

# Private Equity as an Alternative Corporate Restructuring Scheme: Does Private Equity Increase the Operating Performance of PE-Backed Firms?

By JAHYUN KOO\*

*There has been a surge of interest in private equity as an alternative corporate restructuring scheme to complement the current institutional forms such as workouts and court receivership. By empirically examining whether private equity in Korea can improve investee companies, we find that while private equity in Korea did not sacrifice the long-term growth potential of investee firms, it did not improve their profitability (e.g. ROA, ROE, and ROS) or growth (e.g. sales growth) either. Both the negative correlation between business performance and firm age and our empirical results showing that young firms were favored by private equity for investment imply that Korean private equity may perform as growth capital, similar to venture capital rather than as buyouts for corporate restructuring.*

Key Word: private equity, corporate restructuring,  
business performance, buyouts, growth capital  
JEL Code: G34, G32, H25

## I. Introduction

The Korean economy has continued to show sluggish growth since 2010, and company profitability levels have deteriorated among Korean firms. In addition, the number of marginal firms, termed “zombie companies,” has increased. Accordingly, preemptive corporate restructuring must take place before a large number of corporate insolvencies can be realized (Bank of Korea 2015; Jeong 2014; Jeong and Nam 2015). The country's current leading corporate restructuring schemes include corporate structure improvements, “workouts,” and corporate rehabilitation proceedings, also known as “court receiverships.” However, these corporate restructuring procedures led by institutions have had limited effects on business regeneration as they are basically different forms of ex post corporate

\* Fellow, Korea Development Institute (Email: jahyun.koo@kdi.re.kr)

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restructurings, as the processes are conducted after corporate distress has progressed significantly, thereby resulting in considerable costs being incurred, such as a large number of employment adjustments and conflict of interests among stakeholders. Financially advanced countries, including the U.S., actively undertake ex ante corporate restructuring in an effort to eliminate inefficiencies in companies prior to corporate failures, also enacting post-restructuring processes for insolvent companies by utilizing the capital market and, in particular, private equity. Though the opinion that private equity should be actively engaged in corporate restructuring as a complementary corporate restructuring scheme for government-led initiatives is gaining popularity in Korea (Kim and Bin 2012), few studies have attempted to test whether Korean private equity can perform such roles empirically and to determine the policy options for revitalizing private equity as an alternative corporate restructuring procedure or invigorating private equity industry itself. This study attempts to fill this gap.

Whether private equity can assume the functions of alternative corporate restructuring schemes is eventually determined by whether private equity can increase the value of the companies in which it invests. While research continues on how business performance has changed since private equity investing has been actively carried out overseas (e.g., Kaplan 1989; Smith 1990; Cohn and Towery 2014), few studies have been done in Korea given its short history of private equity. This paper empirically investigates how the operating performance of PE-backed firms oriented toward profitability and growth has changed since firms accepted private equity investment. In particular, we carried out an event study which statistically tests changes in operating performance levels between business performances levels before and after a firm accepts private equity investment for the period from 2006 to 2012. We analyzed firm performance while deleting outliers and adjusting industry average levels to enhance robustness. We also ran a regression model to estimate whether the characteristics of private equity have had an impact on the profitability of PE-backed firms. In addition, we made use of propensity score matching for 2012, a year with relatively many PE-backed firms, to complement the results of the event study. Finally, we draw implications from the perspective of policy and the private equity industry.

The results of the event study and those of the statistical test demonstrate that private equity in Korea has been unable to improve profitability (e.g., ROA, ROE, and ROS) and growth (e.g., sales growth), although it does not seem to affect the long-term growth potential of the investee companies in terms of their investment activities, financial stability, and employment levels. Furthermore, the negative relationship between business performance and the age of firms, and the fact that younger firms have been favored by private equity with regard to investment choices, both suggest that private equity in Korea may not be in the form of buyouts (which serve as a corporate restructuring vehicle) but rather as growth capital (acting as venture capital). One of the reasons private equity could not demonstrate the ability to create value in its portfolio is that private equity firms have not had enough opportunities to build up such a capability owing to their short history. Different corporate restructuring market conditions existed compared to those immediately after the foreign exchange crisis, along with governmental regulation and excessive intervention. Therefore, the government should deregulate

to foster dynamism and innovativeness among Korean private equity. The private equity industry itself should also strengthen its capacity through various efforts (e.g., obtaining professional management teams). Finally, private equity funds must grow before they can carry out market-friendly corporate restructuring given the likely increase in the level of demand for corporate restructuring in the future, especially for large companies.

The remainder of this paper is organized as follows. Section II discusses the impact of private equity investments on business performances levels by reviewing the literature in this area. Section III describes our data, and Section IV explores whether private equity firms in Korea have improved the operating performance levels of their investee companies. We analyze and discuss the empirical results in Section V, and Section VI concludes the paper.

## **II. The Impact of Private Equity Investment on Business Performance**

Whether private equity can take on the role of alternative corporate restructuring schemes eventually depends on whether private equity can increase the value of a company in which it invests. Both theoretical and empirical studies have actively been carried out in an effort to examine whether private equity increases the value of the firms in the portfolio. Theoretically, it is argued that private equity can improve the operations of supported firms by reducing agency costs (Jensen 1986, 1989). Private equity adjusts manager incentives to meet the interests of executives such that improvements in the operating performance of a firm are a benefit for them. They also closely monitor the firms in which they have invested by actively joining the board of directors and taking part in proceedings. From a practical perspective, private equity has the ability to improve the operations of firms through what are known as the 4Cs: capabilities, clarity, culture, and capital (Private Equity Council 2015).<sup>1</sup>

Empirical research on whether private-equity-backed firms show improved operations has been vigorous internationally. Kaplan (1989) examined changes in the business performances levels of 76 instances of large management buyouts of public companies between 1980 and 1986, finding evidence which showed that within three years after the transaction, operating income, cash flow and market value all show improvements. He argued that enhanced performance arose not due to cost reductions by cutting jobs but as a result of an increase in efficiency through enhanced incentive measures. Smith (1990) and Smart and Waldfogel (1994) also showed substantial improvements in operating performance levels after U.S. management buyouts in the 1980s. By investigating the changes in operating performance between the time periods prior to and after private equity investments, Muscarella and Vetsuypens (1990) found substantial increases in the profitability of the reverse leveraged buyouts, referring to firms that have completed an initial public offering under a leveraged buyout.

<sup>1</sup>In the same context, Kaplan and Strömberg (2009) argued that private equity enhances the value of the investees through three actions—financial engineering, governance engineering, and operational engineering—which are not necessarily mutually exclusive.

More recent papers also confirm that private equity plays a positive role in improving firms in which investments have been made. Guo, Hotchkiss, and Song (2011) delved into whether leveraged buyouts of 192 firms between 1990 and 2006 created value, finding empirical evidence corroborating the claim that public-to-private companies show improvements with regard to EBITDA/sales by 11% in comparison to a matched sample of firms that had not been taken private. Cohn and Towery (2014), making use of U.S. corporate tax return data on private firm buyouts between 1995 and 2009, provided evidence that private firms acquired in private equity buyouts go through substantial operational increases in the post-buyout period, both in terms of operating performance and growth. They argued that private equity creates value in the portfolio firms either by leading to operational turnarounds of struggling firms or by relaxing financing constraints that limit the growth of healthier firms.

Meanwhile, in contrast to claims that private equity opportunistically attempts to increase the operating value of acquired firms either by stripping the firm, reducing investments, or slashing large numbers of jobs rather than making efforts ultimately to create value, a number of empirical papers have shown the opposite. Smith (1990) found significant evidence that 58 buyout firms showed increases in operating returns when comparing the years before and after the buyouts. These positive changes in operating performance levels were not the result of layoffs or reductions in expenditures for R&D or equipment. Davis *et al.* (2014) argued that private equity raises the total factor productivity of the target firms by divesting the less productive business sectors and acquiring more productive ones. With respect to employment, Boucly *et al.* (2009) demonstrated increases in employment by 13 percent when comparing the three years before and four years after buyouts for French buyout firms. In addition, Davis *et al.* (2011) found that the net relative job losses at target firms were less than 1 percent of initial employment, owing to the rapid reallocation of jobs across establishments within the target firms. Finally, Amess and Wright (2007) found that buyouts in the UK brought about modest declines in employment.

In comparison to western countries, which have a long history of private equity, allowing for active research to access whether private equity can enhance the business performance of target firms, few studies have investigated the effect of private equity on the target value of firms in Asia. Kim and Cho (2009), utilizing 29 samples from 2004 to 2006, estimated that private equity investment has a positive effect on current ratios, risk, and on the ratio of net income to net sales for firms. Park *et al.* (2006) analyzed value changes in firms which maintained business relationships with First Bank after First Bank was acquired by overseas private equity. They found evidence that the acquisition of what was a domestic bank by overseas private equity had negative effects on the value of firms with which First Bank had a business relationship. Recently, Song (2015) conducted event studies of 43 companies which had received private equity investments and which were listed on KOSPI and KOSDAQ from 2006 to 2011. Song explored through t-tests whether private equity investment had helped to improve the business performance of the target firms and argued that private equity had a positive effect on the firms' investment activities, productivity levels, and PBR. He also argued that private equity investment had a negative effect on profitability,

dividends, and employment, although the empirical results were not statistically significant.

### III. Data

This study uses data reported to the Financial Supervisory Service of Korea by private equity firms.<sup>2</sup> We analyzed companies listed on KOSPI and KOSDAQ targeted by private equity firms from 2006 to 2012. We utilized 70 sample observations in our analysis of companies that had received investments from private equity companies more than twice out of 77. To study general trends in operating performance levels, we adopted an event study approach by lining up years across companies and assessed the changes in business performances levels prior to and after private equity investments. We designated the year during which the private equity firm made the investment as year  $t$ . We also analyzed profitability by measuring the variables of return on assets (ROA), return on equity (ROE), and return on sales, while growth was captured by sales growth. We also explored the performance metrics of investment activities, leverage, and employment, which are represented by the fixed asset ratio, debt-to-asset ratio, and the number of employees, respectively. We retrieved accounting data from Kis-Database for our analysis. Figure 1 shows the trends of private equity investment activities in the capital market. Private equity firms increased their investments throughout the years from 2006, reaching a total of 77 companies in 2012.

Looking at the total and yearly trends of private equity investee companies by stock market, private equity in Korea invested in KOSDAQ companies grew more than twice as much as in that in companies listed on KOSPI, as shown in Figure 2 and Figure 3. Electric companies and electronic firms were most commonly favored by private equity firms, with machinery companies taking second place, shown in Figure 4.

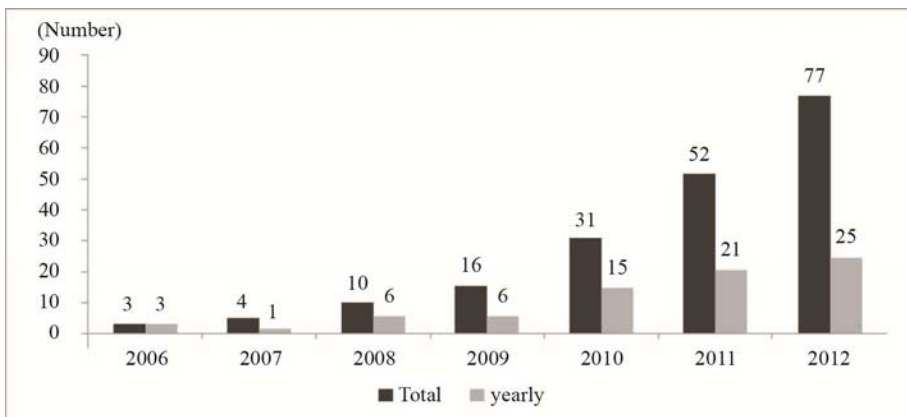


FIGURE 1. NUMBER OF PRIVATE-EQUITY-BACKED COMPANIES BY YEAR

<sup>2</sup>We are grateful to the Financial Supervisory Services (FSS) for providing the data.

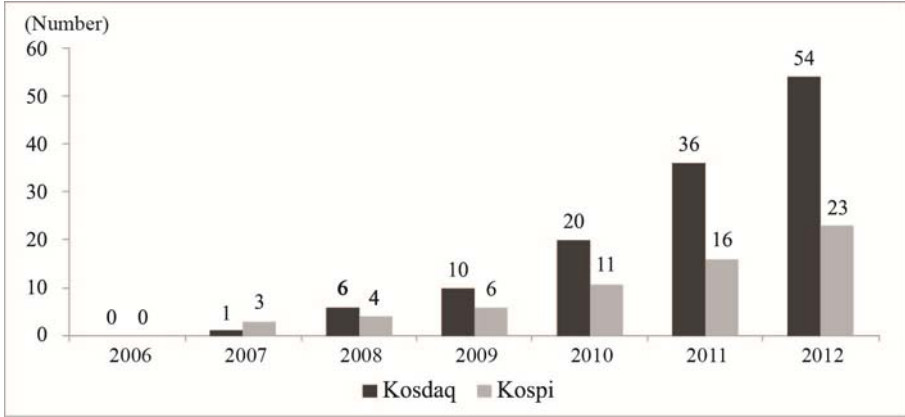


FIGURE 2. TOTAL NUMBER OF PRIVATE-EQUITY-BACKED COMPANIES BY STOCK MARKET

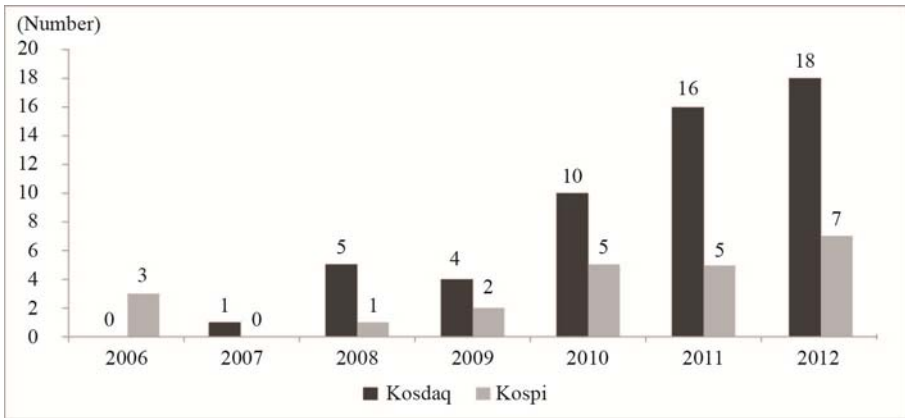


FIGURE 3. YEARLY NUMBER OF PRIVATE-EQUITY-BACKED COMPANIES BY STOCK MARKET

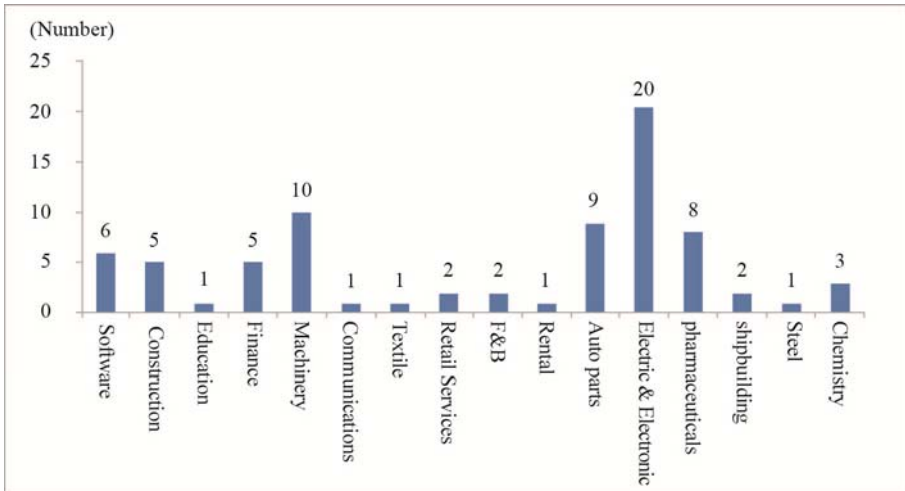


FIGURE 4. NUMBER OF PRIVATE-EQUITY-BACKED COMPANIES BY INDUSTRY SECTOR

## IV. Empirical Results

We mainly focused on how the operating performance metrics, in this case the profitability and growth of the companies targeted by private equity, changed, with an additional assessment of changes with regard to investment activity, leverage, and employment. First, we carried out an event study of ROA, ROE, return on sales and sales growth using all of the samples and then did this with samples winsorized at 5% to limit the influence of potential outliers. We also conducted an event study of these variables after adjusting for industry trends to control for business cycles and idiosyncratic factors within the industry. In addition, we examined whether the individual characteristics of private equity (e.g., investment size) may affect the profitability of PE-backed companies through panel estimations. Regarding the impact on investment activity, leverage, and employment caused by private equity investments, we executed an event study focusing on the fixed asset ratio, debt-to-asset ratio, and number of employees. Finally, we made use of propensity score matching for 2012, when the number of PE-backed companies was highest, to complement the results of the event study and to determine the determination rationale of the private equity investments.

### A. Operating Performance Results

#### 1. Operating Performance Trends

We examined operating performance trends for the firms in our sample from two years before (t-2) to two years after (t+2) private equity investments and carried out a t-test to check this statistically and to provide visual evidence. Figures 5 to 8 show the trends of the mean, 25th quartile, and 75th quartile with regard to ROA, ROE, ROS, and sales growth, as well as all of the operating performance metrics expressed in terms of the means, showing that they reached a peak t value and then decreased afterwards. This implies that private equity firms select companies that have a good business before the investment but cannot increase the operating performance levels further of these backed firms. Table 1 contains the results of the t-tests of changes in operating performance levels between t-1 and t+1, between t-1 and t+2, between t-2 and t+1, and between t-2 and t+2. We note that the differences in operating performance levels compared to the levels one year before the investment are all negative and statistically significant, excluding ROE, confirming the implications of the visual evidence. The results of a comparison two years before the investment (t-2) activity show similar outcomes.

To determine if our results are robust, we conducted a t-test to assess changes in operating performance levels from two years before (t-2) to four years after (t+4) private equity investments. As shown in Table 2, the results are qualitatively similar to those of the t-test of the outcomes two years after (t+2) the private equity investments.

TABLE 1—RESULTS OF THE T-TESTS

	t-1 to t+1	t-1 to t+2	t-2 to t+1	t-2 to t+2
ROA	-1.109 (1.893)	-3.535* (1.863)	-0.599 (1.926)	-3.037 (1.848)
ROE	-0.921 (6.092)	-23.173 (17.662)	-0.389 (6.680)	-23.280 (18.476)
ROS	-3.110 (2.360)	-4.686*** (1.550)	1.839 (3.978)	0.303 (3.348)
Sales Growth	-35.853** (17.947)	-39.104** (18.769)	-24.745* (13.017)	-25.103* (13.350)

Note: Standard errors are in parentheses.

\*\*\* Significant at the 1 percent level.

\*\* Significant at the 5 percent level.

\* Significant at the 10 percent level.

TABLE 2—RESULTS OF THE T-TESTS FOR T+4

	t-1 to t+1	t-1 to t+2	t-1 to t+3	t-1 to t+4	t-2 to t+1	t-2 to t+2	t-2 to t+3	t-2 to t+4
ROA	0.430 (3.277)	-4.264 (3.504)	-6.018** (2.863)	-3.794 (3.230)	1.503 (4.081)	-3.192 (3.938)	-4.946 (4.231)	-2.722 (4.299)
ROE	-4.442 (6.335)	-53.992 (38.653)	-21.091 (15.733)	-4.619 (5.434)	115.174 (112.163)	65.624 (119.961)	98.525 (113.740)	114.997 (11.752)
ROS	0.727 (3.470)	-5.580* (3.185)	-8.977 (5.605)	-10.548 (6.757)	5.839 (6.418)	-0.468 (5.354)	-3.866 (8.022)	-5.437 (9.092)
Sales Growth	-57.233 (38.665)	-63.312 (40.989)	-67.303 (42.036)	-71.454* (40.157)	-161.531 (128.944)	-160.636 (129.218)	-160.614 (129.266)	-166.420 (128.603)

Note: Standard errors are in parentheses.

\*\*\* Significant at the 1 percent level.

\*\* Significant at the 5 percent level.

\* Significant at the 10 percent level.

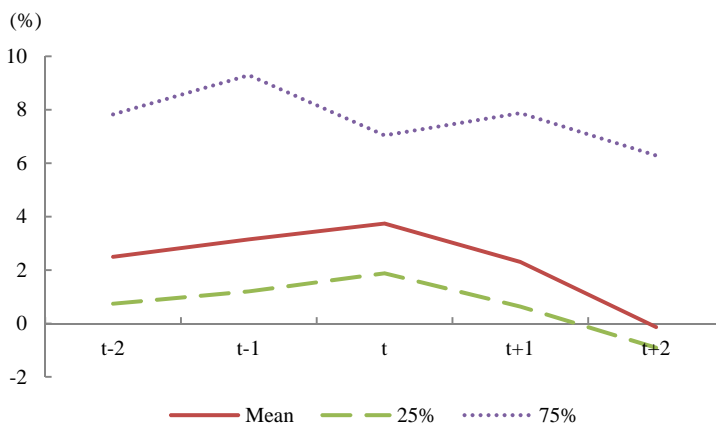


FIGURE 5. TRENDS IN RETURN ON ASSETS



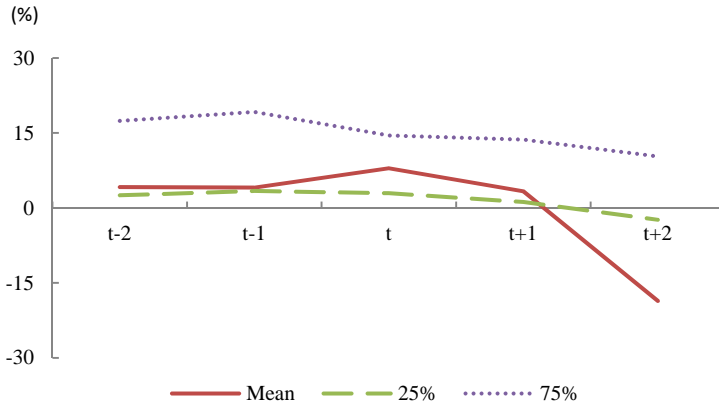


FIGURE 6. TRENDS IN RETURN ON EQUITY

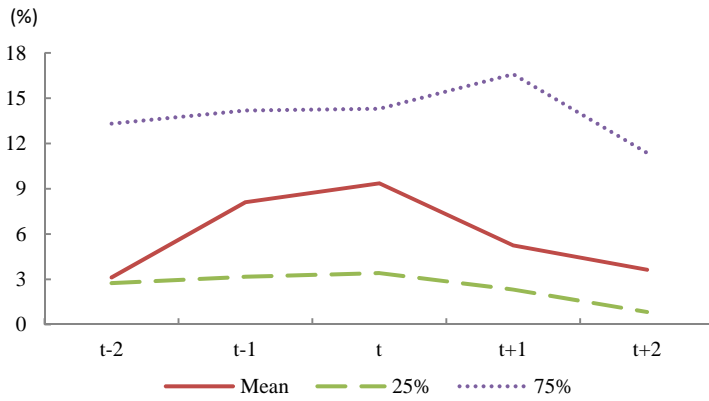


FIGURE 7. TRENDS IN RETURN ON SALES

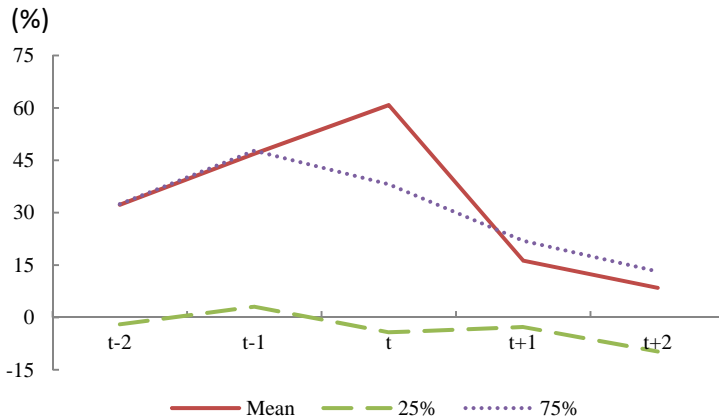


FIGURE 8. TRENDS IN SALES GROWTH

## 2. Trends in Operating Performance Metrics when Controlling for Outliers

Some of the operating performance levels (e.g., ROE and sales growth) show different movements among the means and quartiles from earlier figures. We conducted an event study of the operating performance levels by making use of samples winsorized at 5% to limit the influence of potential outliers. Nearly all of the operating performance metrics excluding ROS peaked at period t-1 and showed a downward trend afterwards, as shown in Figure 9 through Figure 12, indicating that the implication that private equity in Korea had not created value in portfolio companies remains accurate. Furthermore, the results of t-tests using the winsorized samples in Table 2 more strongly support the outcomes with all of the samples.

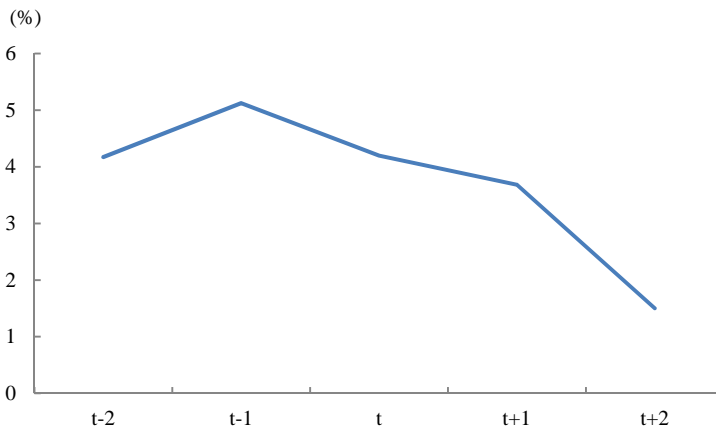


FIGURE 9. TRENDS IN RETURN ON ASSETS

*Note:* ROA is compiled after winsorizing at 5%.

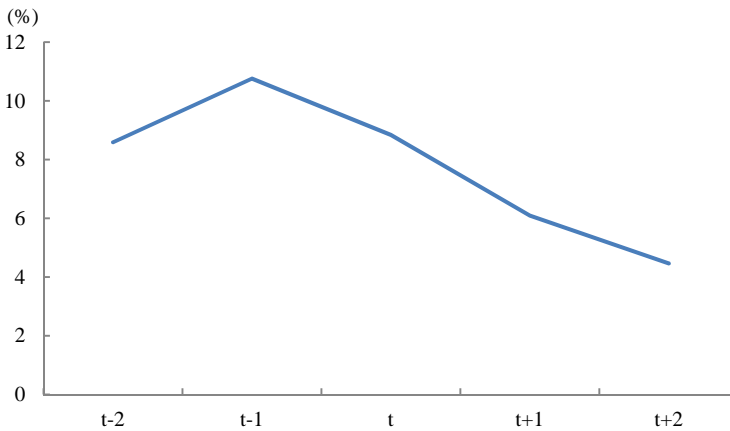


FIGURE 10. TRENDS IN RETURN ON EQUITY

*Note:* ROA is compiled after winsorizing at 5%.

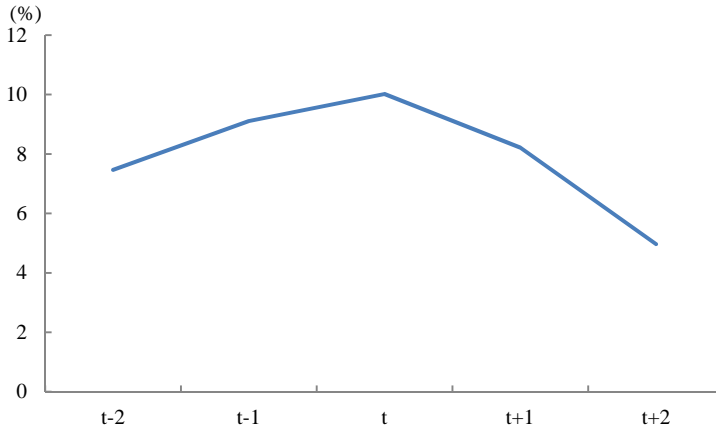


FIGURE 11. TRENDS IN RETURN ON SALES

Note: ROA is compiled after winsorizing at 5%.

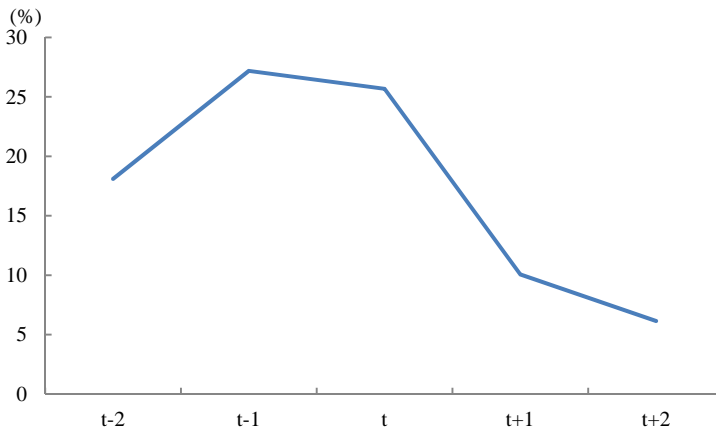


FIGURE 12. TRENDS IN SALES GROWTH

Note: ROA is compiled after winsorizing at 5%.

In Table 3, although the gaps in operating performance levels between the outcomes one year before and one year after private equity investment and two years after private equity investments are negative, the magnitude of the performance differences and the statistical strength both show increases over time. The statistical test results for two years before investment (t-2) and one year after (t+1), and for two years after (t+2) have identical implications with regard to the comparison with the outcomes one year before investment (t-1).

For robustness of our result, running a t-test of changes in operating performance levels from two years before (t-2) to four years after (t+4) private equity investment, with the results presented in Table 4, confirmed that the results are qualitatively similar to those of the t-test of the outcomes two years after (t+2) private equity investments.

TABLE 3—RESULTS OF T-TESTS USING WINSORIZED SAMPLES

	t-1 to t+1	t-1 to t+2	t-2 to t+1	t-2 to t+2
ROA	-1.198 (0.769)	-3.205*** (0.854)	-1.000 (0.876)	-2.765*** (0.883)
ROE	-4.586*** (1.591)	-6.394*** (1.823)	-2.885 (1.745)	-5.528*** (1.323)
ROS	-0.884 (1.087)	-4.201*** (1.110)	0.543 (1.768)	-2.078 (1.523)
Sales Growth	-13.610** (5.870)	-15.260*** (5.471)	-10.638** (4.795)	-12.527*** (4.204)

Note: Standard errors are in parentheses.

\*\*\* Significant at the 1 percent level.

\*\* Significant at the 5 percent level.

\* Significant at the 10 percent level.

TABLE 4—RESULTS OF T-TESTS USING WINSORIZED SAMPLES FOR T+4

	t-1 to t+1	t-1 to t+2	t-1 to t+3	t-1 to t+4	t-2 to t+1	t-2 to t+2	t-2 to t+3	t-2 to t+4
ROA	0.974 (1.226)	-2.653* (1.464)	-3.992** (1.712)	-2.895 (1.818)	1.461 (1.866)	-3.526** (1.534)	-5.336*** (1.799)	-4.124** (1.567)
ROE	-2.730 (2.790)	-3.883 (3.299)	-12.417*** (3.690)	-6.978** (3.318)	-2.835 (4.326)	-4.691* (2.348)	-10.849*** (3.330)	-8.785*** (3.074)
ROS	2.389 (1.740)	-3.934 (2.565)	-3.332 (2.121)	-3.090 (2.389)	3.766 (3.323)	-3.098 (3.312)	-2.608 (3.391)	-3.897 (3.473)
Sales Growth	-8.108 (8.721)	-6.502 (7.323)	-13.909 (8.964)	-11.113 (9.275)	-10.965 (8.688)	-13.32 (9.129)	-16.102 (9.422)	-16.307* (8.480)

Note: Standard errors are in parentheses.

\*\*\* Significant at the 1 percent level.

\*\* Significant at the 5 percent level.

\* Significant at the 10 percent level.

### 3. Trends in Operating Performance Levels after Industry Adjustments

The operating performance levels of firms were discovered to be influenced by either business cycles or idiosyncratic shocks in each industry for which PE-backed companies are associated with private equity (Cohn *et al.* 2014). For example, although the operating performance levels of the target companies deteriorated after private equity firms invested in them, private equity had positive effects on the target firms when the deterioration of such performance metrics was less than the industry average. We conducted an additional event study with industry-adjusted samples when subtracting the annual averages of the operating performance levels for each industry from the operating performance levels of individual firms. We calculated the averages of the operating performance levels in each industry using Kis-Data up to two digits referring to industrial classification codes. ROA, ROE, and sales growth showed the poorest performance levels for t+2, although ROS reached a trough at t+1 and rebounded slightly during t+2, as shown in Figures 13 to 16. Changes in operating performance levels between t-1 and t+1 and between t-1 and t+2 are also mostly negative but not statistically significant, as shown in Table 5.

TABLE 5—RESULTS OF T-TESTS USING INDUSTRY-ADJUSTED SAMPLES

	t-1 to t+1	t-1 to t+2	t-2 to t+1	t-2 to t+2
ROA	-10.555 (9.406)	-12.158 (9.349)	-0.734 (2.056)	-2.325 (1.949)
ROE	1.986 (6.475)	-19.795 (18.846)	2.305 (7.010)	-20.139 (19.581)
ROS	-3.689 (2.911)	-3.002 (2.389)	1.032 (3.754)	1.824 (2.995)
Sales Growth	-16.460 (20.814)	-21.189 (20.216)	-6.721 (15.115)	1.609 (13.851)

Note: Standard errors are in parentheses.

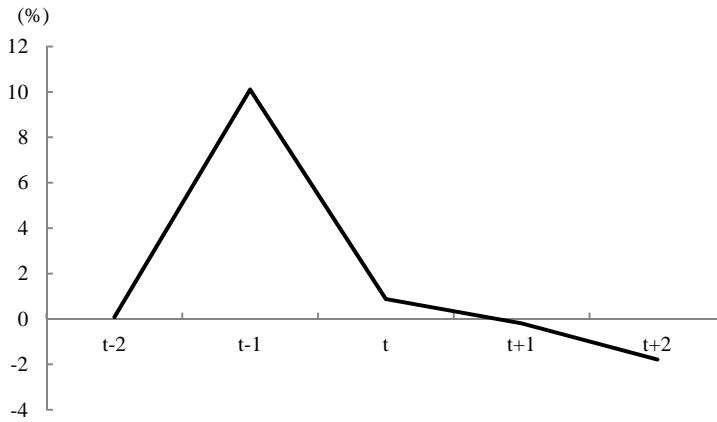


FIGURE 13. TRENDS IN RETURN ON ASSETS

Note: ROA is compiled after adjusting for industry.

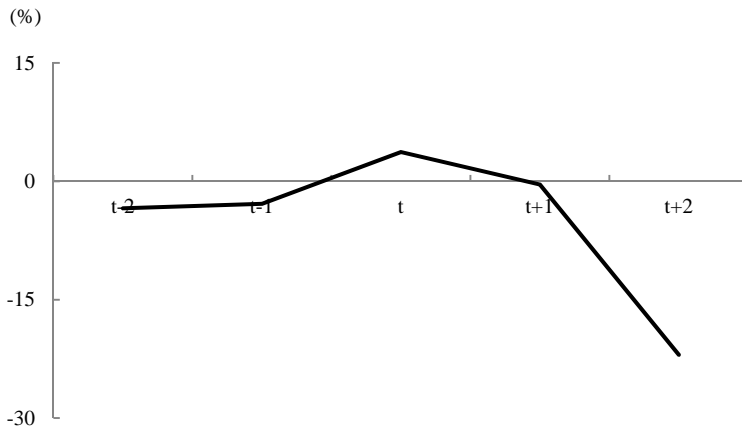


FIGURE 14. TRENDS IN RETURN ON EQUITY

Note: ROA is compiled after adjusting for industry.

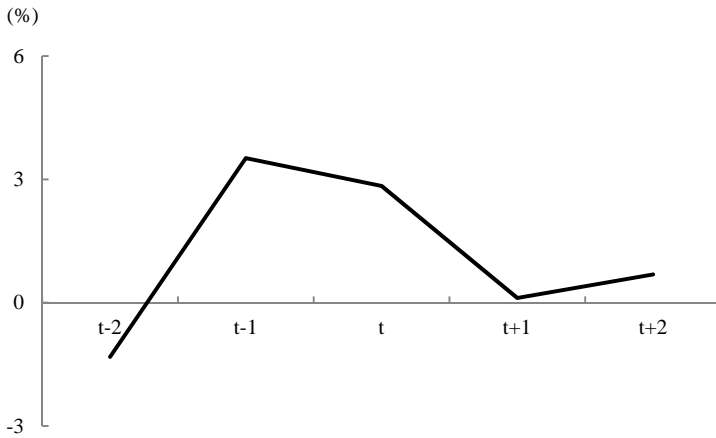


FIGURE 15. TRENDS IN RETURN ON SALES

Note: ROA is compiled after adjusting for industry.

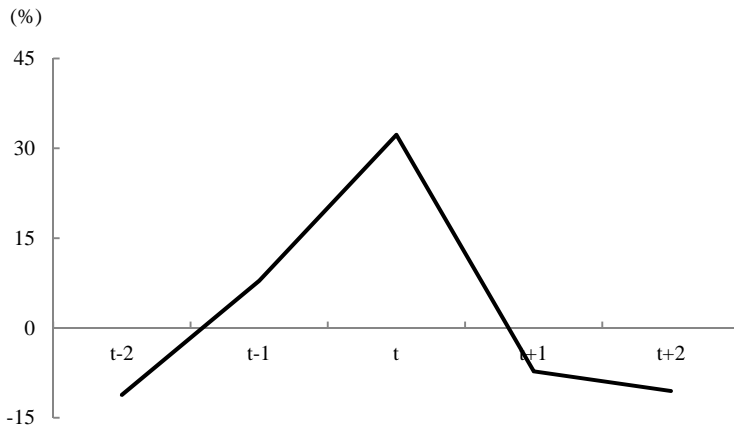


FIGURE 16. TRENDS IN SALES GROWTH

Note: ROA is compiled after adjusting for industry.

### B. Investment Activity, Financial Stability, and Employment Results

The critics against private equity argue that private equity opportunistically attempt to obtain profits in the short-term at the expense of long-term growth potentials of the firms they acquire by either stripping assets or reducing investments, cutting large numbers of jobs, and raising leverages for tax benefits (Capizzi *et al.* 2014). We examined the effects of private equity on investment activity, leverage, and employments for the firms they invest in Korea. Accordingly, we conducted an event study with regards to the fixed asset ratio, debt ratio, the number of employees, and t-statistical test.

Figures 17 through 19 demonstrate the trends of the means, the 25<sup>th</sup> quartiles, and the 75<sup>th</sup> quartiles for the fixed asset ratio, debt ratio, and employment. The fixed asset ratio increased after private equity investments, as shown in Figure 17. The debt ratio decreased after private equity investments were made, although there was a slight increase from t+1 to t+2. Finally, the condition of employment at the targeted firms showed improvements. Visual evidence of this is shown by the statistical test results compiled in Table 6. The changes in the fixed asset ratio and employment levels between the outcomes one year before and one year after private equity investments are positive, while the difference in the debt ratio is negative. The statistical test results are pronounced when we test gaps between outcomes one year before and two years after the private equity investments. The visual and statistical evidence implies that private equity in Korea may not pursue benefits for their targeted companies because they sacrifice the long-term growth potential of these firms.

TABLE 6—RESULTS OF T-TESTS OF INVESTMENT, LEVERAGE, AND EMPLOYMENT

	t-1 to t+1	t-1 to t+2	t-2 to t+1	t-2 to t+2
Fixed asset ratio	0.725 (1.093)	2.659* (1.414)	0.928 (1.541)	2.920 (1.813)
Debt ratio	-5.988*** (2.081)	-4.851** (2.462)	-2.450 (2.237)	-1.433 (2.633)
Employees	72.039*** (21.681)	91.809*** (28.252)	45.824 (63.140)	57.660 (70.923)

Note: Standard errors are in parentheses.

\*\*\* Significant at the 1 percent level.

\*\* Significant at the 5 percent level.

\* Significant at the 10 percent level.

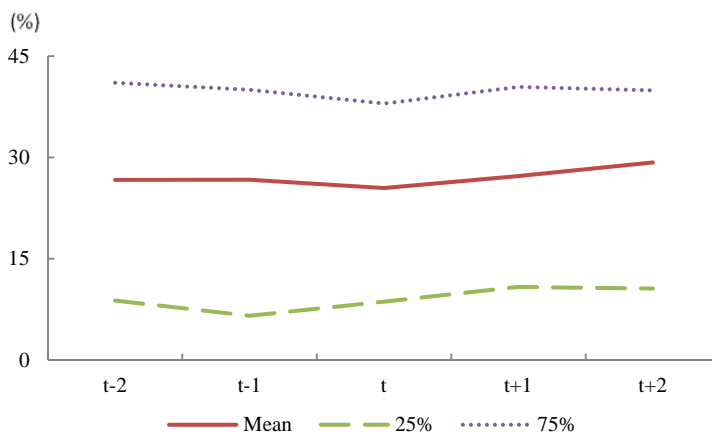


FIGURE 17. TRENDS IN FIXED ASSET RATIO

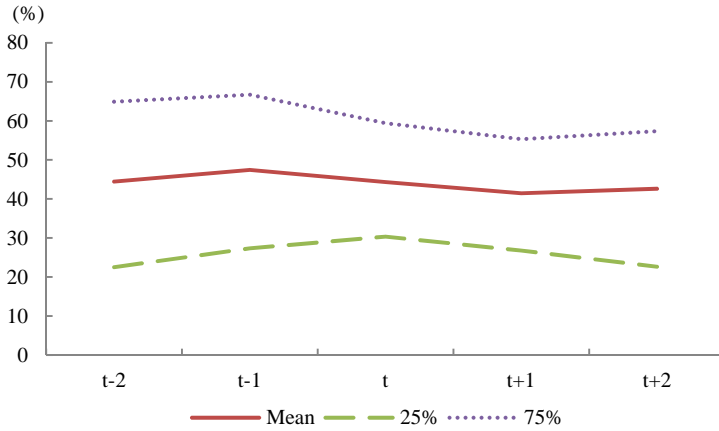


FIGURE 18. TRENDS IN DEBT RATIO

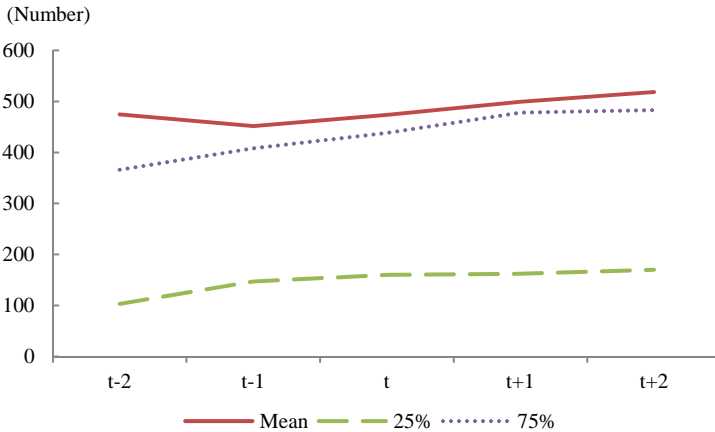


FIGURE 19. TRENDS IN EMPLOYMENT

### C. Characteristics of Private Equity with regard to Operating Performance Results

In section B, we failed to find evidence demonstrating that private equity improves the operating performance levels of targeted firms in terms of visual metrics and statistical t-tests from the event study. We attempt to uncover hints that could explain what may have brought about such poor outcomes in this section. Past studies have argued that the effects of private equity on the operating performance levels of targeted firms hinge on the characteristics of the private equity firms themselves, among other factors (Badunenko *et al.* 2010; Gompers *et al.* 2015; Harris *et al.* 2014). For example, private equity with a buyout objective is inclined to invest sizable amounts to buy a large portion of the equity for management rights, such as 50% of the total equity, compared to firms with a



growth capital goal of supporting the financial activities of a growing young company, similar to venture capital firms and private equity firms, for which the GP has long been assumed to be linked to a high likelihood of success in creating value in targeted firms based on the experience and know-how accumulated over many years by the investing firm.

In this study, we estimated the effect of the amount invested by private equity on the ROE, which is represented by the operating performance, to determine whether private equity in Korea focuses on buyouts or growth capital. The estimation equation is as follows:

$$(1) \quad ROE_{it} = a + b_1 fund\ size_{it} + b_2 current\ ratio_{it} + b_3 age_{it} + b_4 asset_{it} + b_5 current\ asset\ ratio_{it} + b_6 debt\ ratio_{it} + e_{it}$$

We employed ROE as a dependent variable and the current ratio (current asset to current liabilities), the age of the firm, assets, the current asset ratio (current asset to total asset), and the debt ratio (debt to total asset) as control variables. We performed a regression to improve the pooling of the OLS, FGLS, and random effects, as this method was found to be a more suitable panel estimation model through a Hausman test.

Table 7 shows the estimation results. We observed that the relationship between the amount invested by private equity and the ROE is significantly negative in all of our estimation models. That is, the smaller the size of the investment by private equity, the better the operating performance is. Furthermore, the younger the firm is, the more likely it is for the firm to show higher profitability. This result, along with the result showing the negative relationship between the amount invested and the operating performance level, imply that Korean private equity firms have not been acting as buyout firms, which in general target more mature, underperforming firms that need to be restructured. This nonetheless provides growth capital as financial resources for young firms to grow.

TABLE 7—RESULTS OF THE ESTIMATION OF THE PE EFFECTS ON THE OPERATING PERFORMANCE

	Pooled OLS	FGLS	Random Effect
Investment size	-5.223**	-2.905***	-4.826*
Current ratio	-0.007	-0.006***	-0.007
Age	-0.519**	-0.266***	-0.493**
Asset	11.178***	5.891***	10.516***
Current asset ratio	0.438**	0.130**	0.403***
Debt ratio	-0.202**	-0.122**	-0.203**
Constant	-148.634***	-67.809***	-139.936**
Adjusted R square	0.684	0.680	0.708

Note: \*\*\* Significant at the 1 percent level.

\*\* Significant at the 5 percent level.

\* Significant at the 10 percent level.

#### D. Results from the Propensity Score Matching Estimation

In the previous section, we failed to find critical evidence that substantiates the claim that private equity improves the operating performance levels of targeted firms, yet there is some visual and statistical evidence that such private equity funds do not pursue profits from these firms at the expense of their long-term growth potential in terms of investment, financial stability, and employment. However, the event study conducted here has limitations in that there was no control group. Therefore, we utilize the propensity score matching estimation (PSM) model, which has been actively used in policy evaluation studies that share this limitation (Heinrich *et al.* 2010). Propensity score matching selects control groups that are most similar to the firms targeted by private equity companies by making use of the observable characteristics of these firms. Considering that PSM is a cross-sectional estimation method, we use PSM for 2012, the year in which the number of investment firms was largest, as an estimation method complementary to the event study. By making use of Epanechnikov kernel matching for PSM, we explore whether private equity improves the operating performance levels of the targeted firms by comparing these companies with the control group. In particular, we examine the operating performance levels of the firms for the near future (t+1) and the comparatively longer future (t+2) after the investment by private equity.

$$(2) \quad I_i^{PE\ investment} = \alpha + \beta_1 age_i + \beta_2 current\ ratio_i + \beta_3 asset_i + \beta_4 current\ asset\ ratio_{it} + \beta_5 debt\ ratio_{it} + \varepsilon_{it}$$

In the first stage, we estimate the probability of receiving investments from private equity funds by running a probit regression. We consider the age of the firm, the current ratio, assets, the current asset ratio, and the debt ratio as the determinants of investment by private equity funds. Following the selection of the investment targets, we calculate the differences in operating performance levels, investment activity, financial stability, and employment one year after private equity investments have been made.

$$(3) \quad ATE(\text{average treatment effect}) = E(\delta) = E(Y_1 - Y_0)$$

Here,  $\delta_i = Y_{1i} - Y_{0i}$  is defined as the difference between the potential outcome in the case of investment by private equity and the outcomes in the absence of investment, and  $E(\cdot)$  represents the average.

The results of the balancing test, by which matching based on the propensity score works, are shown in Table 8. The reduction of sample selection bias is successful, as no statistically significant variables remain after matching in term of the p-values. Table 9 presents the results of the private equity investment determination. We found that the probability of receiving investments from private equity is higher for larger firms and for younger firms. The outcome showing that younger firms are more likely to obtain investments from private equity companies implies that private equity favors younger firms with greater growth potential than

TABLE 8—RESULTS OF THE BALANCING TEST

Variable	Unmatched Matched	Mean		Bias(%)	Reduction of bias (%)	t-test	
		Treated	Control			t	p> t
Age	U	19.72	27.24	-44.6	52.6	-2.12	0.034
	M	17.26	20.83	-21.1		-0.78	0.440
Current ratio	U	207.69	3,473.50	-3.7	98.4	-0.12	0.902
	M	224.80	227.82	-0.1		-0.23	0.816
Asset	U	26.49	25.87	36.3	91.8	1.90	0.057
	M	26.29	26.24	3.0		0.09	0.928
Current asset ratio	U	25.95	26.78	-3.9	45.5	-0.21	0.833
	M	25.73	25.27	2.1		0.07	0.946
Debt ratio	U	45.43	41.37	18.5	48.0	0.86	0.389
	M	42.91	40.80	9.6		0.31	0.758

TABLE 9—RESULTS OF PRIVATE EQUITY INVESTMENT DETERMINATION

Variable	Coefficient	Standard error	P-Value
Age	-0.020**	0.008	0.013
Current ratio	-0.000	0.000	0.418
Asset	0.117**	0.052	0.024
Current asset ratio	-0.004	0.005	0.441
Debt ratio	0.004	0.004	0.325
Constant	-4.819	1.314	0.000
Observation		Treatment =22 Control =1,665	

Note: \*\* Significant at the 5 percent level.

TABLE 10—RESULTS OF THE AVERAGE TREATMENT EFFECT (T+1)

	ATE	Standard error	t-Value
ROE	5.940	4.734	1.255
ROA	1.326	2.388	0.555
ROS	-2.212	5.720	-0.387
Sales Growth	-18.650**	8.283	-2.251
Fixed asset ratio	0.961	5.111	0.188
Debt ratio	1.895	5.139	0.369
Employees	123.704	266.685	0.464

Note: \*\* Significant at the 5 percent level.

their mature counterparts, which typically require a turnaround through restructuring. Looking at the results of the average treatment effect in Table 10, sales growth deteriorates with statistically significant negative differences compared to the control group, whereas the effect on profitability is not conclusive, with mixed signs of negative ROE and ROA and positive but not statistically significant ROS outcomes. This implies that we cannot support the claim that private equity has the ability to improve the operating performance levels of its targeted companies. With respect to the effects on investment, financial stability, and employment, private equity may not sacrifice the long-term growth potential of

TABLE 11—RESULTS OF THE AVERAGE TREATMENT EFFECT (T+2)

	ATE	Standard error	t-Value
ROE	-5.180	16.135	-0.321
ROA	0.356	1.755	0.203
ROS	0.304	1.804	0.169
Sales Growth	-6.176*	3.234	-1.910
Fixed asset ratio	1.125	4.883	0.230
Debt ratio	2.208	4.824	0.458
Employees	-12.637	174.680	-0.072

Note: \*\* Significant at the 5 percent level.

targeted companies for short-term gains considering that changes in the fixed asset ratio and number of employees are positive with a slight increase in debt ratio. However, we cannot assign any critical meaning to this estimation outcome because the results are not statistically significant. The estimation results for the longer horizon in Table 11 present qualitatively similar implications.

## V. Implications of the Empirical Results

In Korea, private equity was introduced in an effort to foster a native corporate restructuring mechanism which could compete with overseas private equity, as overseas private equity funds began to rake in money in the domestic corporate restructuring market immediately after the currency crisis. Therefore, private equity has been considered as pursuing buyouts, taking control of management and reforming their targeted companies. However, in reality, private equity funds appear to be more akin to growth capital, which provides financial support to funds which show growth potential. Based on the results of the empirical analysis, as the age of the firm becomes younger, profitability improves among companies targeted by private equity firms, as shown in Table 5. Furthermore, private equity appears to favor younger companies when it comes to determining their investment portfolios, as shown in Table 7. That is, private equity funds, up until recently, took on the role of growth capital by supporting the growth of young companies by providing financial resources rather than playing a buyout role and turning around mature companies that are underperforming. The financial supervisory authority has also announced that most private equity funds in Korea are not similar to buyouts funds but are more similar to growth capital funds (Financial Supervisory Service 2015).

## VI. Conclusion

Recently, corporate restructuring has become a critical issue, especially considering the deterioration of the profitability of certain businesses followed by years of low growth with increases in the number of marginal firms. The main corporate restructuring schemes consist of corporate structure improvements, “workouts” by voluntary agreement between creditors, and corporate rehabilitation

proceedings or “court receivership” by the courts. This institutional, court-led, *ex-post* corporate restructuring process basically targets firms with insolvency issues, causing these firms to pay painstakingly high costs, such as significant job losses, ‘fire sales’, and conflicts of interests among stakeholders. Therefore, as an alternative measure, corporate restructuring by the capital market, particularly through private equity funds, has gained popularity as an *ex-ante*, preemptive complementary corporate restructuring scheme which takes place before insolvency. It is therefore considered to be more effective in that it can reduce agency costs by taking control of management and increasing the overall monitoring capabilities. Corporate restructuring schemes headed by domestic private equity funds are also important in that they can provide some competition with overseas private equity funds to prevent the types of cases which arose during the currency crises in the late 1990s and early 2000s.

This study investigates the revitalization of private equity in Korea as an alternative corporate restructuring mechanism by empirically analyzing whether Korean private equity funds have increased the operating performance levels of their targeted firms and by drawing policy implications based on empirical results. Whilst the visual and statistical evidence indicates that private equity in Korea may not have sacrificed the long-term growth potential of the firms, we also could not find evidence that they can improve the profitability (e.g., ROA, ROE, and ROS) and growth (e.g., sales growth) of the targeted firms. The results of propensity score matching confirm that private equity likely did not increase the operating performance levels of targeted companies, as deduced from the results of an event study conducted here. Furthermore, we find substantial evidence that the relationship between business performance and firm age is negatively correlated and that young firms are favored by private equity firms when determining their investments. This implies that private equity in Korea does not engage in buyouts, which were the original reason given for introducing private equity in Korea, taking control of management and executing turnarounds of underperforming companies, instead serving as growth capital, providing timely financial resources to companies which are relatively young, similar to venture capital firms.

In addition, we did not find evidence that Korean private equity could improve its investee portfolio, which implies that private equity in Korea is not yet ready for any corporate restructuring mechanism. We present explanations for this and discuss potential policy actions which can be taken to enhance the role of private equity firms as a corporate restructuring vehicle based on preceding research and on the results of our survey. One of the reasons private equity funds were unable to create value in their portfolios is the dearth of sufficient opportunities to build up such capabilities. In contrast to the period following the currency crisis, underperforming companies may not want to receive investments from private equity firms at the expense of its management rights, and with its possession of a number of underperforming companies, the government may also crowd out investment choices for private equity funds. Furthermore, the history of private equity may be too short for private equity firms to have amassed sufficient know-how and experience with regard to buyouts (Kim and Bin 2012). To invigorate private equity as an corporate restructuring scheme, government deregulation is needed to foster dynamism and innovativeness in the Korea private equity industry,

as regulations pertaining to private equity funds that guide firms towards executing buyouts may limit the activities of private equity. Moreover, the private equity industry itself should build up capacity by making efforts (e.g., hiring professional management teams), and the enlargement of the size of private equity funds is necessary to carry out market-friendly corporate restructuring given likely increase in the demand for corporate restructuring, in particular for large companies (Koo 2015).

Meanwhile this research has some limitations that we would like to leave for follow-up studies. First, we are not able to examine whether private equity takes part in corporate restructuring for targeted firms comprehensively, as we could not look at whether private equity disposes of assets and reorganizes the business structures of these firms. Second, the present study draws upon data of listed firm due to the difficulty in accessing that of non-listed firms. Therefore, this study relies on investment data for listed firms through the Financial Supervisory Service. Unlike overseas, where detailed data on private equity investments (e.g. preqin) are commercially available, such data that include the non-listed firms are not available in South Korea.<sup>3</sup> Finally, due to data limitations, we could not take into account the effect of put-back options on the profitability (e.g., ROE) of targeted firms.<sup>4</sup>

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<sup>3</sup>Although we can collect non-listed firm data by reviewing newspaper articles, this can cause sample selection bias.

<sup>4</sup>A put-back option was often employed when private equity invested in firms up to 2012. However, the financial policy authority has regulated on put-back option since early 2013 by considering it as lending activity and not equity investment.

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