Do Acquisitions by Private Equity Funds Create Value? Evidence from Acquisitions in Korea

Hyewon Seo* and Hyun Seung Na**

This research investigates the performance and sources of value gains of acquisitions by private equity (PE) fund investors using a sample of Korean listed firms acquired in the period from 2007 to 2017. Our sample includes both full acquisitions in which acquirers obtain the largest target ownership and block acquisitions in which acquirers purchase at least 5% of target shares without becoming its largest shareholder. We find significant and positive stock market reactions to both types of acquisitions by PE funds. We also find operating performance improvement following full acquisitions by PE funds. Moreover, the improved post-acquisition performance is more pronounced in PE fund targets that appoint new outside directors or those with finance experiences after full acquisitions. These results suggest that acquisitions by PE funds create value for shareholders mainly by governance and operational engineering and this value enhancement is more evident when PE funds obtain full controls over acquisition targets.

* JB Asset Management
** Korea University Business School

1. Introduction

There have been many studies on the relationship between investments of private equity (PE) funds and firm performance. Specifically, several studies find that PE funds improve overall stock and operating performance (Smith, 1990; Smart and Waldfogel,1994; Kaplan and Stromberg, 2009; Guo, Hotchkiss, and Song, 2007). However, even though PE funds play increasingly important roles in the takeover market in Korea, possibly due to a comparatively short history of PE funds in Korea, there are surprisingly few findings regarding the effects of PE fund investments on firm value and thus we know very little about how Korean PE funds affect corporate performance. Moreover, to the best of our knowledge, there is no research about the sources of value gains in acquisitions by Korean PE funds.

There are a couple of benefits to employ Korean data in investigating whether PE funds create value for shareholders due to unique features of PE funds in Korea relative to using data in other countries prior studies have mainly focused on. To examine the impact of PE funds on firms based on publicly available data, many studies conducted based on other country data use samples of public-to-private transactions or deals after the exit of PE funds (Kaplan, 1989b; Smith, 1990; Guo, Hotchkiss, and Song, 2007). Since public firms get delisted after being acquired by PE funds in general, information such as financial statements is not publicly available until those target firms get listed in the stock market again a while later or PE funds themselves release their performance reports. To overcome this data limitation, there have been several efforts to analyze the roles of PE funds by using the sample of their block share acquisitions in which the information on post-acquisition performance and policy changes is publicly available (Chen et al., 2014; Mietzner and Schweizer, 2014). In contrast, in Korea, it is quite rare for PE funds to let the targets delisted after their acquisitions. Rather, even after PE funds acquire the largest ownership of target firms, targets usually remain in the stock market as public firms. Therefore, we can observe how firm performance changes and what specific changes are made in PE fund targets after acquisitions.

Another benefit of using Korean data is associated with identifying PE funds, since it is usually quite hard to identify PE funds in many other countries. For instance, to identify PE funds Chen et al.

(2014) search various information sources such as *Factiva*, *Google*, news articles, and websites of each fund. In comparison, in Korea, the list of PE funds is readily available from Financial Supervisory Service (FSS) since PE funds are legally obligated to report to FSS within two weeks following their establishment, which enables us to identify PE funds more accurately and conveniently. Therefore, by examining PE funs in the Korean market, we are able to investigate specifically and accurately how PE funds are involved with target management and how they influence firms' operational, financial, and governance policies.

Since the 1998 East-Asian financial crisis, there were massive corporate restructurings of firms with poor performance and governance in Korea and thus international PE funds obtained significant gains by acquiring many domestic firms and financial institutions. In response, from 2004 Korean government has tried to grow domestic PE funds, and thus the PE fund industry expanded rapidly and reached the growth phase after going through the preparation stage in 2004 to 2007 and the introduction stage in 2008 to 2011 (Lee, 2019). In particular, in 2015, the PE fund-related institutional system was reorganized to revitalize PE funds, which boosted the PE fund market more. As of the end of 2019, the number of domestic PE funds was 721, their aggregate contract amount was 84.3 trillion won, and their total fulfillment amount was 61.7 trillion won (Cho and Pyo, 2019).

In this study, we examine the impact of PE fund investments on firm performance and policy changes using a sample of acquisitions of publicly held firms targeted by PE funds in Korea from 2007 to 2017. We classify the total sample of acquisitions into full acquisitions and block share acquisitions. While the acquisitions by which acquirers obtain the largest ownership of targets are classified into full acquisitions, we classify as block share acquisitions the transactions by which acquirers attain at least 5% target ownership that is not the largest. To investigate how specifically PE funds attempt to create value, we follow Kaplan and Stromberg (2009) and Chen et al. (2014) to classify the sources of value gains by acquisitions into governance, financial, and operational engineering.

To examine the effects of acquisitions by PE funds on the wealth of shareholders, this study first analyzes how the stock market reacts to PE fund acquisitions. Second, to investigate the long-term post-

acquisition performance, we look into targets' operating performance measured by the ratio of EBITDA to total assets and buy-and-hold returns (BHRs) after acquisitions. Third, we examine firm policy changes relevant to each engineering activity the literature identifies as a specific strategy PE funds typically adopt.

The main results in this paper are as follows. First, we find positive and significant announcement returns to both full and block share acquisitions by PE funds. Second, we find a significant increase in long-term operating performance from the year before to three years after the full acquisitions by PE funds. However, there is no significant operating performance improvement found following block share acquisitions by PE funds. Third, we find weak evidence of governance engineering by showing that dividend payout ratios and cash holdings increase following acquisitions by PE funds. Moreover, in full acquisitions, we find that the targets of PE funds, particularly those that appoint new outside directors or directors with expertise in finance, experience higher post-acquisition operating performance than non-PE fund targets.

This study contributes to the literature of PE funds in Korea. Previous studies in Korea have limited findings regarding acquisitions by PE funds in that they focus only on the early period after the PE fund introduction and the number of sample firms examined is relatively small. To the best of our knowledge, this is the first research that explicates how PE funds are involved with target board composition and how newly elected directors after acquisitions by PE funds influence target firms' long-term performance using Korean data. In addition, by considering both full acquisitions and block share acquisitions and comparing between them, this study attempts to provide extensive empirical results on acquisitions by PE funds. Moreover, we contribute to the literature of PE funds by documenting specific changes PE funds make in targets after full acquisitions.

The paper is organized as follows. Section 2 reviews the previous literature of PE funds and Section 3 develops the hypotheses this study tests. Section 4 describes the data and methodology, and Section 5 shows the characteristics of targeted firms and deals in our sample. Sections 6 and 7 present the empirical results. Finally, Section 8 explains the additional results and Section 9 concludes.

2. Literature Review

2.1. Performance of target firms

There is extensive literature on the operating performance of companies targeted by PE funds. By using a sample of management buyouts completed between 1980 and 1986, Kaplan (1989b) finds that the ratio of operating income to sales and that of cash flow to sales increase but the ratio of capital expenditure to sales declines. He argues that the operating performance improvement and value increase result from enhanced incentives rather than a wealth transfer from employees by reducing employment substantially. Similarly, Smith (1990) investigates 58 management buyout transactions and finds that their operating performances measured by operating cash flows per employee and per dollar of operating assets increase significantly. Lichtenberg and Siegel (1990) also find a significant increase in total factor productivity after leveraged buyouts. The empirical findings on leveraged buyouts and PE funds in Europe are consistent with the U.S. results. Harris, Siegel, and Wright (2005) assess plant-level data from the U.K. and show that plants experience a substantial increase in productivity after management buyouts, implying that management buyouts cut agency costs and enhance economic efficiency. However, more recent public-to-private transactions show a somewhat different trend. For example, Guo et al. (2007) examine 94 U.S public-to-private transactions and find modest increases in operating performance and smaller cash flow margins compared to those documented in 1980's, although they find high investor returns. For the modest operating improvements in more recent years, Archarya and Kehoe (2009) and Weir, Jones and Wright (2015) also find similar results in deals in the U.K.

Despite the extensive studies on PE funds in the U.S. and European, there are only several studies conducted on the impact of PE funds on target firms in Korea. Kim and Cho (2009) examine market reactions to PE fund investments by using 29 acquisitions as a sample that includes PE funds and M&A funds as acquirers. They show that the current ratio and profit margin are positively and negatively

associated with the announcement returns of target firms, respectively. More recently, Song (2015) conducts event studies of 43 publicly listed companies that receive PE fund investments and finds that PE funds help improve their business performance. Kim, Lee, and Lee (2015) also conduct a survey on 71 fund managers and document that a takeover strategy, ownership in entry strategy, and aggressive operation strategy improve corporate performance. In addition, Koo (2016) investigates whether Korean PE funds increase the operating performance levels of their targeted firms by using a sample of 70 PE fund investments and finds that profitability measured by ROA, ROE, ROS and sales growth of target companies does not increase significantly. This study concludes that PE funds in Korea are not acting as buyout funds, but rather they invest in relatively younger firms.

2.2. Sources of value gains in acquisitions by PE funds

Jensen (1989) and Kaplan and Stromberg (2009) argue that PE funds apply various sets of changes they categorize as governance, financial, and operational engineering. Kaplan and Stromberg (2009) describe governance engineering as an activity that PE funds control the boards of their portfolio companies and monitor them to improve their value. Regarding this strategy, Gertner and Kaplan (1996) and Cornell and Karakas (2008) show that portfolio firms of PE funds have relatively small boards. Cornelli and Karkas (2008) also show that the likelihood of CEO turnovers is high for firms targeted by PE funds. Moreover, Acharya and Kehoe (2009) report that firms targeted by PE funds have more frequent board meetings and are more likely to replace poorly performing management.

Financial engineering facilitates target firms to provide higher incentives or better mechanisms to motivate the managers to maximize shareholder wealth (Kaplan and Stromberg, 2009). Chen et al. (2014) propose that PE funds provide improved incentives with managers by increasing top executives' pay-for-performance sensitivity. For example, managerial stock and option grants can increase managers' motivation to improve overall firm value. In addition, high leverage reduces free cash flow problems caused by excessive managerial discretion and thus induces firms to make efficient investment decisions (Jensen,1986).

Finally, operating engineering refers to industry and operating expertise that PE funds apply to

target firms to generate value (Kaplan and Stromberg, 2009). PE funds often facilitate target firms to hire professionals with experiences in their industry and implement value enhancing plans for target firms. (Gadiesh and MacArthur, 2008; Kaplan and Stromberg, 2009). Acharya, Hahn, and Kehoe (2010) also argue that PE houses create economic value through operational improvements. Specifically, directors who have work experiences in the target's industry help targets generate significantly higher performance. By using their industry and operating knowledge, PE funds identify attractive investments and develop and implement value creation plans.

2.3. Block share acquisitions by PE Funds

Most of the previous studies regarding PE funds mainly focus on their buyout transactions. However, there are several papers regarding minority equity investments by PE funds, which refer to the transactions in which acquirers purchase targets' ownership that is equal to or higher than 5% but does not exceed 50%. For example, Chen et al. (2014) examine the sources of value creation in PE fund minority equity investments and find that PE fund block acquirers are more likely to designate directors on targets' boards, especially directors with industrial or financial experiences. According to their findings, PE fund targets that appoint directors with same industry experiences show more favorable market reactions and operating performance improvement than targets in non-PE fund acquisitions. Mietzner and Schweizer (2014) also analyze block share acquisitions by hedge funds and PE funds using data in Germany and show that block share acquisitions by both types of fund investors experience positive announcement returns, but unlike PE funds hedge funds do not increase shareholder value by lowering agency costs. They also show that long-term stock performance is negatively affected in acquisitions by both PE funds and hedge funds.

3. Hypothesis Development

Based on the literature on PE funds, we develop several testable hypotheses to examine the impact of acquisitions by PE funds on target companies.

3.1 Performance

Mikkelson and Ruback (1985) document that targets whose block shares are acquired by outside investors achieve positive announcement returns. Likewise, various studies associated with shareholder activism report positive market reactions around the block share acquisition announcement. For example, Brav. et al. (2008) and Klein and Zur (2009) find positive market reactions to block share acquisitions by hedge funds. Using Korean data, Kim, Sung and Wei (2017) and Bang, Kim, and Na (2021) find that the stock market reacts positively to block share acquisitions by foreign institutional investors, especially when the investors declare themselves to be an activist or when they are geographically and culturally more proximate to target firms. In this study, we predict that the stock market reaction is higher to PE fund acquisitions if PE fund investments are regarded as value-enhancing activities than to non-PE fund acquisitions.

(H-1-a) Acquisition announcement returns are higher for PE fund targets than for non-PE fund targets.

Previous studies show that acquisitions by PE funds lead to substantial long-term improvements in performance (Kaplan, 1989b; Lichtenberg and Siegel, 1990; Smith, 1990). In accordance with these findings, we set up the following two hypotheses regarding the effects of PE fund acquisitions on targets' long-run stock and operating performance. Long-term stock returns are measured by market adjusted buy-and-hold returns (BHRs) and long-term operating performance is estimated by the ratio of EBITDA to total assets.

(H-1-b) Long-term stock and operating performances after acquisitions are higher for PE fund targets than for non-PE fund targets.

3.2 Sources of value gains

Governance Engineering

As argued by Jensen (1986), firms with substantial free cash flows can mitigate agency conflicts by increasing dividends, resulting in paying out current cash that otherwise would be wasted by overinvesting in projects with negative present values. Consistently, Lang and Litzennerger (1988) find that an increase in dividends reduces overinvestment and increases market value of firms when managers are overinvesting. In the context of these studies, we suggest the following hypothesis.

(H-2-a) PE fund targets are more likely to decrease cash holdings and increase dividend payouts than non-PEF targets after acquisitions.

Prior studies also show that outside directors have a significantly positive impact on firm performance in Korea and these effects are more evident when outside directors are independent and have no professional ties with the firm (Choi, Park and Yoo, 2007). If PE funds have strong incentives to monitor targets and create value, they are more likely to have their representatives in targets' boards than non-PE fund acquirers. Based on this conjecture, we establish the hypothesis below.

(H-2-b) PE fund acquirers are more likely to appoint outside directors onto targets' boards than non-PE fund acquirers and the board representation of PE funds leads to performance improvement of targets.

Financial engineering

In the context of free cash flow, Jensen (1986) argues that high leverage reduces managerial discretion and facilitates firms to make efficient investment decisions as a disciplinary function of agency costs. High debt also leads to more savings corporate taxes through larger interest deduction (Kaplan, 1989a). These studies suggest the following hypothesis.

(H-2-c) A target's leverage increases after being acquired by PE fund investors.

Operational engineering

By operational engineering strategies, private equity fund acquirers attempt to apply the industry and operating expertise to target firms to create value. For example, Acharya, Hahn, and Kehoe (2010) suggest that PE houses create economic value through appointing directors with experiences in the industry a target firm belongs to. Thus, we investigate PE funds' operating engineering by testing the following hypothesis.

(H-2-d) PE funds are more likely to appoint representatives with industrial or financial experiences onto the target's board than non-PE acquirers and the appointment of such directors contributes to enhanced long-term performance of targets.

Finally, the employee-wealth transfer hypothesis argues that buyouts and takeovers transfer wealth

to investors at the expense of employees by layoffs and wage deductions (Shleifer and Summers, 1988), which is one of the most common criticisms to PE funds. In addition, the reduced-agency-cost hypothesis argues that reducing capital expenditure contributes to improved company profitability and value (Kaplan, 1989a). Accordingly, Smith (1990) finds that capital expenditure to sales decreases after buyouts, but this decline does not lead to increase in operating performance. Therefore, we test the following hypothesis using our Korean data.

(H-2-e) PE fund targets are more likely to cut employees and investments to reduce operational costs than non-PE fund targets are.

4. Data and Methodology

This section describes how we construct the sample of this study, what specific methodology and models are used, and how we define the variables used for this study.

4.1. Sample and data

Our sample consists of all acquisitions by domestic PE funds in Korea over 11 years from 2007 to 2017. We manually collect the information of the acquisitions from Data Analysis, Retrieval, and Transfer System (DART). In Korea, all investors who intend to intervene in management must file a report to FSS within five trading days after acquiring a share ownership of 5% or more of a public company. Changes of holding purposes or ownership changes of more than one percentage point also require subsequent disclosures. Among all the acquisitions from DART, transactions by PE funds are identified by using the list of PE funds provided by FSS that updates the list of PE funds on a quarterly basis. We exclude the transactions whose reasons for reporting are IPOs, mergers, split-offs, or debt-to-equity swaps. If a firm's block shares are consecutively acquired by multiple PE funds within 10 days, we include only the first acquisition in the sample. For the estimation of long-term effects, we consider only the first acquisition if there are following acquisitions within three years after the first acquisition.

We classify acquisitions into two types: block share acquisitions and full acquisitions. While full acquisitions entail switches of the largest shareholders, in block share acquisitions acquirers purchase

blocks of shares of targets but do not obtain the largest ownership. We also construct control samples separately for those two types of acquisitions by PE funds. For block share acquisitions, the control sample is composed of all acquisitions by financial institutions other than PE funds during the sample period. For the control sample of full acquisitions, we find matched acquisitions comparable to the PE fund acquisitions in terms of the target's industry, acquisition year, and acquisition size. Our matching procedure for full acquisitions is as follows. For each firm targeted by a PE fund investor, we find firms in which the largest shareholder changes through acquisitions in the same industry as the sample firm industry using the two-digit KSIC codes during the period from three years before to three years after the sample acquisition year. Second, we exclude the firms if their total assets are smaller than a half of the total assets of the sample firm or more than two times larger than the sample firm' total assets. If there is no firm matched using this size criterion, we extend the search period until we find one. Finally, from these possible matches, we choose the one closest to the sample firm in terms of total assets.

The financial and stock price data are collected from DataGuide, which is offered by FnGuide. The information of director appointments is gathered from DART manually and the information regarding previous experiences of newly appointed directors is collected from TS2000. Finally, we get the data of private equity fund size from the FSS website.

Table 1 shows the sample distribution by year and target industry. The number of block share acquisitions in our sample is 278 and among those 156 acquisitions are by PE funds and 122 are by other types of financial institutions than PE funds. The sample of full acquisitions consists of 106 acquisitions of which 53 are by PE funds and 53 are by non-PE funds. Panel A finds that block share acquisitions by PE funds occur in relatively recent years. Panel B presents the sample distribution by industry and shows that target firms in the majority of acquisitions operate in the manufacturing industry regardless of types of acquisitions and acquirers.

4.2. Acquisition announcement returns, post-acquisition performance, and post-acquisition policy changes

4.2.1. Stock market reactions

To estimate stock market reactions to acquisition announcements, we use the standard market model approach. Specifically, we first estimate parameters α and β in equation (1) by using the period from 220 days before to 21 days before the announcement as the estimation window.

$$R_{it} = \alpha_i + \beta_i R_{mt} + \epsilon_{it} \quad \text{---- (1),}$$

where R_{it} is target firm i's stock return at time t and R_{mt} is the market portfolio return at time t.

Second, we calculate abnormal returns (ARs) by using stock returns around announcement and Equation (2):

$$AR_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{mt} \quad \text{---- (2)}$$

Finally, we sum ARs of days in the event window to get cumulative abnormal return (CAR). We use following two event windows: (-5,1) and (-10,1), considering that acquisitions must be announced within 5 days.

We obtain stock returns and market returns from FnGuide. As the market portfolio returns, we use the KOSPI return for firms listed in the KOSPI market and use the KOSDAQ return for firms listed in KOSDAQ.

4.2.2. Post-acquisition stock returns

As a measure of long-term stock returns, we use buy-and-hold abnormal returns (BHAR) which are calculated as follows.

$$BHAR_{it} = \prod_{t=1}^{\tau}[1 + R_{it}] - \prod_{t=1}^{\tau}[1 + R_{mt}] \quad \text{---- (3)}$$

To study long-term performance of targets acquired by PE funds, we use one-year, two-year, and three-year BHARs. As benchmark returns, we use KOSPI returns for firms listed in the KOSPI market and KOSDAQ returns for firms in the KOSDAQ market.

4.2.3. Post-acquisition operating performance

Following Brav et al. (2008), we measure operating profitability by the ratio of operating income (EBITDA) to total assets. Industry-adjusted operating performance is calculated by subtracting the

median three-digit KSIC industry operating performance from each target firm's raw operating performance. we measure operating performance from year -1 to year 1, from year -1 to year 2, and from year -1 to year 3.

4.2.4. Post-acquisition policy changes

To investigate engineering-induced policy changes, we track how targets' cash holdings, leverage ratios, dividend payouts, investments, and numbers of employees change following acquisitions. Cash holdings are calculated as cash plus cash equivalents scaled by total assets and leverage is estimated by the ratio of total debt to total assets. As a dividend payout, we use the ratio of cash dividends to sales. Following Smith (1990), We also measure a firm's investment as capital expenditure divided by sales. Finally, we use the number of employees to examine how targets' employment policies change. We measure the changes in each engineering variable from year -1 to year 1, from year -1 to year 2, and from year -1 to year 3.

4.3. Models

We employ the following regressions to test the hypotheses above. The specific definitions of variables included in the regressions are provided in Appendix.

4.3.1. Determinants of being targets

To examine determinants of being an acquisition target of PE funds, we estimate Equation (4):

$$PE\ Fund\ dummy = \beta_0 + \beta_1 lnAsset + \beta_2 leverage + \beta_3 Tobin's\ q + \beta_4 Salesgrowth + \beta_5 \frac{EBITDA}{TA} + \beta_6 CASH + \beta_7 Prior\_return + \beta_8 Age + \varepsilon_i \quad \text{---- (4)},$$

where a dependent variable is $PE\ Fund\ dummy$, a dummy variable that equals to one if the firm is targeted by PE funds and zero otherwise. Independent variables are defined in Appendix.

4.3.2. Multivariate regressions of CARs

To test Hypothesis (H-1-a), we estimate Equation (5). All the variables are defined in Appendix.

$$CAR = \beta_0 + \beta_1 PEFdummy + \beta_2 leverage + \beta_3 Tobin's\ q + \beta_4 Salesgrowth + \beta_5 \frac{EBITDA}{TA} + \beta_6 lnAsset + \beta_7 Prior\_return + \beta_8 Shares + \varepsilon_i \quad \text{---- (5)}$$

4.3.3. Multivariate regressions of long-term performance

Equations (6) and (7) employ the buy-and-hold abnormal returns of targets after acquisitions as dependent variables to verify Hypotheses (H-1-b) and (H-1-c).

$$BAHR \text{ or } \frac{EBITDA}{TA} = \beta_0 + \beta_1 PEFdummy + \beta_2 leverage + \beta_3 Tobin's\ q + \beta_4 Salesgrowth + \beta_5 \frac{EBITDA}{TA} + \beta_6 lnAsset + \beta_7 Prior\_return + \beta_8 Shares + \varepsilon_i \quad \text{---- (6)}$$

$$\frac{EBITDA}{TA} \text{ or } BAHR = \beta_0 + \beta_1 leverage + \beta_2 Tobin's\ q + \beta_3 Salesgrowth + \beta_4 \frac{EBITDA}{TA} + \beta_5 lnAsset + \beta_6 Prior\_return + \beta_7 Shares + \varepsilon_i \quad \text{---- (7)}$$

5. Characteristics of Target Firms and deals

5.1. Summary statistics and univariate tests

In this subsection, we examine target firm characteristics that are measured as of the fiscal year-end immediately preceding the announcement date of acquisitions. We compare PE fund target firms in block share acquisitions and full acquisitions with their control sample firms. Panel A of Table 2 presents summary statistics for characteristics of target firms and their control firms.

First, in the case of block share acquisitions, we find that median values of total assets and sales of PE fund targets are significantly greater than those of non-PE fund targets. We also show that both mean and median values of EBITDA/total assets and prior stock returns are also significantly higher for PE fund targets than for non-PE fund targets. In addition, the mean leverage of PE fund targets is significantly lower than that of non-PE fund targets. Other variables such as Tobin's q, age, and cash holdings show no significant differences between PE fund and non-PE fund targets. These results suggest that PE funds are more likely to invest in larger firms with higher prior performance and lower financial leverage than non-PE fund institutions.

Second, in full acquisitions, there is a significant difference only in prior stock returns between PE

fund and non-PE fund targets. Unlike partial acquisition results, we find that PE fund acquirers prefer firms with lower prior stock performance. These insignificant differences except for the prior stock returns between PE and non-PE fund targets in full acquisitions would be attributable to the fact that non-PE fund target firms are matched to PE fund targets based on characteristics of firm size, industry, and year unlike control firms for partial acquisition targets of PE funds.

Panel B of Table 2 presents the fractions of shares acquired around the announcement date. In block share acquisitions, the median percentage of acquired shares is significantly larger for PE fund acquisitions than for non-PE fund acquisitions, whereas there is no significant difference between PE fund and non-PE fund full acquisitions.

Panel C of Table 2 shows the length of the holding periods. Following Brav et al. (2008), we define the exit date as an acquirer's filing date when its ownership in the target firm drops below the 5% disclosure threshold. We find that non-PE fund investors are more likely to hold block shares shorter than one year than PE fund investors in the sample of block share acquisitions. While 32% of non-PE fund institutions sell their block shares in one year after their block share acquisitions, the corresponding number for PE fund investors is only 17%. We find no significant difference in the holding periods between PE and non-PE fund investors in the full acquisition sample.

5.2. Probit Analysis of becoming a Target

We expand the univariate analysis in Panel A of Table 2 by using probit regressions in which the dependent variable is *PE fund dummy*. The results are presented in Table 3 and appear to be consistent with those of univariate tests. PE funds are more likely to invest in firms that are larger in size and those with lower leverage and higher prior performance in partial acquisitions. On the other hand, PE funds are likely to target younger firms and firms with lower prior stock returns in full acquisitions.

6. Empirical Results of Block Share Acquisitions

This section presents the results of block share acquisitions. As we explain above, block share

acquisitions are the acquisitions that do not change the identity of the largest shareholders in target firms.

6.1. Announcement effects of block share acquisitions

To determine how the stock market reacts to the announcement of PE fund block share acquisitions, we compute the cumulative abnormal returns (CAR) by using the standard market model approach. Table 4 reports the results of the univariate and multivariate tests of CARs for targets acquired by PE fund and non-PE fund block acquirers. In the results of univariate tests in Panel A, while CAR (-10,1) is positive and significant at the 5% level for PE fund block acquisitions, that for non-PE fund acquisitions is not statistically significant. There is no significant difference in the estimated announcement returns between PE fund acquisitions and non-PE fund acquisitions. In panel B, multivariate regressions of CARs are performed to verify the impact of PE fund involvement after controlling for other firm and deal characteristics. Column (1) and column (2) use CAR (-5,1) and CAR (-10, 1) as the dependent variables, respectively. We include leverage, tobin's q, sales growth, prior operating performance, size, prior stock returns, and the percentage of shares acquired as control variables. In both regressions, we find that targets acquired by PE funds show higher announcement returns than targets acquired by non-PE funds, which indicates that PE fund block share acquisitions are perceived as value-enhancing decisions in the stock market. These results are consistent with previous studies, in which higher CARs are obtained from acquisitions by PE funds (Chen et al., 2014).

6.2. Post-block share acquisition performance of targets

In this subsection, we examine a target's post-block share acquisition stock performance and operating performance. We estimate market-adjusted buy-and-hold returns (BHRs) as a measure of stock performance and the industry-adjusted ratio of EBITDA to total assets as operating performance. In Panel A of Table 5, we present the results of univariate tests of BHRs. We find that although the targets of PE fund acquirers have significant and negative median BHRs for 2 years and 3 years after block share acquisitions, BHRs of PE fund target firms are significantly higher than those of non-PE fund targets except for the mean BHRs for two years after acquisitions.

Panel B of Table 5 shows how a target's operating performance changes after block share

acquisitions. We find that the change in operating performance is not significant both for PE fund and non-PE fund acquisitions except that the operating performance change from year -1 to year 2 is negative and significant at the 1% level for non-PE funds. We also find that the mean and median changes from year -1 to year 2 for PE fund acquisitions are higher than those for non-PE fund acquisitions and the difference between these two subsamples is significant at the 5% level.

In Panel C, we run OLS regressions of BHRs for three years after block acquisitions and the operating performance change from year -1 to year 3 to examine the impact of PE fund acquisitions on firm performance after controlling for other firm and deal characteristics. We find that although the coefficients on PE fund acquirer dummy variables are positive in both columns but insignificant statistically.

To sum up the findings in this subsection, the univariate tests show some evidence of higher long-term returns and post-acquisition operating performance for PE fund acquisitions than non-PE fund acquisitions, but the results become insignificant when we control for characteristics of targets and deals.

6.3. Sources of value gains from block share acquisitions

In this subsection, we investigate potential sources of gains from acquisitions by testing whether acquisitions by PE fund change corporate policies associated with cash holdings, dividend payouts, leverage, investments, and employees, and whether the level of changes differs between PE fund and non-PE fund acquisitions. Table 6 reports industry-adjusted changes related to the three types of engineering. First, Panel A presents the results related to governance engineering. We find that cash holdings of PE fund targets increase after block share acquisitions and the increase in cash holdings is significantly positive when it is measured from year -1 to year 3. However, there is no significant difference between targets of PE funds and targets of non-PE funds. The change in dividend payout is not significant for PE fund acquisitions, but the payout changes after PE Fund block acquisitions from year -1 to year 2 are significantly higher at the 5% level than the corresponding change after non-PE fund acquisitions. Therefore, we find some evidence that firms increase dividend payouts to

shareholders after PE funds acquire a block of their shares unlike block share acquisitions by non-PE fund institutions, which is consistent with governance engineering strategies of PE funds.

In Panel B of Table 6, for financial engineering, the changes in leverage after PE fund acquisitions are not statistically significant, while that after non-PE fund acquisitions is negative and significant only after one year. Thus, we do not find evidence that PE funds increase leverage ratios of target firms to discipline potential agency problems.

Finally, Panel C of Table 6 shows results associate with operational engineering. We first find no significant results for the change in investments at conventional significance levels for both PE fund and non-PE fund block share acquisitions. Second, the changes in the number of employees are positive after PE fund block acquisitions, although only the change from year -1 to year 2 is significant at the 10% level. The corresponding changes after non-PE fund block acquisitions are also positive and significant in the periods from year -1 to year 1 and from year -1 to year 2. The differences in changes in the number of employees between PE fund and non-PE fund block acquisitions are not significant. Thus, these results do not support the common notion that the employment reduces after PE finds are involved with firms.

Overall, our analyses on block share acquisitions by PE funds find that firms targeted by PE funds gain favorable market reactions and improve their long-term stock and operating performances. However, we do not find significant evidence for their engineering strategies except that we find some evidence of governance engineering activities by PE funds.

7. Empirical Results of Full Acquisitions

This section provides the results of full acquisitions in which PE funds become the largest shareholder in targets after acquisitions. We conduct the same empirical approaches as what we use in the block share acquisition section.

7.1. Announcement effects of full acquisitions

Table 7 reports the result of the univariate and multivariate tests of market reactions to acquisition

announcements. In Panel A, the mean CAR (-10,1) of PE fund acquisitions is positive and significant at the 10% level, while for non-PE fund acquisitions the results for CAR (-5, 1) have mixed signs and those for CAR (-10, 1) show significant and negative market reactions. The mean and median differences are all positive and statistically significant at the 5% or better, which indicates that the market reacts more favorably to PE fund acquisitions than to non-PE fund acquisitions.

Panel B of Table 7 presents multivariate regression results using CAR (-5, 1) and CAR (-10, 1) as dependent variables. In both columns (1) and (2), the coefficient estimates on PE fund indicators are positive and significant at the 5% level, suggesting positive effects of PE fund acquisitions on target valuations. These results suggest that PE funds create value for shareholders by acquisitions according to the market's perception, which is similar to what we find from the block share acquisition sample.

7.2. Post-acquisition performance of targets

Table 8 shows the results of the long-term performance of targets after PE fund acquisitions. Panel A indicates that firms targeted by PE funds, overall, have higher post-acquisition stock performance than matched acquisitions. While matched acquisitions by non-PE fund acquirers appear to continuously underperform the market for three years, those by PE funds mostly show positive long-term returns although only the BHR for one year following acquisitions is significant. The tests of differences find that BHRs for two and three years after acquisitions are significantly different between PE fund and non-PE fund acquisition targets. Likewise, Panel B of Table 8 shows that operating profitability changes for two and three years after acquisitions are significantly higher for PE fund acquisitions than for non-PE fund acquisitions.

In Panel C, we control for firm and deal characteristics using multivariate regressions and examine whether PE fund acquisitions improve post-acquisition stock and operating performances. While the coefficient estimate on PE fund indicator in column (1) is insignificant, column (2) shows that PE fund acquisitions are positively related to the operating performance of targets from year -1 to year 3. These results are consistent with Hypothesis (H-1-b), suggesting that targets improve their long-term operating performance after being acquired by PE fund investors.

7.3. Sources of value gains from full acquisitions

Similar to the prior analysis on block share acquisitions, this subsection explores the industry-adjusted change in the three types of engineering after full acquisitions. The results are presented in Table 9. First, Panel A investigates changes related to governance engineering. In addition to the analyses on cash holdings and dividend payouts, we additionally investigate how many outside directors are appointed to the boards of targets from acquirers. We find that 79% of the targets appoint outside directors after PE fund acquisitions, while 68% of targets appoint outside directors after non-PE fund acquisitions. However, the difference in the number of targets appointing outside directors is not significant. We find that cash holdings significantly decrease from year -1 to year 3 in PE fund acquisitions and the difference in this cash holding change between PE fund and non-PE fund targets is significant at the 5% level. We also show that dividend payouts in PE fund acquisitions significantly grow from year -1 to year 2, but we find no significant difference in payout ratio changes between PE fund and non-PE fund subsamples.

In Panel B that examines financial engineering-induced changes, financial leverage after PE fund acquisitions significantly decreases after three years following acquisitions, while non-PE acquisitions show no significant changes in financial leverage. The differences in financial leverage changes between PE fund and non-PE fund acquisitions are significant in all the tested periods, suggesting that PE funds relatively decrease debt ratios of target firms after acquisitions.

Finally, we examine changes associated with operational engineering in Panel C. We find that targets of PE funds are more likely to appoint new directors with finance experiences. While 81% of PE fund targets appoint new directors with finance experiences, only 38% of non-PE fund targets appoint such directors. For the employment policies after acquisitions, we find that the number of employees increases after both PE fund and non-PE fund acquisitions, but the increase is statistically significant only for the employment change three years after non-PE fund acquisitions. There are no significant results regarding directors with industrial experiences and changes in investments.

To further examine the sources of value creation in full acquisitions, we estimate multivariate

regressions of long-term stock and operating performances on governance and operating engineering-related variables. We specifically use the operating performance change from year -1 to year 3 as the dependent variable in columns (1) and (2) of Table 10. Column (1) shows that the coefficient estimate on interaction term between PE fund acquirer and new outside director appointment is statistically significant at the 10% level. The results imply that the long-term operating performance is significantly higher for full acquisitions in which PE funds appoint new outside directors. In addition, in column (2), when we include interaction terms between the indicator for PE fund acquirers and finance experience director appointments and that between the PE fund acquirer indicator and the indicator for industry experience director appointment, only the coefficient estimate on the interaction term involving finance experience directors is statistically significant at the 5% level. The results suggest higher value creation for targets in which PE funds place directors with finance experience onto the target's board. We also use BHRs for three years after acquisitions as dependent variables in columns (3) and (4), but do not find any significant results. Overall, our results suggest that the governance and operational engineering-related changes are important components of sources of value gains in full acquisitions by PE funds.

8. Additional Tests

In this subsection of additional tests, we attempt to investigate whether the size of PE funds influences the performance of targets. Due to the lack of data accessibility, we are only able to obtain a PE fund's initially planned contract size from FSS. According to the mean contract size of PE funds, we divide the sample into large and small PE fund subsamples. Using these subsamples, we examine if there is any difference in targets' performances between acquisitions by large PE funds and small PE funds. We perform analyses using both block share and full acquisition samples. In untabulated results, we find that in both cases, there is no significant relationship between the size of PE funds and target performance after acquisitions.

9. Conclusion

Mergers and acquisitions involving PE funds have been increasing steadily over time in Korea. In particular, in 2018, PE funds account for 50% of the total transaction amount in the domestic M&A market. However, research on acquisitions by PE funds and their effects on target firms in Korea is currently scarce. To fill this research gap, in the study, we attempt to examine the effects of PE funds on target firms by using the sample of acquisitions of publicly traded firms from 2007 to 2017. To obtain comprehensive understanding, we include both acquisitions where PE funds acquire the full control over the management by becoming the largest shareholder (full acquisition) and those in which PE funds acquire a 5 % or more portion of equity (partial acquisition) without being the largest shareholder. The empirical results we find are as follows.

First, we find the evidence of different targeting patterns. In block share acquisitions, PE funds are more likely to acquire firms with lower leverage and higher previous performance in terms of both operating and stock performances. On the contrary, younger firms and firms with lower prior stock performance have higher probability of being targeted by PE funds in full acquisitions.

Second, we document significantly positive announcement returns in both partial and full acquisitions by PE funds. These results imply that PE fund involvement is viewed as a value-enhancing opportunity in the market, which is similar to previous empirical studies regarding hedge fund activism (Brav. et al., 2008; Klein and Zur, 2009).

Third, regarding the long-term performance, we find a significant increase in long-term operating performance in three years following full acquisitions by PE funds. However, there is no corresponding result in block share acquisitions.

Finally, we find some evidence of value gains from governance engineering by documenting the increase in dividend payout ratios and in the change of cash holdings after block acquisitions by PE funds. In full acquisitions, we find that the targets of PE funds, particularly those who appoint new

outside directors or new outside directors with expertise in finance, experience higher post-acquisition operating performance than the targets of non-PE funds.

This study has some limitations. Since the sample includes only publicly traded target firms, we are not sure about whether the presented results can be extended to PE fund acquisitions of private firms, considering the fact that many PE funds are frequently investing in unlisted companies. Furthermore, due to the lack of data availability, we are not able to fully consider the characteristics of PE funds in this study.

Table 1. Sample distribution by acquisition type, acquirer type, year and target industry

The sample consists of 156 partial acquisitions by private equiry funds (PEFs), 122 partial acquisitions by financial institutions, 53 full acquisitions by PEFs, and 53 acquisitions matched to PEF full acquisitions from 2007 to 2017. I obtain the sample from Data Analysis, Retrieval and Transfer System (DART). I define full acquisitions as the acquisitions by which PEFs hold the largest ownership of the target and partial acquisitions as the transactions in which PEFs purchase larger than 5% target shares but does not become the target's largest shareholder. Panel A presents the distribution of partial and full acquisitions by year and Panel B shows that by target industry.

Panel A: Distribution acquisition by acquirer type and year

	Partial acquisition		Full acquisition	
Year	Private equity acquisition	Non-private equity acquisition	Private equity acquisition	Non-private equity acquisition
2006	-	-	-	1
2007	7	20	4	6
2008	5	22	4	3
2009	1	11	3	7
2010	8	8	7	3
2011	19	5	6	5
2012	18	5	3	5
2013	32	7	2	5
2014	14	7	4	3
2015	16	16	10	4
2016	17	13	2	9
2017	19	8	8	2
Total	156	122	53	53

Panel B: Distribution acquisition by acquirer type and target industry

	Partial acquisition		Full acquisition	
Target industry (alphabet clssification of KSIC code)	Private equity acquisition	Non-private equity acquisition	Private equity acquisition	Non-private equity acquisition
Manufacturing (C)	113 (72%)	81 (66%)	27 (51%)	27 (51%)
Water supply; sewage, waste management, materials recovery (E)	-	3 (2%)	2 (4%)	2 (4%)
Construction (F)	2 (1%)	10 (8%)	3 (6%)	3 (6%)
Wholesale and retail trade (G)	7 (4%)	10 (8%)	3 (6%)	3 (6%)
Transportation (H)	2 (1%)	1 (1%)	1 (2%)	1 (2%)
Information and communication (J)	12 (8%)	13 (11%)	8 (15%)	8 (15%)
Finance and insurance (K)	6 (4%)	-	7 (13%)	7 (13%)
Real estate (L)	1 (1%)	-	-	-
Scientific and technical activities (M)	11 (7%)	2 (2%)	2 (4%)	2 (4%)
Business facilities management and business support services (N)	-	2 (2%)	-	-
Education (P)	1 (1%)	-	-	-
Other personal services (S)	1 (1%)	-	-	-
Total	156	122	53	53

Table 2. Descriptive statistics for targets and acquisitions

This table reports firm and deal characteristics of PEF acquisitions and matched acquisitions. The sample consists of 156 partial acquisitions by private equiry funds (PEFs), 122 partial acquisitions by financial institutions, 53 full acquisitions by PEFs, and 53 acquisitions matched to PEF full acquisitions from 2007 to 2017. Panel A summarizes the descriptive statistics of target firms. All variables are measured as of the fiscal year-end that immediately precedes the acquisition announcements. Apendix A provides details of variable construction. Panel B shows the percentage of stock shares acquired when acquisitions are initially announced. Panel C summarizes the length of holding period. I set the filing date that the acquier's ownership in the target firm drops below 5% to be the exit date. For each variable, the mean and median values are reported. The numbers in the test-of-differene colums denote p-value. ***, ** and * indicate statiatical significance at the 1%, 5% and 10% level, respectively.

	Partial acquisition						Full acquisition					
Variables	Private equity acquisition (A) N = 156		Non-private equity acquisition (B) N = 122		Test of difference (A-B)		Private equity acquisition (A) N = 53		Non-private equity acquisition (B) N = 53		Test of difference (A-B)	
	Mean	Median	Mean	Median	*t* -test	Wilcoxon Z-test	Mean	Median	Mean	Median	*t* -test	Wilcoxon Z-test
Panel A: Descriptive statistics for target												
Total assets (billions of KRW)	2623.26	176.73	524.10	65.45	0.34	0.00***	905.04	224.69	820.86	149.69	0.82	0.27
Leverage	0.510	0.532	0.567	0.591	0.06*	0.11	0.548	0.529	0.562	0.583	0.78	0.75
EBITDA/total assets	0.088	0.082	-0.008	0.023	0.00***	0.00***	0.068	0.079	0.064	0.047	0.87	0.21
Tobin's q	1.480	1.114	1.450	1.126	0.82	0.61	1.419	1.048	1.486	1.097	0.78	0.49
Sales (billions of KRW)	490.86	168.05	360.53	50.21	0.49	0.00***	502.80	131.21	525.77	112.57	0.93	0.21
Prior stock returns (-13,-1)	0.240	0.053	-0.130	-0.240	0.00***	0.00***	-0.072	-0.180	0.344	0.084	0.01***	0.02**
Age	23.58	18.00	24.52	19.00	0.64	0.67	25.36	21.00	28.55	25.00	0.29	0.33
CASH	0.090	0.056	0.083	0.051	0.53	0.57	0.096	0.079	0.089	0.058	0.65	0.81
Panel B. Percent of shares acquired												
Shares (%) acquired around the announcement date	13.96	11.04	13.07	10.00	0.45	0.10*	41.07	38.89	36.20	33.96	0.21	0.19
Panel C. Length of holding period (%)												
Less than one year	26 (17%)		40 (32%)		0.00***		8 (15%)		5 (9%)		0.37	
More than one year and less than two years	36 (23%)		27 (22%)		0.85		7 (13%)		5 (9%)		0.54	
More than two years and less than three years	27 (17%)		8 (7%)		0.01***		6 (11%)		4 (8%)		0.51	
More than three years	67 (43%)		47 (39%)		0.46		32 (61%)		39 (74%)		0.15	

Table 3. Probit regression estimates of being targeted by private equity funds

This table reports the estimates of probit regressions of being targeted by private equity funds (PEFs). The depdendent variable is equal to one if the firm is targed by PEFs and zero otherwise. All explanatory variables are measured as of the fiscal year-end immediately before acquisitions. Column (1) shows the estimates of parital aqusitions and column (2) shows those of full acqusitions. The marginal probability denotes the change in the probability of becoming an acquisition target for a one-standard deviation change in the values of the explanatory variables at their sample means. ***, ** and * indicate statiatical significance at the 1%, 5% and 10% level, respectively.

Dependent Variable: Private equity acquirer indicator	(1) Partial acquisition			(2) Full acquisition		
	Coefficient	P-value	Marg. Prob.	Coefficient	P-value	Marg. Prob.
lnAsset	0.335***	0.00	0.132	0.200*	0.09	0.071
leverage	-0.971**	0.02	-0.384	-0.829	0.24	-0.295
Tobin's q	0.077	0.43	0.030	-0.134	0.31	-0.048
Sales growth	-0.030	0.66	-0.012	0.135	0.76	0.048
EBITDA/total assets	2.826***	0.00	1.118	0.457	0.75	0.163
CASH	-0.061	0.95	-0.024	1.082	0.55	0.385
Prior_return	0.259**	0.02	0.102	-0.572***	0.01	-0.204
Age	-0.008	0.22	-0.003	-0.016*	0.10	-0.006
Pseudo-R-squared	0.170			0.100		
No. of observations	271			106		

Table 4. Target's cumulative abnormal returns (CARs) around the announcements of partial acquisitions

This table reports the announcement returns of partial acquisitions. Cumulative abnormal returns (CARs) are estimated using the market model approach in which parameters are estiamted during 200 trading days from 220 days before to 21 days before the announcement. I use KOSPI returns as a proxy for the market return for firms listed in KOPSI, whereas KOSDAQ returns are used for those listed in KOSDAQ. Panel A presents the univarate test results. The numbers in the test-of-differene colums denote p-values. Panel B shows the OLS regression estimates of target CARs. The dependent variables in columns (1) and (2) are CAR (-5,1) and CAR (-10,1), respectively. The variable definitions are presented in Appendix A. The numbers in parentheses are p-values. ***, ** and * indicate statiatical significance at the 1%, 5% and 10% level, respectively.

Panel A: Univariate tests of target CARs

	Private equity acquisitions (A)		Non-private equity acquisitions (B)		Test of difference (A-B)	
	Mean	Median	Mean	Median	*t* -test	Wilcoxon z-test
	N = 156		N = 122			
CAR(-5,1)	0.009	0.000	-0.003	0.003	0.54	0.47
CAR(-10,1)	0.032**	0.022**	0.024	0.025	0.77	0.89

Panel B: OLS regressions of targets CARs

Independent variable	(1) CAR(-5,1)	(2) CAR(-10,1)
Private equity acquirer (indicator)	0.051*	0.069*
	(0.07)	(0.06)
Leverage	-0.044	-0.009
	(0.41)	(0.90)
Tobin's q	0.003	-0.005
	(0.79)	(0.76)
Salesgrowth	0.008	0.018**
	(0.16)	(0.02)
EBITDA/total assets	-0.103	-0.190*
	(0.17)	(0.06)
lnAsset	-0.014	-0.022
	(0.18)	(0.13)
Prior stock returns	-0.016	-0.033*
	(0.22)	(0.07)
Shares acquired	-0.001	-0.001
	(0.32)	(0.54)
Year (indicators)	Yes	Yes
Industry (indicators)	Yes	Yes
Intercept	0.276	0.380
	(0.19)	(0.19)
Adj R-squared	0.005	0.005
No. of observations	272	272

Table 5. Long-term performance of targets after parial acquisitions

This table presents the long-term performance of targets after partial acquisitions. Panel A summarizes the univariate test results of market-adjusted buy-and-hold returns (BHRs). BHRs are measured using monthly stock returns and are adjusted for the market returns. I use KOSPI returns as a proxy for the market return for firms listed in KOPSI, whereas KOSDAQ returns are used for those listed in KOSDAQ. Panel B shows the univariate test results of industry-adjusted oprating peformance, which is measured as the ratio of EBITDA to total assets and adjusted for the median of three-digit KSIC industry, after partial acquisitions. The numbers in the test-of-differene colums denote p-values. Panel C shows the OLS regression estimates of long-term performance of targets. The dependent variables in columns (1) and (2) are three-year BHRs and industry-adjusted operating peformance, respectively. The definitions of variables used are presented in Appendix A. The numbers in parentheses are p-values. ***, ** and * indicate statiatical significance at the 1%, 5% and 10% level, respectively.

Panel A: Univariate tests of market adjusted BHRs of targets

	Private equity acquisitions (A)		Non-private equity acquisitions (B)		Test of difference (A-B)	
	Mean	Median	Mean	Median	*t*-test	Wilcoxon z-test
	N = 142		N = 104			
1 year	-0.001	-0.116	-0.144**	-0.283***	0.05**	0.01***
	N = 140		N = 97			
2 year	-0.012	-0.243***	-0.151	-0.353***	0.29	0.05**
	N = 137		N = 89			
3year	0.145	-0.303**	-0.261***	-0.509***	0.06*	0.02**

Panel B: Univariate tests of change in industry-adjusted post-acquisition operating performance of targets

	Private equity acquisitions (A)		Non-private equity acquisitions (B)		Test of difference (A-B)	
	Mean	Median	Mean	Median	*t*-test	Wilcoxon z-test
	N = 142		N = 103			
Year -1 to year 1	0.007	-0.003	-0.005	-0.001	0.57	0.99
	N = 140		N = 91			
Year -1 to year 2	0.010	0.000	-0.038	-0.027***	0.04**	0.02**
	N = 120		N = 76			
Year -1 to year 3	0.000	-0.006	-0.003	-0.002	0.90	0.87

Panel C: OLS regressions of market-adjusted BHRs and changes in industry-adjusted post-acquisition operating performance of targets

Independent variable	(1) 3 years BHR	(2) EBITDA/Asset (-1,3)
Private equity acquirer (indicator)	0.323	0.008
	(0.30)	(0.76)
Leverage	0.488	-0.024
	(0.46)	(0.66)
Tobin's q	-0.247**	0.010
	(0.05)	(0.46)
Salesgrowth	0.046	0.003
	(0.43)	(0.51)
EBITDA/total assets	0.044	0.087
	(0.96)	(0.30)
lnAsset	-0.076	-0.004
	(0.57)	(0.73)
Prior stock returns	-0.099	-0.001
	(0.49)	(0.93)
Shares acquired	-0.006	0.003***
	(0.70)	(0.01)
Year	Yes	Yes
Industry	Yes	Yes
Intercept	1.687	0.059
	(0.52)	(0.79)
Adj R-squared	-0.047	0.036
No. of observations	220	193

Table 6. Governance, financial, and operational engineering after parital acquisitions

The table reports the target policychanges related to governance, financial, and opeartional engineering activities after parital acquisitions. I measure changes in the associated policy variables from year -1 to 1, year -1 to 2, and year -1 to 3. Each variable change is adjusted for the median change in the three-digit KSIC industry. The numbers in the test-of-differene colums denote p-values estimated by t-tests. The definitions of all variables used are presented in Appendix A.***, ** and * indicate statiatical significance at the 1%, 5% and 10% level, respectively.

Panel A: Governance Engineering

Changes in cash-holdings

	Year -1 to year 1	Year -1 to year 2	Year -1 to year 3
N (A / B)	N = 142 / 105	N = 140 / 93	N=120 / 78
Private equity acquisitions (A)	0.006	0.006	0.022***
Non-private equity acquisitions (B)	-0.012	-0.011	0.010
T-test difference (A-B)	0.27	0.25	0.45

Changes in dividend payout

	Year -1 to year 1	Year -1 to year 2	Year -1 to year 3
N (A / B)	N = 142 / 105	N = 140 / 93	N=120 / 78
Private equity acquisitions (A)	0.000	0.002	0.000
Non-private equity acquisitions (B)	-0.001	-0.003*	-0.002
T-test difference (A-B)	0.51	0.02**	0.22

Panel B: Financial Engineering

Changes in leverage

	Year -1 to year 1	Year -1 to year 2	Year -1 to year 3
N (A / B)	N = 142 / 105	N = 140 / 93	N=120 / 78
Private equity acquisitions (A)	-0.011	-0.008	-0.009
Non-private equity acquisitions (B)	-0.034*	0.012	-0.005
T-test difference (A-B)	0.29	0.45	0.86

Panel C: Operational Engineering

Changes in investment

	Year -1 to year 1	Year -1 to year 2	Year -1 to year 3
N (A / B)	N = 142 / 105	N = 140 / 93	N=120 / 78
Private equity acquisitions (A)	-0.034	-0.096	-0.132
Non-private equity acquisitions (B)	0.077	0.005	-0.094
T-test difference (A-B)	0.32	0.3	0.77

Changes in the number of employees

	Year -1 to year 1	Year -1 to year 2	Year -1 to year 3
N (A / B)	N = 142 / 105	N = 140 / 93	N=120 / 78
Private equity acquisitions (A)	0.393	0.468*	0.518
Non-private equity acquisitions (B)	0.763*	0.620**	0.963
T-test difference (A-B)	0.45	0.71	0.51

Table 7. Targets' cumulative abnormal returns (CARs) around the announcements of full acquisitions

This table reports the announcement returns of full acquisitions. Cumulative abnormal returns (CARs) are estimated using the market model approach in which parameters are estiamted during 200 trading days from 220 days before to 21 days before the announcement. I use KOSPI returns as a proxy for the market return for firms listed in KOPSI, whereas KOSDAQ returns are used for those listed in KOSDAQ. Panel A presents the univarate test results. The numbers in the test-of-differene colums denote p-values. Panel B shows the OLS regression estimates of target CARs. The dependent variables in columns (1) and (2) are CAR (-5,1) and CAR (-10,1), respectively. The variable definitions are presented in Appendix A. The numbers in parentheses are p-values. ***, ** and * indicate statiatical significance at the 1%, 5% and 10% level, respectively.

Panel A: Univariate tests of target CARs

	Private equity acquisitions (A)		Non-private equity acquisitions (B)		Test of difference (A-B)	
	Mean	Median	Mean	Median	*t*-test	Wilcoxon z-test
	N = 53		N = 53			
CAR(-5,1)	0.029	0.004	-0.060***	0.029***	0.00***	0.01***
CAR(-10,1)	0.041*	-0.003	-0.072**	-0.029*	0.01***	0.03**

Panel B: OLS regressions of targets CARs

Independent variable	(1) CAR(-5,1)	(2) CAR(-10,1)
Private equity acquirer (indicator)	0.066**	0.089**
	(0.05)	(0.05)
Leverage	0.009	0.026
	(0.91)	(0.81)
Tobin's q	-0.008	0.022
	(0.60)	(0.29)
Salesgrowth	-0.088	-0.143**
	(0.12)	(0.05)
EBITDA/total assets	0.452***	0.563**
	(0.01)	(0.02)
lnAsset	-0.016	-0.003
	(0.24)	(0.86)
Prior stock returns	-0.051**	-0.066**
	(0.03)	(0.03)
Shares acquired	0.001	0.000
	(0.85)	(0.69)
Year	Yes	Yes
Intercept	0.242	0.022
	(0.39)	(0.95)
Adj R-squared	0.125	0.143
No. of observations	106	106

Table 8. Long-term performance of targets after full acquisition

This table presents the long-term performance of targets after full acquisitions. Panel A summarizes the univariate test results of market-adjusted buy-and-hold returns (BHRs). BHRs are measured using monthly stock returns and are adjusted for the market returns. I use KOSPI returns as a proxy for the market return for firms listed in KOPSI, whereas KOSDAQ returns are used for those listed in KOSDAQ. Panel B shows the univariate test results of industry-adjusted oprating peformance, which is measured as the ratio of EBITDA to total assets and adjusted for the median of three-digit KSIC industry, after partial acquisitions. The numbers in the test-of-differene colums denote p-values. Panel C shows the OLS regression estimates of long-term performance of targets. The dependent variables in columns (1) and (2) are three-year BHRs and industry-adjusted operating peformance, respectively. The definitions of variables used are presented in Appendix A. The numbers in parentheses are p-values. ***, ** and * indicate statiatical significance at the 1%, 5% and 10% level, respectively.

Panel A: Univariate tests of market-adjusted BHRs of targets

	Private equity acquisitions (A)		Non-private equity acquisitions (B)		Test of difference (A-B)	
	Mean	Median	Mean	Median	*t*-test	Wilcoxon z-test
	N = 50		N = 50			
1 year	-0.093	0.192**	-0.229***	-0.282***	0.23	0.30
	N = 48		N = 48			
2 year	0.070	0.011	-0.203*	-0.260***	0.10*	0.03**
	N = 45		N = 45			
3year	0.156	0.029	-0.317**	-0.523***	0.01***	0.00***

Panel B: Univariate tests of changes in industry-adjusted post-acquisition operating performance of targets

	Private equity acquisitions (A)		Non-private equity acquisitions (B)		Test of difference (A-B)	
	Mean	Median	Mean	Median	*t*-test	Wilcoxon z-test
	N = 50		N = 50			
Year -1 to year 1	-0.001	-0.005	0.004	-0.008	0.82	0.73
	N = 48		N = 48			
Year -1 to year 2	0.007	0.006	-0.028*	-0.015	0.09*	0.08*
	N = 35		N = 35			
Year -1 to year 3	0.013	-0.001	-0.046**	-0.025**	0.03**	0.06*

Panel C: OLS regressions of market-adjusted BHRs and changes in industry-adjusted post-acquisition operating performance of targets

Independent variable	(1) 3 years BHR	(2) EBITDA/Asset (-1,3)
Private equity acquirer (indicator)	0.152	0.045*
	(0.48)	(0.10)
Leverage	-0.194	0.090
	(0.69)	(0.21)
Tobin's q	-0.163	-0.007
	(0.12)	(0.57)
Salesgrowth	0.075	0.054
	(0.83)	(0.26)
EBITDA/total assets	1.334	-0.296**
	(0.19)	(0.04)
lnAsset	0.006	0.006
	(0.94)	(0.59)
Prior stock returns	-0.052	-0.020

	(0.70)	(0.29)
Shares acquired	0.009	0.000
	(0.11)	(0.96)
Year	Yes	Yes
Intercept	-0.214	-0.121
	(0.90)	(0.56)
Adj R-squared	0.119	0.293
No. of observations	90	70

Table 9. Governance, financial, and operational engineering after full acquisitions

The table reports the target policychanges related to governance, financial, and opeartional engineering activities after full acquisitions. I measure changes in the associated policy variables from year -1 to 1, year -1 to 2, and year -1 to 3. Each variable change is adjusted for the median change in the three-digit KSIC industry except for the appointment of outside directors and that of directors with industry or finance experiences. The numbers in the test-of-differene colums denote p-values estimated by t-tests. The definitions of all variables used are presented in Appendix A.***, ** and * indicate statiatical significance at the 1%, 5% and 10% level, respectively.

Panel A: Governance Engineering

Acquirers appoint outside director on target board (up to three years)

	Total	The number of outside directors (%)	
Private equity acquisitions (A)	53	42 (79%)	
Non-private equity acquisitions (B)	53	36 (68%)	
T-test difference (A-B)		0.19	
Changes in cash-holdings			
	Year -1 to year 1	Year -1 to year 2	Year -1 to year 3
	N=50	N=46	N=35
Private equity acquisitions (A)	-0.003	-0.016	-0.035**
Non-private equity acquisitions (B)	-0.016*	-0.003	0.008
T-test difference (A-B)	0.36	0.34	0.04**
Changes in dividend payout			
	Year -1 to year 1	Year -1 to year 2	Year -1 to year 3
	N=50	N=46	N=35
Private equity acquisitions (A)	0.009	0.014*	0.006
Non-private equity acquisitions (B)	0.001	0.000	-0.004
T-test difference (A-B)	0.23	0.12	0.20

Panel B: Financial Engineering

Changes in leverage

	Year -1 to year 1	Year -1 to year 2	Year -1 to year 3
	N=50	N=46	N=35
Private equity acquisitions (A)	-0.079	-0.092	-0.079*
Non-private equity acquisitions (B)	0.063	0.048	0.022
T-test difference (A-B)	0.04**	0.05**	0.10*

Panel C: Operational Engineering

Acquirers appoint directors with experience in the target's industry

	Total	The number of directors (%)	
Private equity acquisitions (A)	53	25 (47%)	
Non-private equity acquisitions (B)	53	33 (62%)	
T-test difference (A-B)		0.12	

Acquirers appoint directors with finance experience

	Total	The number of directors (%)	
Private equity acquisitions (A)	53	43 (81%)	
Non-private equity acquisitions (B)	53	20 (38%)	
T-test difference (A-B)		0.00***	
Changes in investment			
	Year -1 to year 1	Year -1 to year 2	Year -1 to year 3
	N=50	N=46	N=35
Private equity acquisitions (A)	-0.011	0.093	0.033
Non-private equity acquisitions (B)	-0.015	-0.019	-0.095
T-test difference (A-B)	0.98	0.46	0.43
Changes in the number of employees			
	Year -1 to year 1	Year -1 to year 2	Year -1 to year 3
	N=50	N=46	N=35
Private equity acquisitions (A)	0.089	0.097	0.083
Non-private equity acquisitions (B)	0.179	0.208	0.436**
T-test difference (A-B)	0.48	0.51	0.14

Table 10. OLS regressions of market-adjusted BHRs and changes in industry-adjusted post-acquisition operating performance of targets on engineering variables.

This table shows OLS regressions of market-adjusted BHRs and changes in industry-adjusted post-acquisition operating performance of targets on engineering variables. The dependent variables in columns (1) and (2) are operating peformance (EBITDA/total assets) from -1 years to 3 years and those in columns (3) and (4) are 3 years BHR. The definitions of variables used are presented in Appendix A. The numbers in parentheses are p-values. ***, ** and * indicate statiatical significance at the 1%, 5% and 10% level, respectively.

Independent variable	(1)	(2)	(3)	(4)
Private equity fund (PEF) acquirer (indicator)	-0.030	-0.004	0.435	0.134
	(0.56)	(0.94)	(0.31)	(0.77)
Acquirers appoint new outside director on the target's board (indicator)	-0.034		0.257	
	(0.35)		(0.39)	
Acquirers appoint new director with same industry experience on the target's board (indicator)		0.018		-0.031
		(0.64)		(0.92)
Acquirers appoint new director with finance experience on the target's board (indicator)		-0.085**		-0.292
		(0.03)		(0.30)
PEF (indicator) x acquirers appoint new outside director on the target's board (indicator)	0.101*		-0.393	
	(0.09)		(0.42)	
PEF (indicator) x acquirers appoint new director with same industry experience on the target's board (indicator)		-0.062		-0.212
		(0.26)		(0.62)
PEF (indicator) x acquirers appoint new director with finance experience on the target's board (indicator)		0.141**		0.276
		(0.02)		(0.56)
Leverage	0.097	0.095	-0.172	-0.187
	(0.17)	(0.18)	(0.74)	(0.71)
Tobin's q	-0.011	-0.011	-0.149	-0.178*
	(0.40)	(0.38)	(0.16)	(0.09)
Salesgrowth	0.030	0.041	0.128	0.037
	(0.53)	(0.41)	(0.73)	(0.92)
EBITDA/total assets	-0.216	-0.257*	1.094	1.457
	(0.13)	(0.07)	(0.31)	(0.18)
lnAsset	0.002	0.002	-0.007	-0.001
	(0.84)	(0.17)	(0.94)	(0.99)
Prior stock returns	-0.013	-0.011	-0.035	-0.041
	(0.42)	(0.55)	(0.80)	(0.77)
Shares acquired	0.000	0.001	0.009*	0.010*
	(0.91)	(0.50)	(0.10)	(0.10)
Year (indicators)	Yes	Yes	Yes	
Intercept	-0.029	-0.038	-0.253	-0.083
	(0.89)	(0.86)	(0.89)	(0.96)
Adj R-squared	0.264	0.341	0.104	0.092
No. of observations	70	70	90	90

Appendix

Variable	Definition
PE fund dummy	A dummy variable equal to one if the firm is targeted by PE funds and zero otherwise
lnAsset	The natural logarithm of total assets which measures firm size
Leverage	The ratio of total liabilities to total assets
Tobin's q	(Market value of equity + book value of debt) / book value of assets
Salesgrowth	The change in sales
EBITDA/TA	EBITDA divided by total assets
CASH	The ratio of cash plus cash equivalents to total assets
Prior_return	The previous monthly market adjusted BHAR from -13 months to -1 months
Age	The number of years from foundation to the announcement year
Shares	The percentage of shares that PE funds initially acquire.
OutsideDirector(dummy)	An indicator which is set to be one if a target firm appoints new outside directors within 3 years after the fiscal year of the announcement and zero otherwise.
Industry(dummy)	An indicator equal to one if the director has worked for other companies in the same industry as targets or has been a board member of such companies and zero otherwise. Same industry is matched by using two-digit KSIC and if the information of KSIC is not available, we search the company's homepage to identify the main business sector.
Finance(dummy)	An indicator equal to one if the director has been an employee in a financial company or has been CFO or treasurer in other companies, and zero otherwise.

Reference

Acharya, V. V., Gottschalg, O. F., Hahn, M., & Kehoe, C. (2013). Corporate Governance and Value Creation: Evidence from Private Equity. *Review of Financial Studies*, *26*(2), 368–402.

Acharya, V., Kehoe, C., & Reyner, M. (2009). Private equity vs. PLC Boards in the U.K.: A Comparison of Practices and Effectiveness. *Journal of Applied Corporate Finance*. 21(1), 45–56.

Andrei Shleifer, & Lawrence H. Summers. (1987). Breach of Trust in Hostile Takeovers. *NBER Working Papers*.

Bergström Clas, Grubb Mikael, & Jonsson Sara. (2007). The Operating Impact of Buyouts in Sweden: A Study of Value Creation. *The Journal of Private Equity*, 11(1), 22-39.

BRAV, A., JIANG, W., Partnoy, F., & THOMAS, R. (2008). Hedge Fund Activism, Corporate Governance, and Firm Performance. *Journal of Finance (Wiley-Blackwell)*, *63*(4), 1729–1775.

Chen, G., Kang, J., Kim, J., & Na, H. S. (2014). Sources of value gains in minority equity investments by private equity funds: Evidence from block share acquisitions. *Journal of Corporate Finance*, 29, 449-474.

Cho, C. and Pho, K. (2019). PEF(Private Equity Fund) 동향 및 시사점. *FSS*.

Choi, J. J., Park, S. W., & Yoo, S. S. (2007). The Value of Outside Directors: Evidence from Corporate Governance Reform in Korea. *Journal of Financial and Quantitative Analysis*, *42*(4), 941–962.

Cornelli, F., Karakas, O. (2008). Corporate governance and private equity: do LBOs have better boards? Working Paper. London Business School.

Cronqvist, H., & Fahlenbrach, R. (2009). Large Shareholders and Corporate Policies. *Review of Financial Studies*, *22*(10), 3941–3976.

Gertner, R., Kaplan, S. (1996). The value maximizing board. Working Paper. University of Chicago.

Guo Shourun, Hotchkiss Edith S., Song Weihong. (2011). Do buyouts (still) create value? *The Journal of Finance*, 66(2), 479–517.

Harris Richard, Siegel Donald S., & Wright Mike. (2005). Assessing the Impact of Management Buyouts on Economic Efficiency: Plant-Level Evidence from the United Kingdom. *The Review of Economics and Statistics*, 87(1), 148-153.

Jensen, Michael. (1989). Eclipse of the Public Corporation. *Harvard Business Review*, 67(5): 61-74.

Kaplan Steven N., Strömberg Per. (2009). Leveraged buyouts and private equity. *The Journal of Economic Perspectives*, 23(1), 121–146.

Kaplan, S. (1989a). The Effects of Management Buyouts on Operating Performance and Value. *Journal of Financial Economics*, *24*(2), 217–254.

Kaplan, S., 1989b. Management buyouts: evidence on taxes as a source of value. *Journal of Finance*, 44(3), 611–632.

Kim, C., Lee, J., & Lee, S. (2015). The Effects of Strategy of Private Equity Fund (PEF) on Performance. *The Korean Small Business Review*, 37(4), 181-207 (in Korea).

Kim, S. T. and Y. S. Cho. (2009). An Economical Return Analysis on the Investment Assets by Private Equity Fund. *The Korean Journal of Financial Engineering*, 8 (2): 127–146 (in Korean).

Kim, W., Sung, T., & Wei, S.-J. (2017). The diffusion of corporate governance to emerging markets: Evaluating two dimensions of investor heterogeneity. *Journal of International Money and Finance*, 70, 406-432.

KLEIN, A., & ZUR, E. (2009). Entrepreneurial Shareholder Activism: Hedge Funds and Other Private Investors. *Journal of Finance (Wiley-Blackwell)*, *64*(1), 187–229.

Koo, Jahyun. (2016). Private Equity as an Alternative Corporate Restructuring Scheme: Does Private Equity Increase the Operating Performance of PE-Backed Firms? *KDI Journal of Economic Policy*, 38(2), 21-44

Lee, J. (2019). 국내자본시장에서의 PEF의 역할과 발전방향. *KIF working pape*r, 2019(6), 1.

Lichtenberg, F.R., & Siegel, D. (1990). The effects of leveraged buyouts on productivity and related aspects of firm behavior. *Journal of Financial Economics*, 27(1), 165-194.

MacArthur, H., & Gadiesh, O. (2008). Lessons from Private Equity Any Company Can Use. *Harvard Business School Cases*, 1.

Michael C. Jensen. (1986). Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers. *The American Economic Review*, *76*(2), 323–329.

Mietzner, M., & Schweizer, D. (2014). Hedge Funds versus Private Equity Funds as Shareholder Activists in Germany--Differences in Value Creation. *Journal of Economics and Finance*, *38*(2), 181–208.

Mikkelson, W. H. (1), & Ruback, R. S. (2). (n.d.). An empirical analysis of the interfirm equity investment process. *Journal of Financial Economics*, *14*(4), 523–553.

Scott B. Smart, & Joel Waldfogel. (1994). Measuring the Effect of Restructuring on Corporate Performance: The Case of Management Buyouts. *The Review of Economics and Statistics*, 76 (3), 503–511.

Smith, A. J. (1990). Corporate ownership structure and performance: The case of management buyouts. *Journal of Financial Economics*, 27(1), 143–164.

Song, Hong Sun. (2015). The Role of Private Equity in the Evolving Financial System. *Korea Capital Market Institute* Research Reports 15 (7) (in Korea).

Weir, C., Jones, P., & Wright, M. (2015). Public to Private Transactions, Private Equity and Financial Health in the UK: An Empirical Analysis of the Impact of Going Private. *Journal of Management and Governance*, 19(1), 91-112.