Do the effects of Private Equity investments on firms performance persist over time?

Abstract. This study examines whether the effect of private equity (PE) investments persists over time or wears off after the PE investors exit. Unlike previous studies that focus on the PE backed initial public offerings (IPOs), we constructed a unique and distinctive dataset comprising PE investments exiting both via IPO and the other common ways (i.e. trade sale, secondary buy-out and buy-back). Consistent with Jain and Kini (1995), we observe that PE backed firms outperform other firms, but our results shed light on existing literature as we find that whether or not PE investments effect continue to benefit the portfolio firms is strictly related to type (venture capital vs. buy-out) and length of PE investment, nature of PE investor (bank-based vs. non-bank based), and exit strategy (IPO vs. other exit strategies).

Keywords: private equity, venture capital, buy-out, exit strategy, operating performance

JEL Codes: G24,G32, G34

I. Introduction

Over the last decade billions of euros have been invested by global private equity (hear in after "PE") industry and both the amount of investments and fundraising activities are considerably grown[1] despite the negative effects of the financial crisis, and the unfavorable public reputation that PE investors have recently acquired (e.g., Morris, 2010). Specifically, several drawbacks have been associated to PE investments, particularly buy-out (BO), such as the excessive use of debt and the widely practice to strip the firm assets (e.g., Wright *et al*., 2009; Guo *et al*., 2011). As a consequence, there has been a remarkable attention on the importance to regulate the area (e.g., the *Wall Street Journal* reported that the SEC has recently launched a wide-ranging inquiry into the PE industry)[2] and renewed emphasis has been given about whether and how PE investments create value for investing firms.

Empirical literature on PE investments effects have provided numerous evidence supporting the ability of PE investors to growing up productivity and profitability of their portfolio companies (e.g., Kaplan, 1989; Smith, 1990; Davis *et al*., 2008). Otherwise, the persistence of these favourable effects after PE investors exit (hear in after "post-exit period") has remained largely unresolved. Consistent with a long-term value-added hypothesis, the virtuous management and financial practices put in place when a firm is under the PE control will be maintained after the exit (e.g., Levis, 2011). According to a short-term value-added hypothesis, PE investors can take actions useful to maximize their wealth, but resulting in unfavourable long-term effects for the firm. As such, it is not surprising that previous studies paint a mixed picture (e.g. Jain and Kini, 1995; Wang *et al*., 2003; Caokley *et al*., 2007). Moreover, literature shows a clear

[1] In Europe the amount of investments was 27,6 billions of euros in the 2002 and 45,5 billions of euros in the 2011, while the amount of fund raised was 27,5 billions of euros in the 2002 and 39,8 billions of euros in the 2011. Source of data: EVCA.

[2] The *Wall Street Journal*, "SEC Launches Inquiry Aimed at Private Equity", February 11, 2012.

drawback because only analyses PE investments exiting via Initial Public Offering (IPO). Indeed, failing to consider the other PE investments is likely to bias the findings for three main reasons: (i) the IPO is a marginal exit route for PE investors[3]; (ii) only high quality PE backed firms should go public; and (iii) the involvement of PE investors can be not completely terminated at the IPO time.

As a consequence, the major contribution of our paper consists into building a unique and distinctive dataset comprising PE investments exiting both via IPO, and the other common ways (i.e. trade sale (TS), secondary buy-out (SBO) and buy-back (BB)). First, we have constructed a large sample of Italian PE backed firms whose shareholdings have been sell by PE investors over the period 2001-2008. Then, we have constructed a sample of non-PE backed firms by using a matched-pair methodology. Our final sample is composed by 236 firms (118 PE backed and 118 non-PE backed) and contains information on PE investments collected from Private Equity Monitor[4], and firms financial data collected from ORBIS Bureau Van Dijk and the register of the Italian Chamber of Commerce (TELEMACO). The choice to focus on Italian firms takes in account that Italian PE industry appears as an interesting field of investigation (e.g., Caselli *et al.*, 2009; Cumming and Zambelli,2010; Capizzi *et al.,* 2011)[5], although we are conscious that it raises the issue of whether our results can be extended to other PE industries.

Do the effects of PE investments on firms performance persist over time? After controlling for selection bias concerns, we find that PE backed firms outperform other firms over the post-exit period, but this evidence seems confined to VC backed firms.

[3] For example in Europe from 2007-2011 period, the fraction of PE backed firms going public was approximately the 1.2 per cent. Source of data: EVCA.

[4] Private Equity Monitor is the observatory on Italian Private Equity and Venture Capital Industry established by the University Carlo Cattaneo. Through a partnership with AIFI (Italian Private Equity & Venture Capital Association) Private Equity Monitor has collected data about 1.145 deals made in Italy between 1998 and 2011.

[5] Over the period 2007-2011, Italian PE industry was the fourth European PE industry with more than 10 billions of euros invested. Source of data: EVCA.

Our paper sheds light on previous studies suggesting their mixed results could depend on the type of PE investments focused on[6].

We contribute to existing literature in other several ways.

First, we find strong evidence in favour of an inverted U-shaped relation between the length of investment and change in firm performance. While the length of a PE investment is able to capture its quality, too long investment may imply PE investor has had troubles selling its stake (hold-up problems) due to a low firm quality.

Second, we investigate the existence of a relation between the PE investors exit strategy and the portfolio firms performance some years later. We find that PE backed firms have gone public perform worse than other PE backed firms over the post-exit period. This evidence could appear surprising, as only better quality firms should go public, but there is a widely evidence supporting the decline in operating performance of IPO firms (e.g., Jain and Kini, 1994).

Finally, we observe that only bank-based PE investors are able to provide long-term value-added: they are probably interested in a long-term growth of portfolio firms in attempt to yields synergies with their core activity (Hellman *et al*., 2008).

The rest of this paper is organized as follows: next Section reviews prior literature and discusses research hypotheses. Section III contains a description of data and variables, while Section IV describes the empirical strategy. Section V presents the empirical results and the final Section concludes.

II. Literature review and hypotheses

[6] While US research analyses mainly focus on VC backed firms, studies on non-US markets focus on PE backed firms, which also include BO backed firms (Cumming and Johan, 2009).

The economic impact of the PE investments on portfolio firms has interesting implications, not only for the equity and debt holders, but also for policymakers. An early line of research (e.g., Kaplan, 1989; Smith, 1990; Harris *et al*., 2005; Davis *et al*., 2008) has provided evidence supporting the ability of PE investors to growing up productivity and profitability of their portfolio firms. In parallel, literature has analysed why the PE backed firms are more likely to exhibit better operating performance, supporting the ex-ante screening role hypothesis (e.g., Gompers and Lerner, 2001; Baum and Silvermann, 2004; Chemmanur *et al*., 2011), the value-added hypothesis (e.g. Hellmann and Puri, 2002; Kaplan and Strömberg, 2003; Colombo and Grilli, 2010; Ferretti and Meles, 2011) and the value-transfer hypothesis (Tykvová and Borell, 2012).

Other studies (Jain and Kini, 1995; Wang *et al*., 2003; Coakley *et al*., 2007; Levis, 2011; Meles, 2011; Tian, 2012) have also discussed whether the effects on portfolio firms performance persist over time or wear off after the PE investors have exited.

From a theoretical point of view, two main hypotheses can be proposed. Consistent with a long-term value-added hypothesis, the support provided by PE investors should continue to benefit the backed firms, even after their exit. The basic argument is that PE investors play a key role in making their portfolio firms more professional organizations (Hellman and Puri, 2002), as well as in providing resources that support entrepreneurs in defining a new firm strategic behaviour with long-term effects (e.g., Barringer *et al*., 2005; Packalen, 2007). Otherwise, according to a short-term value-added hypothesis, PE investors would take appropriate actions (e.g., in terms of investments selection and/or earning management) useful to maximize their wealth, but resulting in unfavourable long-term effects for the firm.

From an empirical standpoint, the debate on whether the effects on portfolio firms performance persist after the PE investors exit is furthered by Jain and Kini (1995): focusing on US private firms that going public, they point out that PE investors provide

post-issue value-added services, resulting in better operating performance by PE backed firms. Following the Jain and Kini (1995) pivotal paper, a large literature has grown up by testing the post-issue value-added hypothesis. While Tian (2012) confirms the early evidence with reference to US PE syndications, and Levis (2011) extends these results to the UK PE industry, other papers report contrasting findings (e.g, Wang *et al*., 2003; Coakley *et al*., 2007; Meles 2011). As a result the issue of whether PE backed firms over-perform non-PE backed over the post-exit period has remained largely unresolved.

Thus, following Jain and Kini (1995) seminal paper, we define the first hypothesis tested in this paper as follows:

H_1: the profitability of PE backed firms is expected to be higher over the post-exit period.

A likely explanation of the mixed results reported by previous studies is the different composition of their samples. As such, while Jain and Kini (1995), and Tian (2012) focus on VC backed firms and report a strong bias towards the high-technology sector, other studies (e.g., Coakley *et al*., 2007) use samples that are relatively evenly distributed between the type of operations (i.e. VC vs. BO) and sectors (i.e. industry, high technology and services sectors). This is particularly important because while VC investors have the widespread reputation to be "buildwinners", previous studies (Guo *et al*., 2011; Tykvová and Borell, 2012) cast doubt on whether BO investors can add substantial value to backed firms.

Following these indications we develop the following two hypotheses:

H_2: the profitability of VC backed firms is expected to be higher over the post-exit period.

H_3: the profitability of BO backed firms is not expected to be higher over the post-exit period.

Previous papers (e.g., Jain and Kini, 1995; Wang *et al*., 2003) also predict a positive relationship between long-run operating performance and several proxies for PE value-adding ability, such as the number of PE investors with equity positions in the firm, and the length of the investment period. The first variable is a proxy of the quality of PE investments, as when more than one PE investors invest in the same firm, they can provide it with a broad range of inputs (Tian, 2012). Otherwise, the expected sign of the length of PE investment is ambiguous because while it is a proxy of the investment intensity, too long investments may imply hold-up problems for PE investors. As result, our prediction is that such a trade-off will show up as an inverted U-shaped relationship between firm operating performance and PE investment length.

Thus, we develop our fourth and fifth hypotheses as follows:

H_4: the profitability of a firm over the post-exit period is expected to be positive correlated to the number of PE investors with equity positions.

H_5: the profitability of a firm over the post-exit period is expected to be positive correlated to the length of PE investment and negative correlated to the length of PE investment squared.

Previous studies also suggest that bank-based PE investors may perform differently from other investors in the PE market (e.g., Dolvin *et al*., 2007). While non-bank-based PE investors commonly employ active governance techniques, bank-based PE investors have been traditionally involved in more passive activities, such as debt-related due diligence and assets sales. More recently, Hellman *et al*. (2008) suggest that bank-based PE investors target their investments in a manner that yields synergies with the banking core business. Thus, while non-bank-based PE investors have strong incentives to exit their investments as soon as possible and with the maximum gain, bank-based PE

investors could be interested in a long-term growth of their portfolio firms in attempt to develop solid relationships with them.

Following these indications we develop our six hypothesis as follows:

H_6: the profitability of firms over the post-exit period is expected to be higher for firms backed by bank-based PE investors.

By using a unique and distinctive dataset that comprises all PE investments, we are able to extend the existing literature by investigating whether there is a relationship between the PE investors exit strategy and the firms performance after their exit. This issue is particularly interesting because the management of a PE backed firm can be influenced by the existence of a preliminary agreement on how PE investor will exit. Additionally, some papers (e.g., Sørensen, 2007; Guo *et al*., 2012) have recently pointed out a relation between some PE investments characteristics and the exit strategy. For these reasons we develop our final hypothesis as follows:

H_7: the profitability of PE backed firms over the post-exit period is expected to be affected by the PE investors exit strategy (i.e., IPO, vs. other exit strategies).

III. Data and variables

In this section, we provide detailed information about data and variables we use in the empirical analysis.

Data and descriptive statistics

To test our research hypotheses, we have constructed a sample of Italian PE backed firms whose shareholdings have been sell by PE investors over the period 2001-2008 and for which we have accounting data from the fiscal year before the PE investors exit to the third fiscal year after the divestment. Our dataset contains information collected from Private Equity Monitor on PE deals, characteristics of investors and exit strategy,

and firms accounting data collected from ORBIS Bureau Van Dijk and the register of the Italian Chamber of Commerce (TELEMACO). As suggested by previous studies (e.g., Dushnitsky and Lenox, 2006), any results based only on a sample of PE backed firms may cause considerable misinterpretation[7]. In order to address this concern, we have included non-PE backed firms as a control group. The methodology employed to select the control firms is similar in the spirit of the Basic Comparable Firm Approach used by Tian (2012). Specifically, for each PE backed firm, we have selected a matching firm that in the fiscal year before the event window had the same three-digit ATECO 2007 code, and class of sales (i.e., a sales value within 75%–125% of the PE backed firm's sales value) and the closest EBITDA/sales ratio[8]. The resulting data set consists of 236 firms (118 PE backed and 118 non-PE backed), for a total of 1,280 firm-year observations. Table 2 presents the business sector subdivision of the sample based on the ATECO 2007 code, and Table 3 presents descriptive statistics related to firm-specific variables in the year before the divestment, deal characteristics and exit strategy, and firm change in performance over the post-exit period. We find that PE backed firms are younger, show a more balanced financial structure, a lower productivity of capital, and no difference in terms of operating performance compared to matched firms. Moreover, change in operating performance over the post-exit period is not significantly different for PE-backed and non-PE-backed firms. Descriptive statistics also show that among the PE-backed firms, there are some differences between VC backed firms and BO backed firms (see the size of total asset), as well as bank-based PE backed firms and non-bank-based PE backed firms (see the age).

[7] The coefficient for PE backing may reflect the contribution of PE investments, as well as capture other factors such as macroeconomic upturns and industry-wide boosts in productivity.
[8] The choice to use one matched firm for each PE backed firm, although seemingly restrictive, avoids the selection of dissimilar firms as well as the introduction of potentially distorting factors.

Dependent variable

To analyse whether the favourable effects on portfolio firms performance persist after PE investors have sold their shareholding, we estimate the change in operating performance (*ΔPerf*), i.e., the difference between the operating performance in the post-exit period and those obtained in the fiscal year before this event:

$$\Delta Perf_{i,t} = Perf_{i,t} - Perf_{j} \quad (1)$$

where *Perf* is a firm operating performance, *i* denotes a firm (*i* = 1, 2, …, 236), *t* denotes a time-window starting from the divestment fiscal year to the third fiscal year after the divestment (*t* =0, 1, 2, 3) and *j* denotes the fiscal year before the divestment.

To stress whether the operating performance vary across PE backed firms, we estimate the change in operating performance by adjusting the performance of each PE backed firm with that of its matched firm, as in the Eq. (2):

$$\Delta AdjPerf_{i,t} = (Perf_{i,t} - Perf_{j}) - (Perf_{m,t} - Perf_{j}) \quad (2)$$

where *i* denotes a PE backed firm (*i* = 1, 2, …, 118), *m* denotes a matched firm (*i* = 1, 2, …, 118) and all other variables are previously defined.

To estimate our dependent variables we use two accounting-based measures. Specifically, following various studies (e.g., Jain and Kini, 1995; Wang *et al*., 2003) we obtain a first estimate of the dependent variables ($\Delta Perf_1$ and $\Delta AdjPerf_1$) by using the Return on Asset (ROA), i.e., the ratio between the operating income and the total assets. As a robustness check, we also estimated a firm change in operating performance by using the ratio between the net income and the total asset (NI/TA) ($\Delta Perf_2$ and $\Delta AdjPerf_2$).

Independent variables

Following several studies (e.g., Levis, 2011; Meles, 2011) that analyses the impact of PE activity on firm-level indicators, we select as our primary independent variable a dummy (*PE*), which is set at 1 when companies are backed by PE investors, and 0 otherwise. According to the long-term value-added hypothesis (H_1) we expect this variable assumes a positive sign.

Various additional factors related to PE investments characteristics would be expected to influence a firm operating performance. First, previous studies (e.g., Kelly, 2012) suggest there are remarkable difference between VC and BO investments. Therefore, to capture these differences we use two dummy variables: *VC,* which is set at 1 when firms have received PE funding as start-up, development or expansion capital and 0 otherwise; and *BO*, which is set at 1 when PE investors are involved in replacement or buy-out investments and 0 otherwise. According to the hypotheses H_2 and H_3, we believe that only *VC* variable will show a positive and significant sign, as BO investments would be expected to do not produce favourable long-term effects. Second, following several studies (Jain and Kini, 1995; Wang *et al*., 2003) we use proxies for the quality of PE investments: the number of PE investors with equity positions (*NPEI*) and the length of the investment (*LI*). A large number of PE investors simply enhances the effectiveness of their value added role (H_4). Hence, a positive relation is expected. Moreover, the predicted sign of *LI* is ambiguous (H_5) as this variable could also capture any hold-up problems for PE investor. Therefore, we also use the length of investment squared (*LISQ*) in order to assess the existence of a nonlinear relation between the length of investment and the dependent variable. Specifically, we predict an inverted U-shaped relationship among these variables, that means that *LI* will show a positive coefficient while *LISQ* a negative coefficient. Third, following several papers (e.g., Dolvin *et al*., 2007; Ferretti and Meles, 2011), we use

two dummy variables to distinguish bank-related and non-bank related PE investors: *BPE* is set at 1 when firms are backed by bank-based PE investors and 0 otherwise; *NBPE* is set at 1 when firms are backed by non-bank-based PE investors and 0 otherwise[9]. Consistent with the H_6, the profitability of PE backed firms is expected to be higher when they are backed by PE investors which have a long-time oriented approach (i.e., bank-based PE investors).

Finally, we have argued a relationship between how PE investors sell their stake and the PE backed firms performance over the post-exit period (H_7). As such, we use two dummy variables: *IPO* is set at 1, if PE investors' equity positions are divested through an IPO and 0 otherwise; *Other* is set at 1, if PE investors' equity positions are divested through BB, SBO and TS.

Furthermore, as various additional factors at the firm, at the industry and macroeconomic levels may influence a firm operating performance, we add several control variables. Thus, we include a number of "firm specific" characteristics commonly used in the analysis of financial performance as controls (e.g., Berger and Ofek, 1995; Dushnitsky and Lenox, 2006). A firm size is calculated as the natural logarithm of a firm total assets (*TA*). A firm age (*Age*) is calculated by using the natural logarithm of its age. A firm growth rate is calculated as the annual per cent change in sales (*GS*). The characteristics of a firm financial structure are captured by the capital ratio (*CR*), calculated as the ratio of its debt to total assets, and by the liquidity ratio (*LR*), expressed as the ratio between the current assets and the total assets. A firm productivity is measured as labour productivity (*LP*), i.e., the ratio between the log of sales and the number of employees, and capital productivity (*CP*), i.e., the ratio between the log of the sales divided by fixed assets. Finally, we control for time-variant and

[9] For firms backed by BPE investor, we identify the investor that provides the most funding as the lead PE investor and use this criterion to segment our sample.

macroeconomic specific variation by using the regional GDP growth rate between two consecutive years (*GDP*), and a dummy variable (*Crisis*) that controls for financial crisis (it takes the value of 1 for the years after the 2006 and 0 otherwise).

IV. Empirical strategy

We specify a linear model to investigate the determining factors of a firm change in performance as is found in the established empirical literature (e.g., Jain and Kini, 1995). We estimate the Eq. (3) using OLS, where a firm operating performance is a function of the presence or not of PE investors, various other firm-specific characteristics and macroeconomic-specific variation:

$$\Delta Perf_{i,t} = \alpha + \beta_1 PE_i + \delta X_{i,t} + \varepsilon_{i,t} \quad (3)$$

where i denotes a firm (i = 1, 2, …, 236) t denotes the fiscal year of the divestment and the three years after the divestment (t = 0, 1, 2, 3), $\Delta Perf$ is the change in operating performance; *PE* is a dummy variable accounting for the PE backing; X is a vector of control variables; and ε is the random error term. The variable definitions are summarized in Table 1.

Starting from the base equation (*Model 1*) and in attempt to capture additional information on the PE investors value-adding role, we estimate other models by replacing the *PE* variable with further explanatory variables. *Model 2* is constructed by introducing two dummy variables, one for VC investors (*VC*) and another for BO investors (*BO*). *Model 3* and *Model 4* are constructed by using the number of PE investors involved (*NPEI*), and the length of their investments (*LI*), respectively. As we expect a nonlinear relation between the length of investment and the dependent variable, we also estimate *Model 5* by using both *LI* and the length of investment squared (*LISQ*).

In the *Model 6* we use two dummies for bank-based PE investors (*BPE*) and non-bank-based PE investors (*NBPE*), respectively, while *Model 7* is built by adopting two dummy variables, one for each category of exit strategy (*IPO*, *Other*).

We estimate separate multivariate regressions for each group of the above variables because they all assume the value of zero when the firm is non-PE backed, and as result they tend to be correlated. However, we have not this concern when we restrict the analysis to the PE backed firms. In so doing we are able to stress whether the operating performance varies across firms according to the characteristics of PE investments, the type of investor, and the exit strategy, by formulating the empirical model described in Eq. (4).

$$\Delta AdjPerf_{i,t} = \alpha + \beta_1 \mathrm{VC}_i + \beta_2 \mathrm{NPEI}_i + \beta_3 \mathrm{LI}_i + \beta_4 \mathrm{LISQ}_i + \beta_5 \mathrm{BPE}_i + \beta_6 \mathrm{IPO}_i + \delta \mathrm{X}_{i,t} + \varepsilon_{i,t} \quad (4)$$

where *i* denotes a firm (*i* = 1, 2, …, 236), *t* denotes the fiscal year of the divestment and the three years after the divestment (t = 0, 1, 2, 3), $\Delta AdjPerf$ is measured by adjusting the performance of each PE backed firm with that of its matched firm; *X* is a vector of control variables; ε is the random error term, and the other variables have been all above described.

V. Results

Table 4 reports the results obtained from estimating models constructed starting from Eq. (3) and by using OLS (see Appendix 1 for the correlation matrix between independent variables). We have developed seven models to investigate which factors better explain the trend of the firms performance after the PE investors exit.

Model 1 includes the PE backing dummy (*PE*), which coefficient is positive and significant, consistent with the hypothesis H_1. This result is not in agreement with the univariate sorts in Table 2, and indicates that PE investors participation leads to

improved performance while controlling for other potential determining factors. When we replace the variable *PE* with two dummy variables accounting for VC backing and BO backing *(Model 2*), we observe that only VC investments produces favourable long-term effects, while the BO variable shows a negative sign, although not significant. These results confirm the hypotheses H_2 and H_3.

We also find that among PE investors there is wide variation in the quality and effectiveness of value-adding services provided by them. Specifically, we support the hypothesis H_4 as we observe a positive and significant association between the number of PE investors with equity positions (*NPEI*) and the dependent variable (*Model 3*). Otherwise, the length of the PE investments (*LI*) seems do not affect firms operating performance (*Model 4*). These results are similar to those reported by Jain and Kini (1995), and able us to reject the hypothesis of a linear relation between the length of investment and the firm operating performance. Thus, when we jointly use in the *Model 5* the length of investment (*LI*) and the length of investment squared (*LISQ*), we find that firm performance increases as a PE investor have invested, but decline once the length of investment have exceeded a certain threshold level. This result is novel and supports the hypothesis H_5, according to which there is an inverted U-shaped relation between investment length and firm performance.

Further evidence are provided by the *Model 6*, which displays a positive and significant coefficient for the variable *BPE*, and a positive but not significant coefficient for the variable *NBPE*. According to hypothesis H_6, we point out that only bank-based PE investors are able to provide to portfolio firms with long-term value-added, maybe because they are interested in developing solid relationships with firms in order to generate synergies with the banking core business (Hellman *et al*., 2008).

Finally, when the *PE* variable is replaced by two dummy variables (*Model 7*), one for each category of exit route (*IPO* and *Other*), we obtain results confirming the

hypothesis H_7. Among PE backed firms, only those for which PE investors have not divested through the IPO reveal a positive and significant change in operating performance. This result is consistent with the widely documented decline in operating performance of IPO firms (e.g., Jain and Kini, 1994; Pagano *et al*., 1998), and recommends to not extend findings reported for IPO firms to other PE backed firms.

So far we have debated on whether or not PE backed firms significantly change in operating performance over the post-exit period, concluding that the firms behaviour is strictly related to the characteristics of the PE investment, the type of PE investor, and the exit strategy.

In an effort to shed additional light on this discussion, we restrict our analysis to PE backed firms and use a second model specification (as in Eq.(4)) that includes all the variables relative to the PE backing. The results are presented in Table 5, which reports ten columns because we use two accounting-based measures as dependent variable ($\Delta AdjPerf_1$ and $\Delta AdjPerf_2$), and we start from a basic model (*Model 1* and *6*) to arrive at a full model that includes all explanatory variables (*Model 4* and *8*). It should be noted that compared to the analyses in Table 4, these models reveal a greater explanatory power (e.g. in *Model 4*, the *Adj* R^2 is 0.3733), but very similar findings (see Appendix 2 for an overview on the correlation between independent variables). Specifically, once again we report strong evidence that VC backed firms experience a performance growth over the post-exit period. Additionally, while the number of PE investors involved and the dummy for bank-related PE investors retain a positive sign but lose significance, the length of investment confirm its inverted U-shaped relation with the dependent variable. Finally, after controlling for other PE investments characteristics we find the change in performance is negative and significant related to the *IPO* variable.

VI. Conclusion

In this paper, we assess whether the favourable effect of PE investments on portfolio firms persist over time or wears off after the PE investors exit. We delve more deeply into this issue than previously by building a unique and distinctive dataset, comprising PE investments exiting both to an IPO, and to other common ways (i.e., TS, SBO and BB). While controlling for other determining factors of operating performance, we show that PE backed firms outperform their matched firms over the post-exit period.

We also build on previous research by investigating the relationship between this behaviour and a large set of PE investments features.

First, we find strong evidence that among PE investors only venture capitalists provide favourable long-term effects for the firms, thus confirming their widespread reputation to be "buildwinners".

Second, we provide considerable evidence in favour of an inverted U-shaped relation between the length of the PE investment and the post-exit period firm operating performance. Thus, on one hand we support the idea that the length of PE investment represents a proxy of its intensity, on the other, we propose the hold-up hypothesis, according to which too long PE investments may signal a low firm quality.

Third, we observe that a bank-based PE backed firm is more likely to outperform its matched firm over the post-exit period. We explain this evidence by considering that while non-bank-based PE investors have strong incentives to exit their investments as soon as possible and with high returns, bank-based PE investors could be interested in a long-term growth of their portfolio firms in attempt to yields synergies with the banking core business (Hellman *et al*., 2008).

Finally, we find that after controlling for other PE investments characteristics, the change in performance is lower for PE backed firms that have gone public. This result seems surprising as only high quality firms should go public, but it is consistent with

several studies reporting a decline in firms post-IPO operating performance (e.g., Jain and Kini, 1994; Pagano *et al*., 1998).

Our paper leaves open the fundamental issue of whether our findings can be extended to other PE industries, so that academics may build on our research by conducting further investigations. Additionally, we believe that this study provides useful information that allows entrepreneurs to better solve problems arising from PE investors moral hazard actions. As such, while PE investors suffer from an e*x*-ante informational disadvantage (hidden information) relative to entrepreneurs, they are able to reverse this situation when several investment choices, including the identification of the exit strategy, must be taken. As a consequence these decisions may be driven by the PE investors desire to maximize their wealth rather than to the need to pursue corporate goals. In this environment, our work provides valuable indications so that entrepreneurs can take part actively to this decision making process assuming choices that are compatible with a long-term value creation process.

References

Barringer, B. R., Jones, F. F. and Neubaum, D. O. (2005) A quantitative content analysis of the characteristics of rapid-growth firms and their founders, *Journal of business venturing*, **20**, 663-687.

Baum, J. A. and Silverman, B. S. (2004) Picking winners or building them? Alliance, intellectual, and human capital as selection criteria in venture financing and performance of biotechnology startups, *Journal of business venturing*, **19**, 411-436.

Berger, P. G. and Ofek, E. (1995) Diversification's effect on firm value., *Journal of financial economics*, **37**, 39-65.

Bottazzi, L., Da Rin, M. and Hellmann, T. (2004) The changing face of the European venture capital industry: Facts and analysis, *The Journal of Private Equity*, **7**, 26-53.

Capizzi, V., Giovannini, R. and Pesic, V. (2011) The Role of Venture Capital and Private Equity for Innovation and Development of SMEs: Evidence from Italian Puzzle, *Journal of Applied Finance & Banking*, **1**, 189-239.

Caselli, S., Gatti, S. and Perrini F. (2009) Are venture capitalists a catalyst for innovation?, *European Financial Management*, **15**, 92-111.

Chemmanur, T. J., Krishnan, K. and Nandy, D. K. (2011) How does venture capital financing improve efficiency in private firms? A look beneath the surface, *Review of financial studies*, **24**, 4037-4090.

Coakley, J., Hadass, L. and Wood, A. (2007) Post-IPO Operating Performance, Venture Capital and the Bubble Years, *Journal of Business Finance & Accounting*, **34**, 1423-1446.

Colombo, M. G. and Grilli, L. (2010) On growth drivers of high-tech start-ups: Exploring the role of founders' human capital and venture capital, *Journal of Business Venturing*, **25**, 610-626.

Cumming, D. J. and Johan, S. A. (2009) Venture capital and private equity contracting: An international perspective, *Academic Press, New York.*

Cumming, D. and Zambelli, S. (2010) Illegal buyouts, *Journal of Banking & Finance*, **34**, 441-456.

Davis, S. J., Haltiwanger, J., Jarmin, R., Lerner, J. and Miranda, J. (2008) Private equity and employment. The Global Economic Impact of Private Equity Report 2008: World Economic Forum.

Dolvin, S. D., Mullineaux, D. J. and Pyles, M. K. (2007) The impact of bank venture capital on initial public offerings, *Venture Capital*, **9**, 145-164.

Dushnitsky, G. and Lenox, M. J. (2006) When does corporate venture capital investment create firm value?, *Journal of Business Venturing*, **21**, 753-772.

Ferretti, R. and Meles, A. (2011) Underpricing, wealth loss for pre-existing shareholders and the cost of going public: the role of private equity backing in Italian IPOs, *Venture Capital*, **13**, 23-47.

Gompers, P. and Lerner, J. (2001) The venture capital revolution, *The Journal of Economic Perspectives,* **15**, 145-168.

Guo, S., Hotchkiss, E. S. and Song, W. (2011) Do buyouts (still) create value?, *The Journal of Finance*, **66**, 479-517.

Guo, B., Yun, L. and Pérez-Castrillo, D. (2012) Investment, Duration, and Exit Strategies for Corporate and Independent Venture Capital-backed Start-ups, Working Papers 602, Barcelona Graduate School of Economics.

Harris, R., Siegel, D. S. and Wright, M. (2005) Assessing the impact of management buyouts on economic efficiency: plant-level evidence from the United Kingdom, *Review of Economics and Statistics,* **87**, 148-153.

Hellmann, T. and Puri, M. (2002) Venture Capital and the Professionalization of Start-Up Firms: Empirical Evidence, *The Journal of Finance*, **57**, 169-197.

Hellmann, T., Lindsey, L. and Puri, M. (2008) Building relationships early: Banks in venture capital, *Review of Financial Studies*, **21**, 513-541.

Jain, B. A. and Kini, O. (1994) The post-issue operating performance of IPO firms, *The Journal of Finance*, **49**, 1699-1726.

Jain, B. A. and Kini, O. (1995) Venture capitalist participation and the post-issue operating performance of IPO firms, *Managerial and Decision Economics*, **16**, 593-606.

Kaplan, S. (1989) The effects of management buyouts on operating performance and value, *Journal of financial economics,* **24**, 217-254.

Kaplan, S. N., and Strömberg, P. (2003) Financial contracting theory meets the real world: An empirical analysis of venture capital contracts, *The Review of Economic Studies*, **70**, 281-315.

Kelly, R. (2012) Drivers of private equity investment activity: are buyout and venture investors really so different?, *Venture Capital*, **14**, 309-330.

Lerner, J. (1995) Venture capitalists and the oversight of private firms, *The Journal of Finance,* **50**, 301-318.

Levis, M. (2011) The Performance of Private Equity-Backed IPOs. Financial Management, **40**, 253-277.

Lindsey, L. (2008) Blurring firm boundaries: The role of venture capital in strategic alliances, *The Journal of Finance*, **63**, 1137-1168.

Meles, A. (2011) Do Private Equity Investors Create Value for Italian Initial Public Offerings?, *International Review of Finance*, **11**, 391-416.

Morris P. (2010) Private equity, Public loss? Centre for the Study of Financial Innovation working paper.

Packalen, K. A. (2007) Complementing capital: The role of status, demographic features, and social capital in founding teams' abilities to obtain resources, *Entrepreneurship Theory and Practice*, **31**, 873-891.

Pagano, M. and Panetta, F. (1998) Why do companies go public? An empirical analysis, *The Journal of Finance*, **53**, 27-64.

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

Sørensen, M. (2007) How smart is smart money? A two-sided matching model of venture capital, *The Journal of Finance*, **62**, 2725-2762.

Tian, X. (2012). The role of venture capital syndication in value creation for entrepreneurial firms, *Review of Finance*, **16**, 245-283.

Tykvová, T. and Borell, M. (2012) Do private equity owners increase risk of financial distress and bankruptcy?, *Journal of Corporate Finance*, **18**, 138-150.

Wang, C. K., Wang, K. and Lu, Q. (2003) Effects of venture capitalists' participation in listed companies, *Journal of Banking & Finance*, **27**, 2015-2034.

Wright, M., Gilligan, J. and Amess, K. (2009) The economic impact of private equity: what we know and what we would like to know, *Venture Capital*, **11**, 1-21.

Table 1. Description of variables

Variables	Symbol	Description
Operating performance 1	$\Delta Perf_1$	The difference between the ROA over the post-exit period and the ROA of the year before the divestment[a]
Operating performance 2	$\Delta Perf_2$	The difference between the NI/TA ratio over the post-exit period and the value of the NI/TA ratio of the year before the divestment[a]
Adjusted operating performance 1	$\Delta AdjPerf_1$	The difference between the $\Delta Perf_1$ of each PE backed firm with that of its matched firm[a]
Adjusted operating performance 2	$\Delta AdjPerf_2$	The difference between the $\Delta Perf_2$ of each PE backed firm with that of its matched firm[a]
PE backing	PE	Dummy variable which is set at 1 when firms are backed by a PE investor and 0 otherwise[b]
VC backing	VC	Dummy variable which is set at 1 when firms are backed by a VC investor and 0 otherwise[b]
BO backing	BO	Dummy variable which is set at 1 when firms are backed by a BO investor and 0 otherwise[b]
Number of PE investor	NPEI	The number of PE investors with equity positions in the firm[b]
Length of PE investment	LI	The number of years between the investment time and the divestment time[b]
Length of PE investments squared	LISQ	The squared of the number of years between the investment time and the divestment time[b]
Bank-based PE backing	BPE	Dummy variable which is set at 1 when firms are backed by a bank-based PE investor and 0 otherwise[b]
Non-bank-based PE backing	NBPE	Dummy variable which is set at 1 when firms are backed by a non-bank-based investor and 0 otherwise[b]
Initial public offering	IPO	Dummy variable which is set at 1 when PE investors' equity positions are divested through an IPO and 0 otherwise[b]
Other exit strategies	Other	Dummy variable which is set at 1 when PE investors' equity positions are divested through secondary buy-out, trade sale, or buy-back, and 0 otherwise[b]
Size	TA	Natural logarithm of the total asset[a]
Age	Age	Natural logarithm of the firm age[a]
Growth	GS	Sales growth rate between two consecutive years[a]
Liquidity ratio	LR	Current asset divided by total asset[a]
Capital ratio	CR	The book value of total equity divided by total assets[a]
Labor productivity	LP	Natural logarithm of the sales divided by number of employees[a]
Capital productivity	CP	Natural logarithm of the sales divided by fixed assets[a]
Regional GDP growth rate	GDP	The regional GDP growth rate between two consecutive years[c]
Crisis	Crisis	Dummy variable which is set at 1 for years after the 2006, and 0 otherwise

[a] *Source*: ORBIS Bureau Van Dijk and the register of the Italian Chamber of Commerce (TELEMACO)
[b] *Source*: Private Equity Monitor (University Carlo Cattaneo on AIFI data)
[c] *Source* of data: ISTAT (Italian National Institute of Statistics)

Table 2. Sample distribution by firm business sector

Ateco 2007 Code	Sector	PE backed firms		VC backed firms	BO backed firms	Bank based- PE backed firms	Non-bank-based PE backed firms
		Number	%	%	%	%	%
10	Food Industry	5	4.24	1.69	2.54	2.88	1.92
26	Manufacturing Computer and Electronic Equipment	8	6.78	5.08	1.69	0.96	6.73
28	Manufacturing Machineries	10	8.47	1.69	6.78	6.73	2.88
30	Manufacturing Other Transport Vehicles	5	4.24	2.54	1.69	2.88	1.92
46	Wholesale Trade	9	7.63	4.24	3.39	1.92	2.88
47	Retail Trade	5	4.24	1.69	2.54	1.92	1.92
62	Manufacturing Software and IT Consulting	5	4.24	3.39	0.85	1.92	2.88
15	Manufacturing leather and related products	4	3.39	0.85	2.54	0.96	2.88
22	Manufacturing rubber and plastics	5	4.24	4.69	2.54	0.96	3.85
27	Manufacturing electrical equipment and non-electric domestic appliances	6	5.05	3.39	1.69	1.92	3.85
	Other (over 30 sectors)	56	47.46	27.97	19.49	22.12	23.08

Notes: PE backed firms are classified in VC backed and BO backed firms, and in firms backed by bank-based PE investors and non-bank-based PE investors (BPE e NBPE backed firms, respectively)

Table 3. Descriptive sample statistics

	PE backed firms (1)	Non-PE backed firms (2)	(1) vs. (2)	VC backed firms (3)	BO backed firm (4)	(3) vs. (4)	Bank-based PE backed firms (5)	Non-bank-based PE backed firms (6)	(5) vs. (6)
Panel A - Firm Characteristics (pre-exit year)									
TA (€ mln)	156.43	139.77	16.66	108.35	212.89	-104.84**	178.16	164.41	-13.75
Age (years)	14.03	24.45	-10.42*	12.97	15.28	-2.31	17.60	10.86	6.73**
LR (per cent)	39.20	29.25	9.95***	37.90	41.95	-4.05	37.11	40.71	-3.60
CR (per cent)	28.95	29.72	-0.77	28.24	29.80	-1.57	28.53	29.78	-1.24
PC	5.88	12.47	-6.59***	4.73	7.23	-2.49	5.52	7.00	-1.48
PL (per cent)	19.77	33.25	-13.48	19.82	19.72	0.10	20.13	18.53	1.60
ROA (per cent)	2.60	5.60	-3.00	-0.03	5.66	-5.69	2.22	2.56	-0.34
NI/TA (per cent)	-0.86	1.79	-2.65	-3.60	2.34	-5.94	0.09	-1.72	1.81
Panel B – Deal Characteristics and exit strategy:									
NPEI (unit)	1.35	0	-	1.25	1.45	-0.20	1.40	1.32	0.08
LI (years)	3.90	0	-	4.13	3.62	0.50*	4.04	3.74	-0.30
IPO	0.19	0	-	0.20	0.19	0.01	0.19	0.19	0.00
Other	0.81	0	-	0.80	0.81	-0.01	0.81	0.81	0.00
Panel C – Firm Change in Performance (post-exit period):									
$\Delta Perf_1$ (per cent)	-0.35	-1.89	-1.54	1.11	-2.05	3.17	1.82	2.14	-0.32
$\Delta Perf_2$ (per cent)	-0.95	-0.91	-0.04	1.02	-3.25	4.27	-1.80	-0.53	-1.26
$\Delta AdjPerf_1$ (per cent)	1.54	-	-	3.29	-0.65	3.94*	1.90	2.05	0.15
$\Delta AdjPerf_2$ (per cent)	-0.40	-	-	1.89	-2.33	4.22	-0.88	-0.28	-0.60

Notes: This table presents the means for the variables relating to some firm characteristics (Panel A), deal characteristics and exit strategy (Panel B), and firm change in performance over the post exit period (Panel C). PE backed firms are classified in VC backed and BO backed firms, and in firms backed by bank-based PE investors and non-bank-based PE investors (BPE e NBPE backed firms, respectively). The test for mean difference is a standard t-test, allowing for unequal variance. Superscripts *, **, *** indicate statistical significance at 10%, 5% and 1% levels, respectively.

Table 4. Results from OLS Regressions starting from Eq. (3)

	(1) $\Delta Perf_1$	(2) $\Delta Perf_1$	(3) $\Delta Perf_1$	(4) $\Delta Perf_1$	(5) $\Delta Perf_1$	(6) $\Delta Perf_1$	(7) $\Delta Perf_1$
PE	0.0212*						
	(1.73)						
VC		0.0447***					
		(2.60)					
BO		-0.0097					
		(-0.65)					
NPEI			0.0194**				
			(2.30)				
LI				0.0008	0.0192**		
				(0.30)	(2.37)		
LISQ					-0.0029**		
					(-2.17)		
BPE						0.0305**	
						(2.10)	
NBPE						0.0116	
						(0.65)	
IPO							-0.0043
							(-0.16)
Other							0.0284**
							(2.05)
Age	-0.0332**	-0.0359**	-0.0330***	-0.0363**	-0.0320**	-0.0357**	-0.03205**
	(-2.22)	(-2.22)	(-3.84)	(-2.34)	(-2.16)	(-2.44)	(-2.20)
TA	-0.0034	-0.0020	-0.0049	-0.0028	-0.0032	-0.0042	-0.0024
	(-0.91)	(-0.53)	(-1.12)	(-0.75)	(-0.86)	(-1.10)	(-0.64)
GS	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0001
	(-0.52)	(-0.08)	(-0.23)	(-0.62)	(-0.43)	(-0.60)	(-0.84)
LR	0.0655**	0.0603**	0.0593*	0.0517**	0.0594**	0.0511*	0.0665**
	(2.35)	(2.22)	(1.87)	(2.01)	(2.25)	(1.76)	(2.38)
CR	0.2698***	0.2726***	0.2733***	0.2681***	0.2722***	0.2717***	0.2701***
	(3.71)	(3.71)	(3.65)	(3.72)	(3.87)	(3.69)	(3.77)
PC	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
	(0.32)	(0.69)	(0.20)	(0.46)	(0.50)	(0.60)	(0.50)
PL	-0.0209	-0.0223	-0.0199	-0.0201	-0.0211	-0.0202	-0.0206
	(-1.41)	(-1.53)	(-1.18)	(-1.34)	(-1.44)	(-1.37)	(-1.40)
GDP	0.4573**	0.4573**	0.4677*	0.4251*	0.4132*	0.4720**	0.4537**
	(2.10)	(2.10)	(1.88)	(1.96)	(1.91)	(2.13)	(2.09)
Crisis	-0.0194	-0.0183	-0.0183	-0.0220	-0.0200	-0.0194	-0.0207
	(-1.30)	(-1.26)	(-1.19)	(-1.55)	(-1.41)	(-1.24)	(-1.35)
Intercept	-0.0152	-0.0202	0.0007	0.0053	-0.0177	0.0093	-0.0299
	(-0.25)	(-0.34)	(0.01)	(0.09)	(-0.30)	(0.15)	(-0.51)
N	776	794	776	791	791	764	794
Adj R^2	0.2078	0.2162	0.2140	0.2165	0.2233	0.2095	0.2097

Notes: Superscripts *, **, *** indicate statistical significance at 10%, 5% and 1% levels, respectively.

Table 5. Results from OLS Regression starting from Eq. (4)

	(1) $\Delta AdjPerf_1$	(2) $\Delta AdjPerf_1$	(3) $\Delta AdjPerf_1$	(4) $\Delta AdjPerf_1$	(5) $\Delta AdjPerf_1$	(6) $\Delta AdjPerf_2$	(7) $\Delta AdjPerf_2$	(8) $\Delta AdjPerf_2$	(9) $\Delta AdjPerf_2$	(10) $\Delta AdjPerf_2$
VC	0.0619***	0.0606***	0.0462*	0.0444*	0.0606***	0.0437*	0.0459*	0.0409	0.0385	0.0458*
	(2.62)	(2.61)	(1.69)	(1.66)	(2.59)	(1.81)	(1.87)	(1.39)	(1.32)	(1.87)
LI		0.0563***	0.0578***	0.0596***	0.0567***		0.0886***	0.0916***	0.0938***	0.0893***
		(3.25)	(3.41)	(3.54)	(3.31)		(3.40)	(3.49)	(3.57)	(3.46)
LISQ		-0.0084***	-0.0081***	-0.0082***	-0.0084***		-0.0121***	-0.0122***	-0.0124***	-0.0121***
		(-4.45)	(-4.39)	(-4.53)	(-4.57)		(-3.76)	(-3.82)	(-3.91)	(-3.84)
NPEI			0.0100	0.0162				0.0142	0.0221	
			(0.58)	(0.88)				(0.77)	(1.13)	
BPE			0.0094	0.0106				0.0099	0.0114	
			(0.45)	(0.49)				(0.42)	(0.48)	
IPO				-0.0658*	-0.0553*				-0.0846*	-0.0825*
				(-2.21)	(-2.21)				(-2.20)	(-2.32)
Age	-0.0450*	-0.0411**	-0.0323*	-0.0286	-0.0377*	-0.0400*	-0.0374*	-0.0338	-0.0290	-0.0324
	(-2.20)	(-2.06)	(-1.68)	(-1.52)	(-1.90)	(-1.83)	(-1.74)	(-1.63)	(-1.43)	(-1.53)
TA	-0.0096	-0.0066	-0.0085	-0.0038	-0.0023	-0.0114	-0.0064	-0.0053	0.0007	-0.0000
	(-1.49)	(-1.08)	(-1.34)	(-0.61)	(-0.37)	(-1.62)	(-0.97)	(-0.76)	(0.10)	(-0.00)
GS	-0.0002***	-0.0002***	-0.0002***	-0.0003***	-0.0002***	-0.0001***	-0.0001***	-0.0001***	-0.0002***	-0.0001***
	(-7.51)	(-6.88)	(-6.82)	(-6.59)	(-6.83)	(-4.53)	(-2.75)	(-3.00)	(-3.99)	(-3.86)
LR	0.0583	0.0505	0.0705	0.0735*	0.0529	0.0611	0.0680	0.122**	0.126**	0.0715
	(1.11)	(1.04)	(1.57)	(1.66)	(1.08)	(1.08)	(1.29)	(2.40)	(2.46)	(1.34)
CR	0.3692***	0.3800***	0.3959***	0.3983***	0.3830***	0.6098***	0.6238***	0.6443***	0.6473***	0.6282***
	(4.23)	(5.66)	(6.15)	(6.84)	(6.24)	(3.35)	(3.90)	(4.11)	(4.33)	(4.13)
PC	0.0001	0.0000	-0.0001	0.0001	0.0002	0.0001	-0.0000	-0.0002	0.0001	0.0003
	(0.28)	(0.11)	(-0.66)	(0.27)	(0.81)	(0.28)	(-0.00)	(-0.63)	(0.36)	(0.87)
PL	0.0037	-0.0020	-0.0047	-0.0047	-0.0024	0.0193	0.0102	0.0097	0.0098	0.0097
	(0.31)	(-0.18)	(-0.42)	(-0.43)	(-0.22)	(1.35)	(0.73)	(0.64)	(0.65)	(0.71)
GDP	-0.2208	-0.3206	-0.1955	-0.2136	-0.3332	-0.2809	-0.2991	-0.2510	-0.2743	-0.3182
	(-0.56)	(-0.85)	(-0.53)	(-0.58)	(-0.89)	(-0.69)	(-0.75)	(-0.62)	(-0.68)	(-0.80)
Crisis	0.0155	0.0249	0.0093	0.0046	0.0210	0.0022	0.0161	0.0024	-0.0035	0.0102
	(0.64)	(1.12)	(0.40)	(0.19)	(0.92)	(0.08)	(0.67)	(0.09)	(-0.13)	(0.41)
Intercept	0.0609	-0.0502	-0.0763	-0.138	-0.0966	0.0001	-0.199	-0.278**	-0.357***	-0.269*
	(0.59)	(-0.45)	(-0.77)	(-1.42)	(-0.86)	(0.00)	(-1.51)	(-2.26)	(-2.70)	(-1.91)
N	380	377	347	347	377	381	378	348	348	378
Adj R^2	0.2863	0.3507	0.3682	0.3733	0.3577	0.4521	0.5040	0.5308	0.5394	0.5134

Notes: Superscripts *, **, *** indicate statistical significance at 10%, 5% and 1% levels, respectively.

Appendices

Appendix 1. Correlation matrix between independent variables used in Table 4

	Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	PE	**1.0000**																		
2	VC	-	**1.000**																	
3	BO	-	**-0.332**	**1.000**																
4	LI	-	-	-	**1.000**															
5	LISQ	-	-	-	**0.928**	**1.000**														
6	NPEI	-	-	-	-	-	**1.000**													
7	BPE	-	-	-	-	-	-	**1.000**												
8	NBPE	-	-	-	-	-0.121	-	**-0.308**	**1.000**											
9	IPO	-	-	-	-	-	-	-	-	**1.000**										
10	Other	-	-	-	-	-	-	-	-	**-0.270**	**1.000**									
11	Age	**-0.380**	**-0.202**	**-0.239**	**-0.255**	**-0.157**	**-0.350**	-0.073	**-0.378**	-0.026	**-0.372**	**1.000**								
12	TA	**0.174**	0.006	**0.201**	**0.132**	**0.109**	**0.208**	**0.106**	**0.148**	**0.190**	0.062	0.013	**1.000**							
13	GS	-0.044	-0.021	-0.030	-0.040	-0.020	-0.016	-0.030	-0.026	-0.060	-0.008	0.044	-0.072	**1.000**						
14	LR	**-0.253**	**-0.096**	**-0.200**	**-0.207**	**-0.145**	**-0.175**	**-0.090**	**-0.188**	-0.016	**-0.249**	**0.112**	**-0.163**	0.055	**1.000**					
15	CR	**-0.086**	**-0.099**	0.002	**-0.149**	**-0.174**	**-0.159**	-0.086	-0.025	**-0.120**	-0.016	0.060	0.083	0.002	**-0.118**	**1.000**				
16	PC	-0.033	-0.020	-0.018	-0.028	-0.020	-0.025	-0.018	-0.020	-0.011	-0.027	-0.065	0.023	0.001	0.051	-0.005	**1.000**			
17	PL	-0.030	0.029	-0.066	-0.026	-0.031	-0.040	-0.013	-0.033	-0.059	0.005	-0.072	**-0.309**	0.006	0.010	-0.004	0.052	**1.000**		
18	GDP	0.007	0.001	0.006	-0.053	-0.067	0.012	-0.016	0.024	0.016	-0.003	-0.018	0.024	-0.021	0.040	0.041	0.013	-0.027	**1.000**	
19	Crisis	0.000	-0.019	0.021	**0.111**	**0.139**	-0.016	0.018	-0.022	-0.026	0.016	0.047	-0.034	-0.024	0.038	-0.054	-0.051	0.053	**-0.352**	**1.000**

Notes: Table shows Pearson pairs-wise correlation matrix. Bold texts indicate statistically significant at 1% level or more.

Appendix 2. Correlation matrix between independent variables used in Table 5

	Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	VC	**1.000**														
2	LI	**0.135**	**1.000**													
3	LISQ	**0.110**	**0.938**	**1.000**												
4	NPEI	**-0.126**	-0.039	-0.024	**1.000**											
5	BPE	**0.154**	0.080	0.059	0.049	**1.000**										
6	IPO	0.023	0.027	0.028	**0.191**	0.006	**1.000**									
7	Age	0.071	**0.160**	**0.130**	**-0.118**	**0.236**	**0.150**	**1.000**								
8	TA	**-0.203**	-0.038	0.005	**0.125**	0.003	**0.195**	-0.048	**1.000**							
9	GS	0.007	-0.005	0.008	0.029	-0.005	-0.048	0.036	-0.095	**1.000**						
10	LR	-0.037	-0.002	0.006	0.018	0.039	-0.083	0.028	**0.109**	0.071	**1.000**					
11	CR	-0.062	**-0.148**	**-0.159**	**-0.148**	-0.046	-0.098	-0.041	0.028	-0.003	-0.007	**1.000**				
12	PC	-0.077	0.002	-0.014	0.041	-0.003	**0.121**	**0.140**	-0.093	**-0.438**	0.013	-0.014	**1.000**			
13	PL	0.087	-0.004	-0.025	-0.017	0.015	-0.075	0.040	**-0.312**	0.013	-0.037	-0.037	0.109	**1.000**		
14	GDP	0.004	-0.124	-0.104	0.010	-0.022	0.012	-0.043	-0.001	-0.029	-0.117	0.046	0.011	0.004	**1.000**	
15	Crisis	-0.013	**0.239**	**0.203**	0.006	0.034	-0.049	0.075	-0.046	-0.037	0.050	-0.057	0.030	0.031	**-0.377**	**1.000**

Notes: Table shows Pearson pairs-wise correlation matrix. Bold texts indicate statistically significant at 1% level or more.