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Sources of Value Gains in Minority Equity Investments by Private Equity Funds: Evidence from Block Share Acquisitions

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Sources of Value Gains in Minority Equity Investments by Private Equity Funds: Evidence from Block Share Acquisitions

ABSTRACT

Using block share acquisitions made by private equity (PE) funds, we examine the sources of value gains in PE minority equity investments. We find that compared with non-PE acquirers, PE acquirers are more likely to place representatives with finance experience or those with experience in the target's industry on the target's board when the need for target oversight and/or advice is higher. The targets in PE acquisitions, particularly poorly performing targets, targets with high R&D intensity, and targets with PE-appointed directors who have experience in the target's industry, realize both higher announcement returns and better post-acquisition operating performance than do targets in non-PE acquisitions. These findings suggest that the governance and operational engineering that PE acquirers apply to their targets constitutes important sources of value creation in PE minority equity investments.

JEL Classification: G2, G3, G34

Keywords: Private equity; Minority equity investment; Governance engineering; Operational engineering; Board of directors; Monitoring and advisory roles

1. Introduction

Minority equity investments by private equity (PE) funds have become an important part of block share acquisitions in the U.S. over the past two decades. For example, PE minority equity investments account for almost 11% of our sample of block share acquisitions covered in Thomson Financial's Security Data Corporation (SDC) Platinum database from 1990 to 2006. Consistent with this observation, Kaplan and Strömberg (2009) also argue that given PE funds' accumulated experience in minority equity investments and firms' increased demand for such investments, PE funds are increasingly likely to take minority equity positions in their portfolio companies, rather than buying the target companies' entire equity. In spite of this growing importance of PE minority equity investments, we know relatively little about the role of PE block acquirers as monitors/advisors and their effect on firm performance. In particular, there is little evidence concerning how PE funds' motives and the sources of value gains differ between their minority equity investments and majority equity investments.¹

This study seeks to shed light on the sources of value gains in PE funds' minority equity investments by using a sample of partial block acquisitions of publicly held targets (in which PE investors acquire at least 5% but less than 50% of the target's outstanding shares) in the U.S. from 1990 to 2006. We focus on acquisitions of block shares exceeding 5% ownership rather than those of shares below 5% ownership because more detailed information on deal characteristics and post-acquisition governance activities is publicly available for these block acquisitions. Thus, although block acquirers in our study may not be able to exert a full control over the firms as in buyout transactions, they are expected to hold enough large ownership in the firms with strong monitoring incentives.² Further, block share acquisitions represent a setting where acquirers have strong incentives to monitor and advise target managers, so their role as monitors/advisors is expected to be magnified.

¹ For studies that examine the sources of value gains in PE funds' majority equity investments, see Kaplan (1989a, 1989b), Lichtenberg and Siegel (1990), Smith (1990), Harris, Siegel, and Wright (2005), Bergström, Grubb, and Jonsson (2007), Barger et al. (2008), Boucly, Sraer, and Thesmar (2008), Acharya, Kehoe, and Reynier (2009), Acharya et al. (2010), and Guo, Hotchkiss, and Song (2011).

² In our study, we use the terms, buyout and majority acquisitions, interchangeably.

Consistent with the view that governance and operational engineering that PE funds apply to their portfolio firms constitutes important sources of value creation in PE investments (Jensen, 1989; Kaplan, 1991; Strömberg, 2007; Kaplan and Strömberg, 2009), we find that their governance and operational engineering activities are key channels through which they create value in their minority equity investments. Specifically, we find that, compared to non-PE block acquirers, PE block acquirers purchase a larger percentage of target shares and hold these target shares for a longer period of time. PE acquirers are also more likely to place representatives on the target's board, and these representatives are more likely to sit on governance-related board committees such as compensation, executive, nominating, and stock option committees. These findings suggest that PE acquirers actively monitor target management and their governance engineering activities are an important source of value gains in their minority equity investments.

We also find that compared to directors appointed by non-PE acquirers, those appointed by PE acquirers are more likely to have finance experience. Such appointments are more likely to occur when the target has poorer stock performance or when it has more pronounced agency problems. The PE acquirer-appointed directors with finance experience are more likely to replace poorly performing management than other directors, suggesting more active monitoring by PE acquirers when the need for target oversight is greater. Moreover, we find that PE acquirers are more likely to place representatives with experience in the target's industry on the target's board when the target has poorer operating performance (e.g., lower ROA or lower profit margin) or when it has higher R&D intensity. These findings suggest that PE funds use their operating expertise to create value in portfolio companies, particularly when these companies have greater advisory needs, and that the board of directors is an important channel through which PE funds achieve such an objective (Gadiesh and MacArthur, 2008; Kaplan and Strömberg, 2009).

Finally, we find that targets in PE acquisitions, particularly poorly performing targets, targets with high R&D intensity, or targets whose boards have representatives from their PE acquirers, experience both higher abnormal announcement returns and better post-acquisition operating performance than do

targets in non-PE acquisitions. The value creation in PE block acquisitions is also more pronounced when PE-appointed directors have experience in the target's industry. Thus, targets benefit more when PE acquirers bring more oversight and better advice to them.³

Overall, these results suggest that as in PE majority equity investments, the governance and operational engineering changes that PE acquirers apply to their targets are important sources of value gains in PE minority equity investments. However, we find that the changes in incentive-based CEO compensation and the changes in leverage are not directly related to value creation in PE minority equity investments, suggesting that financial engineering plays a less important role in PE minority equity investments than in PE majority equity investments.

By evaluating the sources of value gains in PE minority equity investment, we extend the existing literature in several important ways. First, our study expands the understanding on minority equity investments by PE funds. While prior literature mainly focuses on PE funds' buyout transactions, several recent papers examine their minority equity investments. For example, Cornelli, Kominek, and Ljungqvist (2013) explore monitoring activities of PE funds in firms in 19 transition economies in Central and Eastern Europe and Central Asia from 1993 to 2005 following the collapse of the Soviet Union.⁴ Although their sample includes both majority and minority investments of PE funds, 79% of their samples are minority equity investments. They show that directors PE funds appoint to the boards tend to update their beliefs about CEO ability relying more on soft information than on hard information when firing incompetent CEOs, which leads to improvement in firm performance. Mietzner and Schweizer (2014) investigate block share acquisitions by hedge funds and PE funds in Germany. They show that for both types of block share acquisitions, the announcement returns are significantly positive but post-

³ An alternative explanation for these findings is that PE acquirers are more likely to choose targets for which their governance and operational engineering expertise can add value. According to this explanation, our results can be driven by PE acquirers' ability to choose targets rather than by their governance and operational engineering activities. Section 7 addresses this selection issue using the Heckman (1979) selection model.

⁴ To construct their data, Cornelli, Kominek, and Ljungqvist (2013) use monitoring reports of the European Bank of Reconstruction and Development (EBRD) on firms in its private equity program. To help establish a PE industry in the transition economies, the EBRD invests in funds managed by PE fund investors and prepares the monitoring reports that include detailed hard and soft information regarding firms funded by the program.

acquisition long-term stock performance is significantly negative. In addition, Cronqvist and Fahlenbrach (2009) examine the effects of block ownership on corporate policies by taking into account the heterogeneity in large shareholders' beliefs, skills, and preferences and find strong influence of large shareholders, especially activist, pension fund, corporate, individual, and PE blockholders, on firm policies.⁵ Extending this line of literature, we investigate whether PE funds' partial block share acquisitions in the U.S. affect target firms' value and operating performance and show that PE funds create value in their portfolio companies without having full control. In particular, we extend prior studies by examining the sources of value gains in PE minority investments and present evidence on the importance of the experience of PE fund representatives on the board.

Second, our study expands the literature on sources of value creation by PE investments. Previous literature focuses largely on LBOs to examine the sources of value gains in PE investments and finds mixed evidence. For example, Kaplan (1989a, 1989b), Smith (1990), and Acharya, Kehoe, and Reyner (2009) show that financial engineering is an important source of value creation in buyout transactions in which PE funds acquire full control of the target, and Kaplan (1989b) identifies tax benefits as a source of value creation in such transactions. On the other hand, Bargaron et al. (2008), Acharya et al. (2010), and Guo, Hotchkiss, and Song (2011) argue that performance improvements in PE funds' portfolio companies are not a result of PE funds creating value but rather of PE funds choosing to invest in those companies whose operating performance is likely to improve, that is, of PE investors having superior information. We find that the industry and operating expertise that PE funds bring to their portfolio companies constitutes important sources of value creation in PE minority equity investments, supporting Kaplan and Strömberg's (2009) conjecture that PE funds' capabilities in operational engineering play an important role in PE minority equity investments. We also find that CEO equity ownership and incentive-based

⁵ There are some prior studies on the effect of VC funds in public companies. For example, Dai (2007) shows that VCs gain substantial ownership, request board seats, and often keep their stake in the publicly listed firms while hedge funds rarely join the board of directors in their portfolio firms and typically cash out their positions in the firms. Dai (2007) further finds that stock performance of VC-invested firms is significantly better than hedge fund-invested firms both in the short run and in the long run. Chaplinsky and Haushalter (2010) show that VCs tend to invest in public companies to leverage their experience and capitalize on perceived undervaluation of the issuer's equity shares. We present a discussion of these issues in Section 7.2.

CEO compensation (i.e., the fraction of stock and option awards in total CEO compensation) increase significantly in PE target firms after the block share acquisitions. However, these increases are not significantly related to target announcement returns or post-acquisition operating performance changes, suggesting that financial engineering is not an important source of value creation in PE minority equity investments. Moreover, different from PE funds' buyout transactions of entire firms, we do not find any evidence of leverage increase in targets after PE minority investments. Thus, our findings highlight both similarities and differences in the sources of value gains between PE full and partial acquisitions.

Third, our study provides new evidence on the role of PE funds as directors on their portfolio firms' boards (Gertner and Kaplan, 1996; Cornelli and Karakas, 2008; Acharya et al., 2010; Cornelli, Kominek, and Ljungqvist, 2013) by showing that directors appointed by PE acquirers play both monitoring and advisory roles in their portfolio firms.

Fourth, our study contributes to the growing literature on the role of institution experience in its investments and monitoring. Several recent studies find that firms financed by experienced venture capitalists perform well (Sørensen, 2007; Bottazzi, Da Rin, and Hellmann, 2008) and that targets of hedge fund activists with more experience outperform those of other activists (Boyson and Mooradian, 2012). We extend this line of literature by investigating the effects of PE-appointed experienced directors on target performance and governance activities.

Finally, we complement the literature on block share acquisitions by investigating the role of PE acquirers. Prior studies examine the monitoring and advisory roles performed by various types of institutional blockholders such as corporate investors (Allen and Philips, 2000), hedge funds (Brav et al., 2008; Klein and Zur, 2009), and local institutional investors (Kang and Kim, 2008), and show that these block acquirers perform an important role in establishing value-enhancing corporate strategies and improving firm performance. Our study sheds further light on the importance of active blockholders in increasing firm value by documenting various roles performed by PE block shareholders.⁶

⁶ In the next section, we discuss how block share acquisitions by PE funds are different from those by other types of institutional investors.

We acknowledge a limitation of our study since our sample includes only block share acquisitions but not private placements. By comparing private placements with block trades, Barclay, Holderness, and Sheehan (2007) find a significant difference in abnormal returns between block trades and private placements. They also find that block-trade purchasers are more likely to become active in those firms that remain public. To the extent that large investors in private placements are usually passive investors while block acquirers tend to be active investors, our results based on block share acquisitions could overestimate the monitoring role of PE funds since we do not include the cases in which PE funds acquire significant ownership stakes through private placements.

The remainder of the paper proceeds as follows. In Section 2, we review the literature on PE investments and discuss the main testable implications for the sources of value gains in PE minority equity investments. In Section 3, we describe the data and summary statistics. Section 4 reports univariate results for PE funds' governance, operational, and financial engineering activities in their portfolio companies. In Section 5, we analyze abnormal announcement returns and long-term operating performance for targets. Section 6 examines the determinants of board representation by acquirers and the likelihood of nonroutine top management turnover in targets. In Sections 7 and 8, we present results from the robustness tests and concluding remarks, respectively.

2. Institutional Background, Literature Review, and Testable Implications

2.1. Differences between PE and non-PE equity investments

Jensen (1989) argues that the PE fund is an organizational form that can improve the operations of firms through high leverage and powerful incentives. There are several reasons why PE funds are expected to perform the role of an effective monitor for their portfolio firms. First, PE fund managers have strong incentives to increase their portfolio firms' performance because their pay is closely tied to their fund performance. For instance, similar to hedge fund managers, PE fund managers typically earn 20% of the fund profits as part of their compensation, which is quite different from the compensation structure of other types of institutional investors such as mutual funds and pension funds.

Second, PE funds tend to hold a larger ownership stake in their portfolio firms for a longer period than other types of institutional investors. For example, other institutional investors such as mutual funds cannot hold significant ownership in a single firm due to the legal requirement to maintain diversified portfolios and also tend to hold stocks for a short period.⁷ In contrast, PE funds have a fixed investment horizon, which typically lasts for ten years with an option to extend up to three more years. They usually invest in firms in the first five years and receive the returns in the remaining years. Therefore, by concentrating their capital and resources in a small number of firms, PE funds can have sufficient time and influence to make substantial value-increasing changes in their portfolio firms and improve these firms' long-run performance.

Although PE funds have similar characteristics as hedge funds in several aspects (e.g., organization structures and regulatory controls), they are different in their investment strategies and motivations. First, PE funds typically acquire a larger equity stake in their portfolio firms than hedge funds and hold more concentrated portfolios. For example, in our sample of block share acquisitions, we find that the median initial (maximum) equity ownership held by PE funds in their portfolio firms is 11.7% (14.7%). In comparison, Brav et al. (2008) report that the median initial (maximum) equity ownership by hedge funds in their sample of Schedule 13D filings is only 6.3% (9.1%).

Second, the PE funds' investment horizon tends to be longer than that of hedge funds. According to Kaplan (1991) and Strömberg (2007), the median length of PE ownership after buyouts is 6.82 years and 9 years, respectively. In our sample of minority equity investments, 45% of PE funds hold their block ownership longer than three years. In comparison, hedge funds are generally known to invest in more liquid assets and often seek for short-term gains. For example, Brav et al. (2008) report that the median investment duration of hedge funds in their Schedule 13D filing sample is about one year. This difference

⁷ For example, according to SEC Diversification Rules, investment management companies cannot own more than 10% of a publicly traded stock and cannot invest more than 5% of their fund assets in any one security. These two specific rules also apply to most of mutual funds. In addition, Cohen, Polk, and Silli (2010) argue that vague standards such as the "Prudent man" rule make mutual funds more diversified than other types of institutional investors. They show that mutual fund managers are more likely to face investor litigation when they manage more concentrated funds that perform poorly.

in the investment horizon is attributable to their different funding structures (Mietzner and Schweizer (2014)). PE funds typically have a specific lifetime in which they do not concern about capital withdrawals and thus focus on long-term performance, whereas hedge funds are usually open-ended and would face capital withdrawals when their short-term performance is poor.

Third, while hedge funds pursue various different strategies in making profits, the strategy of PE funds is more homogenous and typically focuses on improving firm value by monitoring and advising target firms. PE funds are frequently involved in their portfolio firms' operations by working closely with firms' management and providing operational expertise specific to the firm's industry. For example, Lerner (1995) shows that venture capitalists often place their representatives onto the boards of portfolio firms and that their governance activities are more intense when the need for oversight is greater. In comparison, hedge funds pursue various different strategies depending on their objectives and thus not all hedge funds are expected to play important monitoring and/or advisory roles. For example, some hedge funds focus on arbitrage strategies such as convergence trading and risk arbitrage, while there are also other hedge funds focusing on strategies that create value by monitoring firms (Brav et al., 2008; Klein and Zur, 2009).

2.2. Differences between PE minority and majority equity investments

In our paper, deals are classified as minority acquisitions if less than 50% is acquired, and as majority acquisitions if greater than or equal to 50% is acquired. We classify even the acquisitions in which share ownership purchased is below 100% as majority acquisitions assuming that the buyers in these acquisitions have strong intentions to take targets private as controlling shareholders. Several studies document that PE funds create value in buyout transactions in which they acquire controlling ownership (Kaplan, 1989a, 1989b; Smith, 1990; Acharya, Kehoe, and Reyner, 2009). However, it is not clear whether PE funds in minority equity investments also create value and whether the sources of value gains in these investments are the same as those in PE buyout transactions. For instance, PE funds may decide to take minority positions in their portfolio firms mainly because they do not have strong

incentives to exert influence over these firms or because it is too costly for them to buy an entire firm. Alternatively, PE funds lack experiences in targets' industries and thus to reduce their risk, they may choose to purchase minority stakes. It is also possible that PE funds take minority positions simply to diversify their investments.

To the extent that the optimal level of monitoring by shareholders increases with the size of their equity investments (Shleifer and Vishny, 1986), PE funds in minority equity investments are expected to have weaker incentives to monitor firms than those in majority equity investments. Specific channels through which PE funds improve firm performance can be also different between these two types of investments. For example, in majority equity investments, PE firm's operating partners typically assume the chairman position in targets, suggesting that they can exert full control over firms' major operational and strategic decisions such as capital structure and managerial compensation changes. In contrast, in minority equity investments, the role of PE firms is limited to serving as an operational advisor or a monitor rather than controlling firms' all major operational and strategic decisions.⁸

However, it is also possible that PE funds, regardless of the levels of their equity ownership, have strong incentives to monitor/advise their portfolio firms by applying similar governance, operational, and/or financial engineering changes. If this is the case, to the extent that PE funds can exert sufficient influence to make such changes with their minority ownership, we expect PE funds to create significant value gains in their minority equity investments and the sources of value gains in these investments to be similar to those in PE majority equity investments. .

Thus, whether the monitoring/advising incentives of PE funds in minority equity investments are different from those of PE funds in majority equity investments and whether the sources of value gains in these two types of investments are different remain important empirical questions.

2.3. Sources of value gains in minority equity investments by private equity funds

⁸ Kaplan and Strömberg's (2009) conjecture that PE funds' capabilities in operational engineering play an important role in PE minority equity investments.

Previous literature shows that PE majority equity investments are generally associated with an improvement in firm performance. For instance, for a sample of going-private deals in the U.S. during the 1980s, Kaplan (1989b) finds a significant increase in both post-buyout profit margin (EBITDA/sales) and post-buyout cash flow to sales. Lichtenberg and Siegel (1990) also find a significant improvement in post-buyout total factor productivity. Harris, Siegel, and Wright (2005), Bergström, Grubb, and Jonsson (2007), and Boucly, Sraer, and Thesmar (2008) confirm such improvements in post-buyout operating performance and productivity for going-private deals in Europe.⁹ Jensen (1989) and Kaplan and Strömberg (2009) argue that such value creation mainly comes from PE acquirers' governance engineering, operational engineering, and/or financial engineering activities. In this section we briefly describe several testable implications for the effects of such activities on value creation in PE minority equity investments.

2.3.1. Governance Engineering

Kaplan and Strömberg (2009) refer to governance engineering as the way that PE funds control the boards of their portfolio companies and monitor these companies' managerial performance. For instance, Gertner and Kaplan (1996) show that the boards of reverse LBO firms are smaller and control larger equity stakes. Cornelli and Karakas (2008) examine board changes following public-to-private transactions in U.K. and find that directors from PE funds are most active in challenging transactions and CEO turnover is high for firms backed by private equity funds. To investigate whether the governance engineering that PE funds apply to their portfolio companies creates value in their minority equity investments, we focus on two specific types of governance activities: board appointments and nonroutine top executive turnover.¹⁰

⁹ However, Acharya et al. (2010) and Guo, Hotchkiss, and Song (2011) show that post-buyout operating improvements are only modest for post-1980s LBOs in the U.S. and U.K.

¹⁰ Previous studies show that outside directors on the boards play an instrumental role in internal governance. Weisbach (1988) and Byrd and Hickman (1992), for example, show that independent outside directors protect interests of shareholders when there are agency problems between managers and shareholders. Denis, Denis, and Sarin (1997), Bethel, Liebeskind, and Opler (1998), and Kang and Shivdasani (1995) argue that removal of the top

We expect that PE acquirers are more likely to appoint representatives onto the target's board than non-PE acquirers, particularly when the need for target oversight is greater, such as when the target performs poorly or has more pronounced agency problems. To the extent that the directors appointed by PE acquirers perform a value-enhancing monitoring function, we also expect targets' abnormal announcement returns and post-acquisition long-term operating performance to be positively related to board membership of PE funds in targets, with these relations more evident when the need for target oversight is greater. We capture poor target performance using indicators for low return on assets (ROA), for low profit margin, and for low stock performance. We capture a target's agency problems using an indicator for high cash flow and low Tobin's q (Jensen, 1986).

2.3.2. Operational Engineering

Operational engineering refers to the industry and operating expertise that PE funds bring to their portfolio companies to create value (Kaplan and Strömberg, 2009). Gadiesh and MacArthur (2008) and Kaplan and Strömberg (2009) argue that PE funds can use their industry knowledge to identify attractive investments and to develop and implement value-creation plans for their portfolio companies. Acharya et al. (2010) further show that PE-appointed directors' operating expertise can be an important channel through which PE funds create value for their portfolio companies in PE majority equity investments.

To evaluate whether the operational engineering is an important source of value gains in PE funds' block share acquisitions, we use PE-appointed directors' past work experience as a key measure of operational engineering capability. Specifically, we focus on PE-appointed directors' work experience in the target's industry and in the finance area. We expect that PE funds are more likely to appoint representatives with industry (finance) experience onto the target's board than non-PE acquirers, and that such appointments lead to higher abnormal announcement returns and better post-acquisition operating performance for targets than the appointments of other types of directors. To the extent that PE-appointed

executive is one of the most aggressive actions taken in the course of corporate governance and show that outside blockholders play an important role in top executive turnover.

directors' past work experience is more valuable when targets have greater advisory needs, we also expect these effects to be more pronounced when targets experience poor performance, or when they engage in high R&D activities. We measure a target's R&D activities using an indicator for high R&D intensity.

2.3.3. Financial Engineering

Jensen (1989) and Kaplan (1989a, 1989b) argue that one of the key financial engineering changes that PE funds can make in their portfolio companies is to motivate the managers to maximize shareholder wealth. For example, by increasing top executives' pay-for-performance sensitivity, PE funds can provide improved incentives to managers and thus increase the target's operating performance and firm value.¹¹ Another typical financial engineering strategy by PE funds is to increase targets' leverage. Jensen (1986) argues that high leverage reduces managerial discretion over the allocation of the free cash flow and thus induces firms to make efficient investment decisions. High debt also generates large interest deductions, which result in more corporate tax savings.¹²

To the extent that PE funds' incentives to use these types of financial engineering also exist in their minority equity investments, we expect improved management incentives and increased debt to play an important role in explaining gains in PE funds' block acquisitions. Target management's incentive changes are measured using the following two variables: the change in equity ownership held by target CEOs from year -1 to year +3 (relative to the block share acquisition year) and the change in incentive-based compensation (stock and option awards to the CEO) as a fraction of total CEO compensation from year -1 to year +3. We measure changes in targets' leverage as the change in the ratio of total debt to total

¹¹ Supporting this view, Kaplan (1989b) finds that for a sample of 76 management buyouts (MBOs) of public companies completed between 1980 and 1986, the equity holdings of the management team increase from a median of 5.88% before the MBO to 22.63% after the MBO. Likewise, Acharya et al. (2010) document a median CEO (management team) equity holding of almost 6% (15%) for a sample of 66 large buyouts in the U.K. from 1996 to 2004, and Kaplan and Strömberg (2009) find similar figures for a sample of 43 LBOs in the U.S. from 1996 to 2004.

¹² Kaplan (1989a) shows that buyout companies experience a reduction in their post-buyout capital expenditures. He also finds that the value of the tax benefits for his sample of buyout companies varies from a lower bound estimate of 21% to an upper bound estimate of 143% of the premium paid to pre-buyout shareholders.

assets from year -1 to year +3. We expect that targets' acquisition announcement returns and post-acquisition operating performance are positively related to these change variables.

3. Data and Summary Statistics

3.1. Data

Our sample consists of domestic block share acquisitions between 1990 and 2006. We end the sample period in 2006 because we measure post-acquisition governance activities, post-acquisition operating performance, changes in target firms' management incentives using data up to three years after the block acquisition. We begin with the 13,364 partial acquisitions available on SDC database between 1990 and 2006, where partial acquisitions are those in which the acquirer initially holds less than 5% of a target firm's outstanding shares and then purchases more than 5% but less than 50% of the firm's outstanding shares. We drop block acquisitions in which acquirers end up holding more than 50% of target equity such as the cases in which acquirers engage in multiple minority acquisitions that results in more than 50% of target equity. We then exclude deals in which 1) the acquirer is an Employee Stock Ownership Plan or an Employee Benefits Trust, 2) the acquirer is a group of companies, individuals, or investment firms (i.e., more than one acquirer), since in such cases the identity of the acquirer that initiates post-acquisition governance activities in the targets is not clear, and 3) stock returns and financial data for targets are not available in CRSP and COMPUSTAT, respectively. Finally, we require that a block share purchase's initial public announcement date be available in *Factiva*, where the initial public announcement date is the date when the acquisition news announcement first appears in this publication. These restrictions result in a final sample of 1,132 targets.¹³

We obtain data on top executives, boards of directors, and managerial ownership of target firms from proxy statements and annual reports. These sources are examined during the holding period of block ownership up to three years after the acquisition. We define the holding period as the period from the date

¹³ Holderness (2009) shows that the mean (median) ownership held by outside blockholders in U.S. publicly held firms is almost 11% (7%) of total ownership.

when the investor announces the acquisition of a target firm's block equity to the date when it decreases its holding in the target to less than 5%.¹⁴ If a firm is delisted within three years, we use the time horizon from the announcement date to the delisted date as the holding period.

There is no standard definition of PE fund per se, so its definition varies widely among academics and in practice. While the narrowest definition of PE funds refers to buyout funds only (Ljungqvist and Richardson, 2003a; Jensen, 1989), their broadest definition includes nearly all types of private investment funds such as buyout, venture capital, mezzanine, distressed, and real estate funds.

In this paper we define PE funds as funds that are classified as either buyout funds or venture capital funds. First, we attempt to define PE funds using fund level information. If we are not able to define PE funds at the fund level, we refer to their holding companies or general partners, i.e. private equity firms, and define PE funds as funds that belong to holding companies or general partners that consist mainly of buyout funds, venture capital funds, or both. In this case, we make sure that PE investments are the holding company's or general partner's main business by imposing the requirement that PE investments account for at least 50% of their business. For example, Goldman Sachs engages in both investment banking and PE businesses. However, since assets under management by its private equity division amount to less than 50% of its total assets under management, we do not define Goldman Sachs as a PE fund.

The rationale for restricting PE funds to those with either of these two fund types is as follows. First, buyout and venture capital funds are known to be the main sectors of the PE industry. For example, according to Ljungqvist and Richardson (2003a, 2003b), buyout and venture capital funds account for more than 97.5% of PE funds recorded in the Venture Economics database.¹⁵ Second, our definition of PE

¹⁴ In 35 transactions, acquirers eventually acquire more than 50% of the target's equity during holding periods of up to three years. Of these 35 acquisitions, eight are by PE funds and 27 are by non-PE funds. Of eight firms targeted by PE acquirers, three are taken private within three years. In unreported tests, we repeat all analyses in the paper excluding these 35 observations and find that the results are qualitatively unchanged.

¹⁵ Using the Venture Economics database, a comprehensive database for the PE industry, Ljungqvist and Richardson (2003a, 2003b) show that over the 1981 to 2001 period venture funds account for 74.6% of total funds and buyout funds account for 90.4% of non-venture funds in the PE industry. This implies that venture capital and buyout funds together account for more than 97.5% of all PE funds in Venture Economics database.

funds is consistent with that used in previous studies, such as Ljungqvist and Richardson (2003b), Kaplan and Schoar (2005), and Metrick and Yasuda (2010). Third, due to increased competition among different types of PE funds, the line between venture capital and buyout funds' investments has been blurred. For example, according to the Private Equity Council, in recent years venture capital funds have been investing more heavily in mature companies, while buyout funds have been investing in young companies.¹⁶

We classify our sample acquirers into PE and non-PE acquirers by extensively searching *Factiva* and *Google* for their identity. In particular, using various versions of the acquirer's name as key words, we first search *Factiva* and *Google* to find acquirers' homepages and news articles describing the acquirers/acquisitions. We then use acquirer information from both of these sources to classify them into PE and non-PE acquirers. If we are not able to obtain detailed information about the acquirers from their homepages and have to rely only on news articles, we require that at least three different news articles be available to determine the acquirer's identity. We also examine the nature of a fund's investment history if its current or historical investment portfolio is available on the internet. In most cases we are able to classify our sample acquirers into buyout funds, venture capital funds, both buyout and venture capital funds, or non-PE fund acquirers. Specifically, we identify 123 (10.9%) deals by PE acquirers and 1,009 (89.1%) by non-PE acquirers. Of the 123 PE acquirers, 68 are venture capital funds and 77 are buyout funds. In 22 cases, PE acquirers can be classified as both buyout and venture capital funds. We also find that the same PE acquirer engage in multiple acquisitions: three PE acquirers in four block acquisitions, four PE acquirers in three block acquisitions, and eight PE acquirers in two block acquisitions. Eighty-three PE acquirers engage in only one block acquisitions.

3.2. Descriptive Statistics

¹⁶Lerner, Sørensen, and Strömberg (2011) show that many buyout firms made some venture capital investments in the late 1990s. Moreover, previous literature shows that both venture capital and buyout firms actively monitor their portfolio companies (Kaplan, 1991; Lerner, 1995; Strömberg, 2007; Hochberg, 2008).

Table 1 reports the distribution of the sample of 1,132 block acquisitions according to acquisition announcement year, target industry, and whether the acquirers are PE or non-PE funds. The four years from 1994 through 1997 are the most active years with respect to acquisition announcements, with 125 (11.0%), 140 (12.4%), 155 (13.7%), and 115 (10.2%) cases, respectively. Most of the targets are in manufacturing (43.7%), services (23.0%), and wholesale and retail trade industries (10.8%).

Panel A of Table 2 presents summary statistics for the sample targets. We measure target characteristics as of the fiscal year-end that immediately precedes the announcement date of block share acquisitions. While the mean total assets are not statistically different between PE and non-PE targets, the median total assets of PE targets is significantly larger than that of non-PE targets. Similarly, the median Tobin's q for PE targets is significantly higher than that for non-PE targets. These results suggest that PE acquirers prefer large, high growth firms as their targets. Leverage, operating performance, prior stock return, R&D intensity, and the free cash flow indicator (equals one if the ratio of cash flow to total assets is above the sample median and Tobin's q is below the sample median, and zero otherwise) show little differences between PE and non-PE targets.¹⁷ The insignificant difference in performance variables and the free cash flow indicator between PE and non-PE targets suggests that the extent of manager-shareholder agency problems is similar between the two sets of targets. In Appendix, we define all variables used in the analysis in details.

Panel B of Table 2 shows summary statistics for the percent of shares purchased by acquirers around the announcement date and the largest percent of shares the acquirer held over the three years after the announcement date.¹⁸ The percent of shares purchased, measured by both approaches, is significantly

¹⁷ Jensen (1986) argues that firms with low growth opportunities and large cash flows suffer from severe agency problems and thus their managers are more likely to waste firms' resources than are those of other firms. Lang, Stulz, and Walkling (1991) develop a measure of free cash flows based on the level of a firm's total cash flows and its Tobin's q . They show that the bidders with high cash flow and low Tobin's q have the lowest abnormal returns, suggesting that they suffer from high free cash flow problem. Following Lang, Stulz, and Walkling (1991), we measure the extent of a target's free cash flow problem using a dummy for high cash flow / low Tobin's q , which equals one if the ratio of cash flow to total assets is above the sample median and Tobin's q is below the sample median, and zero otherwise. Firms with high cash flow and poor growth opportunities (i.e., dummy = 1) are expected to have high free cash flow problem.

¹⁸ If an acquirer continues to purchase target shares subsequent to the initial block acquisition, using the block acquired only in the initial transaction will underestimate the acquirer's total shareholdings in the target and its

larger for PE acquisitions than for non-PE acquisitions. The size of ownership purchased by acquirers suggests that block acquirers, especially PE block acquirers, in our sample are not small but large shareholders who would have strong incentives to monitor target firms.

Panel C of Table 2 shows summary statistics for block ownership holding periods. We find that 45% of PE acquirers hold block shares for longer than three years and 21% of PE acquirers hold block shares for longer than two years but less than three years. The corresponding numbers for non-PE acquirers are 31% and 12%, respectively. These holding period differences between PE and non-PE acquirers are significant at the 1% and 5% levels, respectively. We also find that the fraction of acquirers that hold block shares for less than one year is significantly lower in PE acquisitions than in non-PE acquisitions (14% versus 38%). Taken as a whole, these results suggest that PE acquirers hold block ownership in targets for a longer period than non-PE acquirers in their minority equity investments, consistent with Kaplan (1991) and Strömberg (2007), who find evidence of long-term ownership of PE funds in their buyout portfolios.¹⁹

Panel D of Table 2 shows the fraction of acquirers indicating that they purchase shares for control purposes. We classify an acquisition as for control purposes if an acquirer claims an intention to control the target in the SEC 13D filing, the proxy statement, or the 10-K filing that immediately follows the deal announcement.²⁰ We find that the fraction of acquisitions with a control motivation is higher for PE acquisitions than for non-PE acquisitions (15% versus 10%), but the difference is not statistically significant.

incentives to monitor. Thus, we measure the largest size of blocks acquired during the holding period up to three years and reestimate all the regressions using this largest holding as a control variable instead of the initial holding. Our results are qualitatively similar.

¹⁹ Bushee (1998) argues that “dedicated” institutional investors have a long investment horizon while “transient” institutional investors have a short-term time horizon. In this context, our findings suggest that PE acquirers may be “dedicated” investors, who adopt longer-term strategies and actively monitor target management, while non-PE acquirers may be “transient” investors, who implement short-term strategies and are therefore less likely to engage in governance activities in targets.

²⁰ Specifically, if the purpose of an acquisition is related to a hostile takeover, proxy fight, or any other action related to seeking control, we classify the acquisition as pursued for control purposes: we classify all other acquisitions, such as buying an undervalued firm, as pursued for investment reasons.

4. Board Representation, CEO Turnover, and Managerial Compensation: Univariate Tests

In this section we examine the governance, financial, and operational engineering changes that acquirers make in their targets after the block acquisitions.

To investigate how block acquirers apply governance engineering to their portfolio companies, we focus on two types of post-acquisition governance activities, namely, board appointment and nonroutine top executive turnover activities, and examine whether the frequency of these activities is different between PE and non-PE acquisitions. Panel A of Table 3 shows the results. We find that 62% of PE acquirers appoint representatives onto the target's board. In comparison, the corresponding number for non-PE acquirers is only 28%. Thus, PE acquirers are more than twice as likely as non-PE acquirers to appoint their representatives onto the target's board. We also find that targets acquired by PE funds are more likely to experience nonroutine top executive turnover than those acquired by non-PE funds during the holding period of block ownership (36% versus 26%).²¹ The difference in turnover frequency between PE and non-PE acquisitions is significant at the 5% level, indicating that PE acquirers are more likely to perform a disciplinary role than non-PE acquirers. Panel A also shows that PE acquirers are three times as likely to appoint a target CEO/chairman as are non-PE acquirers (16% versus 6%), suggesting that PE acquirers engage in top management succession activities in their targets more actively than do non-PE acquirers.²² In sum, these results suggest that PE acquirers are more actively involved in the internal governance of targets than are non-PE acquirers.

To measure the operational engineering changes that block acquirers apply to their targets, we examine the past work experience of directors appointed by block acquirers onto the target's board and

²¹ Following Denis, Denis, and Sarin (1997), we refer to turnover events in which the top executive is removed due to death, illness, or other nongovernance-related reasons as routine turnover. Also, we classify a management change as normal if the stated reason for the change is retirement and the retiring manager is between the ages of 64 and 66. We refer to all other turnover events as nonroutine turnover. We also experiment with alternative definitions of nonroutine turnover, assuming that normal retirement takes place at any age above 60 or at any age above 64. Our results are qualitatively similar using these alternatives.

²² Including the president in the analysis does not change the results reported in Panel A of Table 3.

their board committee assignments.²³ In Panel B of Table 3, we find that the directors appointed by PE acquirers are more likely to have finance experience (47%) than those appointed by non-PE acquirers (16%). The difference in the proportion of directors with finance experience between these two groups is statistically significant at the 1% level. However, the proportion of the acquirer-appointed directors with the same industry experience is not significantly different between PE and non-PE acquisitions (31% versus 30%). We also find that PE acquirer-appointed directors are more likely to sit on board committees such as compensation, executive, nominating, and stock option committees than non-PE acquirer-appointed directors.²⁴ Klein (1998) classifies directors' committee assignments into two groups: committees that perform a monitoring role (audit, compensation, and nominating/corporate governance committees) and committees that perform an advisory role (executive, investment, and finance committees). Thus, it appears that PE acquirer-appointed board members are more likely to sit on both monitoring and advisory committees than non-PE acquirer-appointed board members, implying that their monitoring capabilities as well as their advisory services can be an important channel through which PE funds influence their portfolio companies.²⁵

Finally, to examine whether the financial engineering changes that acquirers bring to their portfolio companies are different between PE and non-PE acquisitions, we examine post-acquisition changes in

²³ Similar to Khorana, Tufano, and Wedge (2007), we limit our attention to two kinds of director experience: finance expertise and target industry experience. Specifically, we consider an acquirer-appointed director to have finance expertise if: (1) the director has been an officer in a financial services company with a position higher than or equivalent to vice president or director, including the general partner of a private investment firm, or (2) the director has been a CFO or a treasurer in any company. We consider a director to have target industry expertise if: (1) the director has worked for other companies in the same two-digit SIC industry as the target, or (2) the director has been a board member of such companies. We obtain information on directors' previous work experience from proxy statements and annual reports.

²⁴ The number of directors designated by block acquirers is relatively small for the stock option committee because in most of our sample targets, the stock option committee operates as a part of the compensation committee, not as an independent committee. We count the number of directors in the stock option committee only if this committee operates as an independent committee.

²⁵ In unreported tests, we find that conditional on a director having industry experience in the target's industry, PE directors are more likely to sit on board committees than non-PE directors. Moreover, the results from cross-sectional regressions (Table 8) show that when the targets experience poor operating performance or have high R&D intensity, PE acquirers are more likely to place representatives with industry expertise on these targets' boards. These findings suggest that although PE and non-PE acquirers are equally likely to designate representatives with relevant operational experience on target's board, PE acquirers are more likely to do so when targets have greater monitoring and advisory needs.

target management ownership, target CEO compensation, and target leverage, all measured from year -1 to year +3. Panel C of Table 3 shows the results. First, management ownership in PE targets increases after the block acquisition: the mean and median ownership changes are, respectively, 2.3% and 0.4%, both of which are significant at the 5% level. In contrast, the corresponding mean and median ownership changes for non-PE targets are -1.4% and -1.0%, of which the median change is significant at the 5% level. Second, we find that the industry-adjusted change in the fixed portion of target CEO compensation, measured by CEO salary divided by total CEO compensation, is statistically insignificant for both PE and non-PE targets. However, the industry-adjusted median change in the fraction of options plus stocks awarded to the CEO in total CEO compensation is positive and significant for PE targets, while the corresponding change in non-PE targets is negative and significant. Finally, we find that PE targets display positive but insignificant changes in both short-term and long-term leverage ratios, while non-PE targets display significantly positive changes in these ratios. Our findings of insignificant leverage changes after PE block share acquisitions are quite different from those in the previous literature on full buyout transactions by PE funds (Jensen, 1986; Kaplan, 1989a), suggesting that there are differences in channels through which PE funds incentivize their target CEOs in minority and majority equity investments.

5. Sources of Value Creation in PE Block Acquisitions

In this section we examine targets' acquisition announcement returns and post-acquisition operating performance to assess whether the governance, operational, and financial engineering changes can explain the value creation in PE funds' block acquisitions.

5.1. Announcement Effects

To examine the valuation effects of acquisition announcements, we compute targets' abnormal returns using standard event study methodology. We obtain our estimates of the market model by using 200 trading days of return data, beginning 220 days before and ending 21 days before the announcement

of the block share purchase, and use the CRSP equally weighted return as the market return. We then sum the daily abnormal returns to get the cumulative abnormal return (CAR) over different windows surrounding the block purchase announcement date.

Panel A of Table 4 reports the CARs for the targets acquired by PE and non-PE acquirers. Target firms in both types of acquisitions earn positive mean and median CARs irrespective of the event window we consider, all of which are statistically significant at the 1% level. These findings are consistent with Mikkelsen and Ruback (1985), who document positive announcement returns for targets that sell 5% or more of their equity to outside investors. The median CARs for targets in PE acquisitions are consistently higher than those for targets in non-PE acquisitions across all event windows. The differences in median CARs between the two groups are significant for all event windows that we consider except for the CAR (-1, 1).

In Panel B of Table 4, we report the CAR (-5, 5) classified according to whether the acquirers appoint representatives onto a target's board. Targets with PE acquirer-appointed directors have a mean CAR of 18.8% and a median CAR of 14.5%, while the corresponding mean and median CARs for targets with non-PE acquirer-appointed directors are 13.4% and 8.1%, respectively. The panel also shows that among targets in PE (non-PE) acquisitions, targets with PE acquirer-appointed (non-PE acquirer-appointed) directors have a significantly higher median (mean) CAR than targets without PE acquirer-appointed (non-PE acquirer-appointed) directors. Thus, targets realize higher announcement returns when acquirers place their representatives on a target's board, and this effect is more pronounced in PE acquisitions. These results suggest that the governance and/or operational engineering changes that PE acquirers apply to their targets can be an importance source of value gains in PE funds' block acquisitions.

In Panel C of Table 4, we divide the subsample of targets with acquirer-appointed directors according to whether the directors have finance experience. We find that within the subsample of targets that have acquirer-appointed directors with finance experience, targets acquired by PE funds have significantly higher mean and median CARs (21.0% and 13.9%) than those acquired by non-PE funds (9.5% and 6.0%). However, within the subsample of PE acquisitions, the mean CAR is higher when PE

fund-appointed directors have finance experience than when they do not have finance experience, while the median CAR is higher in opposite cases. However, the differences in mean and median CARs between these two subgroups are not statistically significant.

In Panel D of Table 4, we repeat the analysis in Panel C using the acquirer-appointed directors' experience in the target's industry as a measure of operating expertise. We find that within the subsample of targets that have acquirer-appointed directors with industry experience, the median CAR is significantly higher for targets acquired by PE funds (19.9%) than for those acquired by non-PE funds (5.5%) at the 1% level. Moreover, within the subsample of PE acquisitions, both the mean and median CARs are significantly higher when appointed directors have industry experiences (28.7% and 19.9%, respectively) than when they do not (11.2% and 9.5%, respectively).

Overall, the results in Panels C and D suggest that operational engineering changes that PE acquirers apply to their targets are an important source of value gains in PE minority equity investments.²⁶

To better understand the cross-sectional variation in target returns, we perform multivariate regressions using CAR (-5, 5) as the dependent variable. We use as key explanatory variables an indicator for PE acquisitions, several measures for the governance, financial, and operational engineering changes that acquirers apply to their targets, and interaction terms between the PE acquirer indicator and these change measures. The regressions also include as transaction characteristics the duration of block ownership, the percent of shares acquired at the transaction date, and the degree of industrial relatedness between the acquirer and the target. We include the duration of block ownership since Demsetz and Lehn (1985) argue that as long-term investors, large shareholders have strong incentives to monitor management, suggesting that the holding period of block ownership is positively related to target value.

²⁶ In unreported tests, we classify our sample targets according to the median change in management equity ownership from year -1 to year +3 and the median change in industry-adjusted leverage ratio from year -1 to year +3, respectively. We find that within the subsample of targets that observe a high change in industry-adjusted leverage ratio, the targets acquired by PE funds have significantly higher mean and median CARs (15.2% and 10.9%) than those acquired by non-PE funds (8.7% and 6.1%). However, we find little evidence of a significance difference in CARs between targets of PE and non-PE acquirers when we partition the sample according to the median change in management equity ownership. Overall, these results weakly support the financial engineering view of PE minority equity investments.

The regressions also include the percent of shares acquired since Shleifer and Vishny (1986) argue that as the size of equity ownership by large shareholders increases, their optimal choice of monitoring level increases. Finally, we control for the industrial relatedness between the acquirer and the target since the possibility of increasing economies of scale is likely to be greater when the acquirer and the target operate in the same industry.

We also include as control variables target financial characteristics such as prior stock return performance, prior operating performance, size, leverage, and Tobin's q . Industry and year indicators are also included in all regression equations to control for potential industry and time trends effects, respectively.

Table 5 reports the regression results. All regressions are estimated using ordinary least squares (OLS). In the first regression, we include the PE acquirer indicator, transaction and target characteristic variables, and industry and year indicators. The coefficient estimate on the PE acquirer indicator is 0.053 with a p -value of 0.04. This result shows that, all else equal, targets acquired by PE funds realize 5.3% higher abnormal announcement returns than targets acquired by non-PE funds.

In regression (2), we include an indicator that equals one if acquirers appoint their representatives onto the target's board and zero otherwise and its interaction with the PE acquirer indicator.²⁷ The results show that the coefficient estimate on both the board representation indicator and the interaction term are statistically insignificant.

To further examine the source of the value creation in PE block acquisitions, in regression (3) we include an indicator that equals one if the acquirer appoints directors with experience in the target's industry and an indicator that equals one if the acquirer appoints directors with finance experience. We also interact these two indicators with the PE acquirer indicator. While the coefficient estimates on both interaction terms are positive and economically significant (0.115 and 0.06, respectively), only the coefficient estimate on the former interaction term is statistically significant with a p -value of 0.06. In an

²⁷ This appointment information may not be known to the market since we use the information after the deals are announced. Our approach here is that the market rationally anticipates these appointments in advance. But this assumption can create forward-looking bias if the market is not able to fully anticipate them.

untabulated test, we find that the sum of the coefficient estimates on the PE acquirer indicator and its interaction with the indicator for directors with experience in the target's industry is positive and significant at the 5% level. Thus, the value creation is significantly higher for acquisitions in which PE acquirers place directors with industry expertise in targets' boards than for other types of acquisitions.

In regression (4), we include an indicator for poor operating performance (equals one if target's prior operating performance is in the bottom 25% of the sample) and the interaction between this indicator and the PE acquirer indicator. The sum of the coefficient estimates on the PE acquirer indicator and its interaction term is 0.153, significant at the 1% level, indicating that all else equal, poorly performing PE targets realize 15.3% higher abnormal announcement returns than poorly performing non-PE targets.

In regression (5), we replace the poor operating performance indicator in the previous regression with an indicator for low profit margin (equals one if the target's profit margin is in the bottom 25% of the sample). The sum of the coefficient estimates on the PE acquirer indicator and its interaction with the indicator for low profit margin is 0.148, significant at the 1% level. To the extent that poorly performing firms have higher agency problems and greater advisory needs, these results suggest that the value creation in PE acquisitions is particularly pronounced when the monitoring and/or advisory roles of PE acquirers are more likely to be valuable.

Targets with higher R&D intensity tend to have greater advisory needs because of their significant investments in firm-specific knowledge and intangible assets. To the extent that PE acquirers' advisory function is particularly valuable for these firms, we expect value creation in PE block acquisitions to be larger for targets with higher R&D intensity than for those with lower R&D intensity. To test this conjecture, in regression (6) we include an indicator for high R&D intensity (equals one if the ratio of target R&D expenditures to total sales is in the top 25% of the sample) and an interaction term between this indicator and the PE acquirer indicator. Consistent with our expectation, the sum of the coefficient estimates on the PE acquirer indicator and its interaction term is positive and significant at the 1% level.

In regression (7), we include an indicator that equals one if the acquirer appoints a representative to be the target's CEO/chairman and zero otherwise and the interaction between this variable and the PE

acquirer indicator. The sum of the coefficient estimates on the PE acquirer indicator and its interaction term is 21.6%, significant at the 1% level, suggesting that new top management from PE acquirers add value to targets, possibly due to the experience and expertise that the new management from PE acquirers can bring to targets.

Overall, the results above indicate that the governance and operational engineering changes that PE acquirers apply to their targets are important sources of value gains in PE minority equity investments.

We also examine the importance of financial engineering changes in explaining target returns by including as independent variables the change in target management ownership, the change in the target's leverage ratio, and the change in the incentive-based component of the target CEO compensation (i.e., options plus stock awarded to CEO / total CEO compensation). In untabulated results, we find that none of the coefficient estimates on these variables is statistically significant. We also include the interactions between the PE indicator and these change variables, but they are not significantly associated with target returns. Therefore, the importance of financial engineering changes in explaining target returns appears to be lower in PE minority equity investments than in PE majority equity investments.

5.2. Post-Acquisition Operating Performance

In this subsection we use the change in target operating performance following the acquisition of block ownership as a measure of value creation in block share acquisitions. Table 6 reports industry-adjusted changes in target operating performance from two years before the block acquisitions (year -2) to one year before the block acquisitions (year -1) and from year -1 to one year (year +1), two years (year +2), and three years (year +3) after the block acquisition for several subgroups. Following Brav et al. (2008) and Guo, Hotchkiss, and Song (2011), we measure operating performance as the ratio of operating income (EBITDA) to total sales. Industry-adjusted operating performance is estimated by subtracting the median four-digit SIC industry operating performance from each firm's raw operating performance.²⁸

²⁸ In untabulated tests, we also estimate industry-adjusted operating performance by subtracting the matching firm's operating performance from the target firm's raw operating performance. Specifically, following Lie (2001),

Since our sample firms' operating performance is highly skewed (the raw change in operating performance has skewness less than -28), we use the median change in operating performance as our key statistic.

We find that while the targets of non-PE acquirers have insignificant median changes in industry-adjusted operating performance for all time intervals considered, the targets of PE acquirers have a significant median change from year -1 to year +3 of 2.47 percentage points.²⁹

Table 6 also shows that for targets with board representation by PE acquirers, the median changes in industry-adjusted operating performance from year -1 to year +2 and from year -1 to year +3 are positive and significant at the 10% level, whereas for targets without board representation by PE acquirers, the corresponding median changes are not significant. These results suggest that the directors appointed by PE acquirers play an important role in improving the operating performance of target firms.

To gain further insight into the role of the directors appointed by PE acquirers, we examine whether these directors' past work experience and expertise are related to target operating performance. We find that targets with a PE director with experience in their industries experience a median change in industry-adjusted operating performance from year -1 to year +2 of 23.88 percentage points and a corresponding change from year -1 to year +3 of 30.37 percentage points, which are significant at the 1% and 5% levels, respectively. Therefore, the effect of a PE director's industry expertise on target operating performance appears to be both statistically and economically significant, suggesting that the industry-specific knowledge that PE acquirers bring to target operations constitutes an important source of value creation in

Grullon and Michaely (2004), and Guo, Hotchkiss, and Song (2011), we choose as the matching firm the firm that resembles the target firm the most in terms of the level of operating performance in year -1, the change in operating performance in year -1, the level of market-to-book in year -1, and industry (same four-digit SIC). We find that our results are qualitatively unchanged.

²⁹ Since some targets are delisted from the stock exchanges after the block acquisitions due to mergers, bankruptcies, and other reasons, the number of target samples drops significantly over time (684 targets in year +3). To address the potential survivorship bias, we estimate a probit regression in which the dependent variable is an indicator that takes the value of one if the change in a target's operating performance from year -1 to year +3 is missing and zero otherwise. The explanatory variables include the PE acquirer indicator and all other control variables used in Table 5. The results show that the coefficient estimate on the PE acquirer indicator is negative and insignificant (p -value=0.24), mitigating the potential concern about the impact of survivorship bias on our key results.

PE minority equity investments. However, the corresponding median changes for targets with a PE director who has finance experience are not statistically significant.

When we classify the targets of PE acquirers according to the sample median change in target management ownership from year -1 to year +3, we find that the changes in industry-adjusted operating performance for targets with low management ownership changes are statistically insignificant for all the time intervals considered. In contrast, the performance change for targets with high management ownership changes from year -1 to year +3 is positive and marginally significant, suggesting that improved managerial incentives, albeit weak, are an important source of value creation in PE minority equity investments.

Finally, as a further test of the financial engineering view of PE investments, we divide the PE-targets according to the sample median change in target leverage ratio. We find no significant operating performance changes for targets with both high and low leverage changes.³⁰

Table 7 reports the regression results using the change in target industry-adjusted operating performance from year -1 to year +3 as the dependent variable.³¹ Since our long-term profitability measure is highly skewed, we use median regression instead of OLS to determine the sources of value creation in block share acquisitions. We find that the results in Table 7 are almost the same as those for abnormal announcement returns in Table 5 except that the coefficient estimate on the interaction term between the PE acquirer indicator and the board representation indicator is positive and significant at the 5% level in regression (2). The sum of the coefficient estimates on the PE acquirer indicator and its interaction is positive and significant at the 5% level, indicating that operating performance improvement

³⁰ It is worth noting that industry-adjusted changes in target operating performance from year -2 to year -1 are statistically insignificant for both PE and non-PE targets irrespective of how we divide the sample targets into subgroups except that industry-adjusted operating performance for targets with low management ownership changes are statistically significant at the 10% level. In untabulated tests, we find that the differences in industry-adjusted changes in operating performance from year -2 to year -1 between PE and non-PE targets are not statistically significant. The results are similar for industry-adjusted changes in operating performance from year -5 to year -1. These results indicate that PE targets are not underperforming firms prior to the acquisitions and thus post-acquisition operating performance improvement in PE targets is not likely to be driven by PE acquirers' ability to choose underperforming firms due to their superior information.

³¹ When information on target industry-adjusted operating performance is available only from year -1 to year +2 (96 targets), we use this performance variable as the dependent variable.

is significantly higher for acquisitions in which PE acquirers place their representative in target boards than for other types of acquisitions. These results further suggest that the governance and operational engineering changes that PE acquirers apply to their targets are important sources of value gains in PE minority equity investments.

6. Determinants of Board Representation and CEO Turnover

In this section we examine the factors that determine PE acquirers' representation on the target's board and whether the directors appointed by PE acquirers onto the target's board play an important role in targets' nonroutine top executive turnover.

6.1. Determinants of Board Representation

To examine the determinants of board representation by block share acquirers in targets, we perform multivariate tobit regressions using the board representation ratio as the dependent variable.³² We use the variables that measure the extent to which the targets need monitoring and/or advice as key explanatory variables.

In Table 8, the first two regressions use as the dependent variable the ratio of the number of directors appointed by acquirers to the total number of directors on target boards. In regression (1), the PE acquirer indicator is positive and statistically significant at the 1% level, indicating that board representation by acquirers is greater in PE acquisitions than in non-PE acquisitions. In regression (2), the coefficient estimates on both the percent of shares acquired and the indicator for the duration of block ownership are positive and significant, supporting, respectively, Shleifer and Vishny's (1986) argument on the

³² Since the board representation ratio is affected not only by the board representation of acquirers but by the board size, we check the robustness of our results by estimating logit regressions in which the dependent variable takes the value of one if acquirers place representatives on targets' boards and zero otherwise. We obtain qualitatively similar results. Additionally, we estimate the regressions using a least squares model and a general linear model for fractional response. The results using these approaches are similar to those using a tobit regression in terms of their statistical significance and conditional marginal effects.

monitoring role of large shareholders and Demsetz and Lehn's (1985) argument on the monitoring role of long-term blockholders.

In regressions (3) through (5), we use the number of acquirer-appointed directors with finance experience as the numerator in calculating the board representation ratio. Our key explanatory variables are the interaction between the PE acquirer indicator and the indicator for poor operating performance, the interaction between the PE acquirer indicator and an indicator for poor past stock return performance (equals one if prior industry-adjusted target stock performance is in the bottom 25% of the sample), and the interaction between the PE acquirer indicator and an indicator for high free cash flow problems (equals one if the ratio of the target's cash flow to total assets is above the sample median and its Tobin's q is below the sample median). These interaction terms are included to examine whether, when target agency problems are higher, PE acquirers are likely to appoint more representatives with finance experience onto the target's board than non-PE acquirers. We find that the coefficient estimate on the interaction term between the PE acquirer indicator and the indicator for poor operating performance is not significant (regression (3)). However, the coefficient estimate on the interaction term involving the indicator for poor past stock performance is positive and significant at the 1% level in regression (4). The coefficient estimate on the interaction term involving the indicator for high free cash flow problems is also positive and marginally significant at the 10% level in regression (5). These results indicate that PE acquirers engage in more active monitoring of target management when the need for target oversight is greater.³³

In regressions (6) through (8), we use the number of acquirer-appointed directors with experience in the target's industry as the numerator in calculating the board representation ratio. In regressions (6) and (7), we include as explanatory variables two interaction terms that measure the difference in monitoring/advisory needs of targets between PE and non-PE acquisitions: the interaction between the PE

³³ We conduct tests on the significance of the sum of the coefficient estimates on the PE acquirer indicator and the interaction terms. The results show that PE acquirers are more likely to place their representatives with financial experience and those with industry expertise in target boards, respectively, when the needs for oversights and advices are higher in targets.

acquirer indicator and the indicator for poor operating performance and the interaction between the PE acquirer indicator and the indicator for low profit margin. We find that the coefficient estimates on both interaction terms are positive and significant at least at the 5% level, suggesting that PE block acquirers are likely to appoint more representatives with industry expertise onto the target's board when the target has greater needs for operational improvement.

In regression (8), we include the indicator for high R&D intensity and its interaction with the PE acquirer indicator. We find that this interaction term is positively and significantly related to the board representation ratio. Thus, PE acquirers are likely to appoint more representatives with industry experience onto the target's board when the target has greater advisory needs.

Overall, these results, together with those in Tables 5 and 7, suggest that PE funds use their governance and operational expertise to create value in their portfolio companies and that board representation plays an instrumental role in creating such value, supporting the governance and operational engineering views of PE minority equity investments.

6.2. Likelihood of Nonroutine Top Management Turnover

Table 9 presents the results of logistic regressions in which the dependent variable equals one if a nonroutine top management turnover event occurs in the target during the acquirer's block ownership holding period up to three years after the block share purchase and zero otherwise. In addition to including all explanatory variables used in the previous regressions, we also control for variables that may affect top executive turnover. Specifically, the regressions control for the age and tenure of the top executive, as well as a founder indicator, which equals one if the top executive is the founder of the firm.

In regression (1), we include prior four-digit SIC industry-adjusted stock returns as a key explanatory variable. Consistent with evidence from previous studies, we find that the coefficient estimate on this performance variable is negative and significant at the 1% level, suggesting that poor performance increases the likelihood of nonroutine top executive turnover in targets.

In regression (2), we include the interaction between prior stock performance and the PE acquirer indicator. We find that the coefficient estimate on this interaction term is negative but statistically insignificant, indicating that the sensitivity of top executive turnover to performance is statistically indistinguishable between targets of PE acquirers and those of non-PE acquirers.

In the next three regressions, we include the interaction terms between prior stock performance and the indicators for PE acquirer-appointed directors' past work experience. In regressions (3) and (5), the interaction terms involving an indicator for PE directors with finance experience is significantly negatively related to the likelihood of nonroutine top management turnover, indicating that the negative relation between turnover and performance is stronger when the PE acquirer has representatives with financial expertise on the target's board.³⁴ However, in regressions (4) and (5), the coefficient estimate on the interaction term that involves the indicator for PE directors with experience in the target's industry is not significant.

Overall, the results in Table 9 suggest that PE funds play an important role in monitoring poorly performing target management, particularly when their representatives on the target's board have finance expertise. These results further support the view that the governance engineering is an important channel through which PE funds in minority equity investments exert influence over their portfolio firms.

7. Additional Tests

To verify the robustness of the results above, we conduct three additional tests. Below, we briefly summarize the results of these tests.

7.1. Endogeneity of Target Selection

³⁴ We perform graphical analyses, as suggested by Ai and Norton (2003), to alleviate the concern that the interaction effects change conditional on other independent variables in nonlinear models. We find that most of interaction effects between prior stock performance and the indicator for PE directors with finance experience are between 0 and -40% and their z-statistics are mostly distributed around the 5% significance level, suggesting negative and significant interaction effects for most observations.

Thus far, we have treated the acquirer's target selection as exogenous to the likelihood of board representation (top executive turnover) by acquirers. However, in interpreting our regression results, we must take into account the self-selection issue, i.e., our results may simply reflect PE and non-PE acquirers' different ability to select targets. Our results show that among targets in PE acquisitions, particularly those whose boards have representatives from PE acquirers, realize both higher abnormal announcement returns and better post-acquisition operating performance than do targets in other types of acquisitions, which suggests that post-acquisition activities by PE acquirers constitutes important sources of value creation in PE acquisitions. However, these results may also suggest that PE acquirers seeking to improve target governance are more likely to purchase targets with more pronounced agency problems, while non-PE acquirers do not show such a tendency. In this case, our results could be due to the quality of targets' corporate governance rather than PE acquirers' governance ability per se. To the extent that these self-selection biases exist, the coefficient estimates from the tests in Tables 8 and 9 are likely to be biased and inconsistent. We address the self-selection issue in several ways.

First, to distinguish ex-ante acquirers that are governance oriented from those that are not, we compare the frequency of control-motivated acquisitions, that is, deals in which the acquirer discloses in a 13D filing that it seeks control of the target. As shown in Panel D of Table 2, the frequency of control-motivated deals in PE acquisitions is statistically indistinguishable from that of control-motivated deals in non-PE acquisitions. Thus, it appears that PE acquirers are not significantly different from non-PE acquirers in terms of their ex-ante governance incentives.

Second, we examine whether the need for corporate governance activism in targets is different between targets of PE acquirers and targets of non-PE acquirers. If acquirers purchase targets that require less governance activism, then they might have fewer incentives to engage in post-acquisition governance in these targets. However, as Table 2 shows, pre-acquisition operating and stock performance are not significantly different between PE and non-PE acquisitions. We also find that the extent of free cash flow problems is not significantly different between the two groups. These results suggest that, in general, the

need for corporate governance activism in targets of PE acquirers is not different from that in targets of non-PE acquirers.

Third, to econometrically account for the endogeneity of target selection, we estimate our previous regressions in Tables 8 and 9 using the following two-stage self-selection model, which is based on Heckman's (1979):³⁵

First-stage probit regression (selection equation):

$$\text{Prob}(\text{Selection}_{it} = 1 | IV, \text{Control}) = \Phi(\alpha_0 + \alpha_1 IV_{it} + \vec{\alpha}_2 \text{Control}_{it}) \quad (1)$$

Second-stage regression (outcome equation):

$$\begin{aligned} \text{Dependent Variable}_{it} = & \beta_0 + \beta_1 \text{Selection}_{it} + \beta_2 \text{Key}_{it} \\ & + \beta_3 \text{Selection}_{it} \times \text{Key}_{it} + \vec{\beta}_4 \text{Control}_{it} + \delta \lambda + \epsilon_{it} \end{aligned} \quad (2)$$

where *Selection* is an endogenous indicator that equals one if the observation is "treated" and zero otherwise. In our case, it is either the PE acquirer indicator or an indicator that takes the value of one if a PE acquirer appoints its representatives onto the target's board and zero otherwise. *IV* is an instrumental variable, which is the average number of PE deals in a 4-digit SIC industry from year -5 to year 0 (announcement year) excluding the sample deal itself divided by the number of publicly listed firms in the same 4-digit SIC industry in Compustat in year 0.³⁶ *Control* is a vector of the other explanatory variables used in Table 8 (9) and *Key* is an exogenous firm or board characteristic variable used in the interaction term involving the PE acquirer indicator in Table 8 (9). As in Campa and Kedia (2002), λ is the sum of λ_1 and λ_2 , where λ_1 is the inverse Mills ratio for PE acquirers ($= \frac{\phi(\hat{\alpha}_0 + \hat{\alpha}_1 IV_{it} + \text{Control}_{it} \hat{\alpha}_2)}{\Phi(\hat{\alpha}_0 + \hat{\alpha}_1 IV_{it} + \text{Control}_{it} \hat{\alpha}_2)} \times PE_{it}$) and λ_2 is

³⁵ Previous papers that use the self-selection model include Campa and Kedia (2002) and Chemmanur, Krishnan, and Nandy (2011). For a detailed discussion of the self-selection model that extends Heckman's (1979) two-stage estimation procedure, see Prabhala and Li (2007). Our method is close to Campa and Kedia (2002).

³⁶ Peer firms' acquisition activities can influence those of other firms in the same industry. For example, Song and Walking (2000) argue that acquisition attempt within an industry generates shock waves that cause firm specific reassessment of the acquisition probability for rivals of target firms (i.e., firms in the same industry as the target). They show that an acquisition attempt for a target increases the probability that its rival firms become targets of other firms. Therefore, to the extent that PE funds' block acquisition activities affect the block share acquisition probability of other firms by PE funds in the same industry, our instrumental variable is expected to be positively correlated with the likelihood of a firm becoming a target of PE funds.

the inverse Mills ratio for non-PE acquirers ($= \frac{-\phi(\hat{\alpha}_0 + \hat{\alpha}_1 IV_{it} + \text{Control}_{it} \hat{\alpha}_2)}{1 - \Phi(\hat{\alpha}_0 + \hat{\alpha}_1 IV_{it} + \text{Control}_{it} \hat{\alpha}_2)} \times (1 - PE_{it})$). The functions ϕ and Φ in λ_1 and λ_2 are the probability density function and cumulative distribution function of the normal distribution, respectively.

Assuming that PE funds make their endogenous block acquisition decision based on observable characteristics, the first-stage regression estimates the ex-ante probability of a firm being acquired by a PE fund. In the second-stage regression, the inverse Mills ratio term, λ (Heckman correction terms), allows us to proxy for the correlation between the second-stage dependent variable and the unobserved determinants of the propensity of being acquired by PE funds and non-PE funds, respectively, and thus correct for the self-selection bias. This two-step estimation procedure therefore allows us to examine whether, conditioning on the probability of being acquired by a PE fund, a differential effect exists between being acquired by PE funds and non-PE funds.

Table 10 presents regression estimates of the selection equation in which the dependent variable is the PE acquirer indicator (indicator for PE-appointed directors with finance experience) and of the outcome equations in which the dependent variable is the board representation ratio (indicator for nonroutine top executive turnover).

In regressions (1) through (5), we examine the effects of PE acquisitions on board representation activities after controlling for self-selection bias. Regression (1) shows the results from the first-stage probit selection regression in which the dependent variable is the PE acquirer indicator, the endogenous selection variable. Consistent with our expectation, we find that *IV* is positively and significantly related to the PE acquirer indicator, which confirms the relevancy of our instrument variable. Regressions (2) through (5) report the estimates from the second-stage regressions that examine the relations between the board representation ratio and a target's monitoring and advising needs. Consistent with the results in Table 8, regression (2) shows that PE acquirers have higher tendency to appoint representatives into target boards after acquisitions, even controlling for the selection effect. Moreover, PE acquirers are likely to appoint more representatives with finance experience onto the target's board than non-PE acquirers when

the target has greater monitoring needs, that is, higher free cash flow problem (regression (3)). PE acquirers are also likely to appoint more representatives with experience in the target's industry onto the target's board (regression (4)) and this likelihood is particularly higher when the target has greater advisory needs, as measured by higher R&D intensity (regressions (5)).

In regressions (6) and (7), we estimate the effects of PE acquisitions on nonroutine top executive turnover after controlling for self-selection bias. Regression (6) shows the results from the first-stage probit selection regression in which the dependent variable is the indicator for PE-appointed directors with finance experience. We find that *IV* is positively and significantly related to the selection indicator, confirming the relevancy of our instrument variable.³⁷ Regression (7) reports the estimates from the second-stage regression in which the dependent variable is the indicator for nonroutine top executive turnover in target firms.³⁸ The coefficient estimate on the interaction between past stock performance and the predicted value for the indicator for PE acquirer-appointed directors with finance experience is negative and significant at the 5% level. This result is consistent with that in regression (3) of Table 9 and indicates that the sensitivity of top executive turnover to performance is higher when the PE acquirer has representatives with financial expertise on the target's board.

Overall, our results from the two-stage self-selection regressions are generally consistent with those in Tables 8 and 9, suggesting that self-selection bias is unlikely to affect our results.³⁹

7.2. Buyout versus Venture Capital Funds

³⁷ We acknowledge that to the extent that PE-appointed directors' finance experience is an endogenous variable, peer firms' acquisition activities may not be a good instrument for a selection indicator used in regression (6). For a robustness test, we estimate the first-stage regression using the same Heckman procedure without *IV* and find that the coefficient estimate on the key interaction variable (indicator for PE-appointed directors with finance experience and prior stock return) in the second-stage regression is still statistically significant at the 5% level.

³⁸ To apply Heckman (1979) model, we need to assume normal errors in the second stage. Since this assumption does not hold for a logit model, we use a probit model in the second-stage regression in estimating the likelihood of nonroutine top executive turnover.

³⁹ In untabulated tests, we estimate the regressions in Table 10 including interactions with the firm performance. Results are similar to those in Table 8. For the sake of brevity, we do not report results from these regressions.

As described in Section 3, our sample of PE acquirers consists of 68 venture capital funds, 77 buyout funds, and 22 acquirers with both buyout and venture capital funds. Although we treat both venture capital and buyout funds as PE funds, the two sets of firms might differ in that the former tends to invest in early-stage companies whereas the latter tends to invest in companies that are more mature in their corporate lifecycle. These differences in investment strategy raise a concern that these two types of firms may have different motives for pursuing block share investments and thus different valuation effects. However, the blurred distinction between venture capital and buyout funds, as discussed in Section 3, also suggests that our key results would not differ between acquisitions made by venture capital funds and those by buyout funds.

To address this issue, in untabulated tests we exclude 22 cases in which PE acquirers can be classified as both venture capital and buyout funds. We then examine whether targets' characteristics, abnormal announcement returns, and post-acquisition operating performance, as well as acquirer governance activities in targets (i.e., board representation and nonroutine CEO turnover), are different between acquisitions made by venture capital funds and those by buyout funds. We find no statistically discernible differences in results between the two groups.

7.3. Event Window

In Table 5, we use CAR (-5, 5) as our key measure of announcement effects, while Brav et al. (2008) and Klein and Zur (2009) use longer-term event windows surrounding Schedule 13D filing dates such as CAR(-20, 20) and CAR (-30, 5) to estimate market reactions to the filings by hedge fund investors. Prior studies use those long-term event windows to allow for possible prior information leakage and short-term price pressures from stock purchase by the hedge funds in addition to the 10-day 13D filing window. Since many of the announcement dates used in our analyses are 13D filing dates reported in news articles, in untabulated tests, we re-estimate all regressions in Table 5 using CAR (-10, 10) and CAR (-20, 20) as the dependent variables. We find that the results are qualitatively similar to those using CAR (-5, 5).

8. Summary and Conclusion

Using a sample of 1,132 block share acquisitions in the U.S. during the 1990 to 2006 period, we examine the sources of value creation in PE minority equity investments. We find that PE acquirers purchase a larger percentage of target shares and hold these shares for a longer period of time than non-PE acquirers. PE acquirers are also more likely to place representatives on the target's board and their representatives are more likely to sit on various board committees in targets, such as compensation, executive, nominating, and stock option committees.

Moreover, we find that compared to non-PE acquirers, PE acquirers are more likely to appoint representatives with finance experience onto the target's board when targets perform poorly or have higher agency problems. These PE-appointed directors with finance experience also increase the likelihood of top executive turnover in targets with poor performance. PE acquirers are also more likely to place representatives with experience in the target's industry on the target's board when the target performs poorly or when it has more advisory needs.

Finally, we find that the targets of PE acquirers, particularly those whose boards have representatives from the PE acquirers, experience both higher abnormal announcement returns and better post-acquisition operating performance than targets of non-PE acquirers. These effects are more pronounced when PE acquirer-appointed directors have expertise in the target's industry, suggesting that value creation in PE minority equity investments is closely related to PE funds' experience and expertise.

Overall, our findings show that the governance and operational engineering changes that PE acquirers apply to their targets are important sources of value gains in PE minority equity investments, suggesting that there are similarities in the sources of value gains between PE minority equity investments and PE majority equity investments. However, the change in CEO compensation and the change in financial leverage are not directly related to value creation, suggesting that financial engineering changes play a less important role in PE minority equity investments than in PE majority equity investments. Although our results using PE investors are generally consistent with previous studies on shareholder activism by other types of institutional investors, we show that compared to these institutional investors, PE funds

take different approaches to value creation in their portfolio firms and thus they represent another important model for shareholder activists.

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Table 1
Distribution of Block Share Acquisition Activity by Acquirer Type, Year, and Target Industry

The sample consists of 1,132 domestic block share acquisitions between 1990 and 2006. We obtain the initial sample of block share acquisitions from the Thomson Financial's Security Data Corporation (SDC) Platinum database. We then identify partial acquisitions in which the acquirers initially held less than 5% of a target firm's outstanding shares and then purchased more than 5% but less than 50% of its outstanding shares. Acquisitions are considered to be private equity acquisition if the acquirer is either a buyout fund or a venture capital fund.

Panel A: Distribution of Block Share Acquisition Activity by Acquirer Type and Year			
Year	Private Equity Acquisitions	Non-Private Equity Acquisitions	Total
1990	6	54	60
1991	2	52	54
1992	5	56	61
1993	4	48	52
1994	17	108	125
1995	20	120	140
1996	9	146	155
1997	8	107	115
1998	8	77	85
1999	10	75	85
2000	16	69	85
2001	7	21	28
2002	1	20	21
2003	4	15	19
2004	1	10	11
2005	1	17	18
2006	4	14	18
Total	123	1,009	1,132

Panel B: Distribution of Block Share Acquisition Activity by Acquirer Type and Target Industry			
Target Industry (first two digits of the SIC code)	Private Equity Acquisitions	Non-Private Equity Acquisitions	Total
Agriculture, forestry, and fishing (01-09)	1	9	10
Mining and construction (10-17)	5	68	73
Manufacturing (20-39)	46	449	495
Transportation and public utilities (40-49)	13	45	58
Wholesale and retail trade (50-59)	13	109	122
Finance (60-69)	10	104	114
Services (70-89)	35	225	260
Total	123	1,009	1,132

Table 2**Descriptive Statistics for Targets and Block Ownership**

The sample consists of 1,132 domestic block share acquisitions between 1990 and 2006. We obtain the initial sample of block share acquisitions from the Thomson Financial's Security Data Corporation (SDC) Platinum database. We then identify partial acquisitions in which the acquirers initially held less than 5% of a target firm's outstanding shares and then purchased more than 5% but less than 50% of its outstanding shares. Acquisitions are considered to be private equity acquisition if the acquirer is either a buyout fund or a venture capital fund. Appendix provides a detailed description of the construction of the variables. The numbers in the test-of-difference columns denote p -values. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Variables	Private Equity Acquisitions (A) N=123		Non-Private Equity Acquisitions (B) N=1,009		Test of Difference (A-B)	
	Mean	Median	Mean	Median	<i>t</i> -test	Wilcoxon Z-test
Panel A: Descriptive Statistics for Targets						
Book value of total assets (millions of dollar)	766.58	140.87	1,910.47	82.21	0.13	0.02**
Leverage	0.287	0.228	0.263	0.197	0.32	0.45
Operating income / total assets	-0.059	0.087	-0.035	0.061	0.49	0.33
Prior stock return	-0.053	-0.053	-0.017	-0.042	0.60	0.55
Tobin’s q	1.840	1.229	1.787	1.087	0.76	0.05**
Free cash flow (indicator)	0.277	-	0.269	-	0.85	-
R&D expenditures / sales	1.665	0.039	2.932	0.000	0.50	0.84
Panel B: Percent of Shares Acquired						
Percent of shares acquired around the announcement date	0.155	0.117	0.125	0.082	0.00***	0.00***
Largest percent of shares the acquirer hold over the three years after the announcement date	0.205	0.147	0.150	0.089	0.00***	0.00***
Panel C: Distribution by Holding Periods of Block Ownership						
Less than one year	18 (14%)		383 (38%)		0.00***	
More than one but less than two years	27 (20%)		199 (20%)		0.87	
More than two but less than three years	24 (21%)		119 (12%)		0.02**	
More than three years	54 (45%)		308 (31%)		0.00***	
Panel D: Distribution by Purposes of Acquisitions						
Acquisitions with control purpose	18 (15%)		102 (10%)		0.18	

Table 3**Governance, Operational, and Financial Engineering Changes Applied by Block Share Acquirers: Univariate Tests**

The sample consists of 1,132 domestic block share acquisitions between 1990 and 2006. We obtain the initial sample of block share acquisitions from the Thomson Financial's Security Data Corporation (SDC) Platinum database. We then identify partial acquisitions in which the acquirers initially held less than 5% of a target firm's outstanding shares and then purchased more than 5% but less than 50% of its outstanding shares. Acquisitions are considered to be private equity acquisition if the acquirer is either a buyout fund or a venture capital fund. The numbers in the test-of-difference columns denote p -values. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Governance Engineering Changes: Frequency of Board Representation, Nonroutine Top Executive Turnover, New CEO / Chairman Designation Activities				
	Total	Private Equity Acquisitions (A)	Non-Private Equity Acquisitions (B)	Test of Difference (A-B)
Acquirers have representatives on the target's board during the block ownership holding period (up to three years)	359 (32%) N=1,131	76 (62%) N=122	283 (28%) N=1,009	0.00***
Targets that experience nonroutine top executive turnover during the block ownership holding period (up to three years)	290 (27%) N=1,071	43 (36%) N=120	247 (26%) N=951	0.02**
Acquirers that designate their representatives as new target CEOs or chairmen	74 (7%) N=1,059	19 (16%) N=120	55 (6%) N=939	0.00***
Panel B: Operational Engineering Changes: Acquirer-Designated Directors' Past Work Experience and Their Board Committee Assignments				
	Total N=640	Directors Designated by Private Equity Acquirers (A) N=154	Directors Designated by Non-Private Equity Acquirers (B) N=486	Test of Difference (A-B)
Directors' Past Work Experience				
Director with finance experience	153	73 (47%)	80 (16%)	0.00***
Director with experience in the target's industry	194	47 (31%)	147 (30%)	0.95
Directors' Board Committee Assignments				
Audit committee	125	37 (24%)	88 (18%)	0.11
Compensation committee	132	49 (32%)	83 (17%)	0.00***
Executive committee	74	32 (21%)	42 (9%)	0.00***
Nominating committee	58	32 (21%)	26 (5%)	0.00***
Stock option committee	22	12 (8%)	10 (2%)	0.00***

Panel C: Financial Engineering Changes: Post-Acquisition Changes in Managerial Ownership, CEO Compensation, and Leverage Ratio from Year -1 to Year +3, Relative to the Block Acquisition Year (Year 0)						
	Private Equity Acquisitions (A)		Non-Private Equity Acquisitions (B)		Test of Difference (A - B)	
	Mean	Median	Mean	Median	t-test	Wilcoxon z-test
Change in Target CEO Equity Ownership	N=79		N=502			
Change in CEO Ownership	0.023**	0.004**	-0.014	-0.010**	0.01***	0.00***
Change in Target CEO Compensation	N=14		N=104			
Salary / total compensation						
Raw change	-0.047	-0.092	-0.026	-0.018	0.86	0.68
Industry-adjusted change	0.003	-0.083	0.037	0.000	0.75	0.44
Options (value estimated by the Black-Scholes model) and stock awards / total compensation						
Raw change	0.376*	0.302*	-0.104**	-0.071**	0.00***	0.01***
Industry-adjusted change	0.410	0.446*	-0.104**	-0.144***	0.00***	0.01***
Option (reported value) and stock awards / total compensation						
Raw change	0.450*	0.420*	-0.164***	-0.067**	0.02**	0.03**
Industry-adjusted change	0.476*	0.493*	-0.142**	-0.132**	0.01***	0.01***
Total Compensation						
Raw change	1.599***	0.496***	1.488	0.197	0.93	0.49
Industry-adjusted change	0.957	0.496	0.708	-0.225	0.87	0.66
Change in Target Leverage Ratio	N=86		N=642			
Short-term leverage						
Raw change	0.019	0.000	0.062*	0.000	0.29	0.78
Industry-adjusted change	0.021	0.005	0.068*	0.003**	0.27	0.69
Long-term leverage						
Raw change	0.117	0.000	0.043**	0.000**	0.36	0.73
Industry-adjusted change	0.108	0.000	0.036**	0.004	0.37	0.86

Table 4**Cumulative Abnormal Returns (CARs) for Targets around the Announcement Date**

The sample consists of 1,132 domestic block share acquisitions between 1990 and 2006. We obtain the initial sample of block share acquisitions from the Thomson Financial's Security Data Corporation (SDC) Platinum database. We then identify partial acquisitions in which the acquirers initially held less than 5% of a target firm's outstanding shares and then purchased more than 5% but less than 50% of its outstanding shares. We estimate the market model by using 200 trading days of return data ending 21 days before the acquisition announcement. We use the CRSP equally weighted return as a proxy for the market return. Numbers in brackets denote the number of observations. Acquisitions are considered to be private equity acquisition if the acquirer is either a buyout fund or a venture capital fund. Appendix provides a detailed description of the construction of the variables. The numbers in the test-of-difference columns denote p -values. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Private Equity Acquisitions (A)		Non-Private Equity Acquisitions (B)		Test of Difference (A - B)	
	Mean	Median	Mean	Median	t -test	Wilcoxon z -test
Panel A: CARs around the Announcement Date						
	[N=123]		[N=1,005]			
CAR (-1, 1)	0.104***	0.061***	0.079***	0.038***	0.35	0.14
CAR (-2, 2)	0.123***	0.059***	0.085***	0.045***	0.19	0.08*
CAR (-3, 3)	0.133***	0.080***	0.088***	0.047***	0.10*	0.04**
CAR (-5, 5)	0.153***	0.097***	0.099***	0.060***	0.08*	0.06*
CAR (-10, 10)	0.163***	0.124***	0.110***	0.070***	0.12	0.04**
CAR (-20, 20)	0.199***	0.112***	0.114***	0.085***	0.06*	0.09*
Panel B: CAR (-5, 5) Classified by Board Representation by Block Acquirers						
Acquirer has representatives on the target's board (A)	0.188***	0.145***	0.134***	0.081***	0.22	0.04**
	[N=76]		[N=281]			
Acquirer does not have representatives on the target's board (B)	0.098***	0.041**	0.086***	0.053***	0.75	0.67
	[N=47]		[N=724]			
Test of difference (A - B)						
t -test		Wilcoxon z -test	0.11	0.02**	0.03**	0.13
Panel C: CAR (-5, 5) Classified by Finance Experience of Directors Designated by Block Acquirers						
Acquirer has representatives with finance experience on the target's board (A)	0.210***	0.139***	0.095***	0.060***	0.10*	0.04**
	[N=46]		[N=66]			
Acquirer does not have representatives with finance experience on the target's board (B)	0.153***	0.175***	0.145***	0.088***	0.87	0.28
	[N=30]		[N=215]			
Test of difference (A - B)						
t -test		Wilcoxon z -test	0.47	0.94	0.15	0.31
Panel D: CAR (-5, 5) Classified by Industry Experience of Directors Designated by Block Acquirers						
Acquirer has representatives with experience in the target's industry on the target's board (A)	0.287***	0.199***	0.143***	0.055***	0.12	0.01***
	[N=33]		[N=103]			
Acquirer does not have representatives with experience in the target's industry on the target's board (B)	0.112***	0.095***	0.128***	0.091***	0.59	0.83
	[N=43]		[N=178]			
Test of difference (A - B)						
t -test		Wilcoxon z -test	0.07*	0.04**	0.74	0.23

Table 5
OLS Regression of Cumulative Abnormal Returns (-5, 5) for Targets on Explanatory Variables

The sample consists of 1,132 domestic block share acquisitions between 1990 and 2006. We obtain the initial sample of block share acquisitions from the Thomson Financial's Security Data Corporation (SDC) Platinum database. We then identify partial acquisitions in which the acquirers initially held less than 5% of a target firm's outstanding shares and then purchased more than 5% but less than 50% of its outstanding shares. We compute abnormal returns using the market model. We estimate the market model by using 200 trading days of return data ending 21 days before the acquisition announcement. We use the CRSP equally weighted return as a proxy for the market return. The dependent variable is cumulative abnormal returns (-5, 5) for targets. Acquisitions are considered to be private equity acquisition if the acquirer is either a buyout fund or a venture capital fund. Appendix provides a detailed description of the construction of the variables. *p*-values are in parentheses. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Independent Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Private equity acquirer (indicator)</i>	0.053** (0.04)	0.048 (0.22)	0.002 (0.94)	0.018 (0.55)	0.019 (0.51)	0.019 (0.51)	0.035 (0.21)
<i>Acquirer has representatives on the target's board (indicator)</i>		0.023 (0.28)					
<i>Acquirer has representatives with same industry experience on the target's board (indicator)</i>			0.027 (0.33)				
<i>Acquirer has representatives with finance experience on the target's board (indicator)</i>			-0.012 (0.72)				
<i>Operating income / total assets is in the bottom 25% of the sample (indicator)</i>				-0.017 (0.45)			
<i>Profit margin is in the bottom 25% of the sample (indicator)</i>					-0.011 (0.65)		
<i>R&D expenditures / sales is in the top 25% of the sample (indicator)</i>						0.022 (0.33)	
<i>Acquirers designate a new target CEO or chairman (indicator)</i>							-0.044 (0.24)
<i>Private equity acquirer (indicator) × Acquirer has representatives on the target's board (indicator)</i>		-0.002 (0.98)					
<i>Private equity acquirer (indicator) × Acquirer has representatives with same industry experience on the target's board (indicator)</i>			0.115* (0.06)				
<i>Private equity acquirer (indicator) × Acquirer has representatives with finance experience on the target's board (indicator)</i>			0.060 (0.32)				
<i>Private equity acquirer (indicator) × Operating income / total</i>				0.135***			

<i>assets is in the bottom 25% of the sample (indicator)</i>					(0.01)		
<i>Private equity acquirer (indicator) × Profit margin is in the bottom 25% of the sample (indicator)</i>						0.129** (0.02)	
<i>Private equity acquirer (indicator) × R&D expenditures / sales is in the top 25% of the sample (indicator)</i>						0.133** (0.02)	
<i>Private equity acquirer (indicator) × Acquirers designate a new target CEO or chairman (indicator)</i>							0.182** (0.02)
<i>Prior stock return</i>	-0.080*** (0.00)	-0.080*** (0.00)	-0.080*** (0.00)	-0.083*** (0.00)	-0.080*** (0.00)	-0.078*** (0.00)	-0.075*** (0.00)
<i>Operating income / total assets</i>	-0.033 (0.17)	-0.032 (0.18)	-0.030 (0.22)		-0.004 (0.89)	0.009 (0.75)	-0.035 (0.16)
<i>Log of book value of total assets</i>	-0.010* (0.06)	-0.009* (0.07)	-0.010** (0.05)	-0.012** (0.02)	-0.011** (0.04)	-0.010** (0.04)	-0.010* (0.06)
<i>Leverage</i>	0.072** (0.05)	0.069* (0.06)	0.067* (0.07)	0.076** (0.04)	0.074** (0.04)	0.085** (0.02)	0.061 (0.10)
<i>Tobin's q</i>	-0.002 (0.59)	-0.002 (0.56)	-0.002 (0.57)	-0.000 (0.93)	-0.001 (0.82)	-0.002 (0.58)	-0.001 (0.84)
<i>Percent of shares acquired</i>	0.089 (0.28)	0.044 (0.63)	0.067 (0.43)	0.095 (0.25)	0.112 (0.17)	0.113 (0.17)	0.110 (0.25)
<i>Holding period of block shares is longer than three years (indicator)</i>	0.005 (0.78)	0.001 (0.96)	0.006 (0.75)	0.004 (0.84)	0.003 (0.87)	0.005 (0.80)	0.004 (0.84)
<i>Acquirer and target are in the same 2-digit industry (indicator)</i>	0.052** (0.02)	0.052** (0.02)	0.051** (0.02)	0.054** (0.01)	0.057** (0.01)	0.053** (0.02)	0.065*** (0.00)
<i>Industry (indicators)</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Year (indicators)</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Intercept</i>	0.069 (0.11)	0.068 (0.12)	0.077* (0.08)	0.081* (0.07)	0.073* (0.09)	0.063 (0.15)	0.084* (0.06)
Adjusted R ²	0.1001	0.0995	0.1048	0.1028	0.1069	0.1091	0.1068
F-value	4.800***	4.550***	4.550***	4.790***	4.760***	4.850***	4.590***
No. of observations	1,093	1,093	1,093	1,093	1,070	1,070	1,023

Table 6
Industry-Adjusted Median Changes in Post-Acquisition Operating Performance (EBITDA / Sales) of Targets

The sample consists of 1,132 domestic block share acquisitions between 1990 and 2006. We obtain the initial sample of block share acquisitions from the Thomson Financial's Security Data Corporation (SDC) Platinum database. We then identify partial acquisitions in which the acquirers initially held less than 5% of a target firm's outstanding shares and then purchased more than 5% but less than 50% of its outstanding shares. Operating performance is measured as the ratio of operation income (EBITDA) to total sales. Industry-adjusted operating performance is estimated by subtracting the median four-digit SIC industry operating performance from each firm's raw operating performance. Acquisitions are considered to be private equity acquisition if the acquirer is either a buyout fund or a venture capital fund. The first and second numbers in parentheses denote the number of total observations and the number of observations with positive operating performance, respectively. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Year -2 to Year -1	Year -1 to Year +1	Year -1 to Year +2	Year -1 to Year +3
By acquirer type (using a full sample)				
Non-private equity acquisitions	-0.53% (919;428)	-0.60% (763;365)	-0.18% (681;336)	-0.03% (604;301)
Private equity acquisitions	-0.30% (107;53)	0.42% (101;51)	1.35% (92;49)	2.47% (80;44)*
By private equity acquirer' board representation (using a subsample of private equity acquisitions)				
Without board representations	0.30% (39;22)	1.35% (39;20)	-1.71% (37;16)	0.24% (29;15)
With board representations	-0.76% (68;31)	0.00% (62;31)	2.59% (55;33)*	3.22% (51;29)*
By private equity acquirer-appointed directors' past work experience (using a subsample of private equity acquisitions)				
Directors have industry experience in the target's industry	-0.53% (29;14)	8.01% (23;13)	23.88% (19;16)***	30.37% (19;13)**
Directors have finance experience	-0.21% (42;21)	-0.46% (39;19)	1.03% (33;18)	-2.89% (30;14)
By change in CEO equity ownership from year -1 to year +3 (using a subsample of private equity acquisitions)				
Above sample median	-1.03% (41;17)	-0.47% (40;19)	3.91% (37;21)	2.99% (34;21)*
Below sample median	2.37% (27;18)*	-0.46% (31;14)	0.36% (29;15)	-0.29% (24;11)
By change in industry-adjusted leverage ratio from year -1 to year +3 (using a subsample of private equity acquisitions)				
Above sample median	-0.30% (51;25)	2.38% (47;27)	2.28% (46;23)	3.32% (38;21)
Below sample median	-0.49% (55;27)	-2.11% (54;24)	1.30% (49;26)	0.95% (43;23)

Table 7
Median Regression of Change in Industry-adjusted Post-Acquisition Operating Performance (EBITDA / Sales) of Targets on Explanatory Variable

The sample consists of 1,132 domestic block share acquisitions between 1990 and 2006. We obtain the initial sample of block share acquisitions from the Thomson Financial's Security Data Corporation (SDC) Platinum database. We then identify partial acquisitions in which the acquirers initially held less than 5% of a target firm's outstanding shares and then purchased more than 5% but less than 50% of its outstanding shares. The dependent variable is the change in industry-adjusted operating performance (EBITDA/sales) for targets from year -1 to year +3, relative to the acquisition announcement year (year 0) of block ownership. For 96 targets whose information on operating performance from year -1 to year +3 is not available, we use target industry-adjusted operating performance from year -1 to year +2 as the dependent variable. The industry-adjusted operating performance is estimated by subtracting the median same 4-digit SIC industry operating performance from each firm's raw operating performance. Acquisitions are considered to be private equity acquisition if the acquirer is either a buyout fund or a venture capital fund. Appendix provides a detailed description of the construction of the variables. *p*-values are in parentheses. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Independent Variables	(1)	(2)	(3)	(4)	(5)	(6)
<i>Private equity acquirer (indicator)</i>	0.039** (0.03)	-0.018 (0.45)	0.023 (0.41)	0.009 (0.74)	0.017 (0.43)	0.028 (0.20)
<i>Acquirer has representatives on the target's board (indicator)</i>		0.027** (0.04)				
<i>Acquirer has representatives with same industry experience on the target's board (indicator)</i>			0.039* (0.10)			
<i>Acquirer has representatives with finance experience on the target's board (indicator)</i>			-0.002 (0.93)			
<i>Operating income / total assets is in the bottom 25% of the sample (indicator)</i>				0.221*** (0.00)		
<i>Profit margin is in the bottom 25% of the sample (indicator)</i>					0.097*** (0.00)	
<i>R&D expenditures / sales is in the top 25% of the sample (indicator)</i>						-0.037** (0.04)
<i>Private equity acquirer (indicator) × Acquirer has representatives on the target's board (indicator)</i>		0.062** (0.05)				
<i>Private equity acquirer (indicator) × Acquirer has representatives with same industry experience on the target's board (indicator)</i>			0.149*** (0.01)			
<i>Private equity acquirer (indicator) × Acquirer has representatives with finance experience on the target's board (indicator)</i>			0.019 (0.71)			
<i>Private equity acquirer (indicator) × Operating income / total assets is in the bottom 25% of the sample (indicator)</i>				0.347*** (0.00)		
<i>Private equity acquirer (indicator) × Profit margin is in the bottom 25% of the sample (indicator)</i>					0.222*** (0.00)	
<i>Private equity acquirer (indicator) × R&D expenditures / sales is in</i>						0.096**

<i>the top 25% of the sample (indicator)</i>						(0.02)
<i>Prior stock performance</i>	-0.005 (0.57)	-0.006 (0.45)	-0.005 (0.63)	0.006 (0.64)	-0.007 (0.49)	-0.008 (0.39)
<i>Operating income / total assets</i>	-0.538*** (0.00)	-0.544*** (0.00)	-0.532*** (0.00)		-0.441*** (0.00)	-0.563*** (0.00)
<i>Log of book value of total assets</i>	0.008** (0.04)	0.008** (0.02)	0.007 (0.12)	0.009* (0.10)	0.011*** (0.00)	0.011*** (0.01)
<i>Leverage</i>	-0.072*** (0.01)	-0.078*** (0.00)	-0.076** (0.02)	-0.057 (0.13)	-0.082*** (0.00)	-0.086*** (0.00)
<i>Tobin's q</i>	0.001 (0.87)	-0.004 (0.16)	0.002 (0.60)	-0.000 (0.96)	-0.003 (0.47)	-0.001 (0.84)
<i>Percent of shares acquired</i>	-0.111* (0.07)	-0.207*** (0.00)	-0.107 (0.16)	-0.072 (0.41)	-0.053 (0.41)	-0.112* (0.08)
<i>Holding period of block shares is longer than three years (indicator)</i>	0.011 (0.35)	0.005 (0.97)	0.006 (0.69)	0.008 (0.66)	0.004 (0.74)	0.008 (0.55)
<i>Acquirer and target are in the same 2-digit industry (indicator)</i>	-0.001 (0.95)	-0.000 (0.97)	-0.003 (0.88)	0.015 (0.53)	-0.001 (0.96)	-0.008 (0.65)
<i>Industry (indicators)</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Year (indicators)</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Intercept</i>	0.036 (0.24)	0.044 (0.11)	0.029 (0.42)	-0.050 (0.26)	0.014 (0.65)	0.031 (0.32)
Pseudo R ²	0.0058	0.0061	0.0060	0.0038	0.0069	0.0065
No. of observations	780	780	780	780	772	772

Table 8**Tobit Regression Estimates of the Board Representation Ratio**

The sample consists of 1,132 domestic block share acquisitions between 1990 and 2006. We obtain the initial sample of block share acquisitions from Thomson Financial's Security Data Corporation (SDC) Platinum database. We then identify partial acquisitions in which the acquirers initially held less than 5% of a target firm's outstanding shares and then purchased more than 5% but less than 50% of its outstanding shares. The dependent variable is the board representation ratio in targets by block acquirers. Acquisitions are considered to be private equity acquisition if the acquirer is either a buyout fund or a venture capital fund. Appendix provides a detailed description of the construction of the variables. *p*-values are in parentheses. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	# of Acquirer-Appointed Directors / Total # of Directors		# of Acquirer-Appointed Directors with Finance Experience / Total # of Directors		# of Acquirer-Appointed Directors with Industry Experience in the Target's Industry / Total # of Directors			
Independent Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Private equity acquirer:</i> (indicator)	0.254*** (0.00)	0.178*** (0.00)	0.333*** (0.00)	0.259*** (0.00)	0.283*** (0.00)	0.081 (0.14)	0.036 (0.54)	0.081 (0.14)
<i>Operating income / total assets is in the bottom 25% of the sample</i> (indicator)			-0.006 (0.90)			0.094** (0.04)		
<i>Prior stock performance is in the bottom 25% of the sample (indicator)</i>				-0.046 (0.27)				
<i>High cash flow and low Tobin's q</i> (indicator)					-0.065 (0.15)			
<i>Profit margin is in the bottom 25% of the sample (indicator)</i>							0.070 (0.13)	
<i>R&D expenditures / sales is in the top 25% of the sample (indicator)</i>								-0.011 (0.83)
<i>Private equity acquirer:</i> (indicator) $\times$ <i>Operating income / total assets is in the bottom 25% of the sample (indicator)</i>			-0.050 (0.52)			0.184** (0.04)		
<i>Private equity acquirer:</i> (indicator) $\times$ <i>Prior stock</i> <i>performance is in the bottom 25% of the sample (indicator)</i>				0.214*** (0.00)				
<i>Private equity acquirer:</i> (indicator) $\times$ <i>High cash flow and low Tobin's q (indicator)</i>					0.122* (0.10)			
<i>Private equity acquirer:</i> (indicator) $\times$ <i>Profit margin is in the bottom 25% of the sample (indicator)</i>						0.291*** (0.00)		
<i>Private equity acquirer:</i> (indicator) $\times$ <i>R&D expenditures / sales is in the top 25% of the sample (indicator)</i>								0.220** (0.02)
<i>Prior stock return</i>	-0.014 (0.50)	0.010 (0.56)	0.024 (0.26)		0.022 (0.30)	0.022 (0.37)	0.011 (0.66)	0.014 (0.58)
<i>Operating income / total assets</i>	-0.010 (0.79)	-0.025 (0.41)		0.158** (0.02)			-0.036 (0.45)	-0.084* (0.07)
<i>Log of book value of total assets</i>	-0.051***	-0.019***	-0.028***	-0.038***	-0.023**	-0.003	-0.006	-0.007

	(0.00)	(0.01)	(0.01)	(0.00)	(0.02)	(0.76)	(0.60)	(0.51)
<i>Leverage</i>	0.298***	0.103**	0.203***	0.206***	0.220***	0.028	0.037	0.016
	(0.00)	(0.04)	(0.00)	(0.00)	(0.00)	(0.71)	(0.64)	(0.84)
	0.001	0.003	-0.001	0.003		-0.009	-0.011	-0.008
<i>Tobin's q</i>	(0.91)	(0.62)	(0.86)	(0.74)		(0.31)	(0.27)	(0.42)
		1.562***	1.072***	1.030***	1.048***	1.041***	1.053***	1.045***
<i>Percent of shares acquired</i>		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
		0.141***	0.106***	0.102***	0.114***	0.119***	0.113***	0.112***
<i>Holding period of block shares is longer than three years (indicator)</i>		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
		0.022	-0.075	-0.069	-0.072	0.092**	0.072	0.071
<i>Acquirer and target are in the same 2-digit industry (indicator)</i>		(0.46)	(0.12)	(0.14)	(0.12)	(0.03)	(0.10)	(0.11)
<i>Industry (indicators)</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Year (indicators)</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	-0.044	-0.349***	-0.520***	-0.525***	-0.530***	-0.544***	-0.519***	-0.504***
<i>Intercept</i>	(0.51)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Pseudo R ²	0.1401	0.4056	0.4283	0.4330	0.4319	0.2617	0.2745	0.2537
No. of observations	1,094	1,094	1,025	1,025	1,033	1,025	1,005	1,005

Table 9
Logit Regression Estimates of the Likelihood of Nonroutine Top Executive Turnover

The sample consists of 1,132 partial block share acquisitions between 1990 and 2006. We obtain the initial sample of block share acquisitions from the Thomson Financial's Security Data Corporation (SDC) Platinum database. We then identify partial acquisitions in which the acquirers initially held less than 5% of a target firm's outstanding shares and then purchased more than 5% but less than 50% of its outstanding shares. We define the top executive as the CEO. If a firm does not have a CEO, we use the chairman of the board as the top executive. Otherwise, the top executive is defined as the president. Following Denis, Denis, and Sarin (1997) and Kang and Kim (2008), we refer to turnover events in which the top executive is removed due to death, illness, or other nongovernance-related reasons over the three years from the acquisition date as routine turnover. We classify a management change as normal if the stated reason for the change is retirement and the retiring manager is between the ages of 64 and 66. We refer to all other turnover events as nonroutine turnover. The dependent variable takes the value of one if nonroutine top management turnover occurs and zero otherwise. Acquisitions are considered to be private equity acquisition if the acquirer is either a buyout fund or a venture capital fund. Appendix provides a detailed description of the construction of the variables. *p*-values are in parentheses. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Independent Variables	(1)	(2)	(3)	(4)	(5)
<i>Prior stock return</i>	-0.535*** (0.00)	-0.500*** (0.00)	-0.454*** (0.00)	-0.536*** (0.00)	-0.473*** (0.00)
<i>Private equity acquirer (indicator)</i>		0.252 (0.32)			
<i>Prior stock return × Private equity acquirer (indicator)</i>		-0.270 (0.50)			
<i>PE acquirer has representatives with finance experience on the target's board (indicator)</i>			0.591 (0.16)		0.573 (0.22)
<i>Prior stock return × PE acquirer has representatives with finance experience on the target's board (indicator)</i>			-1.363** (0.05)		-2.090** (0.02)
<i>PE acquirer has representatives with same industry experience on the target's board (indicator)</i>				0.325 (0.49)	0.105 (0.85)
<i>Prior stock return × PE acquirer has representatives with same industry experience on the target's board (indicator)</i>				0.042 (0.95)	1.464 (0.12)
<i>Operating income / total assets</i>	-0.769*** (0.01)	-0.756*** (0.01)	-0.780*** (0.01)	-0.748*** (0.01)	-0.732*** (0.01)
<i>Log of book value of total assets</i>	0.040 (0.46)	0.031 (0.57)	0.027 (0.62)	0.038 (0.49)	0.027 (0.62)
<i>Leverage</i>	-0.560 (0.15)	-0.554 (0.15)	-0.636 (0.10)	-0.569 (0.14)	-0.638 (0.10)
<i>Tobin's q</i>	-0.063 (0.20)	-0.064 (0.19)	-0.071 (0.15)	-0.062 (0.20)	-0.067 (0.17)
<i>Percent of shares acquired</i>	6.711*** (0.00)	6.569*** (0.00)	6.465*** (0.00)	6.680*** (0.00)	6.524*** (0.00)
<i>Holding period of block shares is longer than three years (indicator)</i>	0.982*** (0.00)	0.971*** (0.00)	0.970*** (0.00)	0.982*** (0.00)	0.966*** (0.00)
<i>Acquirer and target are in the same 2-digit industry (indicator)</i>	0.118 (0.58)	0.166 (0.45)	0.173 (0.42)	0.131 (0.54)	0.169 (0.43)
<i>Age of top executive</i>	0.031*** (0.00)	0.031*** (0.00)	0.032*** (0.00)	0.031*** (0.00)	0.031*** (0.00)
<i>Tenure of top executive</i>	0.003 (0.80)	0.004 (0.74)	0.004 (0.72)	0.003 (0.79)	0.004 (0.74)
<i>Founder (indicator)</i>	-0.031	-0.064	-0.108	-0.040	-0.097

	(0.88)	(0.77)	(0.62)	(0.85)	(0.66)
<i>Industry (indicators)</i>	Yes	Yes	Yes	Yes	Yes
<i>Year (indicators)</i>	Yes	Yes	Yes	Yes	Yes
<i>Intercept</i>	-3.909***	-3.894***	-3.833***	-3.903***	-3.834***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Pseudo R^2	0.1655	0.1670	0.1741	0.1659	0.1765
No. of observations	1,002	1,002	1,002	1,002	1,002

Table 10
Heckman Two-Step Regression: Controlling for Endogeneity of Target Selection

The sample consists of 1,132 domestic block share acquisitions between 1990 and 2006. We obtain the initial sample of block share acquisitions from the Thomson Financial's Security Data Corporation (SDC) Platinum database. We then identify partial acquisitions in which the acquirers initially held less than 5% of a target firm's outstanding shares and then purchased more than 5% but less than 50% of its outstanding shares. A two-step regression described in Heckman (1979) is used to address the self-selection issue. The instrumental variable (*IV*) is the number of PE deals in a 4-digit SIC industry from year -5 to year 0 (announcement year) excluding the sample deal itself divided by the number of publicly listed firm in the same 4-digit SIC industry in Compustat in year 0. Acquisitions are considered to be private equity acquisition if the acquirer is either a buyout fund or a venture capital fund. Appendix provides a detailed description of the construction of the variables. *p*-values are in parentheses. The symbols *, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

	Selection Equation		Outcome Equation			Selection Equation	Outcome Equation
	PE Indicator	# of Acquirer-Appointed Directors / Total # of Directors	# of Acquirer-Appointed Directors with Finance Experience / Total # of Directors	# of Acquirer-Appointed Directors with Industry Experience in the Target's Industry / Total # of Directors		PE-Appointed Director with Finance Experience (Indicator)	Nonroutine Top Executive Turnover (Indicator)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>IV</i>	0.317** (0.04)					0.339** (0.03)	
<i>Private equity acquirer (indicator)</i>		0.430* (0.09)	0.356 (0.32)	1.017*** (0.00)	1.173*** (0.00)		
<i>High cash flow and low Tobin's q (indicator)</i>			-0.064 (0.17)				
<i>R&D expenditures / sales is in the top 25% of the sample (indicator)</i>					-0.001 (0.98)		
<i>Private equity acquirer (indicator) × High cash flow and low Tobin's q (indicator)</i>			0.123* (0.09)				
<i>Private equity acquirer (indicator) × R&D expenditures / sales is in the top 25% of the sample (indicator)</i>					0.256*** (0.00)		
<i>PE acquirer has representatives with finance experience on the target's board (indicator)</i>							0.361 (0.20)
<i>Prior stock performance</i>	-0.017 (0.83)	0.010 (0.49)	0.023 (0.22)	0.023 (0.30)	0.010 (0.63)	-0.083 (0.52)	-0.259*** (0.00)
<i>finance experience on the target's board (indicator) × Prior stock performance</i>							-0.841** (0.02)
<i>Operating income / total assets</i>	-0.183 (0.23)	-0.015 (0.66)		-0.039 (0.25)		0.364 (0.43)	-0.427*** (0.00)
<i>Log of book value of total assets</i>	0.054* (0.05)	-0.021*** (0.01)	-0.024** (0.02)	-0.017 (0.12)	-0.020* (0.06)	0.024 (0.57)	0.003 (0.91)
<i>Leverage</i>	0.057 (0.79)	0.096* (0.05)	0.210*** (0.00)	-0.025 (0.73)	0.009 (0.90)	0.848*** (0.00)	-0.349 (0.11)
<i>Tobin's q</i>	0.006 (0.78)	0.002 (0.59)		-0.007 (0.37)		0.041 (0.10)	-0.038 (0.16)
<i>Percent of shares acquired</i>		1.558*** (0.00)	1.052*** (0.00)	1.019*** (0.00)	1.030*** (0.00)		3.839*** (0.00)
<i>Holding period of block shares is</i>		0.141***	0.108***	0.118***	0.113***		0.565***

<i>longer than three years (indicator)</i>		(0.00)	(0.00)	(0.00)	(0.00)		(0.00)
<i>Acquirer and target are in the</i>		0.022	-0.077*	0.087**	0.076*		0.092
<i>same2-digit industry (indicator)</i>		(0.47)	(0.10)	(0.04)	(0.08)		(0.46)
<i>Age of top executive</i>							0.016***
							(0.00)
<i>Tenure of top executive</i>							0.000
							(0.97)
<i>Founder (indicator)</i>							-0.100
							(0.40)
<i>λ, Inverse Mill's Ratio</i>		-0.133	-0.035	-0.466***	-0.592***		-0.010
		(0.31)	(0.85)	(0.00)	(0.00)		(0.89)
<i>Industry (Indicators)</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Year (Indicators)</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Constant</i>	-1.608***	-0.3585***	-0.5380***	-0.536***	-0.566***	-2.981***	-2.233***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Log-likelihood	-355.2	-318.6	-150.0	-223.2	-215.9	-164.2	-481.9
Pseudo R^2	0.0561	0.4052	0.4293	0.2511	0.2603	0.1252	0.1733
No. of observations	1093	1092	1023	1023	1003	1093	1001

Appendix Definitions of Variables

This appendix shows detailed descriptions of the construction of all the variables used in the tables.

Variable name	Definition
Age of top executive	Age of top executive in the year before the partial acquisition.
Acquirer and target are in the same 2-digit industry (indicator)	One if the acquirer's two-digit SIC code is the same as the target's two-digit SIC code and zero otherwise.
Acquirers designate a new target CEO or chairman (indicator)	One if the acquirer designate a CEO or chairman in the target during the block ownership holding period (up to three years after the block share purchase) and zero otherwise.
Acquirer has representatives on the target's board (indicator)	One if the acquirer has board representation on the target's board during the block ownership holding period (up to three years after the block share purchase) and zero otherwise.
(PE) Acquirer has representatives with finance experience on the target's board (indicator)	One if the (PE) acquirer places a director with finance experience on the target's board and zero otherwise. The director is considered to have finance experience if: (1) the director has been an officer in a finance service company with a position higher than or equivalent to vice president or director, including the general partner of a private investment firm, or (2) the director has been a CFO or a treasurer in any company.
(PE) Acquirer has representatives with same industry experience on the target's board (indicator)	One if the (PE) acquirer places a director with experience in the target's industry on the target's board and zero otherwise. The director is considered to have target industry expertise if: (1) the director has worked for other companies in the same two-digit SIC industry as the target, or (2) the director has been a board member of such companies.
Board representation ratio	Number of members of the board of directors appointed by acquirers / total number of members of the board of directors in target during the block ownership holding period (up to three years after the block share purchase).
Change in industry-adjusted post-acquisition operating performance (EBITDA / Sales) of targets from year -1 to year +3	Change in industry-adjusted operating performance (EBITDA/sales) for targets from year -1 to year +3, relative to the acquisition announcement year (year 0) of block ownership. The industry-adjusted operating performance is estimated by subtracting the median same 4-digit SIC industry operating performance from each firm's raw operating performance.
Change in leverage ratio from year -1 to year +3	Change in leverage ratio from year -1 to year +3, relative to the acquisition announcement year (year 0) of block ownership. The leverage is estimated as total debt divided by the sum of market value of equity and book value of debt.
Change in the proportion of option and stock awards in total CEO compensation from year -1 to year +3	Change in the ratio of options and stocks (both restricted and unrestricted) awarded to the CEO to total CEO compensation, from year -1 to year +3.
Change in CEO equity ownership from year -1 to year +3	Change in the CEO equity ownership in the target, including stocks, vested options and vested warrants, and convertible preferred stocks and bonds, in percentage of total number of shares outstanding, from year -1 to year +3.
Founder (indicator)	One if the top executive is the founder of the firm and zero otherwise. We define founders as those top executives who are described as founders in the proxy statement or annual statement, or those who have held the position of top executive since the inception of the firm.
High free cash flow and low Tobin's q (indicator)	One if the ratio of target cash flow to total assets is above the sample median and its Tobin's q is below the sample median.

Holding period of block shares is longer than three years (indicator)	One if the acquirer holds block shares for longer than 3 years after the partial acquisition and zero otherwise.
Industry (indicators)	One if the firm operate in one of industries used in Panel B of Table 1 and zero otherwise.
IV	Instrumental variable, which is the average number of PE deals in a 4-digit SIC industry during year -5 to year 0 (announcement year) excluding the sample deal itself divided by the number of publicly listed firms in the same 4-digit SIC industry in Compustat in year 0.
λ , <i>Inverse Mill's Ratio</i>	The sum of λ_1 (inverse Mill's ratio term for PE acquirers) and λ_2 (inverse Mill's ratio term for non-PE acquirers), as in Campa and Kedia (2002).
Leverage	Total debt / market value of equity plus book value of debt.
Log of book value of total assets	Log (total assets)
Nonroutine top executive turnover (indicator)	One if nonroutine top executive turnover event occurs in a certain year and zero otherwise. We define the top executive as the CEO. If a firm does not have a CEO, we use the chairman of the board as the top executive. Otherwise, the top executive is defined as the president. Following Denis, Denis, and Sarin (1997) and Kang and Kim (2008), we refer to turnover events in which the top executive is removed due to death, illness, or other nongovernance-related reasons over the three years from the acquisition date as routine turnover. We classify a management change as normal if the stated reason for the change is retirement and the retiring manager is between the ages of 64 and 66. We refer to all other turnover events as nonroutine turnover.
Operating income / total assets	Earnings before interest, taxes, depreciation, and amortizations / total assets
Percent of shares acquired	The percent of shares acquired at the transaction date.
Prior stock return	Four-digit SIC industry mean-adjusted return for the past one year before the block acquisition
Private equity acquirer (indicator)	One if the acquirer is either a buyout fund or a venture capital fund and zero otherwise.
R&D expenditures / sales	R&D expenses divided by sales.
Tenure of top executive	The number of years that the current top executive serves as a CEO as of the year before the partial acquisition.
Tobin's q	Market value of equity plus book value of debt / book value of total assets.
Year (indicators)	One if the block acquisition takes place in certain calendar year and zero otherwise.