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Managerial Incentives at Private-Equity-Owned Companies*

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Abstract

We analyze the differences between companies owned by private equity (PE) investors and similar public companies. We document that PE owned companies use much stronger incentives for their top executives and have substantially higher debt levels. However, we find little evidence that PE owned firms outperform public firms in profitability or operational efficiency. We also show that the compensation and debt differences between PE owned companies and public companies disappear over a very short period (one to two years) after the PE owned firm goes public. Our results raise questions about whether and how PE firms and the incentives they put in place create value.

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1 Introduction

Private equity (PE) firms buy companies, hold them for a period, and then sell them. Given the historical success private equity firms have had generating lucrative returns, scholars and practitioners have long been interested in the sources of private equity returns.[1] In his influential papers, Jensen (1986 and 1989) argued that private ownership improved management in three ways: (i) increasing debt that disciplines managers, (ii) increasing managerial incentives, and (iii) enhanced governance. In this paper, we examine the first two of these mechanisms for improvement, with a particular focus on managerial incentive contrcts. We ask if, and to what degree, incentives are different at PE-backed companies than at comparable public companies.

We compare managerial incentives at public companies with PE owned companies, using data for U.S. firms during the period 1996 to 2005. A key challenge in this research is obtaining data on managerial incentives at PE portfolio companies, which are not required to disclose such information. Our approach is to collect data on companies that have PE owners and undergo an IPO (sometimes referred to as a "reverse LBO").[2] In such cases the PE owned firms are required to disclose the same information as a public company for the two years prior to the IPO. The dataset covers 144 such companies. We then go on to measure whether PE owned firms outperform their public counterparts in profitability and operational efficiency, and to determine if any differences between PE owned firms and public firms persist after PE owned firms go public.

Many papers study executive compensation in public companies.[3] However, there is very little research on managerial incentives at private companies. One exception is Kaplan (1989) who studies the change in managerial incentives occurring in management buyouts in the early 1980s, finding significantly higher incentives when companies are private.[4] Holmstrom and Kaplan (2001) argue that many public corporations actually adopted the beneficial PE

[1] See Kaplan and Schoar (2005), Muscarella and Vetsuypens (1990), and Phalippou and Gottschalg (2007) on private equity returns.

[2] Muscarella and Vetsuypens (1990) also utilize data on reverse LBOs.

[3] See Murphy (1999) for a detailed review of the literature.

[4] We compare our findings with Kaplan's results in Section 4. Also see Baker and Wruck (1989) for a detailed description of management incentive changes in a case study of a single firm that was taken private in 1986.

practices in the 1990s, driven by two changes: (i) innovation in information and communication technology made capital markets more efficient (i.e., enhanced disciplining); and (ii) deregulation increased the rewards to restructuring.[5] Others are more skeptical, such as Bebchuk and Fried (2004) who argue that managerial power continues to drive executive compensation in most public corporations, to the detriment of shareholders.

Since there is reason to expect public companies have adopted some of the practices of PE in the years since Kaplan's study, and also because it is conceivable that PE has significantly evolved, it is timely to assess whether these differences in managerial incentives have persisted. Furthermore, we seek to examine broader evidence on managerial incentives than simply the fraction of equity owned by the CEO (although that is one important measure).

We find that, as conventional wisdom and economic theory suggest, top executive incentives are much stronger at PE owned companies than at comparable publicly traded companies. More specifically, relative to his counterpart at a publicly traded company in the same industry with similar observable characteristics, the highest paid executive at a PE owned firm owns approximately twice as large a share of the firm, earns about 12% less in base pay, and receives a substantially larger share of his cash compensation through variable pay. These differences do not exist at companies before they are bought by PE firms, suggesting that these differences are the result of PE ownership. We do not find, however, that PE owned firms are substantially more successful than comparable public firms in operating metrics such as return on assets (ROA), operating income, or headcount. While the incentives given to PE owned firms' managers keep their companies operating at average levels of profitability and efficiency, we do not find evidence that they create significant excess profits. Finally, we show that any differences between PE owned firms and public firms quickly disappear after PE owned firms execute an IPO. Within a year of the IPO, the previously PE owned firm has managerial incentives and debt levels similar to comparable public firms.

In the next section we describe anecdotal evidence about the range of managerial incentives implemented by PE firms in their portfolio companies. In Section 3 we summarize the data used in our study. Section 4 then contains our analysis of the differences in managerial incentives between public corporations and PE owned companies. In Section 5 we examine

[5] Also see Hermalin (2005).

evidence concerning operational differences, and in Section 6 we explore the longevity of high managerial incentives once a PE owned firm undergoes an IPO. Section 7 concludes.

2 Institutional Background on PE Firms

In this section we provide an overview of some of the key changes that PE firms implement in managerial compensation at their portfolio companies. The information in this section is based on interviews we performed with a half dozen experienced executives at several leading PE firms. The purpose of including this information is to expand our understanding beyond the limited set of facts we are able to study in the formal empirical analysis. It is commonplace in the literature on private equity to propose that a major driver of value creation is enhanced managerial incentives. However, we are unaware of any paper that provides a description of what "enhanced managerial incentives" entails, other than the evidence provided by Kaplan (1989) and Muscarella and Vetsuypens (1990), showing that the fraction of equity owned by the CEO tends to increase. While this is an important feature (which we also examine), the interviews we summarize below clearly indicate that increasing CEO equity is one piece of a more complex set of changes.

Enhanced equity participation is not limited to the CEO. Not surprisingly, all members of the senior management team (Chief Financial Officer, Chief Operations Officer, Chief Technical Officer, and so forth) also obtain significant equity stakes in almost every instance. However, PE firms tend to seek much broader participation than even this. It is typical for the top 20 to 80 managers in an acquired company to obtain significant equity. The number may vary according to the kind of business: manufacturing firms tend to involve fewer managers in equity participation, and service firms tend to involve more managers. It is not unusual to have 150 or more managers participating, and one interviewee told us of a deal that included 500 managers in the new equity program that was implemented.

A very important aspect of the equity programs is that managers are required to contribute capital—managers purchase the equity with their own personal funds. One interviewee explained that equity sharing is less about compensation of managers than it is about investment by managers. Arguably, this feature is why managerial equity programs are the cornerstone of the PE model which transforms managers as agents into managers as owners.

Exposing managers to downside risk may be as important for motivating managers as

the potential upside. However, the interviewees also emphasized that requiring managers to invest themselves helps to reveal information. If any manager is unwilling to make a significant investment (often described as an investment on par with their home) then it is crucial to understand why. Is it because of personal financial limitations, in which case the PE firm will find creative ways to help the manager invest? Or is it because the manager has private information about the business that brings into question future profitability? Hence, increased equity participation of managers may be as important for mitigating adverse selection as it is for overcoming moral hazard.

Alongside equity investments by managers are stock options that are granted in proportion to the initial investment by managers (although not necessarily the same proportion for all managers in a firm). It is typical for a CEO to obtain two to three times his/her initial equity in options. Options vest uniformly, often over five years. There may be some controversy surrounding CEO options in particular, since other managers may obtain lower multiples than the CEO, which can be interpreted as a form of kick-back for CEOs to push the deal. A simple example of a CEO equity package is as follows. Suppose the PE firm acquires the target company for $8 billion, with 50% leverage (i.e. $4 billion in equity, and $4 billion in debt). Suppose the PE firm expects to sell the business for $16 billion, yielding a 300% return on equity (ROE). The CEO may invest $5 million of his/her personal wealth (which is often a rollover of the equity previously owned in the company), and obtain three times that in options for a total stake of $20 million. With 300% ROE, the CEO obtains $60 million upon exit. CEO ownership may increase when competition among PE firms for deals is intensified.

PE firms also expend significant effort re-designing cash bonus structures for managers. The changes are customized to specific businesses, but are generally said to involve an increase in the performance weighting, and amended performance criteria. The overall level of cash bonuses does not always increase, but it generally does not decrease. Some PE firm executives indicated that the changes they implemented should have already been done by the firms.[6] Others said that such changes reflected strategic re-direction. Others again em-

[6]Consistent with this view, prior research has noted the difficulty of changing compensation structures, and that such changes are more likely in the face of bankrupcy or other dramatic changes in ownership structure—people are more willing to accept change when they feel less secure in their jobs. See, for example, Schaefer (1998).

phasized that the changes in bonus structures were not necessarily better, and indeed may be worse in some dimensions. This could be because PE firms are not expert in utilizing non-financial measures that encourage leadership development, for example. According to the interviewees, salaries are largely unchanged.

There is an interesting question concerning the role of exit: does the fact that PE firms intend to exit (after five years, say) enhance or diminish the effectiveness of managerial incentives? On the one hand, unlike at public companies where managers may divest sooner than investors would prefer, managers and investors at PE-owned firms obtain a liquidity event at the same time, providing alignment around timing. On the other hand, there can be disagreement between managers and the PE firm concerning the details of exit. For example, managers may prefer not exiting via an IPO, because they are required to hold stock for a minimum period, delaying their liquidity event. Several PE executives made the compelling point that PE firms tend to favor managers when discord arises, so that the firm can maintain its reputation for treating managers well.

It would be ideal to obtain data on all managers equity investments, option grants, and bonus structures, in order to formally analyze/verify the generality of the anecdotal evidence discussed here. By its very nature, it is difficult to obtain information on the practices of private equity firms for a broad sample, let alone such confidential details of managerial incentives.[7] In the next section we describe the data utilized in our formal analysis, as well as its advantages and limitations.

3 Data Summary

We used CapitalIQ to generate lists of two types of firms that have time periods where they are owned by a PE firm and other periods where they are publicly traded (and, therefore, must disclose financial and compensation data). First, we looked at all firms that, according to CapitalIQ, underwent a leveraged buyout (LBO) between 1996 and 2004, *and* completed an IPO after the LBO but before the end of 2005. We dropped firms that we determined to be venture capital-backed (rather than PE-backed). This is our sample of PE-owned companies, and in the analysis below we clarify when we use information about these firms

[7] Indeed, even for public companies this level of detail is not usually available.

during the private ownership phase and when we use information about these firms after they have gone public. There are 144 firms in this group. Table 1 shows the number of LBOs and IPOs by year for the PE owned companies in our dataset. Most LBOs are early in the sample period, which is to be expected given the firm must go public by 2005. The IPOs build over the sample years, with a distinct dropoff during the weak stock market of 2001–2003.

The second type of firm in our dataset, which we refer to as the *going private* group, is all firms that CapitalIQ lists as having a "going private transaction" between the beginning of 1998 and October of 2007, and for which there is some compensation data available in Standard and Poors' ExecuComp database. There are 89 firms in this group. The annual rate at which firms enter this group went up dramatically in 2004–2006 because of the wave of large PE-backed purchases. These larger firms were more likely to be included in ExecuComp. Table 1 shows the annual rate of going private for firms in this group.

For the PE-owned firms, we downloaded the names of all executives and all compensation information listed by CapitalIQ. We supplemented the compensation information with data from Standard and Poors' ExecuComp database in the few cases where it held relevant information. In most cases, we used firms' proxy statements to fill in compensation information. This compensation data is matched to accounting and stock return data from Compustat and CRSP, respectively.

The PE-owned companies in our sample are a subset of all PE-owned businesses. Strömberg (2008) finds that only 13% of PE exits between 1970 and 2007 are via an IPO, which is a necessary condition to enter our sample. One concern is that our sample is not representative of all PE owned companies. Although we are unaware of a particular reason why managerial incentives at PE owned firms that have an IPO would be different than other PE owned firms, this is an important caveat to our research.

A more important concern relates to selection. The fact that we do not observe pre-acquisition incentives for our sample of PE owned companies raises the question that PE acquirers may target companies with already high managerial incentives. Hence, a finding that PE owned companies have high managerial incentives may be due to selection, rather than a causal effect due to changes that are implemented by the new owners. This concern is the reason why the second group of firms—the going-private sample—is essential to our analysis, because it allows us to test the selection hypothesis.

We were only able to identify five companies that went from public to private and back to public in the time frame of our analysis. We refer to these firms as the *public-PE-public* group. This sample is too small for formal analysis, but we use one company in this group (Petco) for illustrative purposes.

We also generated a comparison sample that includes all firm-years in ExecuComp that are not in one of the other two samples. ExecuComp oversamples large firms (it includes the entire Standard and Poors' 500), so the comparison sample firms are larger, on average, than the two PE samples. We limit the comparison sample to a subset of smaller firms that more closely match those in the other samples for some of our analysis.

To understand the logic of our identification strategy, note that we had hoped to make more use of the public-PE-public (or, as Cao and Lerner (2007) refer to them, "reverse LBOs") by analyzing firms' PE ownership stage relative to both a pre-LBO and post-IPO stage. However, the sample size using our time frame and criteria is simply too small. This is because, as Strömberg (2008) shows, only 6% of PE owned companies were stand-alone public firms before a PE firm bought them. Using two recent prominent investments by Texas Pacific Group (TPG) as examples, Burger King was part of a large British conglomerate and J. Crew Group was private and largely owned by the founder's family before TPG invested in them. As a result, when these companies later went public, it was not possible to track their compensation and performance from a public stage to a private stage and back to a second public phase.

Further complicating this non-comparability issue is the fact that, as already noted, only 13% of PE-owned firms leave PE ownership through IPO. As a result, we focus on differences between firms in their private phase and those that are public as our estimate of differences between PE-owned firms and public firms. Then we look at differences between public firms and firms that are about to go private, to see if there are systematic differences between public firms and firms that have a PE owned stage when both groups are publicly held.

Table 2 shows summary statistics for the three groups of firms in our dataset. As expected, the comparison sample is made up of noticeably larger campanies than the other groups. The difference is not as large in the medians, however, because PE firms make fewer investments in the largest corporations that drive up the average size of public firms.

The table shows summary statistics for three measures of managerial incentives for each sample. Each measure corresponds to compensation for the executive with the highest salary

at each company in any given year (invariably the CEO).[8] "Executive Ownership" in the table, which we refer to as *fraction of the firm's stock owned by the highest paid executive* below, is the number of shares that the executive either owns outright or holds options to buy divided by the number of shares outstanding. "Non-Salary Cash Pay" (or *variable pay share of cash compensation* below) is all cash pay that is not the executive's base salary divided by total cash compensation.

4 Managerial Incentives in Private Equity Owned Businesses

As noted in the introduction, one view of PE firms is that they create value in the businesses they acquire as a result of improved management. Some of the improvement may stem from management turnover, but the literature tends to emphasize the role of reduced agency costs. That is, PE mitigates the principal-agent problem between managers and owners via a combination of higher debt levels, enhanced monitoring, and increased incentives. It is conceivable these three factors are complementary, substitutes, or simply additive in their combined effect on firm performance.

To illustrate the changes in managerial incentives that take place when a PE firm acquires a public company, consider the example of Petco and the equity ownership of CEO Bruce Devine, as depicted in Figure 1. This example is one of the five firms in the public-PE-public group discussed above. Between 1995 and 1999, during the initial public phase, Devine owned about 2% of the equity. After Petco was taken private in 2000, Devine's ownership share sharply increased to about 10%. Petco undertook an IPO in 2002 and Devine's share was immediately reduced to about 7%, and then continued to fall after that. Devine stepped down as CEO in 2004 but continued as Petco's Chairman. By 2006, he owned about 4% of Petco. When Petco went private again in 2006, Devine's role in the company had been reduced and he did not increase his stake. PE ownership is associated with higher top management ownership in the case of Petco. We will show below that this example is representative of PE owned firms more generally.

[8] CapitalIQ does not provide position information. We are in the process of gathering position information for the PE owned sample (it is available for the other samples in ExecuComp) for use in future drafts.

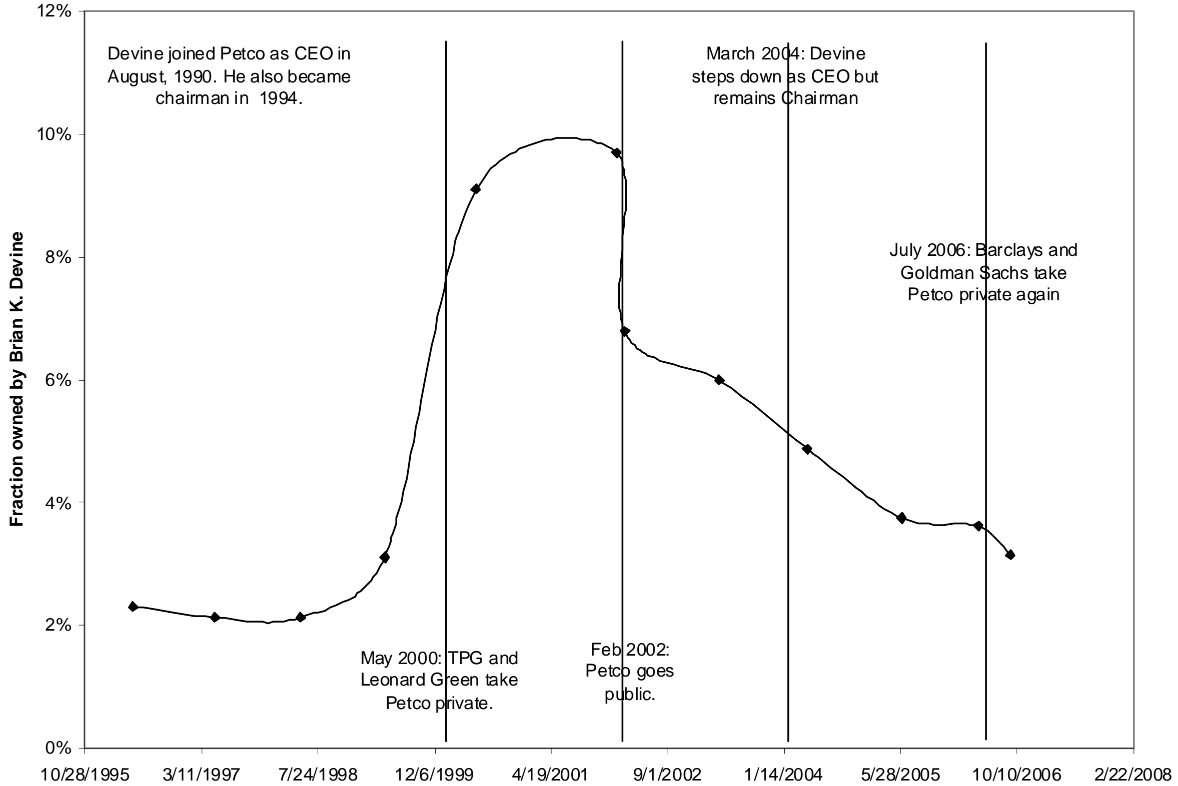

Figure 1: Fraction of Petco owned by CEO Bruce Devine during two public phases and two private phases.

To examine these effects more generally, we estimate the following specification:

$$Y_{it} = \alpha + X_{it}'\beta + \theta_1 PrivateEquity_{it} + \theta_2 GoingPrivate_{it} + \epsilon_{it} \quad (1)$$

in which Y_{it} is one of the three measures for managerial incentives (discussed in Section 3) at firm i in year t, and X is a vector of control variables that includes observed firm characteristics (assets, sales, market capitalization, employees, cash/assets), 2-digit SIC dummies and year dummies. There are two key variables of interest. Firstly, $PrivateEquity_{it}$ is a dummy equal to one for companies that are owned by a PE firm. As explained in Section 3, we observe such firms in the last two years before an IPO (hence, the t subscript). Secondly, $GoingPrivate_{it}$ is a dummy equal to one for public companies in their last year before being acquired by a PE firm. Lastly, α, β, θ_1 and θ_2 are coefficients to be estimated, and ϵ is an

error term that contains unobserved factors which also affect incentives.

Identification of θ_1 is based on cross-sectional variation. Even though the dataset includes a time-dimension, for the reasons explained in Section 3 we do not observe the same company before and after going private. Hence, we are unable to include firm fixed effects, which would have been helpful to control for unobserved heterogeneity. Clearly, PE firms do not randomly select their targets. For our purposes, a biased estimate of θ_1 will arise if there are firm-specific unobservables that are correlated with managerial incentives and the attraction to PE firms.

Three factors which are likely to be important determinants of PE acquisitions, which may also affect managerial incentives are: cash reserves, industry factors (such as availability of profitable investments), and macroeconomic factors (such as interest rates).[9] The above specification includes controls for cash, industry dummies and time dummies, which control for these three factors, respectively. Hence, θ_1 is identified from within-industry and within-year variation.

In addition, the inclusion of $GoingPrivate_{it}$ in equation (1) provides us with a diagnostic for whether the estimate of θ_1 is picking up a causal effect of PE, or if θ_1 is due to selection—PE firms choosing to acquire public companies with already high managerial incentives. Specifically, if $\theta_1 = \theta_2$ then public companies that are acquired by PE firms tend to have the same level of incentives, in the year before going private, as do PE owned firms (prior to IPO). And if $\theta_2 = 0$ then public companies that are acquired by PE firms tend to have the same level of incentives, in the year before going private, as do public firms that do not go private.

The estimates for variations on the above specification are reported in Tables 3, 4 and 5. Each of these tables corresponds to one of the three measures of managerial incentives that were explained in the prior section. For all specifications in these three tables, an observation is an executive-year combination. Also, in every specification in these tables we include year dummies.

[9] See Jensen (1989).

4.1 Fraction of Executive Ownership

The dependent variable in Table 3 is the *fraction of stock owned by the highest paid executive.* Controlling only for year effects, in column (1) we report that highest paid managers in a PE owned businesses tend to have 4.8% more equity than the highest paid managers in public companies. Adding industry dummies in column (2) reduces this difference by a small amount (to 4.4%). Including controls for observed firm characteristics in columns (3) and (4) reduces the difference—with the full set of controls and industry dummies, we estimate the highest paid manager in a PE owned business has 3.3% more equity (on average) than their counterpart in public companies.[10] Columns (5) and (6) verify that the findings are robust to the exclusion of large firms, because we exclude all firms with more employees than the seventy-fifth percentile PE owned firm. Recall from Table 2 that the mean level of executive ownership (for the highest paid executive) in the comparison sample of public corporations is 3.4%. Hence, the estimate of 3.3% more ownership associated with PE represent a dramatically higher level of managerial incentives—100% higher. As a reality check on the data, note that the coefficient on *Log(Assets)* in all columns of Table 3 is negative and significant, picking up the expected size effect (managers tend to have a smaller fraction of ownership in larger firms).

As mentioned above, the coefficent on $GoingPrivate$ (θ_2) indicates whether private equity firms choose targets that already have relatively strong incentives. In the results of the full specification presented in column (4) of Table 3, we report that $\hat{\theta}_2$ is insignificantly different from zero. This indicates that public companies that are acquired by PE firms tend to have the same level of incentives, in the year before going private, as do public firms that do not go private. Unsurprisingly then, we also find that $\hat{\theta}_2$ is significantly different from $\hat{\theta}_1$, indicating that public companies that are acquired by PE firms tend to have signifciantly lower level of incentives, in the year before going private, than PE owned firms (prior to IPO).

To better examine the differences between PE and public companies in the distribution of management ownership, rather than just conditional means, Figures 2 and 3 show kernel density estimates of distributions of executive ownership. Figure 2 shows the empirical distributions for each type of firm without conditioning on any other variables. Figure 3 shows the distributions of executive ownership for each type of company conditional on the

[10] The estimate is significantly different from zero with 99% confidence.

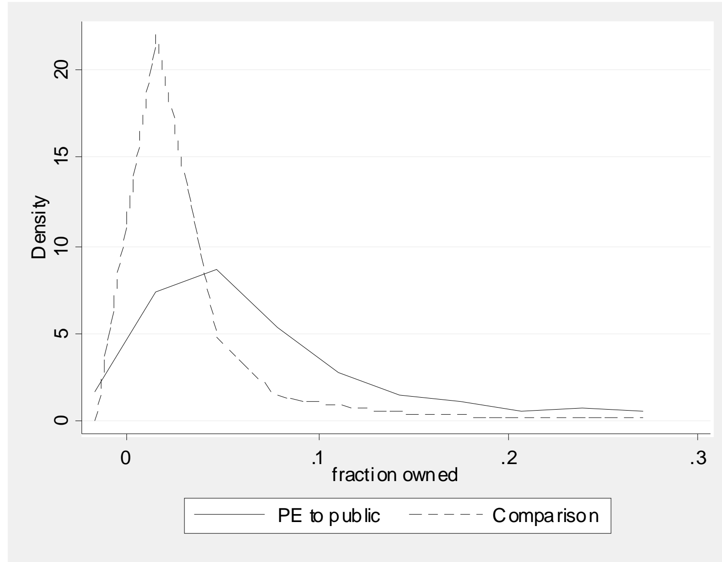

Figure 2: Kernel density of the fraction ownership by the highest paid executive. Sample is the same as in Table 3.

full set of controls. Specifically, Figure 3 graphs the distributions of the residuals from a regression identical to the one in column 4 of Table 3, except that the regression excludes $PrivateEquity$ and $GoingPrivate$ from the set of explanatory variables. Comparing the distributions in both figures leads to the same qualitative conclusion: compared to public companies, the distribution of equity owned by the highest paid executive in PE owned businesses has greater variance, and puts more weight on high levels of ownership. In more quantitative terms, in Figure 3 (with controls) the interquartile range of equity ownership is 8.3% for PE owned firms, and 3.7% for public corporations. Also, in Figure 3 the 75th-percentile is 4.1% higher for PE owned firms than public firms.

Our estimates likely understate the differences between PE owned firms and other firms because we treat shares and options the same in our analysis.[11] Options make up a larger part of ownership for the comparison group than for the PE owned group. But note that each option creates somewhat less incentive and has less value than a share because the price may be below the strike price when the executive wants to exercise the option.

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[11] Again, we are somewhat limited by the detail of the compensation and ownership data in CapitalIQ. For the PE owned sample, we know how many options the executive holds but we do not have details on the date of expiration, strike price, etc.

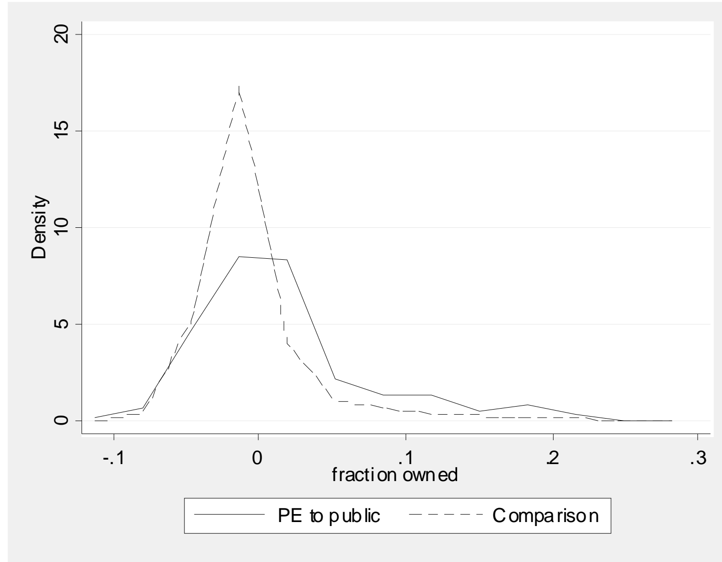

Figure 3: Kernel density of the regression adjusted fraction ownership by the highest paid executive for "PE to Public" and "Comparison" firms. Each line is based on from the regression in Table 3, column 6 without controls for "PE to Public" and "Public to PE". Sample is the same as in Table 3.

Overall, the regression results in Table 3, as well as Figures 2 and 3, make it clear that top executive ownership is significantly larger (both statistically and economically) in PE owned firms than they are at typical publicly-held corporations.

4.2 Salary of Highest Paid Executive

The second measure of managerial incentives we examine is salary. We would expect firms that want to provide stronger incentives to pay lower salaries to their executives for at least two reasons. First, when expected payouts from incentives are high, then (assuming the risk premium is not too great) the firm will want to lower base pay so as to keep compensation costs down. Second, lower salaries increase incentives of risk averse workers by increasing the likelihood of low pay (where marginal utility with respect to income is particularly high.) We again estimate versions of equation (1), but now with the dependent variable: *Log(Salary of Highest Paid Executive)*. Table 4 contains the results. The number of observations is reduced by five from the above analysis because there are five firms with zero salary (and the dependent variable is in log).

Column (1) shows that salaries are about 45% lower at PE owned companies than public corporations, conditional only on year dummies. Adding industry dummies changes this difference by a small amount, to about 42%. The results for the complete set of controls are given in column (4): we estimate that, on average, the salary of the highest paid executive at PE owned companies is 11.9% lower than for similar public companies. Again, in columns (5) and (6) we verify that this finding is robust to excluding large firms in the sample.

The estimated coefficient on the *GoingPrivate* dummy is, again, insignificantly different from zero in all specifications in Table 4. This provides further confidence that the differences in incentives we are finding at PE firms compared to public firms is a causal effect, rather than a selection effect.

4.3 Variable Pay Share of Cash Compensation

The third and final measure of managerial incentives we examine is the *Variable Pay Share of Cash Compensation*, defined as: (total cash compensation – salary) / (total cash compensation). Cash compensation includes salary and bonuses. Hence, the measure is essentially bonuses. Firms that provide higher incentives will utilize more bonuses, because bonuses are a contingent payoff. We again estimate versions of equation (1), but now with the dependent variable: *Variable Pay Share of Cash Compensation*. Table 5 contains the results. The number of observations is reduced by one from the analysis of equity ownership because there is one executive-year combination with zero total cash compensation.

The results are presented in Table 5. The difference in variable pay share between PE firms and public companies is significant (with 95% confidence) in column 1 and column 2. In the full specification reported in column (4), we find that PE owned businesses tend to provide 12.6% higher variable pay shares than public companies. Recall from the discussion of anecdotal evidence in Section 2 that our interviewees did not have a strong sense of whether bonuses would be higher at PE owned companies.

The *PrivateEquity* coefficient changes when firm controls are added because larger firms pay more overall and, given that executives are risk averse, can put more compensation at risk. Relative to the large public firms in the control sample, PE owned firms have both lower salaries and lower incentive-based cash compensation so that the fraction that is variable works out about the same for both groups. However, relative to public firms of the same size, PE owned firms have lower salaries and more variable cash compensation.

The estimated coefficient on the *GoingPrivate* dummy is insignificantly different from zero in specifications (1) to (4) in Table 5, and significantly positive in specification (5) and (6)—indicating that PE firms tend to acquire companies that provide already high bonuses. This issue warrants further investigation.

4.4 Heterogeneous Effects

The above analysis focuses on mean differences in managerial incentives between PE owned and public companies. However, these differences may also depend on other factors. We first examine time trends: is the gap in managerial incentives between PE companies and public companies shrinking over time? Holmstrom and Kaplan (2001) argue that public firms have been catching up during the 1990s. To examine this possibility, we generalize the specification in equation (1) to allow θ_1 and θ_2 to have different values in the years 1996–2000 and 2001–2005. We find no significant difference in the estimated coefficients over time, for all three measures of managerial incentives analyzed above. Hence, not only are there significantly lower incentives at public companies compared to PE owned businesses, but there does not appear to be a strong trend towards convergence between the two groups during this time period.

A second form of heterogeneity we explore is size effects: is the gap in managerial incentives between PE companies and public companies different for big versus small companies? This is of interest because agency costs are likely to be higher in larger companies (e.g. harder to monitor) and incentives may create more risk for a CEO in a larger company. Also, there is a trend towards bigger PE acquisitions. So, while we showed above that there is not a noticeable change in PE owned managerial incentives over time holding firm characteristics constant, there could be a change due to the changing nature of the types of firms that go private. Using number of employees as a measure of size, we find no statistically significant difference in fraction of ownership, or salary, between the largest 25% of PE owned firms and the other PE owned firms. However, we do find that large PE owned firms tend to utilize significantly higher bonuses (variable pay share of cash compensation) than small PE owned firms. Overall, the evidence is mixed at best, and weakly indicates that size does not affect managerial incentives in PE owned firms.

Finally, we looked for differences in incentives for firms backed by KKR, Blackstone, TPG, and other top PE firms compared with other PE firms. The sample for each PE firm

is small, so it is not surprising that we did not find significant differences for any given firm. However, we also did not find any differences between the top 10 PE firms, as defined by *Fortune* magazine, and other firms.

4.5 Summary

To summarize the results in this section, we find that, relative to public corporations, PE-owned firms: (i) provide the highest paid executive with 3.3% more equity (roughly double); (ii) 11.9% lower salary; and (iii) 12.6% higher variable pay share. These estimates are all based on a specification in which we control for year dummies, industry dummies, and various observed firm characteristics. Our analysis also indicates these estimates are not driven by selection effects, and can plausibly be interpreted as the causal impact of PE ownership.

How do these results compare to the earlier findings in Kaplan (1989)? Kaplan did not analyze salaries and variable pay shares, but did analyze equity shares. He found that mean pre-buyout CEO equity share was 7.1%, and the mean post-buyout CEO equity share was 14.7%—an increase of 7.6%, or roughly twice the mean ownership of pre-buyout CEOs.[12] Compared to the data used in this study, the average level of equity ownership by the CEO is higher, both before and after going private. However, the proportional change is roughly similar in both studies—around 2 times greater ownership share as a PE portfolio company. We are not sure why the mean ownership *level* in our sample differs from Kaplan's, but our estimates of the *effects* of PE ownership on executive ownership are comparable to his.

5 Operational Differences Between Private Equity Owned Businesses and Public Corporations

In addition to the measures of managerial incentives analyzed in Section 4, we also observe a variety of performance measures for all the firms in our dataset. In this section we examine the effect of PE ownership on these measures, by again estimating versions of equation (1).

While few papers have examined managerial incentives in PE owned companies, quite a number of papers have looked for evidence of performance improvements. Table 6 summa-

[12] Conditioning on the sub-sample of CEOs that were present before and after the buyout, Kaplan found that equity shares increased from 6.4% to 14.5%, on average.

rizes the prior results. There is seemingly a wide range of findings—it matters when, where the companies are, and how the sample is constructed (type of acquisition and type of exit).

Although not a measure of performance, as a reality check on the data we first analyze the changes in the importance of debt. We use this measure instead of the more conventional debt-equity ratio because negative equity is not uncommon in the data. Again, using Petco as an example, Figure 4 shows that this PE-owned firm increased its debt dramatically when it went private. Petco's debt returned to its pre-PE level slowly over a few years after it went public again. We will again show that Petco is reasonably typical of other PE owned firms.

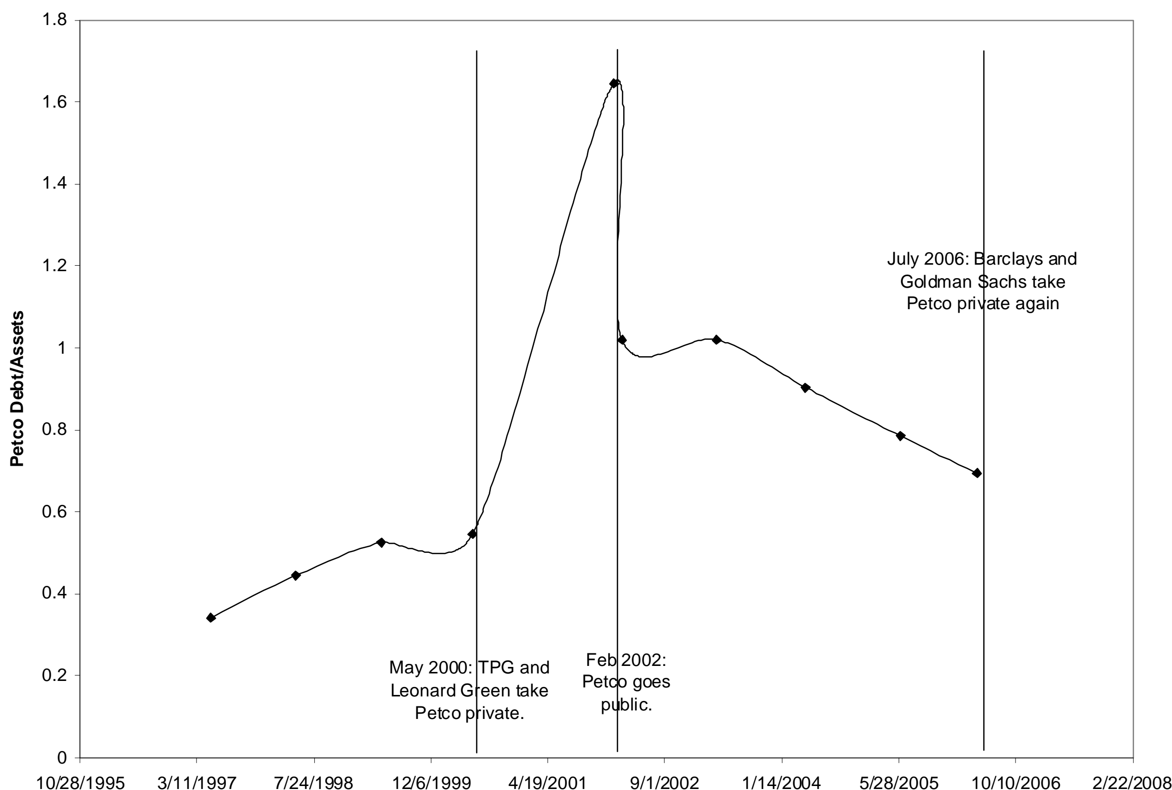

Figure 4: Petco Debt/Assets Ratio

Table 7 reports estimates of regressions for the whole sample where the dependent variable is the ratio of *All Debt* to *Total Assets*. As expected, PE owned firms have dramatically higher debt-asset ratios. In the specification with the full set of controls shown in column (4), we estimate PE companies have 14.3% higher debt-asset ratios than public corporations, on

average. Given that the mean debt-to-assets fraction is 58% for the comparison sample, this represents a very large difference. The coefficient on *GoingPrivate* is insignificant, indicating that this effect is not driven by selection.

We now turn to measures of profitability and operational efficiency. First, Figure 5 shows ROA at Petco over its various forms of ownership. The graph indicates that, if anything, Petco was less profitable during its years under PE ownership. A trend up in profits ended when the firm was bought by TPG and Leonard Green in 2000, and another one began after the firm was returned to public ownership. However, Petco's ownership coincided with a recession, so it is important to look at this in a regression context where we can control for time effects.

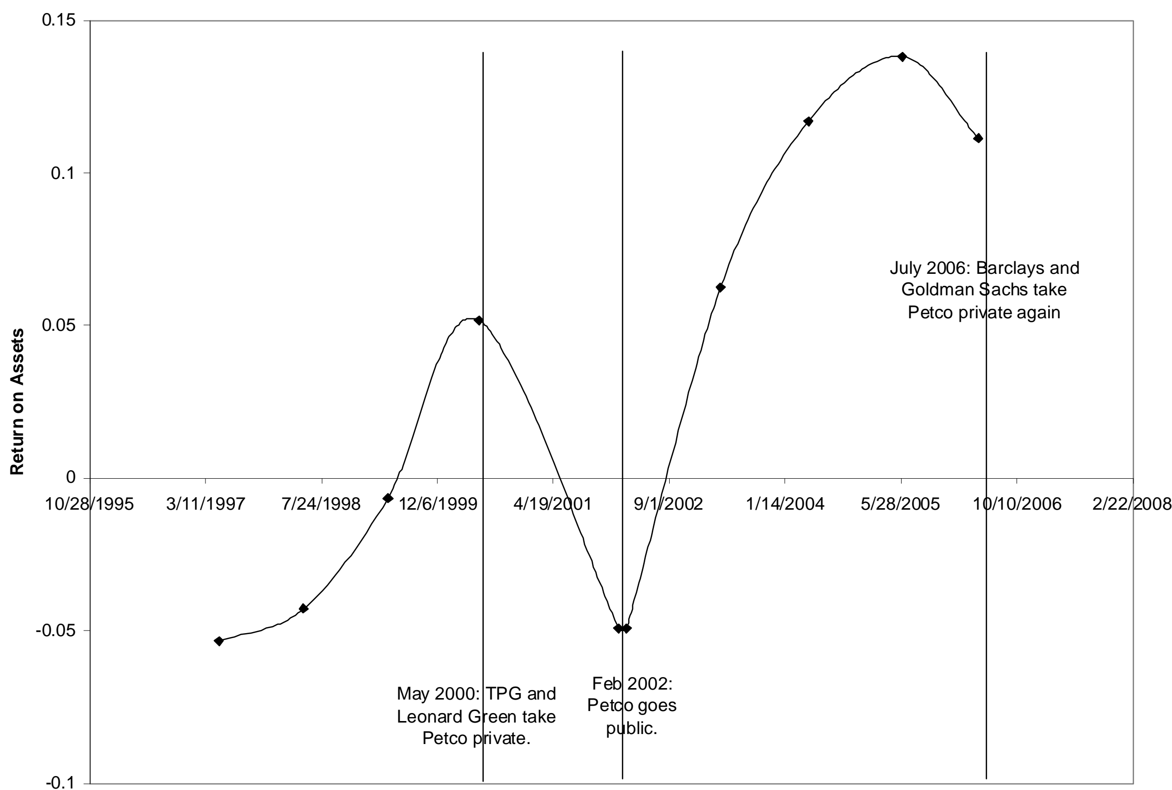

Figure 5: Petco Return on Assets

Using the same regression framework and control variable we used for debt and the incentive measures, we examined the following performance measures: *Return on Assets*, *(Operating Income) / (Total Assets)*, *Sales Per Employee*, and *Employees / (Total Assets)*.

The only one of these measures to show systematic significant effects of PE ownership is *Sales Per Employee*, which we report in Table 8. In the full specification (column 4) we find that *Sales Per Employee* is significantly higher than public corporations with 90% confidence. And, the difference between the coefficient on *PrivateEquity* and *GoingPrivate* is significant with 95% confidence, suggesting that PE firms do cause an increase in *Sales Per Employee*.

Sales Per Employee aside, the general message of the analysis here is that we find little evidence of PE causing performance improvements. We also looked at the correlation between the level of incentives and these measures of profits and efficiency, without finding any obviously strong relationships. Thus far, we have not found any evidence that the increased incentives we documented in the prior section improve bottom-line performance. While one might suspect that this is because the firms that go into PE ownership are often turnarounds and their PE owners are successful in returning them to financial health, this would imply that firms in our going private sample would be underperforming their peers at the time we measure them. We see no evidence to support that idea. Further analysis is necessary to determine if this is caused by the limits of using accounting data to compare public and private companies, by outliers or other data issues, or if it truly is the case that PE ownership does not improve operational efficiency.

6 Longevity of Increased Incentives after IPO

One of the virtues of our dataset is that we focus on PE owned companies that undergo and IPO, which allows us to examine changes after the firm transitions from private to public. So we now analyze the longevity of the higher degree of managerial incentives once these companies go public.

To do this, we generalize equation (1) in the following way:

$$Y_{it} = \alpha + X_{it}'\beta + \sum_{j=-1}^{4} \theta_j PrivateEquity_{it} + \sum_{k=-5}^{-1} \theta_k GoingPrivate_{it} + \epsilon_{it}. \quad (2)$$

Instead of including only the first available observation for PE owned firms that go public, we now include annual observations for the year before the IPO and each subsequent year up to four years after the IPO. The θ_j's capture how managerial incentives (or other dependent variables) evolve at these firms from just before the IPO until four years after. Similarly,

instead of including only the last public year for the going private sample, we now include all available years and the θ_k's track how incentives evolve in the years leading up to the purchase by a PE firm.

Rather than present regression coefficients (which generally mirror those in earlier tables), we graph the θ's and corresponding 95% confidence intervals. Figure 6 shows the θ's from a regression that estimates equation 2 with fraction ownership of the highest paid executive as the dependent variable and all the control variables used in column 4 of Table 3. The graph shows that the θ_k's are generally small for all years leading up to firms going private and there is no obvious trend before PE investments. The evolution of the PE owned sample (and the θ_j's), however, shows that executive ownership drops quickly and substantially right after the IPO. Managerial ownership is very high before the IPO and at the time of the IPO, but quickly drops to levels similar to public firms. This suggests that whatever incentives PE firms put in place for managers of the companies they own last only as long as the PE ownership lasts. The firms do not appear to put in place different incentive systems that outlive PE investment.

Figure 7 presents similar time trends for the salary of the highest paid executive. Again, the θ_k's are small, insignificant, and do not exhibit a trend leading up to the PE investment. The PE owned firms again revert to compensation systems that are equivalent to those of public companies, though salary takes longer (three to four years) to reach public company levels than stock ownership did. Again, it appears that any incentive changes made by PE investors are only in place during the PE phase.

Figure 8 confirms that the capital structure effects of private equity (that is, more debt relative to public firms) is also limited to the PE phase. Debt/Asset ratios are much higher immediately before and around the time of the IPO but revert to typical public company levels within a year or two.

Finally, Figure 9 looks at trends in the one operational measure where we found some reason to think PE owned firms perform well – sales per employee. The individual year θ_j's and θ_k's are measured with considerable error, so we do not want to read too much into this graph. But, taking the θ_k coefficients at face value, it appears that PE firms buy firms that are trending down in terms of sales/employee. Also, to the extent that firms emerge from PE ownership with high sales/employee, that effect appears to dissipate over a few years.

Overall, the graphs and the corresponding regressions in this section suggest that, while

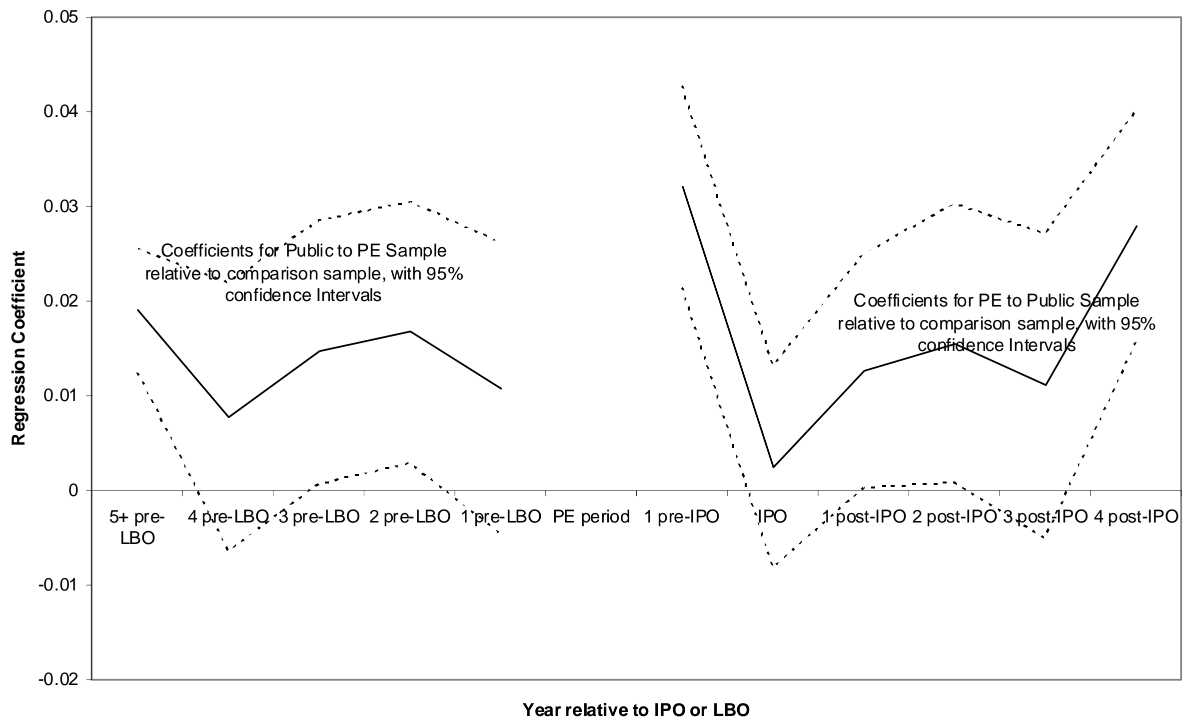

Figure 6: Regression includes the same control variables as column 4 of Table 3.

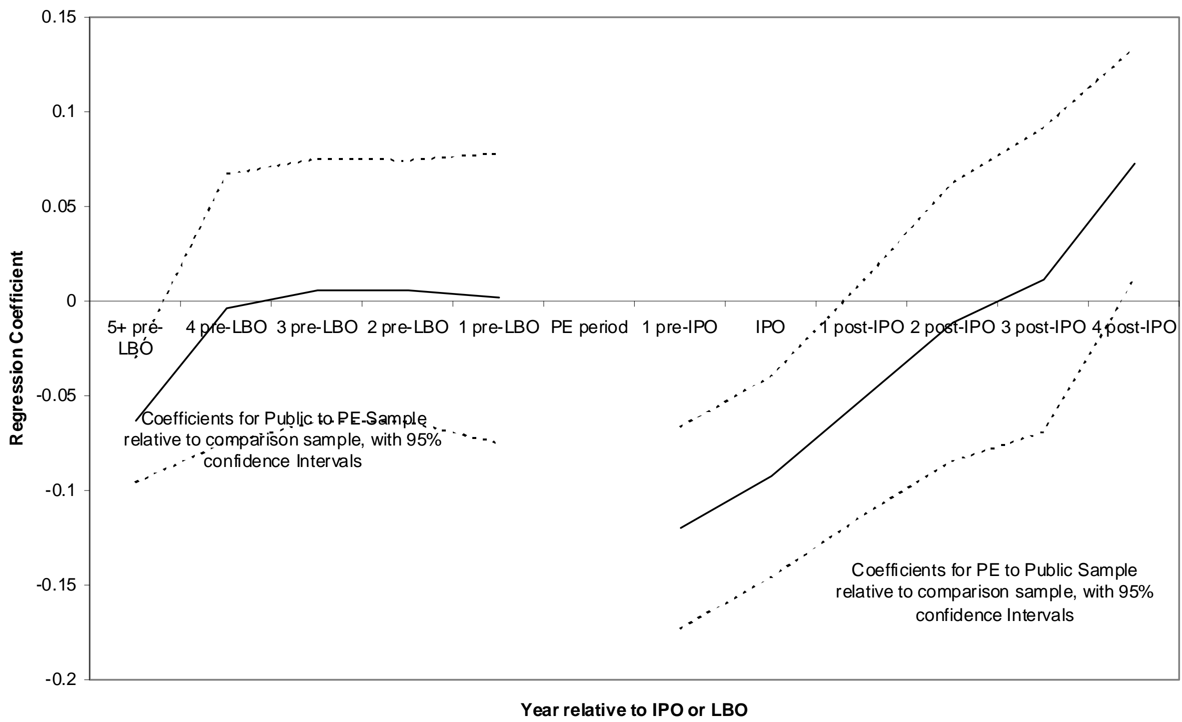

Figure 7: Regression includes the same control variables as column 4 of Table 4.

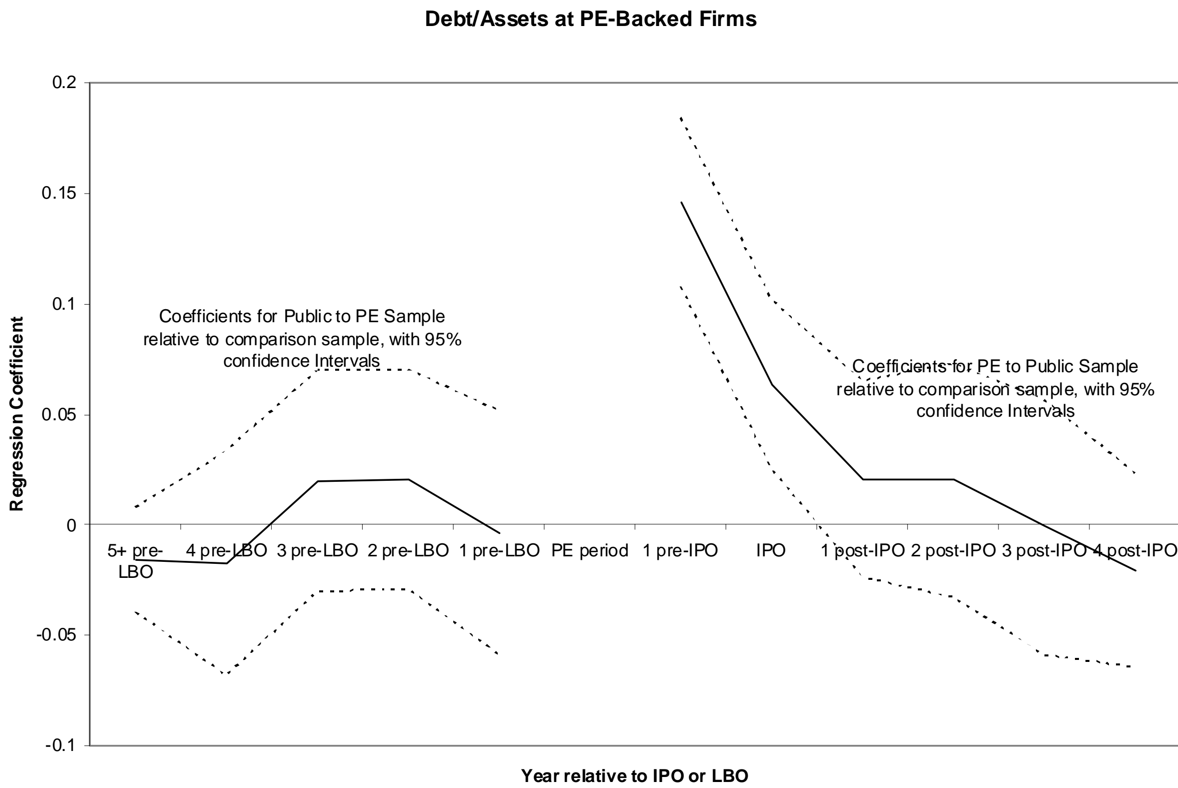

Figure 8: Regression includes the same control variables as column 4 of Table 6.

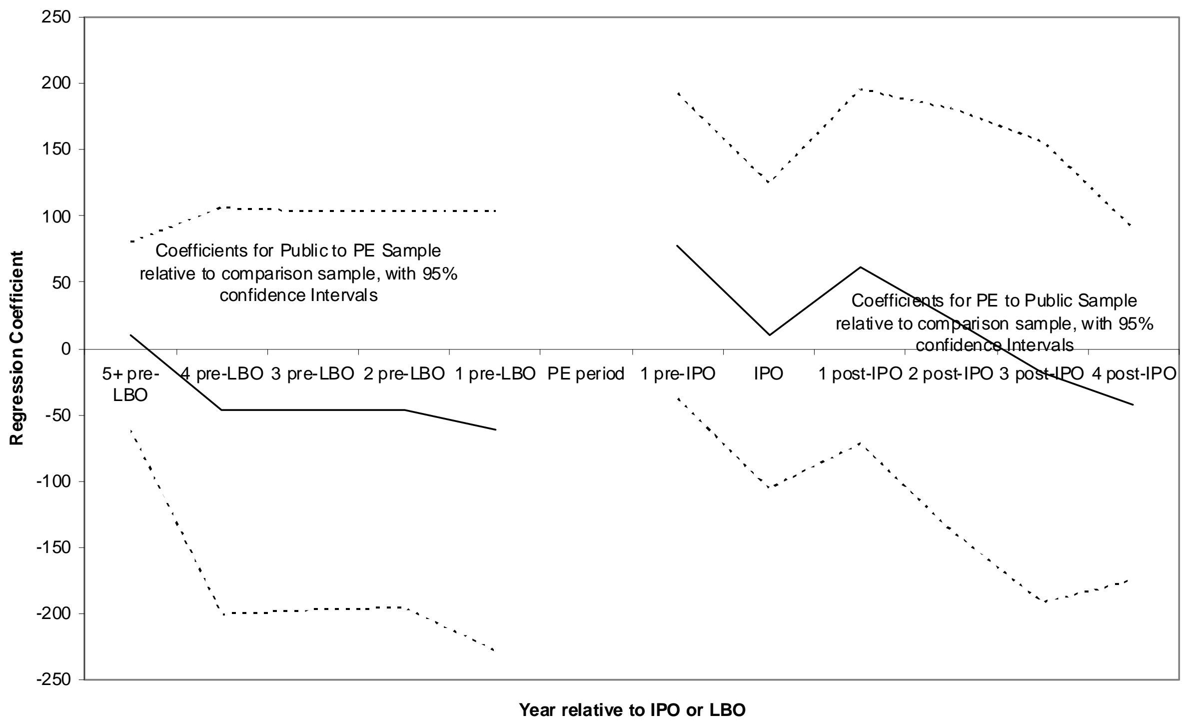

Figure 9: Regression includes the same controls as column 4 of Table 7.

there are some important differences between PE owned firms and comparable public companies, these differences are limited to the period in companies' lives when they are owned by PE firms. We found no evidence that these firms put in place incentive systems or operational efficiency that outlives their ownership.

7 Conclusion

We used data from 187 companies that were owned by private equity investors and subsequently went public to study differences in incentives, capital structure, and operational performance between companies owned by private equity investors and otherwise similar publicly traded companies. We showed that top managers of PE owned firms have substantially higher powered compensation contracts than their counterparts at public companies PE owned firm executives own more, have lower salaries, and get more of their annual cash compensation in variable pay than managers at public firms. Executives at firms that are public but about to get bought by PE firms exhibit no such differences relative to other public firms, suggesting that private firms implement these incentive contracts rather than selecting firms that already use high-powered incentives. We also showed that PE firms hold much more debt than otherwise comparable public firms.

These differences between PE owned and public firms do not extend to most measures of operational efficiency and they are quickly undone when firms return to public ownership. These results raise questions about the value created by private equity. Why are high powered incentive contracts valuable to PE firms if they do not correspond to higher returns and why are public shareholders willing to pay PE firms handsome profits for the firms they take public if these firms quickly take on the characteristics of similar public firms? Have the efficiency advantages of private equity become irrelevant as governance at public companies has improved (as suggested by Holmstrom and Kaplan, 2001)? We hope to address these questions in more detail in future drafts of this paper and related work.

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Table 1. Timing of Ownership Transitions

	Private Equity		Going Private
	Acquisition	IPO	Acquisition
1996	25	9	
1997	20	13	2
1998	21	10	9
1999	28	17	5
2000	9	15	5
2001	10	12	2
2002	13	6	2
2003	10	29	4
2004	8	33	14
2005			30
2006			16
Total	144	144	89

"Private Equity" sample includes firms where CapitalIQ indicates a major investment by a private equity firm ("acquisition") and a subsequent IPO between 1996 and 2005. "Going Private" firms are companies that CapitalIQ indicates had a "going private" transaction in 1998 or later, and that are in the ExecuComp database for at least one year between 1995 and 2006. The year listed is the last year for which public data is available before the firm went private.

Table 2. Summary Statistics

	Private Equity	Going Private	Comparison Sample
Firms	144	89	2555
Firm/Years	662	711	19,768
Assets	$832	$3,728	$14,983
	[335]	[1,091]	[1,733]
	(1,522)	(6,587)	(77,480)
Sales	$671	$2,455	$5,326
	[279]	[1,053]	[1,259]
	(1,324)	(3,561)	(15,854)
Market Capitalization	$874	$3,107	$7,662
	[562]	[902]	[1,735]
	(1,065)	(5,100)	(23,895)
Employees	3,640	18,747	18,800
	[1,602]	[7,100]	[4,803]
	(6,562)	(36,574)	(59,152)
Cash/Assets	6.9%	10.9%	16.2%
	[3.3%]	[6.2%]	[9.0%]
	(10.2%)	(13.0%)	(17.8%)
Executive Ownership	8.76%	5.29%	3.44%
	[5.53%]	[2.26%]	[1.77%]
	(14.77%)	(7.42%)	(5.59%)
Salary	$405K	$688K	$721K
	[$376K]	[$675K]	[$654K]
	($190K)	($312K)	($377K)
Non-Salary Cash Pay	42.4%	35.1%	43.6%
	[46.2%]	[41.1%]	[49.2%]
	(23.1%)	(26.6%)	(24.4%)

See notes to Table 1 for description of sample in each column. "Private Equity" firm characteristics are for year after IPO. "Going Private" firm characteristics are for last full year as a public company. "Comparison Sample" firm characteristics are for 2004 (1,680 observations). Firm characteristic information is in $millions. 'Pay information is for highest paid executive at each firm in a given year. "Non-Salary Cash Pay" is the fraction of an executives cash compensation that is not salary: (total cash compensation - salary)/ total cash compensation. Sample medians are in brackets and standard deviations are in parentheses.

Table 3. Effect of Private Equity on *Fraction of Stock Owned by the Highest Paid Executive*

	(1)	(2)	(3)	(4)	(5)	(6)
PrivateEquity	0.0476	0.0437	0.0343	0.0326	0.0275	0.0226
	(0.0055)	(0.0054)	(0.0053)	(0.0052)	(0.0066)	(0.0064)
GoingPrivate	0.0188	0.0100	0.0135	0.0094	0.0026	-0.0008
	(0.0070)	(0.0068)	(0.0067)	(0.0066)	(0.0118)	(0.0113)
Log(Assets)			-0.0084	-0.0102	-0.0085	-0.0083
			(0.0005)	(0.0008)	(0.0008)	(0.0012)
Cash/Assets			0.0131	0.0139	0.0102	0.0138
			(0.0028)	(0.0031)	(0.0037)	(0.0042)
Log(Sales)			-0.0036	-0.0027	-0.0023	-0.0034
			(0.0008)	(0.0010)	(0.0011)	(0.0013)
Log(Employees)			0.0036	0.0038	0.0028	0.0031
			(0.0005)	(0.0007)	(0.0010)	(0.0011)
2-digit SIC dummies	no	yes	no	yes	no	yes
Sample	All	All	All	All	Drop Largest	Drop Largest
R^2	0.0087	0.0744	0.0755	0.1241	0.0484	0.1366
Observations	20,001	20,001	20,001	20,001	9,680	9,680

Each regression includes dummies for the years 1995 through 2006.

Table 4. Effect of Private Equity on *Log(Salary of Highest Paid Executive)*

	(1)	(2)	(3)	(4)	(5)	(6)
PrivateEquity	-0.4474	-0.4163	-0.1338	-0.1188	-0.1024	-0.0917
	(0.0413)	(0.0390)	(0.0286)	(0.0271)	(0.0328)	(0.0312)
GoingPrivate	-0.0216	-0.0119	0.0276	0.0113	0.0096	-0.0141
	(0.0526)	(0.0494)	(0.0362)	(0.0341)	(0.0582)	(0.0547)
Log(Assets)			0.0756	0.1015	0.1008	0.1201
			(0.0026)	(0.0040)	(0.0037)	(0.0056)
Cash/Assets			-0.0109	-0.0072	0.0624	0.0638
			(0.0150)	(0.0160)	(0.0185)	(0.0201)
Log(Sales)			0.0999	0.0970	0.0970	0.0888
			(0.0042)	(0.0050)	(0.0055)	(0.0062)
Log(Employees)			0.0509	0.0362	0.0124	0.0164
			(0.0029)	(0.0036)	(0.0049)	(0.0055)
2-digit SIC dummies	no	yes	no	yes	no	yes
Sample	All	All	All	All	Drop Largest	Drop Largest
R^2	0.0745	0.1931	0.5626	0.6163	0.4032	0.4819
Observations	19,998	19,998	19,998	19,998	9,680	19,680

Each regression includes dummies for the years 1995 through 2006.

Table 5. Effect of Private Equity on *Variable Pay Share of Cash Compensation*

	(1)	(2)	(3)	(4)	(5)	(6)
PrivateEquity	0.0430	0.0464	0.1346	0.1259	0.1235	0.1122
	(0.0206)	(0.0200)	(0.0194)	(0.0190)	(0.0217)	(0.0213)
GoingPrivate	-0.0163	-0.0015	0.0155	0.0095	0.1186	0.1007
	(0.0261)	(0.0253)	(0.0245)	(0.0239)	(0.0385)	(0.0374)
Log(Assets)			0.0228	0.0113	0.0171	0.0158
			(0.0018)	(0.0028)	(0.0025)	(0.0038)
Cash/Assets			0.1120	0.1105	0.1316	0.1246
			(0.0102)	(0.0112)	(0.0122)	(0.0137)
Log(Sales)			0.0494	0.0546	0.0617	0.0573
			(0.0028)	(0.0035)	(0.0036)	(0.0042)
Log(Employees)			-0.0203	-0.0119	-0.0261	-0.0209
			(0.0020)	(0.0025)	(0.0033)	(0.0037)
2-digit SIC dummies	no	yes	no	yes	no	yes
Sample	All	All	All	All	Drop Largest	Drop Largest
R^2	0.0485	0.1209	0.1629	0.2128	0.1124	0.1765
Observations	20,000	20,000	20,000	20,000	9,680	9,680

Variable pay share of cash compensation is defined as (total cash compensation - salary) / (total cash compensation). Each regression includes dummies for the years 1995 through 2006.

Table 6. Previous Findings on the Impact of Buy-Outs on Profitability and Productivity

	Operational Performance
Ravenscraft and Scherer (1987)	3% decrease in operating income/assets
Kaplan (1989)	20% increase in operating income/assets, and >28% increase in net cash flow/sales
Lichtenberg and Siegel (1990)	6% increase in TFP
Muscarella and Vetsuypens (1990)	Increase in operating income/assets
Smith (1990)	3-6% increase in operating income/assets
Wright et al (1992)	Significant increase in profit
Wright et al (1997)	1-3% increase in ROA
Desbrieres and Schatt (2002)	Decrease in operating income/assets
Harris et al (2005)	>70% increase in TFP
Cressy et al (2007)	5% increase in ROA
Vinten (2007)	4% decrease in ROA
Guo, Hotchkiss and Song (2008)	12% increase in EBITDA/sales
Meuleman et al (2008)	Insignificant change in ROCE
Weir, Jones and Wright (2008)	Mixed evidence on ROCE, and insignificant change in ROE

Table 7. Effect of Private Equity on *(All Debt) / (Total Assets)*

	(1)	(2)	(3)	(4)	(5)	(6)
PrivateEquity	0.1083	0.1385	0.1483	0.1431	0.1306	0.1155
	(0.0233)	(0.0208)	(0.0203)	(0.0197)	(0.0280)	(0.0275)
GoingPrivate	0.0102	0.0478	0.0290	0.0359	-0.0184	-0.0072
	(0.0296)	(0.0263)	(0.0257)	(0.0248)	(0.0498)	(0.0482)
Log(Assets)			0.0857	0.0281	0.0883	0.0152
			(0.0019)	(0.0029)	(0.0032)	(0.0049)
Cash/Assets			-0.4452	-0.3810	-0.4773	-0.4047
			(0.0106)	(0.0116)	(0.0158)	(0.0177)
Log(Sales)			-0.0352	-0.0004	-0.0466	-0.0049
			(0.0029)	(0.0036)	(0.0047)	(0.0054)
Log(Employees)			-0.0118	0.0024	-0.0124	-0.0043
			(0.0021)	(0.0026)	(0.0042)	(0.0048)
2-digit SIC dummies	no	yes	no	yes	no	yes
Sample	All	All	All	All	Drop Largest	Drop Largest
R^2	0.0015	0.2249	0.2536	0.3117	0.2078	0.2705
Observations	19,998	19,998	19,998	19,998	9,678	9,678

Each regression includes dummies for the years 1995 through 2006.

Table 8. Effect of Private Equity on *Sales Per Employee*

	(1)	(2)	(3)	(4)	(5)	(6)
PrivateEquity	32.93	83.70	123.26	125.71	144.19	150.44
	(71.71)	(68.26)	(71.56)	(68.58)	(109.43)	(107.46)
GoingPrivate	-167.22	-67.60	-139.77	-61.77	-101.39	-150.05
	(91.17)	(86.33)	(90.54)	(86.26)	(194.39)	(84.99)
Log(Assets)			57.96	26.53	161.44	118.44
			(3.64)	(4.08)	(9.22)	(11.61)
Cash/Assets			-26.34	76.69	-142.42	16.32
			(36.49)	(39.07)	(59.05)	(65.38)
2-digit SIC dummies	no	yes	no	yes	no	yes
Sample	All	All	All	All	Drop Largest	Drop Largest
R^2	0.0088	0.1222	0.0235	0.1240	0.0496	0.1200
Observations	20,001	20,001	20,001	20,001	9,680	9,680

Each regression includes dummies for the years 1995 through 2006.