

Due Diligence and Investee Performance*

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Due Diligence and Investee Performance

Abstract

We estimate the economic value of due diligence (DD) in the context of private equity (PE) investments by relating DD to investee performance, while controlling for endogeneity. Based on a novel and unique dataset, we show that the due diligence carried out internally by fund managers has a more pronounced impact on performance. DD performed by external agents, such as consultants, lawyers and accountants gives rise to imperfect matching, highlighting the existence of apparent agency problems associated with external DD.

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“What we hope ever to do with ease, we must learn first to do with diligence.”

Samuel Johnson (Boswell, 2010. Life of Johnson, Volume 1, 1709-1765)

1. Introduction

The purpose of this paper is to empirically investigate the role of screening and due diligence (DD), as well as the impact of due diligence types on firm performance. While there is much research on selection models in corporate finance (Li and Prabhala, 2006) and entrepreneurial finance (Sorensen, 2007; Yung, 2009; Bengtsson and Hsu, 2012), there has been no empirical studies examining the financial importance of selection and matching investors and investees. Also, little evidence exists on how such screening takes place and who carries out due diligence. In this paper, we provide some of the first evidence on screening by empirically analyzing the determinants and the economic value of the due diligence (DD) in the context of private equity (PE) financing.¹ Moreover, we provide a novel look at the impact of different types of due diligence (e.g., internal vs. external) on firm performance. We compare the role of lawyers, accountants, and consultants carrying out due diligence to assess whether there are agency costs associated with delegating due diligence.

As highlighted by Brown *et al.* (2008, 2009, 2012), due diligence is crucial for hedge fund and other types of alternative investments, including but not limited to PE financing. Likewise, we would expect that due diligence is particularly important in PE financing where value-added fund managers are actively involved in the governance and management of their portfolio companies (Gorman and Sahlman, 1989; Gompers and Lerner, 1999; Casamatta, 2003; Inderst and Muller, 2004; Yung, 2009; Bengtsson, 2012; Bengtsson and Hsu, 2012).

¹ For the purpose of this study, we adopt the term “private equity” to refer to the expansion financing of existing firms, in line with the definition provided by the Italian Venture Capital Association (AIFI), Capizzi (2004), Caselli (2006) and Heed (2010), among others. This PE definition excludes the funding of start-up firms (venture capital investments) and includes: a) leveraged buyout (LBO) deals, b) development financing, and c) replacement financing.

Also, private equity funds are generally not well diversified and as such fund managers take extra care to mitigate idiosyncratic risks (Kanniainen and Keuschnigg, 2003, 2004; Nahata, 2008; Nielsen, 2008; Knill, 2009; Wang and Wang, 2011a,b; Nahata et al., 2013).

In the context of our analysis, due diligence refers to the investigation process of a prospective investment in a particular target firm by PE investors (hereafter venture capitalists, or VCs). Due diligence involves a thorough assessment of a number of factors, e.g., management skills, target industry and competitors, project opportunity, financial forecasts, and strategic fit with the fund portfolio companies (Camp, 2002). This evaluation process may be performed internally by PE fund managers themselves or externally by strategic and financial consultants, or law and accountancy firms.

A rigorous due diligence is costly and takes time. Expenses for due diligence include direct costs of paying for information pertaining to the investee, legal costs for background checks, and the value of time spent on the due diligence. Indirect costs of due diligence include the potential lost opportunity in terms of the investee walking away from the deal or getting financing elsewhere. Indirect costs likewise include opportunity costs on time not spent considering other potential projects, or time not spent on adding value to other firms in a fund's portfolio. However, considering the direct and indirect costs involved, it is not exactly clear as to whether or not additional due diligence is worth it in terms of performance payoffs. No prior study has investigated the economic value of due diligence. It is therefore important to understand how much the investment in due diligence buys in terms of obtaining better performance from the investee.

Considering the costs, time and effort involved, how worth is the time spent on implementing it? Would it be better to save time and delegate this investigation process to external agents (e.g., strategic consultants, law firms, or accountants)? Despite the relevant role of due diligence, constantly highlighted by various industry guides and venture capital

associations (e.g., the European Venture Capital Association, the National Venture Capital Association, and the Canadian Venture Capital Association), very few academic studies, if any, have investigated the efficacy and the economic value of due diligence.

To the best of our knowledge no prior study has empirically examined the relationship between PE due diligence and investment performance. The importance and the costs of due diligence have been examined solely from a theoretical perspective by Sorensen (2007) and Yung (2009), who theorize that due diligence facilitates matching and mitigates adverse selection problems.

In this paper, we aim to fill this gap by empirically assessing the efficacy and time-value of due diligence through the adoption of a new and unique hand-collected dataset, which covers the majority of the funds actively involved in the Italian PE industry (see the Appendix for details on the methodology and survey procedure employed to collect the data). In Italy, PE transactions experienced relevant legal changes that affected their frequency and the allocation of attention of PE funds (see Nahata *et al.*, 2013 for related studies on the relationship between legal environments and venture performance). More specifically, we investigate the economic value of an additional week of due diligence, and account for the role played by the particular agent performing the due diligence (i.e., private equity fund managers, external legal advisors, chartered accountants, or other external strategic consultants). For each investee firm we track two operating performance indicators over the first three years from the investment date: the Return on Assets (ROA) and the operating profit margin (EBITDA to Sales ratio, hereafter EBITDA/Sales), as measures of operating profitability, in line with Richard *et al.* (2009) and Kabir and Roosenboom (2003).

Our empirical analyses consistently highlight the efficacy and importance of due diligence in improving firm performance (especially if the due diligence activity is carried out by internal fund managers). Our results are highly consistent with the view that the time spent

on due diligence has substantial economic value. Overall, an extra week of due diligence is statistically associated with higher levels of ROA and EBITDA/Sales over a three-year period after the investment date, even after controlling for endogeneity and other things being equal. PE funds on average carry out seven weeks of due diligence, and our estimates suggest that the effect of an extra four weeks of due diligence is on average associated with a doubling of three-year ROA performance.

Our database also allows us to distinguish the role played by different agents implementing the due diligence. The data highlight that the due diligence performed directly by PE investment managers play a more pronounced role on firm performance. Surprisingly, the due diligence carried out by law firms, accounting firms, and external strategic management consultants has no significant role in impacting target firm performance. This result highlights the existence of apparent agency costs associated with external due diligence.

This paper is organized as follows. Section 2 reviews the literature and develops testable hypotheses. Section 3 discusses the institutional setting. Section 4 describes the employed research methodology and the dataset, as well as provides representative tests and summary statistics. Sections 5 and 6 present the univariate and multivariate tests, respectively. The last section provides concluding remarks and suggestions for future research.

2. Related Literature and Testable Hypotheses

Our paper is related to three main streams of literature. The first stream pertains to the literature directly related to due diligence in terms of the value of screening. The second stream pertains to matching models. The third pertains to the private equity literature in terms of the drivers of performance. In this section we briefly discuss each in turn.

Our paper is most closely related to Yung's (2009) theoretical study of the tradeoffs associated with undertaking costly due diligence. One of the main reasons underlying the

existence of private equity funds is that banks and other financial intermediaries offering more traditional sources of capital are unable to perform, in a cost effective manner, the screening required to undertake due diligence and monitor an investee that exhibits significant adverse selection costs (Yung, 2009). Adverse selection costs of attracting excessively risky companies are particularly pronounced for banks and other loan sources of capital (Stiglitz and Weiss, 1981). As a result, private equity funds that are able to mitigate adverse selection by undertaking costly due diligence are in a better position to finance such investee companies. Moreover, the investee companies that are able to incur costly signals of quality are more likely to obtain funding. Costly due diligence is typically more effective than costly signals of quality incurred by target companies because the latter are cash constrained while investors are in a better position to incur costs of due diligence (Yung, 2009).

How entrepreneurial firms and private equity funds form matches has been the subject of recent scholarly research (Bengtsson and Hsu, 2012). Matching models more generally are useful in this regard because they enable evaluation of selection effects distinguished from other effects such as value-added. Sorenson (2007) uses general matching models to empirically study the importance of matching, and finds that matching is roughly twice as important as private equity fund value-added services in the context of explaining private equity returns (see Li and Prabhala, 2006 for a survey of these models).

Empirical studies of venture capital and private equity have examined both screening and the drivers of returns. Kaplan and Stromberg (2004) study screening in terms of factors considered in due diligence and provide examples of what led an investor to invest in the context of venture capital deals. Our context is quite different, since we study private equity deals and measure the extent of due diligence and who exactly carried out the due diligence (internally, or externally by an accounting firm, law firm, or consulting firm). Drivers of returns are studied in numerous papers, such as Nahata (2008), Cao and Lerner (2009), and

Chaplinsky and Haushalter (2010). Prior work has not studied the link between the duration of due diligence effort and PE investee performance. Prior work in the context hedge funds shows that due diligence is a source of alpha (Brown *et al.*, 2008; 2009; 2012). Brown *et al.*, however, do not consider the extent of due diligence effort in terms of the time, but rather examine materials related to registration statements. Our paper is different insofar as we measure screening by the extent of due diligence, and relate this due diligence to performance measures pertinent to the entrepreneurial firm, including ROA and EBITDA/Sales. We expect a positive relation between firm performance and due diligence due to the improved decision making over whether to invest, and a better matching between investee and entrepreneur.

H1: *There is a positive but diminishing relation between weeks spent on due diligence and investee performance due to improved screening and matching.*

Also, we consider differences in this relationship for different parties that carry out due diligence. We expect that internal due diligence is more effective than external due diligence for the purpose of the matching function between entrepreneurs and their investors. The intuition is that external due diligence service providers such as accounting firms, law firms and consulting firms face information asymmetries associated with the skills of the private equity fund and its fund managers, thereby leading to imperfect knowledge in matching with entrepreneurial teams. By contrast, private equity fund managers face no information asymmetries about themselves, and only face the same information asymmetries that external service providers face vis-à-vis the entrepreneurial team. If the ability of the internal management team is the same as the ability of the external consultants in mitigating the information asymmetries with the entrepreneurial team, then the private equity fund managers will be more effective at finding a more suitable match than the external consultants.

H2. *When due diligence is primarily done internally (as opposed to primarily done externally by a law firm, accounting firm, or consulting firm), there is a stronger link between due diligence and performance due to the improved matching of the investor and the entrepreneur.*

In respect of H2, we note that different external service providers (accounting firms, law firms, and consulting firms) may have different abilities in terms of mitigating information asymmetries vis-à-vis the entrepreneurial firms. If so, we would expect different results depending on who carries out the due diligence. We do not conjecture who is most effective in advance of presenting the data, but we do carry out such tests in the analysis of the data.

These above hypotheses are tested for the first time in the subsequent sections. Our tests are based on unique and detailed data that are described below in section 4. The data are based on the Italian private equity industry, and as such in section 3 we first describe the institutional context from which the data are derived.

3. Institutional Context: The Legal Setting Affecting the Italian PE industry

Buyout transactions in Italy experienced a period of uncertain legitimacy and illegality and only recently did they become outright legal (with the issuance of the new corporate governance law, Legislative Decree 6/2003, applicable as of January 1, 2004; Cumming and Zambelli, 2010, 2013). For the investment period spanning 1999–2006, it is possible to identify three crucial sub-periods, associated with the changes in legal settings experienced by the Italian PE industry. Over the ‘90s, the legitimacy of leveraged buyouts were severely criticized and highly debated, because LBOs were accused of involving a lack of full disclosure and contributing to the weakening of the target firms. Leveraged buyout transactions even received a illegality declaration by the Italian Supreme Court, which

prohibited these types of transaction reinforcing the decisions of illegality made by various lower courts in prior years (see the Supreme Court Decision 5503/2000; see Zambelli 2010 for details). In October 2001, the Italian Parliament issued a new Bill of Law (Law 366/2001) announcing its intention of reconsidering the buyout legal framework and create a safer harbor for such types of transactions (Article 7d). This Bill of Law 366/2001 was not immediately applicable in Italy as it was solely an enabling act with which the Government received the power of legalizing leveraged buyouts under specific guidelines. Even though this Bill of Law provided investors with some hopes for a more favorable LBO legal harbor, there was no certainty regarding dates and possible outcomes of the new buyout reform. Moreover, in 2002, a new criminal law reform (Legislative Decree 61/2002) became effective introducing new prosecutions applicable to LBOs in the case of bankruptcy of the target firms (see Zambelli, 2010 for details). In January 1, 2004, a new law came into force and leveraged buyout were legalized under a set of conditions, especially with reference to disclosure (see the article 2501 bis, of the Legislative Decree 6/2003, applicable as of January 1, 2004). Contrary to what occurred in previous years, the new LBO reform reversed the burden of proof: LBOs are now considered legal until proven otherwise. The different legal settings experienced by the Italian PE industry impacted the frequency and the governance structure of buyouts (Cumming and Zambelli 2010, 2013). These legal changes may have affected the time and the type of due diligence performed by PE funds.

In order to account for these legal changes we have created three different dummy variables that are metaphorically labeled: “Dark period”, “Hope period”, and “Sun period” (as in Cumming and Zambelli 2010, 2013). In our data, the “Dark period” (or period of illegality) is represented by the time horizon from January 1999–September 2001, over which the legitimacy of leveraged buyouts was highly disputed and LBOs were even deemed illegal by the Supreme Court. The period characterized by the Parliament’s announcement of rendering

LBOs legal is instead labeled the “Hope period”, and it spans the October 2001–December 2003 time horizon. The period subsequent to January 2004 (and ending July 2006 in our data) over which LBOs became legal is labeled the “Sun period” (or period of legality), and represents the period over which the legitimacy of LBO was ultimately clarified.

The different institutional settings provide useful instruments for our empirical analyses below. We expect due diligence to be weaker in the Dark period, since PE funds had obvious legal incentives to not invest in hostile targets at that time.

4. Data

We use a unique proprietary dataset, hand-collected according to the methodology described by Cumming and Zambelli (2010, 2013). The Appendix provides detailed information pertaining to the survey design and representativeness of the dataset (see Figure A.1. and Panels B-E of the Table A.1. for more details). Our dataset covers approximately 85% of the buyout investors operating in Italy and comprises in depth information on the divestments carried out by PE funds over the 2000-2012 time horizon. The data underlying this paper provide unique and new information on due diligence and investee performance, among other things, that were specifically collected for the purpose of this study and not available for use in earlier studies, as described herein.

Our dataset comprises 178 investee firms acquired by 27 PE organizations over the period from 1999 to 2006 (second quarter). Among these 178 PE investments, 150 have been divested within the period from January 2000 and December 2012 (for details on the yearly exit distribution over the 2000-2012 divestment period, see the Appendix, Table 1, Panel E).

In terms of types of exits employed by PE investors, our data show that the most commonly used divestment route is represented by the trade sale (51%), followed by the secondary sale (27%), IPO (9%), and buyback by the entrepreneur or founder (4%). Our

sample also includes a portion of write-offs (10%), mostly associated with the exits that occurred after the global financial crisis (post August 2007 – 2009 period). In terms of type of transactions, our database includes 116 (65%) leveraged buyouts and 62 (35%) expansion and replacement financing. With reference to investor characteristics, our dataset includes the following types of PE funds: 4 (15%) are Italian bank-subidiaries, 12 (44%) are Italian independent closed-end funds, 3 (11%) are international bank subsidiaries, and the remaining 8 PE firms (30%) are international independent limited partners.

In Table 1 we describe the dependent and explanatory variables included in our dataset and provide related summary statistics. The main dependent variables are represented by firm performance indicators (in terms of Return on Assets - ROA - and EBITDA to Sales ratio), measured in terms of percentage difference over the first three years from the investment date. For example, the variable “Return on Assets three-year difference” represents the percentage difference between the ROA achieved by the target firm after three years (ROA 3) from the entrance of the PE investor (investment date) and the ROA at the investment date (ROA 0). Similarly, the variable “Return on Assets two-year Difference” represents the percentage difference between the ROA achieved by the firm after two years (ROA 2) from the investment date and the ROA at the time of the investment (ROA 0).

Table 1 provides statistics on due diligence efforts (measured in terms of time spent in implementing the due diligence) and type (internal or external) due diligence. PE fund managers on average spend 7 weeks on due diligence prior to making a first investment in a portfolio firm. Forty-seven percent of the PE funds in the sample due a majority of the due diligence internally. Sixty-six percent also use consultants, 68% use lawyers, and 11% use accountants in their due diligence efforts.

Table 1 shows that the data comprise detailed information on a wide set of other control variables aimed at capturing the impact of: market conditions (i.e., market returns);

investment characteristics (e.g., investment values, EBITDA/Sales at the time of the investment, and number of syndicated investors for each financing rounds); characteristics of the target firms (i.e. location and industry market to book values); and fund characteristics (i.e., age, number of funds under management, portfolio size, and independency). Table 1 also includes variables that capture the different legal settings during the 1999-2006 investment period in Italy, as explained above in section 3.

[Insert Table 1 About Here]

5. Univariate Tests

Table 2 reports comparison of means and medians for our main performance measures described in Table 1 (ROA differences, EBITDA/Sales differences). These performance measures are reported in association with different due diligence time length (i.e., above or below 10 weeks) and different types of due diligence (internal or external due diligence; consultant due diligence; legal due diligence; accountants due diligence). The comparison of means and median tests are reported for the entire sample (178 transactions).

As reported in Table 2 (Panel A), the target firms for which PE investors spent more time on the due diligence (i.e., employing more than 10 weeks) show better performance, consistent with our first hypothesis (H1), even though the differences are significant only in terms of three-year ROA and EBITDA/Sales (the difference in the three-year ROA is significant at the 10% level for both the mean and the median; the difference in the tree-year EBITDA/Sales is significant at the 1% level only for median). Similarly, PE transactions for which PE funds implemented the majority of the due diligence (Panel B) show better firm performance in terms of three-year differences (e.g., the difference in the three-year ROA is significant at the 5% for the median, and the three-year EBIDTDA/Sale difference is significant at the 1% level for median and 10% level for mean), consistent with our second

hypothesis (H2). Panels C–E focus on the performance associated with external due diligence: consultants due diligence (Panel C), legal due diligence (Panel D), accountants due diligence (Panel E). The transactions for which the due diligence was delegated to consultancy firms (consultants due diligence) or legal firms (legal due diligence), do not show significant differences in terms of performance. It is instead puzzling to notice worse performance associated with the due diligence delegated to chartered accountants (accountants due diligence). Only the three-year EBITDA/Sales ratios show a statistically significant difference at the 5% (in terms of mean).

[Insert Table 2 About Here]

6. Multivariate Tests

In this section we present a number of multivariate tests for the impact of due diligence on investment performance. We proceed in three steps. First, we present evidence on the determinants of weeks of due diligence in subsection 6.1. Second, we present evidence of the impact of due diligence on ROA and EBITDA/Sales in subsection 6.2. Third, we present evidence from subsets of the data based on who carries out due diligence in subsection 6.3.

6.1. The Determinants of Due Diligence

Because the impact of due diligence on investment performance may be affected by endogeneity, we first examine why due diligence is more intensive for some investments but not others. In Table 3 we present correlation statistics across select variables in the data to examine whether or not there are some variables that are correlated with due diligence, but unrelated with ROA and EBITDA/Sales. The data highlight the importance of three such variables: the dark period dummy variable, preplanned IPOs, and the number of funds managed by the PE investor before investing in the target firm (this variable is considered a proxy for the fund experience). These findings are intuitive, since in the dark period due

diligence was necessarily geared towards merely finding non-hostile target firms (Cumming and Zambelli, 2010). Likewise, we expect that preplanned IPOs would impact the intensity of due diligence since an investor would want to more intensively examine a target firm that is supposed to hopefully undergo the scrutiny of a securities regulatory commission in an IPO (Cumming and Johan, 2013).

Finally, more experienced investors are naturally more likely to be more diligent in their due diligence (Nahata, 2008; Yung, 2009). More experienced investors also certify the quality of the entrepreneurial firm upon exit, which can give rise to improvement in performance upon sale of the company (Nahata, 2008). However, our performance measures are not recorded at the time of sale of the company but instead within the 1-3 year period after the initial investment (for ROA and EBITDA/Sales). More experience could lead to greater value added in the 1-3 year time period; however, such investor value added is more likely to be directed at long term performance to maximize the value of the investee firm at the time of its sale, and not at any point in the interim period (the only reason to maximize value in the interim period prior to exit would be to report inflated investment values to institutional investors, which is something that more experienced investors would not do; see Cumming and Johan, 2013). In short, there is no reason to expect that more experience will affect performance in this 1-3 year time horizon other than through the channel of better and more due diligence. Therefore, since there is no reason to necessarily expect a direct correlation between these three instruments and our performance measures, and given these variables are not significantly correlated with our performance measures, we identify them as candidate instruments for our subsequent analyses of the relationship between due diligence and investee performance. We note that other possible instruments were considered and are available on request. Our findings are quite robust to the use of different instruments and exclusion of any one of these three instruments.

[Insert Table 3 About Here]

Table 4 presents regressions for the determinants due diligence (in this Table we report first stage OLS estimates). We present two models: Model 1 includes fund dummy variables, year dummy variables, and double-clusters standard errors by fund and year, while Model 2 excludes these dummy variables and does not cluster standard errors. These alternative models are presented merely for a robustness check in our subsequent analyses in Tables 5 and 6.

[Insert Table 4 About Here]

The regressions in Table 4 indicate two robust determinants of due diligence. First, buyouts require less due diligence and this effect is significant in both Models 1 and 2 at the 5% and 10% levels, respectively, which is expected since buyout transactions focus more on established target companies with more readily available information and a longer track record. Second, fund managers that have run more funds in the past are more experienced and therefore are more willing to spend more time on due diligence. This result highlights the value of experience and skills in private equity investments (in line with Nahata, 2008). We note that this latter effect is an important one, given that this variable is not correlated with investee performance as discussed above, and therefore represents a useful candidate instrumental variable.

Also, there is some evidence of less due diligence in the dark period (Model 2) and this effect is significant at the 5 % level, but this effect is not significant in Model 1 due to the inclusion of the year dummy variables. Similarly there is evidence significant at the 10% level of more due diligence in the hope period, but this effect is not significant in Model 2. Preplanned IPOs have more due diligence in Model 2, but this effect is not significant in Model 1 due to the inclusion of the fund and year dummies. Model 1 highlights that older

funds carry out more due diligence, arguably due to more experience, and funds with larger portfolios per manager carry out less due diligence due to a dilution in the allocation of their time and attention. However, these effects are not significant in Model 2.

6.2. Relationship between Due Diligence and Investment Performance

Table 5 presents second stage estimates and includes three panels examining the impact of due diligence on the subsequent 3-year ROA (Panel A), subsequent 3-year EBITDA/Sales (Panel B), and subsequent 1- and 2-year ROA and EBITDA/Sales (Panel C). Panels A and B each present 5 different regression models to check for robustness. We include three regressions with the use of the due diligence fitted values from Model 1 in Table 4 (Models 3-5 in Panel A and Models 8-10 in Panel B), one regression with the use of the fitted values from Model 2 in Table 4 (Model 6 in Panel A and Model 11 in Panel B), as well as one regression without fitted values (i.e., no control for possible endogeneity), in Model 7 (Panel A) and Model 12 (Panel B). The Panel C regressions for 1- and 2-year ROA and EBITDA/Sales use the Table 4 Model 1 fitted values; for conciseness we do not report the same sets of models as in Panels A and B for 1- and 2-year ROA and EBITDA/Sales since the results were not materially different. Alternative specifications are available on request.

[Insert Table 5 About Here]

Our data consistently indicate that the number of weeks of due diligence is consistently associated with stronger 3-year ROA and EBITDA/Sales performance, consistent with H1. We model the effect with the use of logs to account for diminishing changes in returns associated with each extra week of due diligence. The effect is statistically significant, at least at the 10% level in each of the models in Panels A and B. The most conservative economic significance is obtained from the regressions without the endogeneity controls (Models 7 and 12). In those estimates, a 1-standard deviation increase in the weeks of due

diligence from the average due diligence level of 8 weeks gives rise to a 197.44% increase in three-year ROA relative to the average three-year ROA in the sample (and this effect is smaller at 113.51% if one starts from the maximum level of weeks of due diligence of 15 weeks, and larger at 533.95% if one starts from the minimum level of due diligence of 2 weeks). Put differently, an extra four weeks of due diligence is on average associated with a doubling of three-year ROA performance.

The effect of due diligence on EBITDA/Sales is similarly consistent in all of the regression models, and the economic significance is most conservative in the models that do not correct for endogeneity. In those estimates, a 1-standard deviation increase in the weeks of due diligence from the average level of due diligence of 8 weeks gives rise to a 52.07% increase in three-year EBITDA/Sales relative to the average three-year EBITDA/Sales in the sample (and this effect is smaller at 29.94% if one starts from the maximum level of weeks of due diligence of 15 weeks, and larger at 140.82% if one starts from the minimum level of due diligence of 2 weeks).

Panel C of Table 5 shows that the impact of due diligence on EBITDA/Sales ratio is significant for the one- and two-years after investment, but the economic significance is higher with each year up to the three-year period after investment for the comparable model (Model 8) in Panel B. Due diligence, by contrast, is statistically unrelated to ROA in the one- and two-year period after investment.

The large economic significance and consistent statistical significance of the impact of due diligence in Panels A and B is contrasted by the weak economic significance and inconsistent statistical significance of all of the control variables.

6.3. The Role of Different Agents Carrying Out Due Diligence

In Table 6 we present second stage regressions for various sample-subsets according to the specific agent performing due diligence (e.g., the fund managers or external firms). The Models are comparable to the Model 3 and 8 models in Table 5. The regressions highlight a more pronounced impact on performance associated with the due diligence carried out internally by the PE investment managers themselves, consistent with H2. When due diligence is performed externally by law firms, accounting firms and consulting firms there is an insignificant relation between weeks of due diligence and performance. These findings are consistent with Table 2 (Panel A). For example, when due diligence is performed by accountants, on average the performances of investee companies are worse compared to the performance of the other transactions for which no accounting firm was hired to perform the due diligence, consistent with Models 31 and 32 in Table 6.

The evidence provided in Table 6 highlights the importance to undertake an internal due diligence. Our results highlight the existence of apparent agency costs associated with the due diligence performed externally by law firms, accounting firms, and consultancy firms, and call for future theoretical and empirical research to investigate the mechanisms to mitigate agency costs incurred in the delegation of due diligence.

[Insert Table 6 About Here]

6.4. Additional Robustness Checks

In the course of our analyses we carried out a number of additional robustness checks which are available on request. First, we considered longer performance horizons, including four and five years. The findings were generally consistent, but to a much greater degree influenced by outliers that are more than likely unanticipated and unrelated to due diligence. Hence, we focus on 3-year performance. Second, we considered performance measures provided by the fund managers themselves versus financial statement information obtained

from official sources filed with the Italian. Our performance measures reported herein are those based on the AIDA database by Bureau Van Dijk, and we did not find major discrepancies with self-reporting in our surveys. Third, we considered other explanatory variables including but not limited to contractual terms studied in Cumming and Zambelli (2013). The findings are robust. We note due diligence is weakly positively correlated to more detailed contracts in our data, which in part is consistent with the findings herein. We do not include these contractual analyses in the results reported herein since the causal link between contracts and due diligence is in need of further empirical testing with other datasets.

7. Conclusions

In this paper we investigate the efficacy of due diligence and quantify the time-value of due diligence in the context of private equity (PE) investments. We relate due diligence to performance measures associated with the investee firms, including changes in return on assets (ROA) and EBITDA/sales ratios over the first three years of the investment.

Based on a novel and unique hand-collected dataset comprising the majority of PE investors in Italy, our results strongly support the view that a diligent due diligence is associated with improved firm performance. Our data also highlight that the due diligence carried out internally by fund managers has a more pronounced impact on performance. No significant impact emerges with reference to the due diligence performed by external agents, i.e., accounting firms, law firms or consultants. These results highlight the existence of apparent agency costs underlying the due diligence performed by external agents. Further theoretical and empirical studies on agency costs associated with the delegation of due diligence to external agents. Further research could likewise examine bargaining over contractual terms during the due diligence process to better understand how contracts are negotiated in practice.

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Table 1. Definitions of Variables and Summary Statistics

This table defines the variables and provides summary statistics. The full sample comprises of 178 observations, of which 116 are leveraged buyouts and 63 expansion financing deals. Summary statistics are provided for the entire sample. The data derive from the survey and interviews with the PE investors carried out in 2005, as described in the body of the paper.

| Variable | Definition | Number of Observations | Standard | | Min | Max |
|--|--|------------------------|----------|--------|-------|----------------|
| | | | Mean | Median | | |
| <i>Dependent Variables</i> | | | | | | |
| Firm Performance Indicators | | | | | | |
| Return on Asset (Roa) Three-Year Difference | Difference (in %) between Roa at the third year after the investment and Roa at Investment Date. Source: AIDA database by Bureau Van Dijk | 178 | 0.77 | 0.86 | 13.27 | -71.16 55.80 |
| Ebitda/Sales Three-Year Difference | Difference between Ebitda/Sales at the third year after the investment and Ebitda/Sales at Investment Date. Source: AIDA database by Bureau Van Dijk | 178 | 2.65 | 1.87 | 12.12 | -31.02 73.39 |
| Return on Asset Two-Year Difference | Difference (in %) between the ROA at the second year after the investment and the Roa at the investment date. Source: AIDA database by Bureau Van Dijk | 178 | -3.36 | -2.37 | 23.29 | -107.69 106.82 |
| Ebitda/Sales Two-Year Difference | Difference between Ebitda/Sales at the second year after the investment and Ebitda/Sales at the investment date. Source: AIDA database by Bureau Van Dijk | 178 | 1.58 | 1.38 | 8.62 | -31.02 65.08 |
| Return on Asset One-Year Difference | Difference (in %) between the ROA at the first year after the investment and the ROA at the investment date. Source: AIDA database by Bureau Van Dijk | 178 | 0.73 | 0.21 | 7.59 | -38.31 38.52 |
| Ebitda/Sales One-Year Difference | Difference between Ebitda/Sales at the first year after the investment and Ebitda/Sales at the investment date. Source: AIDA database by Bureau Van Dijk | 178 | 1.15 | 0.82 | 5.98 | -18.87 53.65 |
| <i>Key-Explanatory Variables</i> | | | | | | |
| Due Diligence Length and Types | | | | | | |
| Ln (Number of Weeks of Due Diligence) | Natural Log. of number of weeks spent on due diligence. Source: Author's surveys | 178 | 1.93 | 1.95 | 0.54 | 0.69 2.71 |
| Fund Greater Due Diligence | A dummy variable equal to 1 if the PE investor implemented spent more than half of the time doing due diligence checks themselves as opposed to using consultants, lawyers, and/or accountants. Source: Author's surveys | 178 | 0.47 | 0 | 0.50 | 0 1 |
| Consultants' Due Diligence | A dummy variable equal to 1 if the PE delegated the due diligence to a consultancy firm specialized in audit, tax, and advisory services (e.g., KPMG). Source: Author's surveys | 178 | 0.66 | 1 | 0.48 | 0 1 |
| Legal Due Diligence | A dummy variable equal to 1 if a legal due diligence was performed by a professional lawyer. Source: Author's surveys | 178 | 0.68 | 1 | 0.47 | 0 1 |
| Accountants' Due Diligence | A dummy variable equal to 1 if the PE investor delegated the due diligence to a professional chartered accountant. Source: Author's surveys | 178 | 0.11 | 0 | 0.31 | 0 1 |
| <i>Other Control Variables</i> | | | | | | |
| Market Conditions | | | | | | |
| 12-Month Stock Market Return | The return on the stock market for the 3–12 month horizon preceding the investment date. Source: MSCI | 178 | 0.08 | 0.14 | 0.17 | -0.32 0.41 |
| MSCI Annual Return over Investment Horizon | The annualized public equities return for Italy over the contemporaneous investment horizon. Source: MSCI | 178 | -0.05 | -0.15 | 0.33 | -0.57 0.72 |
| Legal Settings (source: Cumming and Zambelli, 2010, 2013) | | | | | | |
| Dark Period | A dummy variable equal to 1 for the “dark” period during which leveraged buyouts are illegal (January 1999– September 2001 for the transactions in the data set). | 178 | 0.21 | 0.00 | 0.41 | 0.00 1.00 |
| Hope Period | A dummy variable equal to 1 for the “hope” period during which it is announced by the Italian Parliament that buyouts will soon be legal (October 2001 – December 2003). | 178 | 0.31 | 0.00 | 0.47 | 0.00 1.00 |
| Sun Period | A dummy variable equal to 1 for the “sun” period during which buyouts are legal (January 2004, and ending at July 2006 in the data set). | 178 | 0.48 | 0.00 | 0.50 | 0.00 1.00 |
| Investee Characteristics (source: Cumming and Zambelli, 2010, 2013) | | | | | | |

| | | | | | | | |
|--|---|-----|-------|-------|-------|--------|--------|
| Industry Market / Book | The industry market-to- book value for publicly traded firms at the time of investment | 178 | 2.42 | 1.88 | 1.66 | 0.38 | 11.58 |
| Same Region | Dummy variable equal to 1 if the investee firm is located in the same region of the PE investor | 178 | 0.31 | 0.00 | 0.46 | 0.00 | 1.00 |
| Investor Characteristics (source: Cumming and Zambelli, 2010, 2013) | | | | | | | |
| Age of PE investor | The age of the fund in years from date of formation to date of first investment in the investee firm. | 178 | 5.68 | 4.00 | 8.51 | 0.00 | 74.00 |
| No. of Funds Under Management | Number of funds managed by the same PE firm. | 178 | 1.88 | 1.00 | 1.44 | 1.00 | 7.00 |
| Limited Partnership | A dummy variable equal to 1 for a limited partnership fund. | 178 | 0.545 | 1.000 | 0.499 | 0 | 1 |
| Portfolio Size per Manager | The portfolio size (number of investees) per manager at the time of first investment | 178 | 2.47 | 1.40 | 5.40 | 0.50 | 37.50 |
| Investment Characteristics (source: Cumming and Zambelli, 2010, 2013) | | | | | | | |
| Buyout | Dummy variable equal to 1 if the transaction is a leveraged buyout (LBO). | 178 | 0.65 | 1.00 | 0.48 | 0.00 | 1.00 |
| Investment Value | The total amount invested by the PE investor as at July 2006. | 178 | 9685 | 4450 | 21254 | 90 | 183400 |
| Preplanned IPO | A dummy variable equal to 1 if the PE investor preplanned the IPO | 178 | 0.31 | 0.00 | 0.46 | 0.00 | 1.00 |
| Preplanned Trade Sale | A dummy variable equal to 1 if the PE investor preplanned a trade sale | 178 | 0.38 | 0.00 | 0.49 | 0.00 | 1.00 |
| Ebitda/Sales at the Investment Year | Ebitda/Investment Ratio at the Investment Year | 178 | 10.33 | 10.00 | 8.61 | -52.19 | 41.41 |
| Syndication | The number of syndicated PE investors. | 178 | 1.067 | 1.000 | 1.201 | 0 | 6 |

Table 2. Comparison of Means and Median Tests

This table compares the mean and median statistics for the differences on Return on Asset after 1, 2, or 3 years from the investment date. Variables are defined in Table 1. Panel A focuses on the length of due diligence; Panels B-E focus on the types of due diligence employed. For medians we use a Wilcoxon test; for means we adopt a standard t-test. The superscripts *, **, and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

| Panel A | Group 1 -- Due Diligence > 10 weeks | | | | | | Group 2 -- Due Diligence ≤ 10 weeks | | | | | | Difference Tests | |
|--|-------------------------------------|------|--------|-------------|--------|-------|-------------------------------------|-------|--------|------------|---------|--------|------------------|------------|
| Variable | Number of Observations | Mean | Median | Stand. Dev. | Min | Max | Number of Observations | Mean | Median | Stand Dev. | Min | Max | Mean | Median |
| Difference on Return on Asset (RoA) 3 year | 44 | 3.54 | 1.22 | 10.64 | -11.39 | 55.80 | 134 | -0.14 | 0.22 | 13.94 | -71.16 | 46.82 | 1.84* | 3.019 * |
| Difference on Ebitda/Sales 3 year | 44 | 4.73 | 2.25 | 13.98 | -22.34 | 73.39 | 134 | 1.97 | 1.87 | 11.42 | -31.02 | 64.39 | 1.19 | 12.2168*** |
| Difference on Return on Asset 2 year | 44 | 0.66 | -1.43 | 23.44 | -60.97 | 69.04 | 134 | -4.68 | -2.37 | 23.17 | -107.69 | 106.82 | 1.31 | 0.75 |
| Difference on Ebitda/Sales 2 year | 44 | 2.51 | 2.00 | 8.86 | -23.02 | 47.46 | 134 | 1.27 | 1.37 | 8.55 | -31.02 | 65.08 | 0.82 | 0.27 |
| Difference on Return on Asset 1 year | 44 | 2.43 | 1.27 | 8.02 | -15.19 | 38.52 | 134 | 0.17 | 0.00 | 7.40 | -38.31 | 37.56 | 1.66* | 1.93 |
| Difference on Ebitda/Sales 1 year | 44 | 1.13 | 1.30 | 4.48 | -18.87 | 6.62 | 134 | 1.16 | 0.81 | 6.41 | -11.53 | 53.65 | 0.03 | 1.27 |

| Panel B | Group 1 -- Fund Greater Due Diligence | | | | | | Group 2 -- External Greater Due Diligence | | | | | | Difference Tests | |
|--|---------------------------------------|-----------|--------|-------------|---------|--------|---|-----------|--------|------------|--------|--------|------------------|----------|
| Variable | Number of Observations | Mean | Median | Stand. Dev. | Min | Max | Number of Observations | Mean | Median | Stand Dev. | Min | Max | Mean | Median |
| Difference on Return on Asset (RoA) 3 year | 83 | 1.332236 | 1.22 | 17.14046 | -71.16 | 55.8 | 95 | 0.2759321 | -0.39 | 8.641843 | -42.72 | 29.37 | 0.51 | 5.08** |
| Difference on Ebitda/Sales 3 year | 83 | 4.58179 | 2.25 | 16.42524 | -31.02 | 73.39 | 95 | 0.9610022 | 1.83 | 5.93581 | -10.64 | 28.25 | 1.90* | 20.96*** |
| Difference on Return on Asset 2 year | 83 | -4.601364 | -2.37 | 24.38326 | -107.69 | 69.04 | 95 | -2.279512 | -2.48 | 22.36339 | -60.97 | 106.82 | 0.66 | 0.30 |
| Difference on Ebitda/Sales 2 year | 83 | 2.285619 | 2.13 | 11.87627 | -31.02 | 65.075 | 95 | 0.9587632 | 1.30 | 4.015238 | -8.72 | 13.78 | 0.97 | 1.7700 |
| Difference on Return on Asset 1 year | 83 | 0.8998241 | 1.27 | 9.633122 | -38.31 | 38.52 | 95 | 0.5761868 | 0.00 | 5.252216 | -19.45 | 26.85 | 0.27 | 2.7* |
| Difference on Ebitda/Sales 1 year | 83 | 1.834251 | 0.81 | 7.904743 | -18.87 | 53.65 | 95 | 0.5557874 | 0.80 | 3.47658 | -9.84 | 8.7 | 1.36 | 0.2600 |

Table 2 continued

| Panel C | Group 1 -- Consultants Due Diligence | | | | | | Group 2 -- No Consultants Due Diligence | | | | | | Difference Tests | |
|--|--------------------------------------|-------|--------|-------------|--------|--------|---|-------|--------|------------|---------|-------|------------------|--------|
| Variable | Number of Observations | Mean | Median | Stand. Dev. | Min | Max | Number of Observations | Mean | Median | Stand Dev. | Min | Max | Mean | Median |
| Difference on Return on Asset (Roa) 3 year | 117 | 0.94 | 0.84 | 9.08 | -42.72 | 46.82 | 61.00 | 0.43 | 1.17 | 18.97 | -71.16 | 55.80 | 0.20 | 0.02 |
| Difference on Ebitda/Sales 3 year | 117 | 2.94 | 1.87 | 10.97 | -22.34 | 73.39 | 61.00 | 2.10 | 0.53 | 14.16 | -31.02 | 64.39 | 0.40 | 0.04 |
| Difference on Return on Asset 2 year | 117 | -1.75 | -2.37 | 22.05 | -60.97 | 106.82 | 61.00 | -6.45 | -2.40 | 25.40 | -107.69 | 69.04 | 1.25 | 0.12 |
| Difference on Ebitda/Sales 2 year | 117 | 1.79 | 2.06 | 6.75 | -23.02 | 47.46 | 61.00 | 1.17 | 1.34 | 11.44 | -31.02 | 65.08 | 0.39 | 0.8000 |
| Difference on Return on Asset 1 year | 117 | 0.65 | 0.00 | 5.44 | -19.45 | 38.52 | 61.00 | 0.87 | 1.27 | 10.63 | -38.31 | 37.56 | 0.15 | 0.2200 |
| Difference on Ebitda/Sales 1 year | 117 | 0.93 | 0.80 | 4.07 | -18.87 | 8.70 | 61.00 | 1.59 | 0.74 | 8.55 | -11.53 | 53.65 | 0.57 | 0.2000 |

| Panel D | Group 1 -- Legal Due Diligence | | | | | | Group 2 -- No Legal Due Diligence | | | | | | Difference Tests | |
|--|--------------------------------|-------|--------|-------------|--------|--------|-----------------------------------|-------|--------|------------|---------|-------|------------------|--------|
| Variable | Number of Observations | Mean | Median | Stand. Dev. | Min | Max | Number of Observations | Mean | Median | Stand Dev. | Min | Max | Mean | Median |
| Difference on Return on Asset (Roa) 3 year | 121 | 1.06 | 0.88 | 9.14 | -42.72 | 46.82 | 57.00 | 0.15 | 0.68 | 19.42 | -71.16 | 55.80 | 0.33 | 0.03 |
| Difference on Ebitda/Sales 3 year | 121 | 2.89 | 1.87 | 10.81 | -22.34 | 73.39 | 57.00 | 2.13 | 0.53 | 14.62 | -31.02 | 64.39 | 0.35 | 0.01 |
| Difference on Return on Asset 2 year | 121 | -1.73 | -2.40 | 22.12 | -60.97 | 106.82 | 57.00 | -6.83 | -2.00 | 25.45 | -107.69 | 69.04 | 1.30 | 0.50 |
| Difference on Ebitda/Sales 2 year | 121 | 1.77 | 1.80 | 6.68 | -23.02 | 47.46 | 57.00 | 1.16 | 1.37 | 11.80 | -31.02 | 65.08 | 0.37 | 0.35 |
| Difference on Return on Asset 1 year | 121 | 0.82 | 0.11 | 5.50 | -19.45 | 38.52 | 57.00 | 0.53 | 1.26 | 10.83 | -38.31 | 37.56 | 0.19 | 0.03 |
| Difference on Ebitda/Sales 1 year | 121 | 1.02 | 0.81 | 4.06 | -18.87 | 8.70 | 57.00 | 1.42 | 0.18 | 8.82 | -11.53 | 53.65 | 0.32 | 0.71 |

Table 2 – continued

| Panel E | Group 1 -- Accountants Due Diligence | | | | | | Group 2 -- No Accountants Due Diligence | | | | | | Difference Tests | |
|--|--------------------------------------|------------------------|-------|--------|-------------|-------|---|------------------------|-------|--------|------------|--------|------------------|------|
| | Variable | Number of Observations | Mean | Median | Stand. Dev. | Min | Max | Number of Observations | Mean | Median | Stand Dev. | Min | Max | Mean |
| Difference on Return on Asset (Roa) 3 year | 19 | 0.09 | 1.18 | 5.45 | -11.39 | 10.17 | 159.00 | 0.85 | 0.68 | 13.92 | -71.16 | 55.80 | 0.46 | 0.53 |
| Difference on Ebitda/Sales 3 year | 19 | -0.28 | 0.70 | 5.38 | -9.51 | 9.38 | 159.00 | 3.00 | 1.80 | 12.66 | -31.02 | 73.39 | 2.06** | 0.01 |
| Difference on Return on Asset 2 year | 19 | -8.23 | -4.10 | 20.74 | -54.15 | 28.73 | 159.00 | -2.78 | -2.40 | 23.57 | -107.69 | 106.82 | 1.07 | 0.04 |
| Difference on Ebitda/Sales 2 year | 19 | 0.31 | 1.40 | 4.97 | -8.72 | 13.85 | 159.00 | 1.73 | 1.55 | 8.96 | -31.02 | 65.08 | 1.06 | 1.23 |
| Difference on Return on Asset 1 year | 19 | 0.87 | 0.74 | 3.74 | -8.85 | 10.17 | 159.00 | 0.71 | 0.00 | 7.94 | -38.31 | 38.52 | 0.15 | 0.53 |
| Difference on Ebitda/Sales 1 year | 19 | 1.32 | 0.00 | 4.57 | -7.84 | 8.70 | 159.00 | 1.13 | 0.81 | 6.14 | -18.87 | 53.65 | 0.16 | 0.07 |

Table 3. Correlation Matrix

This table presents correlations across select dependent variables, potentially endogenous due diligence variables, potential instruments and other explanatory variables. Correlations greater than 0.13, 0.15 and 0.20 in absolute value are statistically significant at the 10%, 5% and 1% levels, respectively. Correlations greater than 0.15 in absolute value are highlighted with an underline. Correlations among potential instruments that are significant at the 5% level with the number of weeks of due diligence but not the two main dependent variables (EBIT/Sales Difference and ROA Difference) are highlighted in bold.

| | | [1] | [2] | [3] | [4] | [5] | [6] | [7] | [8] | [9] | [10] | [11] | [12] | [13] | [14] | [15] |
|--|-------------|--------------|--------------|---------------------|--------------|--------------|-------------|-------------|--------------|-------|-------|-------|--------------|------|-------------|-------|
| EBITDA / Sales Difference from 3 Years relative to Investment Year | [1] | 1.00 | | | | | | | | | | | | | | |
| ROA Difference from 3 Years to Investment Year | [2] | <u>0.50</u> | 1.00 | | | | | | | | | | | | | |
| Number of Weeks of Due Diligence | [3] | <u>0.19</u> | <u>0.16</u> | 1.00 | | | | | | | | | | | | |
| Dark Period | [4] | -0.14 | -0.01 | <u>-0.24</u> | 1.00 | | | | | | | | | | | |
| Hope Period | [5] | -0.04 | 0.02 | 0.06 | <u>-0.35</u> | 1.00 | | | | | | | | | | |
| Investment Value | [6] | 0.01 | 0.03 | 0.05 | 0.00 | 0.05 | 1.00 | | | | | | | | | |
| Buyout Dummy | [7] | 0.14 | 0.06 | 0.03 | -0.12 | -0.11 | <u>0.19</u> | 1.00 | | | | | | | | |
| Industry Market / Book | [8] | -0.04 | -0.03 | -0.10 | <u>0.45</u> | <u>-0.22</u> | -0.10 | -0.13 | 1.00 | | | | | | | |
| Same Region | [9] | 0.00 | -0.01 | 0.00 | -0.07 | -0.14 | -0.04 | 0.00 | -0.03 | 1.00 | | | | | | |
| Return 1 year prior | [10] | 0.12 | 0.00 | 0.00 | 0.15 | <u>-0.66</u> | 0.11 | 0.02 | 0.07 | 0.00 | 1.00 | | | | | |
| EBIT / Sales in Most Recent Period Prior to Investment | [11] | <u>-0.53</u> | <u>-0.31</u> | -0.11 | 0.05 | -0.05 | 0.00 | -0.12 | 0.08 | 0.02 | 0.01 | 1.00 | | | | |
| Preplanned IPO | [12] | -0.08 | -0.04 | <u>0.16</u> | 0.08 | 0.04 | -0.03 | -0.10 | 0.14 | -0.05 | 0.11 | 0.06 | 1.00 | | | |
| Preplanned Acquisition | [13] | 0.14 | 0.11 | 0.03 | -0.14 | -0.03 | -0.02 | <u>0.37</u> | <u>-0.17</u> | 0.01 | -0.12 | -0.15 | <u>-0.34</u> | 1.00 | | |
| Fund Age | [14] | -0.01 | -0.02 | 0.08 | <u>-0.17</u> | -0.07 | <u>0.23</u> | 0.15 | -0.07 | -0.09 | 0.08 | -0.06 | -0.12 | 0.14 | 1.00 | |
| Portfolio Size Per Manager | [15] | -0.04 | 0.00 | -0.08 | -0.08 | 0.14 | <u>0.38</u> | 0.05 | -0.08 | 0.08 | -0.07 | -0.04 | -0.04 | 0.00 | -0.06 | 1.00 |
| Number of Funds | [16] | 0.14 | 0.14 | <u>0.35</u> | -0.12 | -0.08 | 0.11 | <u>0.33</u> | 0.01 | 0.06 | 0.02 | -0.07 | 0.10 | 0.05 | <u>0.22</u> | -0.07 |

Table 4. First Stage Regressions to Explain the Number of Weeks of Due Diligence

This table presents OLS estimates of the number of weeks of due diligence in Model 1, and the natural log of the number of weeks of due diligence in Model 2. Variables are as defined in Table 1. *, **, *** Significant at the 10%, 5%, and 1% levels, respectively.

| | Model 1: | | Model 2: | |
|--|------------------------------------|-------------|------------------------------------|-------------|
| | Ln (Number of Weeks Due Diligence) | | Ln (Number of Weeks Due Diligence) | |
| | Coefficient | t-statistic | Coefficient | t-statistic |
| Dark Period | -0.1283 | -0.51 | -0.2946 | -2.57** |
| Hope Period | 0.1872 | 1.75* | -0.0312 | -0.25 |
| Investment Value | 1.86E-06 | 1.12 | 2.30E-06 | 1.10 |
| Buyout Dummy | -0.1927 | -2.15** | -0.1687 | -1.81* |
| Industry Market / Book | -0.0212 | -1.00 | -0.0099 | -0.38 |
| Same Region | -0.0072 | -0.09 | -0.0253 | -0.30 |
| Return 1 year prior | 0.3544 | 1.18 | -0.0202 | -0.06 |
| EBIT / Sales in Most Recent Period Prior to Investment | -0.0018 | -0.70 | -0.0059 | -1.32 |
| Preplanned IPO | -0.0128 | -0.10 | 0.1914 | 2.13** |
| Preplanned Acquisition | 0.0747 | 0.67 | 0.0900 | 0.98 |
| Fund Age | 0.0490 | 2.12** | -0.0026 | -0.52 |
| Portfolio Size Per Manager | -0.0089 | -4.15** | -0.0092 | -1.17 |
| Number of Funds | 0.0256 | 1.89* | 0.1285 | 4.39*** |
| Year of Investment Dummies? | | Yes | | No |
| Fund Dummies? | | Yes | | No |
| Clustering by Fund and Year? | | Yes | | No |
| Constant | 1.8385 | 55.15*** | 1.8898 | 12.36*** |
| Number of Observations | | 178 | | 178 |
| Adjusted R2 | | 0.4142 | | 0.1542 |

Table 5. Impact of Due Diligence on Three-Year ROA and Three-Year EBITDA/Sales

This table presents second stage OLS estimates of the impact of due diligence on Three-Year ROA in Panel A and EBITDA / Sales in Panel B. Estimates are for the difference between the year 3 performance values versus the year of investment values. Variables are as defined in Table 1. *, **, *** Significant at the 10%, 5% and 1% levels, respectively.

| Panel A. Three-Year ROA | Model 3 (With Outliers) | | Model 4 (Outliers Removed) | | Model 5 (No Year and Fund Dummies) | | Model 6 (No Clustering) | | Model 7 (No Endogeneity Controls) | |
|--|----------------------------|--------------|-------------------------------|---------------|--|----------------|----------------------------|---------------|--------------------------------------|---------------|
| | Coefficient | t-statistic | Coefficient | t-statistic | Coefficient | t-statistic | Coefficient | t-statistic | Coefficient | t-statistic |
| Ln Number of Weeks Due Diligence (Fitted, Table 4, Model 1) | 24.9441 | 1.67* | 17.3146 | 2.09** | 5.4510 | 3.10*** | | | | |
| Ln Number of Weeks Due Diligence (Fitted, Table 4, Model 2) | | | | | | | 5.3885 | 2.28** | | |
| Ln Number of Weeks Due Diligence | | | | | | | | | 3.8341 | 2.03** |
| MSCI Return Over Horizon | 2.5370 | 0.59 | 3.4617 | 0.89 | 4.3838 | 1.54 | 4.5397 | 1.30 | 4.4879 | 1.28 |
| Dark | -1.9701 | -0.40 | 1.7224 | 0.32 | 2.4681 | 1.44 | 2.6100 | 0.88 | 2.0829 | 0.71 |
| Hope | -4.5435 | -1.10 | 0.5027 | 0.12 | -0.7276 | -0.34 | -0.6766 | -0.26 | -0.7096 | -0.27 |
| Buyout Dummy | 2.7514 | 0.86 | -0.9458 | -0.74 | 1.6932 | 1.03 | 1.6280 | 0.76 | 1.6205 | 0.76 |
| Market / Book | 0.2545 | 0.32 | -0.2520 | -0.46 | -0.2635 | -0.74 | -0.2679 | -0.40 | -0.2623 | -0.39 |
| Fund Age | | | | | -0.0363 | -0.52 | | | | |
| Portfolio Size Per Manager | | | | | 0.0156 | 0.17 | | | | |
| Year of Investment Dummies? | Yes | | Yes | | No | | No | | No | |
| Fund Dummies? | Yes | | Yes | | No | | No | | No | |
| Clustering by Fund and Year? | Yes | | Yes | | Yes | | No | | No | |
| Constant | -49.6825 | -1.57 | -32.5327 | -1.86* | -10.12083 | -3.43*** | -10.1514 | -1.83* | -7.0361 | -1.48 |
| Number of Observations | 178 | | 175 | | 178 | | 178 | | 178 | |
| Adjusted R2 | 0.2565 | | 0.2739 | | 0.0461 | | 0.0121 | | 0.0061 | |

Table 5 continued

| Panel B. Three-Year EBITDA / Sales | Model 8 (With Outliers) | | Model 9 (Outliers Removed) | | Model 10 (No Year and Fund Dummies) | | Model 11 (No Clustering) | | Model 12 (No Endogeneity Controls) | |
|---|----------------------------|----------------|-------------------------------|----------------|--|--------------|-----------------------------|----------------|---------------------------------------|---------------|
| | Coefficient | t-statistic | Coefficient | t-statistic | Coefficient | t-statistic | Coefficient | t-statistic | Coefficient | t-statistic |
| Ln Number of Weeks Due Diligence (Fitted, Table 4, Model 1) | 51.6339 | 3.91*** | 31.75703 | 2.69*** | 5.8626 | 1.84* | | | | |
| Ln Number of Weeks Due Diligence (Fitted, Table 4, Model 2) | | | | | | | 5.8626 | 2.80*** | | |
| Ln Number of Weeks Due Diligence | | | | | | | | | 3.4862 | 2.07** |
| MSCI Return Over Horizon | 1.6229 | 0.53 | 2.284831 | 0.81 | 5.2018 | 5.86*** | 5.5064 | 1.77* | 5.5461 | 1.77* |
| Dark | 7.2669 | 0.51 | 2.456892 | 0.57 | -3.0799 | -1.62 | -2.7309 | -1.04 | -3.5275 | -1.34 |
| Hope | 0.3077 | 0.1 | -3.53788 | -0.78 | -3.8548 | -3.09*** | -3.8764 | -1.67* | -3.9684 | -1.69* |
| Buyout Dummy | 11.2664 | 2.59*** | 6.336529 | 2.55** | 2.8999 | 1.63 | 2.7054 | 1.43 | 2.6895 | 1.41 |
| Market / Book | 1.1934 | 1.98** | 0.7217392 | 1.72* | 0.1555 | 0.34 | 0.1563 | 0.26 | 0.1632 | 0.27 |
| Fund Age | | | | | -0.0532 | -1.73* | | | | |
| Portfolio Size Per Manager | | | | | -0.0755 | -1.80* | | | | |
| Year of Investment Dummies? | Yes | | Yes | | No | | No | | No | |
| Fund Dummies? | Yes | | Yes | | No | | No | | No | |
| Clustering by Fund and Year? | Yes | | Yes | | Yes | | No | | No | |
| Constant | -105.5339 | -3.93*** | -63.4908 | -2.50** | -8.2649 | -1.32 | -8.7494 | -1.78* | -3.9619 | -0.94 |
| Number of Observations | 178 | | 175 | | 178 | | 178 | | 178 | |
| Adjusted R2 | 0.2887 | | 0.2425 | | 0.1065 | | 0.0721 | | 0.0533 | |

| Panel C. One-Year and Two-Year ROA and EBITDA / Sales | Model 13 (Year 1 - Investment Year ROA) | | Model 14 (Year 1 - Investment Year EBITDA/Sales) | | Model 15 (Year 2 - Investment Year ROA) | | Model 16 (Year 2 - Investment Year EBITDA / Sales) | |
|---|---|-------------|--|--------------|---|-------------|--|---------------|
| | Coefficient | t-statistic | Coefficient | t-statistic | Coefficient | t-statistic | Coefficient | t-statistic |
| Ln Number of Weeks Due Diligence (Fitted, Table 4, Model 1) | 5.3909 | 0.51 | 29.6533 | 1.74* | 8.0861 | 0.95 | 37.2893 | 2.03** |
| MSCI Return Over Horizon | 1.0449 | 0.68 | -0.5575 | -0.25 | 1.1450 | 0.42 | 0.7254 | 0.22 |
| Dark | -0.8743 | -0.24 | 5.3286 | 1.43 | -1.9361 | -0.42 | 3.8732 | 1.11 |
| Hope | -3.8877 | -2.17** | 0.4274 | 0.26 | -5.9671 | -1.59 | -2.8181 | -0.99 |
| Buyout Dummy | 1.0697 | 0.34 | 7.2720 | 2.28** | 2.3351 | 0.69 | 8.9877 | 2.17** |
| Market / Book | 0.0490 | 0.07 | 0.5702 | 1.55 | 0.0947 | 0.2 | 0.8876 | 1.57 |
| Year of Investment Dummies? | Yes | | Yes | | Yes | | Yes | |
| Fund Dummies? | Yes | | Yes | | Yes | | Yes | |
| Clustering by Fund and Year? | Yes | | Yes | | Yes | | Yes | |
| Constant | -10.2356 | -0.46 | -60.7341 | -1.72* | -17.4284 | -0.94 | -76.0893 | -1.95* |
| Number of Observations | 178 | | 178 | | 178 | | 178 | |
| Adjusted R2 | 0.3062 | | 0.2813 | | 0.2759 | | 0.2925 | |

Table 6. Regression Analyses for Different Agents Carrying Out Due Diligence

This table presents OLS estimates of the impact of due diligence on Three-Year ROA in Panel A and EBITDA / Sales in Panel B. Regressions are based on the different subsamples for different agents carrying out due diligence: primarily the fund, whether or not consultants are used, whether or not external law firms are used, and whether or not external accounting firms are used. Estimates are for the difference between the year 3 performance values versus the year of investment values. Variables are as defined in Table 1. Where variables are excluded in the regressions it was due to necessity in the subsamples (e.g., in the case of consultants in the Dark period, for example). *, **, *** Significant at the 10%, 5% and 1% levels, respectively.

| Panel A. Three Year ROA with subsets of the data by Due Diligence Types | Model 17 Fund Due Diligence | | Model 18 No Fund Due Diligence | | Model 19 Consultants Due Diligence | | Model 20 No Consultant Due Diligence | |
|---|--------------------------------|-------------|-----------------------------------|-------------|---------------------------------------|-------------|---|-------------|
| | Coefficient | t-statistic | Coefficient | t-statistic | Coefficient | t-statistic | Coefficient | t-statistic |
| Ln Number of Weeks Due Diligence (Fitted, Table 4, Model 1) | 10.4179 | 2.38** | -2.0003 | -0.83 | 1.2482 | 0.93 | 15.4722 | 2.92*** |
| MSCI Return Over Horizon | 1.7337 | 0.37 | 7.0056 | 2.90*** | 5.4701 | 1.44 | 1.9902 | 0.3 |
| Dark | 4.0836 | 1.5 | -0.0685 | -0.04 | 0.6783 | 0.17 | 7.6875 | 3.47 |
| Hope | 1.8136 | 0.33 | -3.2929 | -2.45 | -3.3307 | -2.03** | 5.9219 | 0.52 |
| Buyout Dummy | 1.7968 | 1.03 | -0.3378 | -0.15 | 1.1721 | 0.72 | 2.6648 | 0.68 |
| Market / Book | -0.4613 | -1.06 | -0.4333 | -0.47 | -0.7483 | -0.88 | 0.5346 | 0.36 |
| Portfolio Size Per Manager | -4.3185 | -0.49 | -0.0233 | -0.18 | -0.0247 | -0.18 | 2.3067 | 0.66 |
| Year of Investment Dummies? | | No | | No | | No | | No |
| Fund Dummies? | | No | | No | | No | | No |
| Clustering by Fund and Year? | | Yes | | Yes | | Yes | | Yes |
| Constant | -14.73654 | -1.59 | 7.0884 | 1.33 | 0.7338 | 0.25 | -36.0129 | -3.64*** |
| Number of Observations | | 83 | | 95 | | 117 | | 61 |
| Adjusted R2 | | 0.0650 | | 0.0560 | | 0.0583 | | 0.1350 |

| | Model 21 Legal Due Diligence | | Model 22 No Legal Due Diligence | | Model 23 Accountants Due Diligence | | Model 24 No Accountants Due Diligence | |
|--|---------------------------------|-------------|------------------------------------|-------------|---------------------------------------|-------------|--|-------------|
| | Coefficient | t-statistic | Coefficient | t-statistic | Coefficient | t-statistic | Coefficient | t-statistic |
| Ln Number of Weeks Due Diligence (Fitted, Table 4, Model 1) | 1.4851 | 1.49 | 20.6433 | 3.87*** | -2.9945 | -1.38 | 7.3279 | 3.07*** |
| MSCI Return Over Horizon | 5.6285 | 1.6 | 1.1184 | 0.15 | 1.2143 | 0.52 | 5.2251 | 1.53 |
| Dark | 0.5670 | 0.14 | 7.6147 | 1.97** | -8.5574 | -2.90*** | 4.0426 | 2.14** |
| Hope | -3.1003 | -2.08** | 5.9196 | 0.44 | -0.2985 | -0.08 | -0.2108 | -0.07 |
| Buyout Dummy | 1.4498 | 0.91 | 2.3813 | 0.72 | 7.1457 | 2.23** | 1.8869 | 0.87 |
| Market / Book | -0.6640 | -0.87 | 0.9600 | 2.40** | 1.8999 | 0.4 | -0.3574 | -0.83 |
| Portfolio Size Per Manager | -0.0178 | -0.13 | 9.6564 | 0.32 | -0.0893 | -2.15** | 0.5490 | 1.09 |
| Year of Investment Dummies? | | No | | No | | No | | No |
| Fund Dummies? | | No | | No | | No | | No |
| Clustering by Fund and Year? | | Yes | | Yes | | Yes | | Yes |
| Constant | -0.0978 | -0.02 | -55.6239 | -1.31 | -1.3937 | -0.12 | -14.9546 | -4.03*** |
| Number of Observations | | 121 | | 57 | | 19 | | 159 |
| Adjusted R2 | | 0.0607 | | 0.1530 | | 0.3674 | | 0.0650 |

Table 6 continued

| Panel B. Three Year EBITDA/Sales with subsets of the data by Due Diligence Types | Model 25 Fund Due Diligence | | Model 26 No Fund Due Diligence | | Model 27 Consultants Due Diligence | | Model 28 No Consultant Due Diligence | |
|--|--------------------------------|-------------|-----------------------------------|-------------|---------------------------------------|-------------|---|-------------|
| | Coefficient | t-statistic | Coefficient | t-statistic | Coefficient | t-statistic | Coefficient | t-statistic |
| Ln Number of Weeks Due Diligence (Fitted, Table 4, Model 1) | 8.6556 | 1.95* | -0.7937 | -0.29 | 2.2609 | 0.57 | 14.5982 | 2.86*** |
| MSCI Return Over Horizon | 5.9963 | 1.13 | 4.4972 | 2.59*** | 7.0100 | 2.98*** | 2.0069 | 2.66*** |
| Dark | -6.7325 | -1.72* | -0.3567 | -0.21 | -3.4372 | -0.95 | -2.0532 | -0.84 |
| Hope | -8.7708 | -2.68*** | 0.3611 | 0.32 | -2.8506 | -1.12 | -5.0015 | -0.43 |
| Buyout Dummy | 4.7131 | 2.23** | 0.2005 | 0.12 | 2.5596 | 1.21 | 5.1071 | 1.61 |
| Market / Book | -0.0235 | -0.04 | -0.0670 | -0.13 | 0.5192 | 0.75 | -0.2324 | -0.82 |
| Portfolio Size Per Manager | 0.0123 | 0.00 | -0.0750 | -2.05** | -0.0775 | -3.07*** | -1.0594 | -0.92 |
| Year of Investment Dummies? | | No | | No | | No | | No |
| Fund Dummies? | | No | | No | | No | | No |
| Clustering by Fund and Year? | | Yes | | Yes | | Yes | | Yes |
| Constant | -11.8661 | -1.76* | 3.0945 | 0.54 | -2.5726 | -0.31 | -20.8755 | -2.90*** |
| Number of Observations | | 83 | | 95 | | 117 | | 61 |
| Adjusted R2 | | 0.1806 | | 0.0663 | | 0.0790 | | 0.2438 |

| | Model 29 Legal Due Diligence | | Model 30 No Legal Due Diligence | | Model 31 Accountants Due Diligence | | Model 32 No Accountants Due Diligence | |
|--|---------------------------------|-------------|------------------------------------|-------------|---------------------------------------|-------------|--|-------------|
| | Coefficient | t-statistic | Coefficient | t-statistic | Coefficient | t-statistic | Coefficient | t-statistic |
| Ln Number of Weeks Due Diligence (Fitted, Table 4, Model 1) | 2.4960 | 0.79 | 19.6158 | 3.17*** | -3.6668 | -3.63*** | 7.6630 | 2.02** |
| MSCI Return Over Horizon | 6.6034 | 3.05*** | 2.1164 | 0.6 | 7.2562 | 0.91 | 5.6062 | 1.77* |
| Dark | -3.2735 | -0.92 | -1.6074 | -0.35 | 4.6261 | 1.41 | -3.1858 | -1.48 |
| Hope | -2.6719 | -1.14 | -6.4581 | -1.26 | 3.3402 | 1.2 | -4.4112 | -2.09** |
| Buyout Dummy | 2.6306 | 1.15 | 3.4693 | 2.07** | 7.4089 | 1.77 | 2.4935 | 1.99** |
| Market / Book | 0.5042 | 0.76 | 0.0109 | 0.1 | -0.1428 | 1.68 | 0.1458 | 0.37 |
| Portfolio Size Per Manager | -0.0793 | -0.51 | 6.4580 | 0.43 | -0.1674 | 0.03 | 0.2693 | 0.24 |
| Year of Investment Dummies? | | No | | No | | No | | No |
| Fund Dummies? | | No | | No | | No | | No |
| Clustering by Fund and Year? | | Yes | | Yes | | Yes | | Yes |
| Constant | -3.2395 | -0.48 | -39.5266 | -1.44 | 1.1806 | 0.15 | -11.7207 | -1.67* |
| Number of Observations | | 121 | | 57 | | 19 | | 159 |
| Adjusted R2 | | 0.079 | | 0.2917 | | 0.7432 | | 0.1315 |

One of the major problems faced by scholars in PE financing is the lack of detailed public data. Typically, PE organizations and their investee companies are privately held and are not required to disclose detailed information on their investments, capital structure, governance, and performance. The most commonly used public database on PE financing is Thomson Financial Venture Economics, which is not helpful for our research purpose and focus because it includes solely standard and generic information on PE deals around the world, e.g., target firms, lead investors, syndicated investors, invested and divested amounts, financing rounds, number of investors involved, equity stake, investment location. For countries outside the U.S. and Canada, Thomson Financial Venture Economics only includes a small fraction of the PE deals carried out in each year. With reference to the Italian PE market, a few industry datasets exist: a) the AIFI Statistics Report, which disclose aggregate information of the private equity and venture capital activity in Italy; b) the Venture Capital Monitor (VEM), which reports start-up deals; and c) the Private Equity Monitor (PEM), which reports generic data on the private equity deals. Both VEM and PEM datasets are collected by the Italian Venture Capital Association in association with the Università Cattaneo di Castellanza. Even though the above industry datasets report the majority of the deals carried out in Italy, they include generic information and do not report information on deal structure, due diligence, financial forms, investor rights, risk mitigation, and governance mechanisms employed by PE investors. Our database, instead, includes unique and detailed information on PE investments, target firms, deal structure and contractual provisions, screening criteria and due diligence, divestments and exit outcomes. In this section we describe the methodology employed to collect our data, as well as present summary statistics of the PE investments carried out in Italy over the 1999-2006 period, and the associated divestments occurred over the 2000-2012 period.

Part A of this Online Appendix describes the methodology underlying our dataset. Part B discusses sample representativeness and potential sample selection bias.

Part A. Data Collection Methods

In the absence of detailed publicly available information on due diligence, deal structure and investment outcomes, we created a new and novel database by employing different sources. Our primary source of information is represented by a three-stage survey of PE investments carried out in Italy over the period from 1999 to 2006 and the related divestments realized over the 2000-2012 time horizon. Our secondary sources of information are represented by various publicly available datasets on Italian PE deals (e.g., PEM database), performance of private firms (e.g., AIDA), market characteristics, fund websites, and economic press release, employed to integrate, cross-check and validate the information collected through the survey instrument. The next subsections describe the above sources of information in greater detail.

Survey Procedure

We collected the data by undertaking a three-stage survey of international and local venture capitalists actively involved in Italy over the 1999-2006 period. For each survey we employed a sequential mixed mode (SMM) survey approach (see De Leeuw 2005 and Dillman *et al.* 2009 for details), in combination with the “Total Design Method” (TDM), developed by Dillman (1978) specifically for mail and telephone surveys. The sequential mixed mode survey (SMM) is a particular survey procedure that recommends the adoption of a different survey mode in sequential phases, for example:

- a) Phase 1: mail questionnaire;
- b) Phase 2: web questionnaire;
- c) Phase 3: telephone survey;
- d) Phase 4: face-to-face interviews.²

² With the sequential mixed mode approach, the non respondents to a mail survey (phase 1) are contacted and requested to answer the questionnaire through a different survey mode, e.g., web survey (phase 2). Thereafter, the non

To better highlight the research framework and time frame underlying our study, in Figure A.1 we summarize the entire survey procedure employed to collect our database.

[Insert Figure A.1 about here]

As shown in Figure A.1, in October 2005 we developed a four-page questionnaire on PE investment cycle and conducted a pilot study in order to test its efficacy and clearness. Once we received the feedbacks on our pilot study, we reviewed the questionnaire and sent the first survey in December 2005. In the first place, we administered our survey by post and devoted particular attention to following all the steps highlighted by Dillman (1978). The purpose of our first survey was to gather detailed and unique information on investment characteristics, screening criteria of target firms, due diligence procedure, deal structure and governance mechanisms employed by international and local PE investors active in Italy, as well as exit rights and exit expectations. In order to minimize potential sample biases, we decided to send the questionnaire to all members of the Italian Venture Capital Association (AIFI), which at that time recorded 88 full members.³ After eliminating double-counted investors and various non-applicable replies that we received in the

respondents of phase 2 are contacted and requested to answer the questionnaire through a different mode (e.g., a telephone or a face-to-face interview). Recent studies show that this survey methodology significantly improves the response rate (see, e.g., De Leeuw, 2005; Dillman *et al.*, 2009).

³ According to AIFI statistics published in October 2005, the total number of AIFI members was 88. According to the PEM database, the total number of investors actively involved in the PE sector was lower (57). However, the information about the specific identity of the investors active in the PE sector was not publicly available. Therefore, we decided to send the questionnaire to all 88 AIFI members, being aware of the fact that this list was not entirely applicable to our survey (some investors were new, others were not actively involved in the PE industry because they were specialized in start-up financing only). For our mail survey, we followed all the steps and suggestions recommended by Dillman (1978), devoting particular attention on the content of the package that was sent to each investor along with the questionnaire. Each investor received a package containing: a four-page questionnaire, a cover letter containing the motivation underlying the research project and a presentation of the authors' main research; a signed confidential agreement; a glossary of the PE terminology included in the questionnaire, and a reward promise made by the authors in terms of follow-up reports summarizing the results of the survey.

subsequently weeks (e.g., some investors were new, other investors were not active in the PE sector but only in the early stage sector), we identified 57 investors actively involved in the PE industry. This number was in line with the number of active investors published by the PEM database and PEM Statistics in 2005. After performing our mail survey, only 5 PE investors replied (response rate of 9%) and provided us with detailed information on 19 target firms. In line with the suggestions of Dillman *et al.* (2009), a few months later we contacted the non respondents to the mail survey and asked them to answer the questionnaire via fax (or e-mail). Thereafter, 8 PE investors replied (response rate of 14%) providing us with complete information on additional 49 PE investee firms. In June 2006, we contacted the non-respondents once again in order to ask their permission to perform a face-to-face interview in their office. Additional 14 investors (response rate 24%) agreed to partake in our survey and provided full information about 110 target firms. By the end of August 2006, we completed the interview process related to our first survey and collected detailed data on PE investments in 178 target firms acquired in Italy over the period from January 1999 to 2006 (second quarter). For each investee firm, we gathered information on target companies, screening procedure, investor rights and governance mechanisms employed by PE investors.

Normally, PE fund managers exit their investments in 3-5 years (see, e.g., Cumming and Johan 2009). In order to investigate exit outcomes, we waited for another three years and a half to allow PE funds to exit their investee firms. In January 2010, we started a second survey of the same 27 PE investors included in our sample, with the aim of collecting information on the development of the investee firms included in our sample and gather additional information on exited investments, associated investment returns (in terms of IRR), and exit expectations for the non-exited investments. Upon request, 19 PE firms replied to our second survey directly via e-mail (response rate of 70%), providing us with information on the performance of their investments in 93 target firms. The remaining 8 PE firms (30%) agreed to answer the second survey only through a face-to-face interview. By the end of July 2010, we completed the scheduled interviews and we

collected information on exit outcomes of additional 85 target firms. By the end of our second survey, we collected detailed information on 127 divestments, which occurred from January 2000 to December 2009. For each divestment we recorded the following information: exit routes (i.e., IPO, trade sale, secondary sale, buyback, write-off), divestment values, exit years, and associated investor returns (in terms of IRR). For each non-exited investments, we gathered information on exit expectations of PE investors (e.g., expected year, expected divestment route and value, as well as expected IRR returns). By the end of our second survey, in December 2009, our dataset included 51 non-exited investments performed by 20 PE funds.

In order to have a more complete picture of the exited investments, we waited for three more years to allow the remaining PE funds to exit their investee firms. In December 2012, we started our third survey by contacting the remaining 20 PE investors included in our database. Our purpose was to collect information on additional divestments, exit routes, exit outcomes, and firm performances. Upon request, 5 PE investors replied promptly to our mail survey, providing us with detailed information on their divestments in 12 target firms. The remaining 15 investors accepted to answer the questionnaire through an interview, after which we collected information on 39 target firms. By the end of January 2013, our database included 150 divestments, occurred over the period from January 2000 to December 2012. We also monitored the performance of the venture-backed firms that went public over the same divestment year, and collected information on potential post-IPO bankruptcies, legal investigations, and the delisting occurred until December 2012.

Secondary Sources of Information, and Survey Integration

In order to validate, correct and integrate the information gathered through our three-stage survey, we considered a number of secondary sources. First, we compared our data with the Statistics Report provided by the Italian Venture Capital Association (AIFI), available at the AIFI website, in combination with two additional private equity databases: a) the Private Equity Monitor (PEM[®]) dataset, developed by AIFI in association with Università Cattaneo – LIUC, and b) Venture Economics database. With this first comparison we cross-checked, and eventually corrected, the

information we received on investment characteristics (i.e., target firm, location, investment year, industry, invested amounts and divestment values).

Second, we considered the AIDA database by Bureau Van Dijk to collect information on financial performances of the target firms included in our database, e.g., Return on Assets (ROA) Ratios, and EBITDA to sales ratios, as well as the balance sheets of the target firms included in our database, their Debt to Equity ratios, and the cost of debt over the 1999-2006 period.

Third, we collected further information on market conditions, by looking at Datastream by the Thomson Corporation, MSCI database, and Borsa Italiana. We integrated our database with important control variables related to market returns, and industry market to book values.

Fourth, we considered additional sources of information in order to make sure that our dataset included the majority of the investments listed in each fund website, as well as minimize potential sample biases and avoid the risk of having a sample biased toward the most successful PE deals. Among these additional sources, we checked investor websites, financial reports provided by investors, and the most relevant economic press release. In so doing, we gathered important information about fund characteristics (i.e., age, location, portfolio size, capital under management, legal structure, independency, number of partners, executives and directors).

The entire data collection procedure described above is summarized in Figure A.1. The survey implementation and its validation took considerable time and effort but it ultimately allowed us to create a unique and novel dataset containing detailed information on PE investment cycle, financial performance, due diligence, security design, deal structure, governance and investor rights, exit outcomes. Our ultimate dataset includes specific information on 178 target firms acquired over the 1999-2006 investment period, as well as data on divestments and exit outcomes occurred between January 2000 up to December 2012.

Response Rates

The response rates associated with our survey are reported in Table A.1, Panel A. Despite the difficulties associated with the implementation of a three-stage survey on confidential

information, we obtained a high response rate. With reference to the PE market as a whole, we obtained a total response rate of 47% (27 over 57 investors actively involved in the PE industry in 2005). Considering the buyout sub-sector, our survey covers 84% of the buyout investors active in Italy by the end of 2005 (21 over 25 PE funds). Considering the total number of buyout transactions reported in the PEM[®] Statistics, our dataset comprises 38% of the buyouts carried out in Italy over the 1999-2006 period (see Table A.1, Panel A). These response rates compare favorably with previous surveys carried out in the financial economic field (e.g., Brau and Fawcett, 2006, who received a total response rate of 19%; Graham and Harvey, 2001, who obtained a response rate of 9%).

[Insert Table A.1 About Here]

Part B. Sample characteristics and Sample Representativeness

Our ultimate dataset includes 178 target firms, acquired by 27 private equity organizations covering approximately 85% of the buyout investors operating in Italy over period from 1999 to 2006 investment period. The data include detailed information on 150 exits realized over the 2000-2012 divestment period. Our dataset includes both quantitative and qualitative information about: a) investment and divestment values; b) deal structure; c) valuation models employed by investors; d) returns associated with the exited investments; d) performance of the target firms (from the investment date up to three years after the investment); e) screening criteria employed by PE investors to screen out non attractive investment opportunities; these criteria are ranked on a scale of 1–5 in order to capture the level of relevance associated with each criterion, as perceived by PE investors; f) financial forms employed by PE investors, as well as the control and cash flow rights retained by them (including exit rights and events upon which a reallocation of cash flow and control right may occur).

To evaluate the representativeness of our sample, we compared our dataset with both AIFI Statistics Reports and the Private Equity Monitor (PEM[®]) database, which includes generic and standard information about all PE deals realized in Italy. Table A.1 shows the various comparison

tests we performed between the PEM data (or AIFI data) and our sample to ensure the representativeness of our dataset (see Table A.1 Panels B–G). In particular, Panels B–D compare our database with the PEM sample, while Panels E–G compare our data with the AIFI Statistics Reports. We performed several comparison tests with respect to various sample characteristics: target firm location (Panel B); industry distribution of PE transactions (Panel C, part 1) and buyouts (Panel C, part 2); yearly distribution of PE investments over the 1999–2006 period (Panel D); exit distribution of PE divestments over the 2000–2012 period (Panel E); IPO distribution over the 2000–2012 time horizon (Panel F); and write-off distribution (Panel G). As highlighted in Table A.1 (Panels B–G), our sample is quite similar to the datasets provided by AIFI and PEM. Apart from a few exceptions, no statistically significant differences exist between our dataset and the PEM database (Panels B–D). Similar patterns emerge when comparing our dataset with the AIFI Statistics Reports (Panels E–G): the comparison tests do not show statistically significant differences, apart from a few rare cases. For example, Panels B and C focus on the location distribution of target firms (Panel B) and industry distribution of PE investments realized in Italy (Panel C). The comparison tests show no significant differences between Private Equity Monitor (PEM) data and our sample.⁴ Similar trends are observed in Panel E, which focuses on distribution of divestments realized from 2000 to 2012. In terms of exit distribution, the comparison tests in Panel E do not show statistically significant differences. In terms of yearly distribution of buyout investments (Panel D), IPO distribution (Panel F) and write-off distribution (Panel G), the comparison tests indicate scant statistical significance in terms of differences between our sample and the PEM[®] or AIFI data. Panel D shows that the proportion of buyouts is similar in both data sets, apart from the years of 2000 and 2004, for which our sample comprises a higher proportion of

⁴ It is worth noting that the PEM[®] data highlighted in Panels B–D cover the period 1999–2003, the years for which the information is available. For Panels B–D, comparison tests in our sample are reported for the 1999–2006 period. We also performed comparison tests with reference to the shorter period (1999–2003) and did not observe materially different results.

buyouts. The comparison tests in Panels F do not highlight significant differences apart from the years of 2003 and 2004, for which AIFI Statistics report higher proportion of IPO exits. Similar conclusions can be driven by looking at Panel G, which compares the write-off distribution related to AIFI dataset with the one related to our sample. In Panel G, no relevant differences emerge, apart from the sole exception of the year 2007, for which our database report a higher percentage of write off.

Table A.1. Representativeness Tests

This Table presents comparison of proportions tests between the survey data used in this paper relative to the data reported by the PEM[®] database, published by the Italian Venture Capital and Private Equity Association (AIFI) in association with the “Masters in Merchant Banking” team of Università Carlo Cattaneo (LIUC). To show that the data are representative of the population, we perform various comparison tests (see Panels B-G). Panel A summarizes the response rate and coverage for our sample. Panel B compares the proportion of investments by location, Panel C compares the industry sectors for all types of PE investments and buyout transactions, Panel D compares the years of investment, Panel E compares the exit year distributions of investments, Panel F compares the IPO exit years, Panel G compares the write-off exit years. The *, **, *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

| Panel A: Response Rate | PEM & AIFI STATISTICS REPORTS | | OUR SURVEY | | RESPONSE RATE & COVERAGE |
|--|--|--|---|---|-------------------------------------|
| Total number of AIFI members in Oct. 2005, including new funds, VC funds and PE funds (source: AIFI statistics, October 2005) | 88 | | 27 | | 31% |
| Total number of buyout deals carried out within the 2000-06 period (source: PEM database) | 284 | | 109* | | 38% |
| Total number of PE firms actively involved in the PE industry at the time of our survey (source: PEM Report 2005) | 57 | | 27 | | 47% |
| Total number of PE firms actively involved in the buyout industry at the time of our survey (source: AIFI statistics, 1st term 2005) | 25 | | 21 | | 84% |
| | | | * with reference to the 2000-06 period | | |
| Panel B: Location Comparison | PEM SURVEY | | OUR SURVEY | | COMPARISON |
| Location of target firms - Area of investment (within Italy) | Total # of Transactions in PEM (1999-2003) | Proportion ALL Transactions IN PEM (1999-2003) | # TOTAL Transactions in Our Data (1999-2006 2nd quarter) * | Proportion ALL transactions in our Data | Comparison of Proportions Test |
| North | 317 | 0.81 | 173 | 0.78 | 0.79 |
| Center | 317 | 0.15 | 173 | 0.17 | -0.58 |
| South | 317 | 0.04 | 173 | 0.05 | -0.32 |
| | Source: PEM 1999-2003 | | * From our database we excluded 5 transactions carried out abroad to ensure comparison with the AIFI data | | |
| Panel C: Industry Distribution Comparison | PEM SURVEY | | OUR SURVEY | | COMPARISON |
| (1) All PE transactions | Total # of Total Transactions in PEM (99-2003) | Proportion of transactions in PEM (99-2003) | Total # Transactions in Our Data (1999-2006 2nd quarter) | Proportion of PE deals in our Data | Comparison of Proportions Test |
| Industrial / Basic Material | 317 | 0.45 | 178 | 0.46 | -0.21 |
| Consumer Goods | 317 | 0.20 | 178 | 0.16 | 1.02 |
| Services / Financial Services | 317 | 0.24 | 178 | 0.22 | 0.45 |
| Telecommunication / Utilities | 317 | 0.06 | 178 | 0.05 | 0.46 |
| Technology | 317 | 0.03 | 178 | 0.06 | -1.62 |
| Healthcare | 317 | 0.02 | 178 | 0.05 | -1.85 * |
| | 1.00 Source: PEM 1999-2003 | | 1.00 | | |

Table A.1 continued

| (2) Buyouts transactions | Total # of Total Buyouts in PEM (1999-2003) | Proportion Buyouts PEM (99-2003) | Total # Buyouts Transactions in Our Data (1999-2006 2nd quarter) | Proportion of Buyout deals in our Data | Comparison of Proportions Test |
|--|--|--|--|--|--------------------------------|
| Industrial / Basic Material | 134 | 0.57 | 115 | 0.56 | 0.16 |
| Consumer Goods | 134 | 0.19 | 115 | 0.16 | 0.62 |
| Services / Financial Services | 134 | 0.15 | 115 | 0.18 | -0.64 |
| Telecommunication / Utilities | 134 | 0.04 | 115 | 0.03 | 0.43 |
| Technology | 134 | 0.03 | 115 | 0.04 | -0.22 |
| Healthcare | 134 | 0.02 | 115 | 0.04 | -0.73 |
| | 1.00 Source: PEM 1999-2003 | | | 1.00 | |
| Panel D: Yearly Distribution Comparison | PEM SURVEY | | OUR SURVEY | | COMPARISON |
| Buyouts | Total # of Transactions in PEM (1999-2006) ° | Proportion Buyouts PEM (1999-2006) | # TOTAL Transactions in Our Data (1999-2006 2nd quarter) | Proportion Buyouts our Data | Comparison of Proportions Test |
| 1999 | 56 | 0.45 | 14 | 0.50 | -0.34 |
| 2000 | 69 | 0.33 | 16 | 0.63 | -2.18 ** |
| 2001 | 60 | 0.20 | 8 | 0.38 | -1.12 |
| 2002 | 61 | 0.56 | 26 | 0.62 | -0.48 |
| 2003 | 71 | 0.56 | 29 | 0.55 | 0.08 |
| 2004 | 55 | 0.71 | 29 | 0.90 | -1.94 * |
| 2005 | 89 | 0.70 | 42 | 0.67 | 0.38 |
| 2006 2nd quarter °° | 95 | 0.36 | 14 | 0.36 | 0.02 |
| ° Source: PEM 1999-2003; PEM 2005 for years 2004-2005. | | | 178 | | |
| °° Source: AIFI Statistic Report 2006, 2nd quarter (where the total number of expansion, replacement and buyout deals is 48, 13, and 34 respectively). | | | | | |
| Panel E: Exit Distribution Comparison | AIFI DATABASE | | OUR SURVEY | | COMPARISON |
| EXIT DISTRIBUTION-ALL TRANSACTIONS (2000-2009) | Total # of exit in AIFI database (1999-2012) | Proportion of exits through trade sale in AIFI | # Exits in Our Dataset (1999-2012) | Proportion of exits through trade sale in our Database | Comparison of Proportions Test |
| 2000 | 188 | 0.58 | 3 | 0.67 | -0.31 |
| 2001 | 148 | 0.55 | 3 | 0.66 | -0.38 |
| 2002 | 149 | 0.52 | 3 | 0.33 | 0.65 |
| 2003 | 222 | 0.52 | 10 | 0.50 | 0.12 |
| 2004 | 137 | 0.36 | 11 | 0.45 | -0.60 |
| 2005 | 150 | 0.47 | 10 | 0.70 | -1.41 |
| 2006 | 181 | 0.38 | 22 | 0.52 | -1.27 |
| 2007 | 207 | 0.51 | 25 | 0.50 | 0.09 |
| 2008 | 181 | 0.54 | 21 | 0.53 | 0.09 |
| 2009° | 143 | 0.6 | 19 | 0.47 | 1.05 |
| 2010 | 123 | 0.51 | 3 | 0.66 | -0.51 |
| 2011 | 139 | 0.44 | 2 | 1.00 | -1.58 |
| 2012°° | 44 | 0.5 | 18 | 0.33 | 1.22 |
| | Source: AIFI statistics | | 150 | | |
| ° It is worth noting that in 2009, Aifi Annual Report excludes write off from the proportion of exits through Trade Sale. | | | | | |
| °° It is worth noting that the total number of Exits recorded in AIFI in 2012 refers to the first semester only. | | | | | |

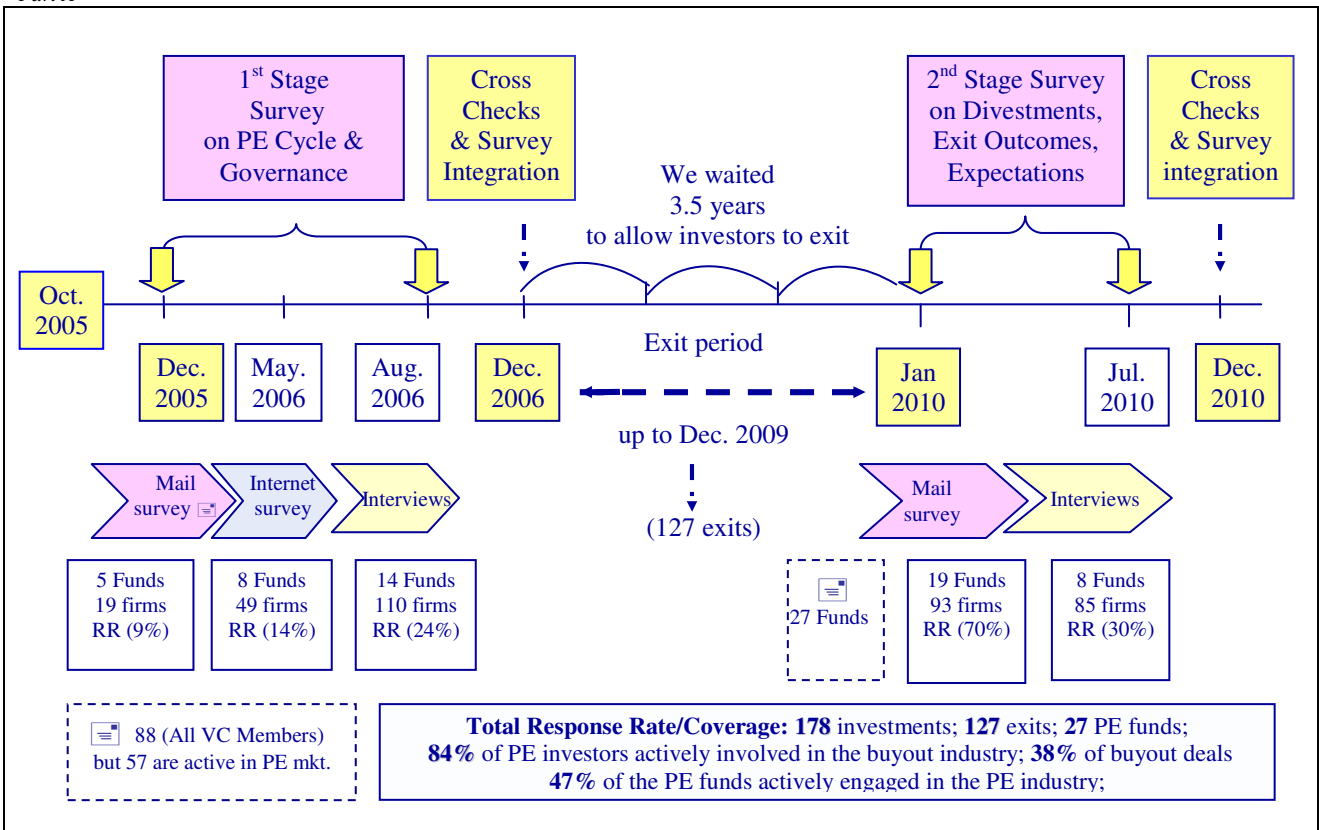
Table A.1 continued

| Panel F: IPO distribution comparison | | AIFI DATABASE | | OUR SURVEY | |
|---|--|---|-------------------------------------|---|--------------------------------|
| ALL TRANSACTIONS (2000-2012) | Total # of exit in AIFI database (99-2007) | Proportion of exits through IPO in AIFI | # Exits in Our Dataset (99-2012) | Proportion of exits through IPO in our Database | Comparison of Proportions Test |
| 2000 | 188 | 0.33 | 3 | 0.33 | 0.00 |
| 2001 | 148 | 0.20 | 3 | 0.00 | 0.86 |
| 2002 | 149 | 0.56 | 3 | 0.25 | 1.07 |
| 2003 | 222 | 0.56 | 10 | 0.10 | 2.86 *** |
| 2004 | 137 | 0.71 | 11 | 0.09 | 4.19 *** |
| 2005 | 150 | 0.11 | 10 | 0.00 | 1.11 |
| 2006 | 181 | 0.13 | 22 | 0.13 | 0.00 |
| 2007 | 207 | 0.08 | 25 | 0.12 | -0.68 |
| 2008 | 181 | 0.04 | 21 | 0.00 | 0.93 |
| 2009* | 143 | 0.16 | 19 | 0.05 | 1.24 |
| 2010 | 123 | 0.02 | 3 | 0 | 0.25 |
| 2011 | 139 | 0.06 | 2 | 0 | 0.36 |
| 2012 ^{oo} | 44 | 0.02 | 18 | 0 | 0.65 |
| Source: AIFI statistics | | | 150 | | |
| ^o It is worth noting that in 2009, Aifi Annual Report excludes write off from the proportion of exits through Trade Sale. ^{oo} It is worth noting that the total number of Exits recorded in AIFI in 2012 refers to the first semester only. | | | | | |
| Panel G: Write off Distribution | | AIFI DATABASE | | OUR SURVEY | |
| ALL TRANSACTIONS (2005-2012) | Total # of exit in AIFI database (2005-2009) | Proportion of exits through write off in AIFI | # TOTAL exits in Our Data (2005-09) | Proportion of exits through Write-off in our Database | Comparison of Proportions Test |
| 2005 | 150 | 0.06 | 10 | 0 | 0.80 |
| 2006 | 181 | 0.10 | 22 | 0.04 | 0.87 |
| 2007 | 207 | 0.04 | 25 | 0.17 | -2.66 *** |
| 2008 | 181 | 0.20 | 21 | 0.11 | 0.99 |
| 2009 ^o | 143 | 0.39 | 19 | 0.37 | 0.17 |
| 2010 | 123 | 0.11 | 3 | 0.00 | 0.61 |
| 2011 | 139 | 0.20 | 2 | 0.00 | 0.71 |
| 2012 ^{oo} | 44 | 0.09 | 18 | 0.00 | 1.32 |
| Source: AIFI statistics | | | 120 | | |
| ^o It is worth noting that in 2009, Aifi Annual Report excludes write off from the proportion of exits through Trade Sale. ^{oo} It is worth noting that the total number of Exits recorded in AIFI in 2012 refers to the first semester only. | | | | | |

Figure A.1. Survey Structure and Timing

This Figure summarizes the three-stage survey employed to collect the data underlying this paper.

Part A



Part B

