[0.079176]
Significant Acquisitions	0.0095673	-0.0302155
	(0.942)	(0.700)
	[0.1314069]	[0.0778817]
CEO Change	**0.2764027***	0.1321972
	(0.079)	(0.154)

	[0.1540834]	[0.0913216]
Constant	-0.054008	0.0602035
	(0.788)	(0.613)
	[0.1996606]	[0.1183341]
Observations	64	64
(Pseudo) Adjusted R^2	0.273	0.273

Operating Performance:

I find that changes in profitability, ROA and CapEx / Sales are statistically significant indicators of market- and risk-adjusted returns. The coefficients for profitability growth and improvements in ROA are very similar in the OLS regression, but profitability is significant at the 5% level, while ROA is only significant at the 10% level, indicating weaker predictive power. Changes in ROA are not a statistically significant indicator in the quantile regression. This is consistent with Table VI which shows that there is more volatility in the changes in ROA, such that outliers lead to different interpretations in the OLS and QR regressions. Furthermore, changes in ROA are more susceptible to accounting adjustments that do not represent true changes in operating performance. As mentioned earlier, in most buyouts, buyout accounting leads to an increase in the book value of assets, representing the difference between the market value of equity and the book value of assets (Kaplan, 1989). In some cases, though, target companies are forced to write down the value of their assets to fair market value. Thus, we expect changes in ROA to measure operating improvements less accurately than changes in profitability. Guo et al. (2011) similarly found that changes in profitability and ROA were statistically significant indicators of market-adjusted returns to post-buyout capital at the 5% level. However, Guo et al. (2011) found that ROA had a slightly greater effect on returns than profitability by magnitude, as evident by the larger regression coefficient. Kaplan's (1989) findings are less supportive of the notion that post-buyout operating changes have real valuation

effects. The parametric correlation of industry-adjusted operating income changes and market-adjusted returns was 0.37, which was not quite significant at the 10% level with a p-value of 0.12. Considering both the OLS and QR regressions, I conclude that profitability is the single greatest predictor of market-adjusted returns. This is logical as we expect private equity investors to outperform the market if their target firm is operationally outperforming its public peer, which contributes to the overall market return. Although weaker, my evidence still supports the notion that changes in ROA are a significant predictor of market-adjusted returns. Although CapEx / sales is statistically significant at the 1% level in both the OLS and QR regressions, it does not have economic significance. This means that observed changes in CapEx do not have a sizeable effect (0.25%+) on returns. In the case of the OLS regression, if the change in CapEx / Sales increases by 1 (meaning CapEx / Sales grows by 100% in a year) then I expect investor returns to increase by 0.99% that year. On average, CapEx / Sales only increases 1.41% per year. Thus, CapEx / Sales changes have a negligible effect on market-adjusted returns.

Leverage:

Although ROA and Capex / Sales appear to have a weak effect on market-adjusted returns, my results suggest that private equity sponsors should focus on operational improvements and outperformance rather than financial engineering. Annualized changes in leverage are not a significant predictor of investor returns. This finding reinforces the notion that leverage has both beneficial and harmful effects in an LBO, and that these effects can be challenging to separate. As Guo et al. (2011) documented, increased leverage causes larger tax shields. They found that these tax shields had a large, positive effect on market-adjusted returns. Given the time and scope of this thesis, I was unable to estimate the annual tax shields for each

year post-buyout for my subsample of 74 deals. Leverage can also be beneficial by reducing the cash equity contribution necessary at the outset of the deal. However, high levels of leverage also can leave target firms cash constrained and increase bankruptcy risk. Unlike Kaplan and Andrade (1998) who determined that their sample firms could maintain healthy operating metrics despite financial distress, I find that excessive leverage causes both financial and economic distress. Median CapEx / Sales falls 10.74% annually for sample firms that undergo Chapter 11 bankruptcy, whereas it only falls 3.1% for all other firms. There is an inverse correlation (-0.41) between annualized leverage change and annualized CapEx / Sales change, suggesting that higher leverage levels leave target firms unable to invest in new property, equipment, and projects. Similarly, profitability also appears to be related to excessive leverage. Sample firms that file for Chapter 11 bankruptcy experience a 10.59% median annual decline in profitability while their leverage (Debt / EBITDAs) climbs 55.95%. Non-Chapter 11 bankruptcy sample firms only see leverage grow 16.28% annually, and profitability remains virtually unchanged, only growing 0.37% per year. Despite the clear differences in profitability and leverage between the Chapter 11 bankruptcy sample firms and the other sample firms, there is not a strong correlation between leverage and profitability over the entire sample. It appears that excessive overleverage, as in the Chapter 11 bankruptcy cases, is associated with declining operating performance. Overall, though, there is no evidence that increasing leverage to a level of 5-6x EBITDA boosts or diminishes profitability in an LBO.

Industry Multiple & Market Timing:

Interestingly, market timing and industry multiple expansion (or contraction) are only significant drivers of returns when Chapter 11 bankruptcies are included in the sample. This

suggest that the Chapter 11 bankruptcies are heavily affected by market conditions, but that other deals are not. Furthermore, changes in industry multiple are a more significant predictor in the OLS regression than QR regression, suggesting that there a few outliers in the data set. Annualized industry multiple expansion is inversely related to market-adjusted returns when bankruptcies are included but are not related to returns once bankruptcies are excluded. This finding is counterintuitive at first. One would expect that industry multiple expansion would lead to higher returns, since the valuation for a target firm would increase even if EBITDA remained constant. Guo et al.'s (2011) evidence weakly supports this hypothesis. They found that the change in industry multiple was positively related to market-adjusted returns at the 10% level, but was extremely marginal compared to profitability and ROA, with a 40-70x smaller regression coefficient.

One potential reason for a weaker-than-expected relationship between multiple expansion and market-adjusted returns is that industry multiple expansion is not adjusted for overall market expansion. For instance, the sample firm's industry valuation multiple may increase, but increase less than most other industries in the market, leading to marginal or negative market-adjusted returns. The opposite is also true. The industry's multiple could decline, but less so than other industries, leading to positive market-adjusted returns. From 1990 to 2000 the S&P median EV/EBITDA multiple roses significantly. It then fell between 2000 and 2008, before beginning to steadily rise again mid-way through 2008 (Mauboussin and Callahan, 2020). However, there is very little variation in the annualized industry multiple changes in my data set. In non-Chapter 11 bankruptcy deals the mean and median annualized industry multiple changes are -0.86% and -0.26%, and the standard deviation of just 0.13%. This lack of variation in the industry multiple data inhibits its explanatory power since these minor changes in industry multiple provide little

new information to the model. By contrast, industry multiples change quite dramatically in the cases of Chapter 11 bankruptcies, with an average annual decline of 0.35% and a standard deviation of 5.89%. There is a negative correlation (-0.20) between annualized industry multiple expansion and market-adjusted returns in the cases of Chapter 11 bankruptcies. The Chapter 11 bankruptcy market-adjusted returns are all abysmal, but in half of the Chapter 11 bankruptcy cases the industry valuation multiple increases. Thus, there appears to be an outlier effect in which the extreme variation in Chapter 11 bankruptcies dominate the overall relationship between multiple expansion and market-adjusted returns. The outlier Chapter 11 bankruptcies provide significantly greater variation to the model, and thus dominate the effect of non-bankruptcies, which experience very little change in industry valuation multiple.

The effect of credit market conditions on market-adjusted returns is also only significant when Chapter 11 bankruptcies are included in the sample. The credit spread between high-yield U.S. corporate bonds has a statistically significant direct relationship with market-adjusted returns at the 10% level when Chapter 11 bankruptcies are included in the sample. According to Kaplan and Stein's (1993) overheated market hypothesis, more defaults and bankruptcies occur when credit market conditions are lax, making the low cost of debt a primary incentive in completing buyouts. My finding that the regression coefficient for the pre-buyout credit spread is positive and statistically significant for the OLS regression including bankruptcies supports this theory. As high yield spreads widen, the credit market conditions are tightening, and this is associated with higher market-adjusted returns. However, it appears that my result is primarily the result of a few outliers since the relationship is no longer statistically significant when bankruptcies are excluded. Since the magnitude of the negative returns in the Chapter 11 bankruptcies is so great, it skews the overall finding. The average credit spread is only slightly

greater in Chapter 11 bankruptcies than non-bankruptcies (6.95% vs. 6.45%), while the median credit spread is actually lower in Chapter 11 bankruptcies than non-bankruptcies (6.01% vs. 6.14%). This implies that credit market conditions are not directly related to Chapter 11 bankruptcies – several bankruptcies were completed when the cost of corporate debt was very similar to LIBOR, while others were completed when U.S. corporate debt was significantly more expensive. Thus, I conclude that the relationship between credit spreads and market-adjusted returns appear to be the result of a few outliers in which there were extremely narrow credit spreads leading up to a deal that ended in a Chapter 11 bankruptcy.

It is also important to note that existing literature has primarily demonstrated the link between credit market conditions and buyout volume, rather than firm-level returns. Kaplan and Schoar (2005) and Davis et al. (2019) showed that easier credit conditions lead to greater inflows into buyout funds and accelerated buyout activity. In turn, this was linked to higher purchase prices and lower fund-level returns as potential buyers bid up the price. Given my relatively small sample size of 74, it is challenging to capture the effect of increased buyout activity due to lax credit market conditions. Since I only can include deals with public post-buyout data available, I am only able to include select deals, even when there is a rise in buyout activity. Therefore, it is difficult to extrapolate the results of 5-10 deals to characterize entire credit cycles. Thus, while I do not find evidence of a relationship between credit spreads and market-adjusted returns, this may be primarily due to my small sample size and limited scope. A potentially useful future analysis would be to examine how credit market changes over the duration of the investment have an impact on firm-level returns. For instance, easing credit conditions could allow the target firm to refinance their debt to pay interest and principal more efficiently and invest more in projects. Davis et al. (2019) suggested that a post-buyout widening

of credit conditions curtails productivity gains in public-to-private buyouts. Ultimately, though, it is challenging to effectively capture the effect of changing credit-cycles on deal-level returns.

Pre-buyout Real GDP growth is not a statistically significant predictor of returns. Similarly, it appears there are too many nuances involved on the transaction-level that real GDP growth feasibly impacts market-adjusted returns. For instance, profitability changes, equity contributions, leverage, management, and the overall market are all changing and could be related to GDP growth. The potential impact of GDP growth is also partially captured by the fact that the investors returns are adjusted for market performance. The stock market is a leading indicator of GDP, and thus we expect that market-adjusted returns already control for some of the growth (or decline) that the target firm experiences.

Management and Corporate Decisions:

None of the variables used to proxy for management and corporate decisions are statistically significant predictors of market-adjusted returns, except for the CEO change in the OLS regression excluding bankruptcies. These results are very similar to Guo et al. (2011), who similarly found that the concentration of private equity ownership and activities, as measured by Acquisition (value) / Capital, Club PE involvement, and the percentage of management equity contributed were not significant predictors of changes in operating performance. Guo et al.'s (2011) findings largely suggest that the concentration of private equity ownership and asset sale and acquisition behavior of companies are unrelated to cash flow performance and overall returns. I also find that whether the existing management team contributes additional equity at the time of the buyout is not related to returns. Unlike Guo et al. (2011) who found that target firms owned by more than one private equity firm experience greater cash flow improvements, I

find that my Club Deal indicator variable is not related to market-adjusted returns. As seen in Table XVI, 70% of the deals that end in Chapter 11 bankruptcy are club deals. Thus, there are a disproportionately high number of Chapter 11 bankruptcies amongst the club deals, dragging down market-adjusted returns. A very high percentage of Chapter 11 bankruptcies involve club deals because the deals were much larger and required a consortium of buyers to take the target firm private. The mean enterprise value for deals resulting in Chapter 11 bankruptcy is $5.82 billion, compared to $3.05 billion for deals that do not go bankrupt. Thus, more buyers were often needed to finance the transaction. For example, Bain Capital, KKR, and Vornado Realty Trust took Toys R Us Inc. private in 2005 for $6.60 billion and Apollo Management and Texas Pacific Group teamed up to take Harrah's Entertainment private in 2006 for $27.8 billion.

Table XVI: Management & Corporate Decision Characteristics as a % of Deals

This table presents deal characteristics for the subsample of 74 deals with post-buyout data available. Variables are defined in the Appendix. The number of observations is reported, followed in parentheses by the percentage of deals of that investment outcome type with that characteristic. For instance, eight of sixteen deals resulting in an acquisition are club deals, meaning 50% of acquisitions are club deals.

Outcome	Acquired	IPO	2nd LBO	Chapter 11	Still Private or Unknown	Total
Club Deal	8 (50.00%)	15 (60.00%)	6 (37.50%)	7 (70.00%)	2 (28.57%)	38 (51.35%)
Management Buyout	2 (12.5%)	6 (24.00%)	5 (31.25%)	1 (10.00%)	3 (42.86%)	17 (22.97%)
Significant Acquisition	10 (62.50%)	20 (80.00%)	9 (56.25%)	6 (60.00%)	6 (85.71%)	51 (68.92%)
CEO Change	5 (31.25%)	3 (12.00%)	1 (6.25%)	3 (30.00%)	1 (14.29%)	13 (17.57%)

Table XVI also demonstrates that a majority (68.92%) of target firms made a significant acquisition (of $10 million or more) over the investors' holding period. The acquisition behavior is also consistent across outcome type. Given the lack of variation in acquisition behavior, it is

not surprising that making a significant acquisition is not a predictor of market-adjusted returns. Even after controlling for the relative size of acquisitions, by finding the total acquisition deal value divided by the company's enterprise value, Guo et al. (2011) found that it was unrelated to market-adjusted returns. This is sensible because these variables are unable to distinguish between good and bad acquisitions, and thus they could either improve or diminish returns.

Guo et al. (2011) found evidence that changing the CEO at or shortly after the buyout leads to improvements in cash flow performance and returns. However, I find changing the CEO is only a statistically significant predictor (at the 10% level) after excluding Chapter 11 bankruptcies. The CEOs were replaced in the Zilog, Readers Digest Association, and Avaya buyouts, but all later filed for Chapter 11 bankruptcy. Overall, my research shows that replacing the CEO shortly after the buyout does not have a strong positive or negative effect on market-adjusted returns.

Model Fit:

My regressions show that it is very difficult to explain the variation in market-adjusted returns for public-to-private buyouts. I have strong evidence that peer-adjusted profitability changes are a significant predictor of market-adjusted returns, while improvements in ROA are less strongly related to returns. CapEx / Sales are a statistically significant predictor, but do not have any economic significance in explaining market-adjusted returns to public-to-private LBO investors. The change in Debt / EBITDA (leverage) is unrelated to market-adjusted returns, even after excluding Chapter 11 bankruptcies, signaling that high leverage can have harmful effects on operating performance and returns even if the firm is not in financial distress. I do not obtain evidence that industry multiple expansion, GDP growth, and the high-yield credit spread affect

market-adjusted returns. It appears that macroeconomic variables provide little information on transaction-level returns, since there are so many idiosyncratic factors that influence outperformance and returns. Although my model yields very few significant variables, it fits the data nearly as well as Guo et al.'s (2011) does. My adjusted R^2 values for my OLS and QR regressions including Chapter 11 bankruptcies are 0.288 and 0.245, respectively. When Chapter 11 bankruptcies are excluded, the OLS and QR regressions each yield an R^2 value of 0.273. This compares to Guo et al.'s (2011) R^2 values of 0.255 and 0.345 when excluding and including the effect of deal pricing on returns, respectively. As explained in Section III, I build on Guo et al.'s (2011) work by also examining the impact of operating performance, leverage effects, market timing, and management and corporate decision making on peer-adjusted returns in my second regression.

Table XVII: Regressions Showing Effect of Operating Performance, Industry Valuation Multiple, and Management on Private Equity Outperformance over Peers

This table reports the OLS and QR estimates for returns to post-buyout invested capital for the subsample of 74 deals that have reached an outcome and have post-buyout data available. The dependent variable is the peer-adjusted return to post-buyout capital, which is capital invested by the sponsors at the time of the buyouts. P-values are reported under the coefficients in parentheses and standard errors are reported in brackets. Coefficients that are significantly different than zero are indicated in bold. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

	Dependent Variable:	
Independent Variables:	OLS: Peer-Adjusted Performance	QR (Median Regression): Peer-Adjusted Performance
PA change in profitability (EBITDA / Sales)	**0.1906392***	**0.4404324*****
	(0.056)	(0.000)
	[0.0980892]	[0.0777848]
PA change in ROA (EBITDA / Assets)	**0.2031466***	0.1024367
	(0.057)	(0.223)
	[0.1049378]	[0.0832158]
PA change in CapEx / Sales	**0.0076233*****	**0.0071253*****
	(0.002)	(0.000)
	[0.002306]	[0.0018287]
PA Leverage Change (Debt / EBITDA)	0.0034221	0.0021513
	(0.530)	(0.618)
	[0.0054211]	[0.0018287]
Club Deal	-0.0548839	-0.047517
	(0.559)	(0.523)
	[0.0933516]	[0.0740279]
Management Buyout	-0.0023281	0.0195267
	(0.984)	(0.828)
	[0.1130248]	[0.0896287]
Significant Acquisitions	0.0332475	0.0014797
	(0.749)	(0.986)
	[0.1036803]	[0.0822186]
CEO Change	0.0612074	0.0529924
	(0.615)	(0.583)
	[0.1212423]	[0.0961452]
Constant	0.0189883	0.0158326
	(0.852)	(0.844)
	[0.1012448]	[0.0802872]
Observations	74	74
(Pseudo) Adjusted R^2	0.278	0.211

Table XVIII: Regressions Showing Effect of Operating Performance, Industry Valuation Multiple, and Management on Private Equity Outperformance over Peers, Excluding Chapter 11 Bankruptcies

This table reports the OLS and QR estimates for returns to post-buyout invested capital for the subsample of 64 deals that have post-buyout data available and did not file for Chapter 11 bankruptcy. The dependent variable is the peer-adjusted return to post-buyout capital, which is capital invested by the sponsors at the time of the buyouts. P-values are reported under the coefficients in parentheses and standard errors are reported in brackets. Coefficients that are significantly different than zero are indicated in bold. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

	Dependent Variable:	
Independent Variables:	OLS: Peer-Adjusted Performance	QR (Median Regression): Peer-Adjusted Performance
PA change in profitability (EBITDA / Sales)	**0.1581598***	0.0771891
	(0.075)	(0.272)
	[0.0870655]	[0.0695322]
PA change in ROA (EBITDA / Assets)	**0.16560***	**0.1653695****
	(0.080)	(0.030)
	[0.0927788]	[0.0740949]
PA change in CapEx / Sales	**0.0078286*****	**0.008014*****
	(0.000)	(0.000)
	[0.0020279]	[0.0016196]
PA Leverage Change (Debt / EBITDA)	0.0037015	0.0010602
	(0.443)	(0.783)
	[0.0047906]	[0.0038259]
Club Deal	-0.0252767	-0.0473293
	(0.776)	(0.506)
	[0.088475]	[0.0706579]
Management Buyout	-0.0662036	-0.0630332
	(0.525)	(0.449)
	[0.1035647]	[0.0827088]
Significant Acquisitions	0.0484074	**0.1353557***
	(0.627)	(0.092)
	[0.0989403]	[0.0790156]
CEO Change	**0.2161754***	**0.1763154***
	(0.073)	(0.067)
	[0.1181566]	[0.0943622]
Constant	0.0530209	-0.0256836
	(0.587)	(0.742)
	[0.0971223]	[0.0775638]
Observations	64	64
(Pseudo) Adjusted R^2	0.319	0.257

Operating Performance:

Changes in profitability and changes in ROA are significant predictors of peer-adjusted performance. Logically, if target firms experience greater operating performance improvements than their public peers, they also experience higher returns. CapEx / Sales have a positive and statistically significant relationship with peer-adjusted returns, meaning that simple firms that increase investment more than their peers typically outperform their public peers. However, as in the case of market-adjusted performance, improvements in CapEx / Sales have a negligible effect on peer-adjusted returns since target firms do not out-invest their peers to a great enough degree to actually drive meaningful outperformance. Interestingly, ROA is not a significant predictor in the QR regression including Chapter 11 bankruptcies and profitability is not a significant predictor in the QR regression excluding Chapter 11 bankruptcies. One possible explanation is that since profitability and ROA both are ratios containing EBITDA (EBITDA / Sales and EBITDA / Assets, respectively) the variables are collinear. The OLS regressions are better fit to the data than the QR regressions (as evident by significantly greater adjusted R^2 values), so I primarily rely on the OLS regressions to interpret the results. Profitability and ROA are both significant just above the 5% level in the regression including bankruptcies and demonstrate that operating improvements have the greatest impact on private equity investments outperforming peers' stocks.

Thus, I conclude that the primary reason public-to-private buyouts do not yield higher returns than investing in the stock of a public peer over the same period is their lack of operational outperformance. The mean and median peer-adjusted return for public-to-private buyouts is 6.90% and 2.54%, respectively. Although the peer-adjusted returns are positive, they

are not statistically significant unless Chapter 11 bankruptcies are excluded. Given that profitability and ROA are the chief predictors of peer-adjusted returns, it logically follows that since profitability and ROA do not grow more under private ownership than public ownership, public-to-private buyout and public peer returns are comparable. Tables XIX and XX below show sample and peer mean and median financial characteristics at the end of the investment holding period. The tables report mean and median operating performance metrics, such as profitability, ROA, and CapEx / Sales, and leverage ratios such as Debt / Equity and Debt / EBITDA. The sample and peer firms follow a very similar financial trajectory from pre- to post-buyout, with similar post-buyout revenue and EBITDA. The sample firms experience an increase in median profitability from 0.130 to 0.139 (see Table VIII), while peer firms' experience a decline from 0.147 to 0.138, but the changes in profitability are not statistically significantly different. The median annualized changes in ROA and Capex / Sales are also not significantly different between sample and peer firms. The median sample firm experiences an annual decline in ROA of 4.35%, while the median sample firm ROA falls by 2.79% per year (see Table VI). At the post-buyout outcome date, sample firms still have significantly lower ROA than their public counterparts just as they did pre-buyout (see Table VIII). CapEx / Sales also wane slightly for both sample and peer firms. Although increases in leverage correspond to larger declines in CapEx / Sales (as discussed earlier), there is no evidence that public-to-private target firms are more cash constrained than their public peers. Target firms do not cut CapEx / Sales more than their public counterparts and do not experience significantly different changes in profitability or ROA than their peers. This suggests that public-to-private buyout target firms can maintain pre-buyout levels of investment and efficiency even while their balance sheet balloons. However, public-to-private firms only perform as well as their public counterparts during privatization,

rather than outperform. Furthermore, maintaining this operating performance comes as a substantial cost – increased leverage and bankruptcy risk.

Table XIX: Post-Buyout Sample & Peer Mean Financial Characteristics

	Sales ($M)	EBITDA ($M)	EBITDA / Sales	Net Cash Flow / Sales	EBITDA / Assets	Net Cash Flow / Assets	EBITDA / Interest	Total Debt ($M)	Debt / Equity	Debt/ EBITDA	CapEx/ Sales
Full Sample (Peer & Sample Firms)	4,440.58	358.78	0.144	0.091	0.947	0.486	61,197.89	2,289.29	1.51	4.55	0.0478
Peers	5,461.24	410.50	0.127	0.066	0.125	0.076	5,067.41	1,434.82	1.18	2.39	0.0492
Sample Firms	3,419.93	307.063	0.161	0.115	1.77	0.895	117,328.354	3,143.76	1.84	6.70	0.0464

Table XX: Post-Buyout Sample & Peer Median Financial Characteristics

The significance of the difference of medians is based on a two-sample Wilcoxon signed-rank test. ***, ** and * denote the significance at the 1%, 5% level and 10% level, respectively.

	Sales ($M)	EBITDA ($M)	EBITDA / Sales	Net Cash Flow / Sales	EBITDA / Assets	Net Cash Flow / Assets	EBITDA / Interest	Total Debt ($M)	Debt / Equity	Debt/ EBITDA	CapEx/ Sales
Full Sample (Peer & Sample Firms)	1,359.74	158.48	0.138	0.074	0.113	0.078	3.80	614.32	0.657	3.44	0.031
Peers	1,616.67	178.75	0.138	0.064	0.130	0.072	12.80	262.50	0.431	1.57	0.036
Sample Firms	1,212.99	154.66	0.139	0.0816	0.107	0.0816	1.97	853.28	1.78	5.48	0.027
Difference in Medians	(-)	(-)	(+)	(+)	(-)*	(+)	(-)***	(+)***	(+)	(+)***	(-)

Leverage:

Although public-to-private target firms experience larger increases in leverage than their public peers, it does not appear to help or hurt peer-adjusted returns. Table XX and Table XXI demonstrate the massive increases in debt and leverage (Debt / EBITDA) levels for sample firms. The average debt outstanding at the post-buyout outcome date for sample firms is over double that for public peers ($3.14 billion versus $1.43 billion). The median leverage level for sample firms is 5.48, more than doubling from the median pre-buyout level of 2.56. Guo et al. (2011) similarly found a leverage ratio of 6.0 for their full sample from 1990 -2006. The median leverage ratio increases by a similar percentage for peer firms, as it nearly doubles from 0.891 to 1.57, but overall leverage for peer firm remains on a much smaller scale post-buyout. Interestingly, annualized leverage changes are only statistically significantly different for sample and peer firms at the 10% level. Although public-to-private target firms experience much larger increases in debt by magnitude, they do not experience a massive change relative to peers after accounting for the differences in pre-buyout level debt. Leverage changes, which turn out to be quite similar for public and peer firms, do not predict peer-adjusted performance in both the samples containing and excluding Chapter 11 bankruptcies. As mentioned earlier, it is challenging to separate the beneficial and harmful effects of leverage. It is especially difficult to understand the role of increasing leverage on peer-adjusted returns, because the sample and peer firms maintain extremely different leverage levels from each other both pre- and post-buyout. It appears that leverage only plays a major role in impacting operating performance and returns when the firm is financially distressed (i.e., filing for Chapter 11 bankruptcy).

Management and Corporate Decisions:

Variables measuring management and corporate decision making are insignificant drivers of peer-adjusted returns, as they were for market-adjusted returns. As explained earlier, there is a lack of variation in the significant acquisitions variable, since it is an indicator variable and nearly 70% of target firms make a sizeable acquisition. The concentration of ownership and oversight, proxied by the Club Deal and Management Buyout indicator variables, do not explain peer-adjusted returns. Although literature shows that public-to-private buyouts better align management incentives with the company's performance (see Leslie and Oyer (2009)), it does not drive outperformance over peers. One possible reason is that public peers already have ample accountability in the form of hundreds of public shareholders. Furthermore, CEO and management pay is already closely linked to share appreciation (and thus underlying financial performance) for most public companies. As was the case in regression (1), CEO Change is a statistically significant predictor at the 10% level in the OLS regression excluding bankruptcies. As explained earlier, three Chapter 11 bankruptcies with dismal returns involved changing the CEO post-buyout. Thus, when these bankruptcies are excluded, we find a positive relationship between changing management and peer-adjusted returns. Overall, there is not a strong relationship between CEO changes and market- and peer-adjusted returns.

In addition to researching what drives market- and peer-adjusted returns in public-to-private buyouts, I also examine employment changes in target firms. As reported in Table XXI below, the median change for employee growth over the entire investment holding period is 11.07%. 63.51% of sample firms increased their headcount during private ownership. However, employee growth at target firms was slower than at their public counterparts. Peer-adjusted

employment growth, which equals the percentage change in employees at the sample firm minus the percentage change in employees at the target firm, is negative and statistically significant. These results mirror Kaplan's (1989), who found that median employee growth at 46 public-to-private buyout target firms from 1980 – 1986 was 12% lower than employee growth at companies in the same industry (Kaplan, 1989). My results undercut claims that public-to-private buyouts create value by firing many employees. A majority of target firms actually increased their workforce, just less so than public peers. Furthermore, this slower employee growth does not appear to harm or help operating performance, as sample and public firms' experience extremely similar changes in profitability, ROA, and CapEx / Sales.

Table XXI: Employment Changes in Public-to-Private Buyouts

The significance of the difference of medians is based on a two-sample Wilcoxon signed-rank test. ***, ** and * denote the significance at the 1%, 5% level and 10% level, respectively.

		Percentage Change			Peer-Adjusted Change		
	N	Median	Average	% > 0	Median	Average	% > 0
Employee Growth	74	11.07%	792.54%	63.51%	-8.14%**	737.74%	37.84%

IX: Conclusion

This thesis contributes to the ongoing debate about whether private equity sponsorship adds value to a target firm or degrades it, and whether investors are well compensated regardless. I conclude that private equity investors outperform assets with the same level of pre-buyout systematic risk as the target firm, but they do not perform better or worse than their public counterparts. Public-to-private target firms do not experience significantly different changes in profitability, ROA, or CapEx / Sales than their public peers. Debt increases to a median multiple of 5.48x EBITDA in target firms, but this relative increase in debt is not substantially greater than that of peers, who start with extremely low levels of leverage pre-buyout. It appears that neither narrative about buyouts rings particularly true. On average, private equity firms do not

add value by improving the operating performance of their targets beyond what would have been achieved if they were publicly traded. While private equity sponsors do not add substantial value, they do not destroy it. My evidence suggests that increasing leverage neither helps nor hurts investor returns, although the use of leverage is oftentimes necessary to enable large public-to-private transactions. Adding on debt does not appear to cripple operating performance either, except in the cases of Chapter 11 bankruptcies. Sponsors also do not extract value at the expense of employees; in fact, public-to-private target firms tend to grow their labor force rather than cutting it.

The effects of operating performance, leverage, multiple expansion, and management and corporate decision making on market- and peer-adjusted returns are quite heterogenous and appear quite skewed by Chapter 11 bankruptcies. My research shows that multiple expansion is not a significant predictor of market- or peer-adjusted returns, largely because multiples remained quite similar over the course of the investment horizons, meaning changes in EBITDA primarily accounted for post-buyout valuations. This suggests that public-to-private buyout investors cannot rely on "timing the market" to drive their return. However, existing literature demonstrates that private equity sponsors are very opportunistic with public-to-private buyouts. Transaction volume soared in the mega-buyout era when high yield credit spreads fell below 3%. Despite the surge in transaction volume and dismal returns from 2005 – 2007, I do not find strong evidence that credit market conditions are directly linked to market- and peer-adjusted returns. I caution that this negative finding may be attributable to my relatively small sample size, as I do not have enough transactions to accurately represent market performance during a particular credit cycle. Just as sponsors cannot rely on timing their investment, they cannot rely on financial engineering alone to earn them a profit. Operational improvements are the highest

value-creating lever in an LBO, and private equity sponsors should focus more of their attention on growing the firm from within. How private equity sponsors can best drive outperformance at a target firm is worth further investigation. I find that replacing the CEO, making significant acquisitions, and encouraging existing management members to contribute more equity at the time of the buyout does not add any substantial value.

Like Guo et al. (2011), I call into question whether public-to-private buyouts can reliably provide above-market returns for years to come. My extended dataset demonstrates that public-to-private buyouts did not offer a financial advantage over the market or peers from 2005 – 2013, despite carrying a higher bankruptcy risk. As the largest spike in public-to-private deals since the mega-buyout era continues into 2022, it will be interesting to see whether history repeats itself. The multiples paid for public-to-private targets in 2021 are even higher than they were in 2007, with an average EV/EBITDA multiple of 19.3 (or 1.6 times the S&P 500 average), compared to 12.6 (or 1.3 times the market) in 2007 ("McKinsey Global Private Markets Review 2022"). Despite the higher purchase prices, this wave of public-to-private buyouts has involved smaller target companies. Furthermore, the private equity sponsors engaged in today's transactions have deep expertise in the sector, which may lead them to focus more on improving operational performance, the greatest lever of returns. Perhaps this wave of private equity buyouts will one day serve as a counterargument to critics claiming private equity ownership destroys value. For now, it is only clear that public-to-private target companies neither strongly benefit nor suffer due to private equity ownership.

X: Appendix

Table XXII: Sample & Peer Firms

Target Firm	Public Peer	Years	Outcome
Community Health Systems, Inc.	Health Management Associates	1996 – 2000	IPO
Kinetic Concepts Inc	Patterson Companies, Inc.	1997 – 2004	IPO
Zilog Inc	Skyworks Solutions Inc	1998 – 2001	Chapter 11 Bankruptcy
Fisher Scientific International Inc.	Danaher Corp	1998 – 2006	Acquired
LIN Television Corp	Granite Broadcasting Corp	1998 – 2002	IPO
Regal Cinemas Inc	CEC Entertainment, Inc.	1998 – 2001	Chapter 11 Bankruptcy
Harveys Casino Resorts	Scientific Games Corp	1999 – 2001	Acquired
Winsloew Furniture Inc	Flexsteel Industries, Inc.	1999 – 2003	Still Private
Denbury Resources Inc	SilverBow Resources Inc	1999 – 2004	IPO
Integrated Circuit Systems Inc	Skyworks Solutions Inc	1999 – 2006	Still Private
Juno Lighting Inc	LSI Industries Inc.	1999 – 2005	Acquired
BancTec Inc	Electronics for Imaging	1999 – 2007	Secondary LBO
Autocam Corp.	LCI Industries	2000 – 2004	Secondary LBO
Wilmar Industries Inc	Huttig Building Products	2000 – 2004	IPO
Jostens Inc	Wiley (John) & Sons Inc.	2000 – 2015	Secondary LBO
Veterinary Centers of America	Idexx Laboratories, Inc.	2000 – 2001	IPO
TravelCenters of America Inc	Pantry Inc.	2000 – 2006	Acquired
Buffets Inc	Applebee's International	2000 – 2008	Chapter 11 Bankruptcy
Michael Foods Inc	Bob Evan Farms Inc	2001 – 2003	Secondary LBO
CB Richard Ellis Services	Jones Lang LaSalle Inc	2001 – 2004	IPO
Delco Remy International Inc	Thor Industries, Inc.	2001 –	Still Private
VICORP Restaurants Inc	Cheesecake Factory Inc	2001 – 2003	Secondary LBO
Herbalife International Inc	NU Skin Enterprises, Inc.	2001 – 2004	IPO
Loews Cineplex Entertainment	AMC	2002 – 2004	Secondary LBO
Nortek Inc	Modine Manufacturing Co	2003 – 2004	Secondary LBO

BWAY Corp	Winpak, Ltd.	2003 – 2010	IPO
Quintiles Transnational Corp	Covance, Inc.	2003 – 2008	Secondary LBO
Natural Resource Partners LP	PVR Partners LP	2003 – 2005	IPO
Protection One Inc	Kratos Defense & Security Solutions	2004 – 2010	Secondary LBO
Panamsat Corp	TW Telecom Inc	2004 – 2005	IPO
Select Medical Corp	Encompass Health Corp	2004 – 2009	IPO
Duane Reade Inc	Village Super Market, Inc.	2004 – 2010	Acquired
Hillman Cos Inc	Lawson Products, Inc.	2004 – 2010	Secondary LBO
US Oncology Inc	DaVita Inc	2004 – 2011	Acquired
Del Laboratories Inc	Nature's Sunshine Products, Inc.	2005 – 2007	Acquired
Insurance Auto Auctions Inc	A.S.V. Inc.	2005 – 2007	Still Private
Toys R Us Inc	Bed, Bath & Beyond, Inc.	2005 – 2016	Chapter 11 Bankruptcy
SunGard Data Systems Inc	Deluxe Corp	2005 – 2015	Acquired
Readers Digest Association Inc	Daily Mail & General Trust PLC	2006 – 2009	Chapter 11 Bankruptcy
Station Casinos Inc	Penn National Gaming Inc	2006 – 2011	Chapter 11 Bankruptcy
Biomet Inc	Bard (CR) Inc	2006 – 2015	Acquired
iPayment Inc	Global Payments Inc	2006 –	Still Private
Petco Animal Supplies Stores, Inc	Veterinary Centers of America	2006 – 2015	Secondary LBO
ServiceMaster Co	Rollins Inc.	2007 – 2014	IPO
Bausch & Lomb Holdings Inc	The Cooper Companies, Inc.	2007 – 2013	Acquired
Samsonite Corp	Coach, Inc.	2007 – 2011	IPO
PRA International	Parexel International	2007 – 2013	Secondary LBO
Dollar General Corp	Dollar Tree Inc	2007 – 2009	IPO
First Data Corp	Fidelity National Information Services Inc	2007 – 2015	IPO
Symbion Inc	Amsurg	2007 – 2014	Secondary LBO

	Frontier Communications	2007 – 2009	Acquired
Alltel Corp	Inc		
RailAmerica Inc	Genesee & Wyoming Inc.	2007 – 2012	Secondary LBO
CDW Corp	Insight Enterprises Inc.	2007 – 2013	IPO
Ceridian Corp	Gartner Inc.	2007 – 2018	IPO
Nuveen Investments Inc	Stifel Financial Corp	2007 – 2014	Acquired
	Level 3 Communications	2007 – 2017	Chapter 11 Bankruptcy
Avaya Inc	Inc		
US Xpress Enterprises Inc	ArcBest Corp	2007 – 2018	IPO
Ryerson Inc	AK Steel Holding Corp.	2007 – 2014	IPO
Radiation Therapy Services		2007 –	Still Private
Inc	LCA-Vision Inc.		
Laureate Education Inc	Perdoceo Education Corp	2008 – 2017	IPO
Restoration Hardware Inc	Ethan Allen Interiors, Inc.	2008 – 2013	IPO
Harrah's Entertainment Inc	MGM Resorts International	2008 – 2016	Chapter 11 Bankruptcy
Interactive Data Corp	HIS Inc	2009 – 2015	Acquired
BWAY Corp	Silgan Holdings Inc.	2010 – 2012	Secondary LBO
IMS Health, Inc.	DST Systems, Inc.	2010 – 2016	IPO
Gymboree Corp.	G-III Apparel Group Ltd.	2010 – 2017	Chapter 11 Bankruptcy
J Crew Group Inc	Express Inc	2011 – 2020	Chapter 11 Bankruptcy
Express-1 Expedited		2011 – 2021	IPO
Solutions	United Parcel Service Inc		
SRA International Inc	CACI International Inc	2011 – 2015	Acquired
Pharmaceutical Product	Charles River Laboratories	2011 – 2021	Acquired
Development	International		
99 Cents Only Stores	Fred's Inc.	2011 –	Still Private
American Greetings Corp.	1-800-Flowers.com, Inc.	2012 – 2018	Secondary LBO
Par Pharmaceutical	Vertex Pharmaceuticals,	2012 – 2015	Acquired
Companies Inc	Inc.		
Dell Inc	Lenovo Group Ltd	2013 – 2018	IPO

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