

# Minority and Majority Private Equity Investments: Firm Performance and Governance

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### **Abstract**

This paper adds to the literature on the determinants of the effects of private equity (PE) investments. Using an original dataset of 191 target firms in Italy, we study the effects on performance and governance of the stakes acquired by the PE investor. We employ a difference-in-differences approach and compare target and control firms sharing similar characteristics and performance in the years preceding the deal. We find that PE investment has a positive effect on profitability, sales, and employment; these effects are larger for minority investments. We argue that this signals effective governance that follows from complementing rather than substituting incumbent managers in minority investments.

**Keywords:** Private equity, minority investment, family firm, firm performance, corporate governance

**JEL codes:** G32, G34

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## **1. Introduction**

Private equity (PE) investors hit the news for the first time in the 1980s when a wave of highly leveraged hostile takeovers took private a number of public companies in the United States. Since then, the effects of PE investments have been lively debated. Advocates describe PE investments as a means to provide a superior form of governance, while opponents depict them as a means to transfer value from employees to corporate raiders at the expense of firm's long-term growth and profitability.

Building on this stream of research, we study 191 PE investments between 1995 and 2004 in Italy and we provide evidence that PE minority investments (MINs) foster firm growth more than do majority investments (MAJs). We use a difference-in-differences approach to evaluate the impact of PE on the performance, ownership, and governance of target firms. Similar to recent evidence for continental Europe (e.g., Boucly et al., 2011), we show that PE has a positive causal effect on profitability, sales, and employment. Despite the anecdotal evidence suggesting that MAJs and MINs involve firms with very different characteristics, we find that targets in our sample are statistically undistinguishable along a large number of observables in the years before the deal. On the contrary, we document that MAJs and MINs show considerably different performances in the years after the PE investment, family firms in particular. Based on this evidence, we argue that MINs are particularly effective in fostering firm growth, possibly as a result of the effective governance that follows from complementing rather than substituting incumbent managers in MINs.

Most studies use UK and US data to show that LBO targets increase profitability by cutting investment and selling assets (Kaplan, 1989), reducing employment and wages (Lichtenberg and Siegel, 1990; Amess and Wright, 2007) and implementing measures to downsize operations while maintaining their ability to create value. Most recent studies

show instead that LBO targets tend to increase sales, capital expenditures, and employment (Boucly et al., 2011). PE investments have changed considerably since the 1980s, extending their scope to encompass private-to-private buyouts with little to moderate leverage, as well as MINs. Strömberg (2008) reports that private-to-private transactions account for the vast majority of all PE investments between 1970 and 2007. The role played by MINs is discussed by Lerner et al. (2009). Studying a large sample of deals, they conclude that MINs account for 23.4% of all PE-backed transactions worldwide. The increasing relevance of minority deals is also discussed by Kaplan and Strömberg (2009), who speculate that PE investors will increasingly take minority stakes. The experience gained by PE investors in governance, operational, and financial engineering, should guarantee value without full control.

Notwithstanding the widespread occurrence of MINs, rigorous empirical evidence on their effects remains scant. To the best of our knowledge, the only exception is the study of Chen et al. (2014), who find weak evidence that PE investors increase firm profitability in MINs. In line with the empirical literature, economic theory also has focused exclusively on public-to-private transactions, emphasizing in particular the agency conflicts between shareholders and the management of public firms (Metrick and Yasuda, 2011). However, traditional agency theory is unlikely to explain the investment in privately held targets, since ownership is generally already concentrated in these firms prior to the deal.

This paper marks something of a departure from this literature, and considers both MAJs and MINs undertaken by PE investors. Our working sample consists of 90 majority and 101 minority targets that, for the most part, are family owned and privately held and

belong to the manufacturing industries.<sup>2</sup> Our contributions can be summarized as follows. First, we add to the limited literature on the effects of PE investments in continental Europe (Achleitner et al., 2013; Cumming et al. 2007). We find that PE investments are associated with increases in growth, profitability, and employment. Targets systematically outperform controls in the three years after the deal. This finding supports the idea that PE investments have persistent effects on performance over and above temporary effects that might result from cherry picking.

Second and most importantly, we show that PE investment effects are larger for MINs, particularly when it comes to profitability and growth.<sup>3</sup>

Finally, we add to the growing body of literature on the drivers of PE investment effects (e.g., Acharya et al., 2013) by exploring the effects on performance of changes to the board of target firms. We show that PE investment causes substantial changes to the board after the deal, for MAJs in particular. We find that MAJs experience significantly higher board and CEO turnover than controls as well as than MINs,<sup>4</sup> resulting in younger and less “local” directors after the deal. In contrast with the literature on social ties that predicts strong connections among directors as detrimental to firm performance (e.g., Battistin et al., 2012; Giannetti et al., 2015), we find that PE investors are more effective in MINs, in that they do not substantially change the board’s features. In our sample, a high degree of board localness might indicate that board members have contributed to the foundation and development of the firm itself and belong to the same family or families.

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<sup>2</sup> We exclude early-stage ventures (seed and start-up) from our study (i.e., the subset of investments where PE, usually referred to as the venture capital firm, funds companies in their primary development stage).

<sup>3</sup> MINs and MAJs in our sample are statistically identical in the years before the deal for ownership, sector, age, sales, profitability, leverage, capital expenditure, number of employees, and growth opportunities measured by change in sales, EBITDA, and EBITDA margin (see Table 3, Panel C). To the extent that all these dimensions are strong predictors of future growth, we conclude that our analysis is robust to the effect of unobservable features of the firm determining the share acquired by investors.

<sup>4</sup> For the sake of simplicity, we use the terms *board* and *directors* interchangeably in the following. However, our study is focused on a subset of directors, namely, those serving as CEO, chairperson, and vice chairperson.

Substituting the CEO or the chairperson/vice chairperson may prevent one of the driving forces of success.<sup>5</sup> When we distinguish between family and non-family firms, we show that, in the former case, PE investors are effective only in MINs when they assign a monitoring role to their representatives on the board, supplementing rather than substituting the human capital of the existing board. We argue that, in family firms, PE investors are especially successful in providing incumbent entrepreneurs/owners with suitable support to exploit growth opportunities. This result echoes the literature on the effects of large blockholders (e.g., Maury and Pajuste, 2005; Attig et al., 2013) and shareholder activism (e.g., Brav et al., 2008; Klein and Zur, 2009), since it demonstrates a positive effect of active minority shareholders on corporate governance efficiency and firm performance. Moreover, it suggests that PE MINs might bring effective governance that helps limiting the opportunism of a private firm's managers (Lerner, 1995; Schulze et al., 2002; Morck and Yeung, 2003) while preserving the key idiosyncratic competencies of the existing management.

Of course, PE investments are not random. The selection of target companies and the negotiation of the stakes acquired are likely sources of bias. Following the empirical literature that investigates the effects of PE investments, we construct a sample of control firms sharing with targets key demographics and the same trajectory of outcomes in the years before the deal. We select controls separately for majority and minority investments. The availability of control groups that are specific to the share acquired by the PE investor together with the longitudinal dimension of the data allow us to employ a difference-in-differences approach to evaluate the effect of PE versus non-PE by investment type. Our strategy controls for *observable* differences with respect to a large set of pre-investment

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<sup>5</sup> The relations between founding family ownership and firm performance has been studied by, among others, Anderson and Reeb (2003), Barontini and Caprio (2006), Maury (2006), Villalonga and Amit (2006, 2010), and Miller et al. (2007). While still partially contrasting, these contributions are generally positive regarding the role of the founding family.

characteristics, as well as for time-invariant *unobservables* using firm fixed effects. A potential explanation for the heterogeneous effects of PE across MIN and MAJ is that the initial investment may reflect expectations about future growth along dimensions that we do not observe. Our maintained assumption to address PE selection is that all unobservable dimensions are modeled using firm fixed effects.

While the difference-in-differences technique has already been used to assess the effects of PE investments on performance (Boucly et al., 2011; Chung, 2011), to the best of our knowledge we are the first to combine the difference-in-differences method with propensity score matching (e.g., Heckman and Vitlacyl, 2007) to assess the effect of PE investment on operating performance, governance, and ownership changes. This represents the methodological contribution of this work to the literature on the effects of PE investment.

The remainder of the paper is organized as follows. Section 2 reviews the related literature and derives the hypothesis, Section 3 describes our data sources and the sample, Section 4 introduces the research design, Section 5 presents the empirical results, and Section 6 summarizes and concludes the paper.

## **2. Hypotheses**

We assess empirically three different hypotheses. First, we consider the effects of PE investment on firm performance without distinguishing for share acquired and pre-investment ownership. Early studies emphasized the role of PE in improving firm efficiency. Kaplan (1989) finds that targets slow sales growth and keep EBITDA constant through enhanced profitability from post-buyout divestures. More recent research in the US and UK corroborates the idea that PE investments are associated with significant operating and productivity improvements, and with a decline in capital expenditures

(Harris et al., 2005; Kaplan and Strömberg, 2009; Datta et al. 2013), number of employees (Muscarella and Vetsuypens, 1990; Davis et al., 2014) and wages (Lichtenberg and Siegel, 1990; Amess and Wright, 2007). In contrast, empirical evidence for Europe shows that PE investments are associated with firm growth. Target firms tend to increase sales, capital expenditures, and employment (Boucly et al., 2011; Chung, 2011). Where capital and credit markets are not large enough and well-functioning, PE investments may help relax credit constraints, allowing targets to take advantage of unexploited growth opportunities (Boucly et al., 2011). These elements lead us to postulate our first hypothesis.

**Hypothesis 1:** PE investments foster growth of target firms.

We then consider the role of share acquired by the investors and pre-deal ownership type. PE investors are believed to contribute to value creation reducing agency costs (Jensen, 1986), providing strategic resources (Achleitner et al., 2008) and fostering entrepreneurship (Wright et al., 2001). The dominant view emphasizes the role of leverage and governance in reducing agency costs of publicly traded firms. Private firms, the large majority of targets in our sample, could have lower pre-investment agency costs (Cumming et al., 2007), since they are usually owned and managed by a small, concentrated group of shareholders. On the other hand, the literature recognizes that private firms ownership and control structures can introduce agency problems (Schulze et al., 2002; Morck and Yeung, 2003; Howorth et al., 2004; Scholes et al., 2007). Private ownership and owner management may limit external control causing owners to adopt non-economically motivated behaviors, driven by personal preferences or taste, harming themselves as well as those around them (Schulze et al., 2001). Examples of such actions may be the use of owner-managers position to help friends or the refusal to change the

business model because this would threaten the status quo, require too much effort, or reveal redundancies of long-time collaborators (Schulze et al., 2002). These problems are likely to be more pronounced in family firms, where owners may have a tendency to nepotism and to retain family control at all costs (Dawson, 2011). Beyond agency theory, literature offers other explanations for the effects of PE investments. Wright et al. (2001) argue that PE investors may enhance entrepreneurship and promote strategic innovation (Markides, 1997) in firms where such opportunities cannot be achieved under existing ownership. PE investment effects have been discussed also according to the resourced-based view (Wernerfelt, 1984; Barney, 1991), where the PE firm is supposed to influence the resource profile of the portfolio company (Achleitner et al., 2008).

*Table 1 about here*

In light of the evidence discussed, we expect the effect of PE to vary between MINs and MAJs (see Table 1). The degree of ownership concentration is unlikely to change radically in MAJs, as the PE firm assumes full responsibility for the firm's strategic direction, substituting the existing owners. Therefore the reduction of agency costs must be associated with an "institutional" superiority of PE as owners. The net effect of the substitution of incumbent owners with PE representatives on entrepreneurship and strategic resources is difficult to predict. While the PE investor brings in additional resources, those delivered by existing owners are lost. In MINs, the PE firm complements existing owners. In this case, the reduction of agency costs may stem from PE firms acting as active minority shareholders, monitoring controlling shareholders' behavior and their commitment to value creation (Holderness, 2003; Maury and Pajuste, 2005). PE investors provide intensive oversight of their portfolio firms, through both board participation and



informal visits and involvement in key strategic decisions. Moreover, the strategic resources brought in by PE investors are in addition to those already available and likely synergic with them. PE investors' expertise is likely to be in areas such as financial engineering, management information systems, and strategy development (Achleitner et al., 2008), while the existing owner's knowledge is possibly superior regarding industry- and firm-specific matters. Moreover, we expect the differential effects of MINs and MAJs to be stronger in family firms, where the existing owners are more likely involved in the management of the company and bearing critical strategic resources (Sirmon and Hitt, 2003).

The possibility of differential effects of MINs and MAJs on target firms, coupled with the fact that most firms in our sample are family owned, lead us to formulate the following two hypotheses.

**Hypothesis 2:** PE minority investments foster growth of target firms more than do PE majority investments.

**Hypothesis 3:** PE investments contribute to the growth of family firms but only when the PE firms buy a minority share, complementing rather than substituting existing human capital.

### **3. Data**

#### *3.1. Targets*

The Italian PE industry represents an ideal setting for testing the hypothesis that MINs yield a governance structure particularly effective in promoting the growth of family firms. Italy is characterized by many family managed businesses (Faccio and Lang,

2002)<sup>6</sup>, which sometimes are unable to access the resources and capabilities needed to sustain competitive advantage and to grow or that are undergoing succession (Dawson, 2011). Thus, we consider an economy with many investment opportunities from a PE firm's perspective.

Second, PE investments in family and private firms in Italy are relatively more common than in other countries. According to CMBOR (2008) in the period from 1998 to 2007, largely overlapping to the one of our study, Italy was the European country with the highest share of transactions attributable to family firms (more than 40%).<sup>7</sup>

We use two main sources to collect information on deals: Private Equity Monitor and Mergermarket.<sup>8</sup> We consider only PE deals carried out before 2004. We require that the targets' operating performances be tracked up to three years after the deal. Furthermore, we require that the target be headquartered in Italy and backed by a PE investor for the first time. In light of the above selection criteria, our source list includes 455 PE deals that targeted Italian firms between 1995 and 2004.

Financial statements and other non-financial data for targets were obtained from Telemaco, a database administered by the Italian Chamber of Commerce.<sup>9</sup> For each target, we consider financial reports from two years before to three years after the deal to ensure data comparability over time. Finally, data on the governance of the targets for the year before (time -1) and the year after (time +1) the deal were gathered from Cerved's

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<sup>6</sup> See also Eurostat ([http://ec.europa.eu/eurostat/statistics-explained/index.php/Business\\_economy\\_-\\_size\\_class\\_analysis](http://ec.europa.eu/eurostat/statistics-explained/index.php/Business_economy_-_size_class_analysis)).

<sup>7</sup> Wright et al. (1992) report that the share of investments in family and private firms accounts for 50% of investments in Italy, slightly higher than the 44.8% of France and the 38.9% of Germany and almost double of the UK 29.7%.

<sup>8</sup> Private Equity Monitor (PEM) is a yearly publication on PE transactions completed in Italy. Mergermarket is a news service that provides, among others, information on PE investments realized worldwide. The two databases allowed the identification of PE investments. For determining the legal entities involved in the deals and for collecting financial information we then relied on official data obtained from services administered by the Italian Chamber system (see below).

<sup>9</sup> Telemaco contains a broad range of financial and non-financial information about Italian limited liability companies. Among others, Telemaco provides individual and consolidated financial statements from 1993 onward and information on shareholders, the board, merger plans, and the like from 1996 onward.

Databank, our second source of financial and non-financial data on PE-backed and control firms.<sup>10</sup>

After discarding deals with missing or poor quality information, our working sample consists of 90 MAJs and 101 MINs completed from 1995 to 2004.<sup>11</sup> The distribution over time of PE investments in the sample is markedly similar to our best estimate of the total number of deals in Italy for the period considered. This finding ensures the representativeness of the conclusions drawn from our empirical exercise.<sup>12</sup>

There are 104 PE investors involved in the 191 deals in our sample. The median equity stake acquired by PE firms in MAJs is 73%, ranging from a minimum of 50%<sup>13</sup> to a maximum of 100%. In minority deals, the median equity stake is 22.5%, with a minimum of 5% and a maximum of 49.5% (Table 2, Panel A).

*Table 2 about here*

Most targets in our sample are medium-sized, manufacturing, and privately held firms (see Table 2, Panel B). Of the 191 targets, 142 belong to manufacturing industries, while 86% are family owned and privately held (see Table 2, Panel C). Only four firms were listed in the stock exchange at the time of the deal and they were all targets of MINs. Subsidiaries account for 18 targets and are mostly involved (14 cases) in MAJs. Overall,

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<sup>10</sup> Cerved is an Italian information provider. Its offer includes financial information about all the Italian firms, via the financial reports that all the Italian firms are obliged to deposit annually to the Chamber of Commerce.

<sup>11</sup> PE investments gained substantial ground in Italy after 1995. The time span covered is constrained by data availability.

<sup>12</sup> To cross check the representativeness of our sample, we used as benchmark the population of deals that is collected in Capital IQ, since this database is employed as a control or as one of the primary sources of data by other empirical studies on PE investments and LBOs (Boucly et al., 2011; Chung, 2011). In analysis not displayed in the paper for sake of brevity, we find that the evolution of our sample over time mirrors the evolution of PE deals listed in Capital IQ, therefore confirming the representativity of our sample.

<sup>13</sup> In two out of 191 deals, the PE firm acquires an equity stake of 50%. Even if technically these two transactions are neither a MAJ nor a MIN, we classify them as majority deals to underline the relevant influence exerted by the PE investor in the target.

MAJs and MINs are not significantly different with respect to industry and ownership structure.<sup>14</sup>

In the years before the deal, majority and minority targets are not statistically different with respect to a long array of characteristics. Results in Panel C of Table 3 suggest that the targets are comparable in terms of size, profitability, growth opportunities, and leverage before the PE transaction. The same result applies to governance (Table 3, Panel D); in MAJs and MINs, the CEO, the chairperson, and vice chairperson are in their mid-50s and strongly connected to the firm. Of course, the fact that the stakes acquired by the PE firm are orthogonal to such a large set of observable variables does not exclude differences with respect to unobservable dimensions that are good predictors of prospective performance. To the extent that these dimensions are firm fixed effects (i.e., time-invariant unobservables), the availability of panel data adjusts for this problem through the empirical analysis carried out in Section 5. The comparison of the results for MINs and MAJs relies on the assumption that the decision to acquire minority or majority stakes does not depend on firm-level time-varying variables that we do not observe in the data and that the investor uses as predictors of future performance.

*Table 3 about here*

### *3.2. Definition of the control group*

A group of firms similar to those in the target population was selected to define a control group for the analysis. We followed a two-step procedure to obtain a working

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<sup>14</sup> We run regressions for industry and ownership type on a dummy for MIN controlling for calendar year fixed effects. For both outcomes the coefficient on the dummy is never statistically different from zero at the conventional levels.

sample in which the target and control firms present similar predictors of long-term performance.

In the first step our aim was to identify all the Italian firms that potentially could constitute good controls. To this aim, for every target in our database, we extracted from Cerved, which includes all listed and private companies in Italy, information on a large number of firms in the same industry (two-digit NACE code) and with similar sales and EBITDA margin in the year before the deal. Since our main concern in this phase was not excluding potentially good controls, we used coarse filters in order to obtain many potential controls for each of our targets. This procedure yielded 41,137 cases not involved in any PE investment to be used as potential controls.

The sample of control firms used in our empirical exercise follows from additional selection criteria applied to these 41,137 cases. We employed a procedure that defines a distance between targets and controls as a function of sales, EBITDA, and EBITDA margin in the years preceding the deal before matching each target to the most similar control firm along these dimensions. Building upon the well-established literature on program evaluation (e.g., Heckman and Vytlacil, 2007), we employed the propensity score metric to define the degree of similarity between the target and control firms. After pooling observations for the two groups, we estimated the propensity score by running a logistic regression of the dummy for being a target firm on sales, EBITDA, and EBITDA margin in the two years before the deal, as well as the NACE code and year-of-deal dummies. The inclusion of the former set of variables was motivated by the need to control for both levels and changes over time in performance in the years before the deal.

Using well-known results from the literature on matching in statistics it is possible to show that the target and control firms that share the same propensity score also share, on average, the same levels of the variables used to estimate such a quantity (e.g., Rubin,

2006). Building upon this result, we matched firms in the two groups to find, among the 41,137 potential controls defined in the first step, the most similar firms to our targets. Our definition of this group is very operational, and reflects a tradeoff between bias and precision. One possibility is to match each target firm to its closest counterpart in the control group in terms of their propensity score (this is often referred to as “nearest neighbor matching”). The procedure yields a sample of control firms with size equal to that of the target group. An alternative to this procedure is to keep all 41,137 potential controls, and assign them weights which are decreasing with distance from the target firm. The resulting statistical contribution of control firms to the analysis is high only for those “close enough” to targets in terms on their propensity score. The latter case, often referred to as “kernel matching”, together with “nearest neighbor matching” represent two extreme examples of how to implement the idea of similarity, along the propensity score metric, between the two groups of firms. When all controls firms are retained, increased sample size boosts precision at the cost of introducing bias. When one control firm is considered, bias is minimal but precision is compromised.

Following many empirical papers, we decided to adopt a procedure in between these two extremes (for discussion and examples, see Guo and Fraser, 2015). We matched each firm involved in a PE transaction to the closest 25 potential controls, imposing a distance between target’s and controls’ propensity scores of at most one percent. This procedure amounts to a “1% caliper matching” for the 25 nearest neighbors, and is formally equivalent to matching each target to the average of the most similar 25 control firms in the sample. The choice of 25 firms followed from data inspection, under the idea of having enough controls to estimate this average. In most cases the number of potential controls within a 1% distance of a target’s propensity score exceeded 25, weighing against

any common support problem in our data (see Rubin, 2006).<sup>15</sup> By means of this procedure, we select 2,826 control firms<sup>16</sup> (on average,  $2,826/191 = 15$  per target), for which we retrieve the financial data (the same as those gathered for the targets) from time -2 to time +3, as well as the name and tax code of the CEO, chairperson, and vice chairperson at times -1 and +1.

As demonstrated in Table 3 (Panels A and B), the targets and controls selected for the analysis are very similar in the years before the deal. The median control, with sales of €28.34 million, is somewhat smaller than the median target, which has sales of €38.65 million. The median EBITDA is smaller for the controls (€2.73 million) than for the targets (€4.92 million), whereas the EBITDA margin difference between the two groups is rather small (0.12 for targets versus 0.10 for controls). Net debt as a multiple of EBITDA is slightly larger for control than targets firms (1.41 versus 1.01). Furthermore, in the two years before the deal, both targets and controls achieve non-trivial sales and EBITDA growth, even though the former performs a little better than the latter. Finally, the directors of the 2,397 controls (2,104 unique firm–year controls) for which we have governance data in years -1 and +1 are the same age and as well connected to the firms as the targets’ directors are.<sup>17</sup> As we make clear in the next section, residual differences across target and control firms are accounted for in the estimation.

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<sup>15</sup> In those cases in which the number of controls falling within the caliper was larger than 25, we selected 25 of them at random. For those targets with less than 25 controls, we retained them all in the final sample. An alternative strategy, often used in empirical studies, would have been that of considering all controls within 1% distance of a target’s propensity score. This is known as “caliper matching”.

<sup>16</sup> Since we match controls to targets with replacement, the same firm in the same calendar year can be matched to more than one target. Therefore, the number of unique firm–year controls is slightly lower (2,509).

<sup>17</sup> The degree of similarity between the targets and the selected controls is confirmed by running a multivariate (probit) regression of a dummy for the target firms on the various dimensions considered. For both MINs and MAJs, the variables considered do not serve as good predictors of being a target versus a control firm. Results, not reported for sake of brevity, are available upon requests.

## 4. Methods

### 4.1. Effects on operating performance

To quantify the effects of PE investment, we compare targets with control firms before and after the deal through a difference-in-differences approach. In a nutshell, changes in outcomes for target firms from before to after the investment are contrasted to changes in outcomes of their controls over the same period. As we have longitudinal information of the same firms, the comparison described adjusts for firm unobservables (fixed effects) and does not require that target and control firms have the same outcomes pre-deal. The key identifying assumption here is that outcome change for control firms approximates the outcome change that we would have observed for target firms, had PE investments not taken place. This is often referred to as “common trend” (or “parallel trend”) assumption (Heckman and Vytlacil, 2007). For the context at hand, the assumption appears plausible because of the procedure that we adopted in the definition of the control sample. The firms in this group are in the same industry as the targets and are selected to present a time series of sales, EBITDA, and EBITDA margins that are most similar to those of the target firms in the two years before the deal.

We assess the effect of PE investments on all targets by estimating the following regression:

$$y_{it} = \alpha_t + \beta_i + \gamma p_{it} d_i + \varepsilon_{it}, \quad (1)$$

where  $y_{it}$  represents the outcome (EBITDA, Sales, Number of Employees and EBITDA Margin) for firm  $i$  in period  $t$ , the latter index ranging from two years before to three years after the deal. The variable  $d_i$  is a dummy that identifies target firms, while  $p_{it}$  is a dummy for the post-deal period. Finally, the  $\beta_i$  are (unobserved) firm fixed effects and the  $\alpha_t$  are time effects (from -2 to +3). Equation (1) is standard, and compares target and control firms using 6 observations for each firm from -2 to +3 (unless the outcome



variable considered presents missing data). Any difference in the outcome after the deal is measured by the parameter  $\gamma$ , which represents the average effect of PE investment across targets in the years from 1 to +3. Outcome levels for the two groups may differ because of firm-specific unobserved factors that are captured by  $\beta_i$ . It follows that our analysis allows for selection based on variables that are not observed in our data, but limits these variables to being time invariant. This is a standard assumption made in empirical work when panel data are available – as is the case here. Equation (1) also includes dummies for the calendar year of the deal as additional regressors, which control for business cycle effects.

In presenting our results, we run separate regressions for MINs and MAJs. Standard errors are made robust to heteroskedasticity and clustered on the firm, thus allowing for general forms of serial correlation. The estimation results from (1) are presented in the fourth row of Table 4. In addition to presenting average effects from 1 to +3, we report year-to-year changes to differences between target and control firms after the deal. This is obtained by considering the following variant to equation (1):

$$y_{it} = \alpha_t + \beta_i + \gamma_1 z_{i1} d_i + \gamma_2 z_{i2} d_i + \gamma_3 z_{i3} d_i + \varepsilon_{it}, \quad (2)$$

where  $z_{it}$ , for  $t = 1, 2, 3$ , are dummies taking value one for observations in period  $t$ . The coefficients  $\gamma_1$ ,  $\gamma_2$ , and  $\gamma_3$  can be interpreted as the effect of PE one year after the deal (1-st year effect), two years after the deal (2-nd year effect) and three years after the deal (3-rd year effect), respectively. Results from Equation (2) are presented in the first three rows of Table 4.

#### 4.2. *Effects on governance*

After having estimated the direct, “reduced-form” effect of PE investment on operating performance through Equation (1), we investigate the mediating factors that may have fueled such an effect. In particular, we consider the causal channel that passes

through changes in the governance brought by the PE investor. Since the board composition, in terms of both number of directors and their characteristics, most likely affects firm operating performance, it may well be that changes in performance are mediated by important changes to the board. Since the extent of such changes are *ex ante* expected to differ between minority and majority deals, the interplay with PE investment types is certainly a dimension worth considering.

To this end, we present the results obtained from the following regressions:

$$b_i = \delta_0 + \delta_1 d_i + \delta_2 x_i + v_i, \quad (3)$$

where  $b_i$  represents the change in the board composition of firm  $i$  between year -1 and year 1,  $d_i$  is again a dummy for the target firms, and  $x_i$  is a set of regressors that are predetermined with respect to the deal. In our preferred specification, the latter set includes lagged values of net debt over sales, (log) sales, and EBITDA. Change in board composition is proxied by numerous indicators, which are presented in Section 5.2, that we use to check the sensitivity of our conclusions to the outcome employed. Thus Equation (3), unlike Equations (1) and (2), makes use of only one observation per firm. The results of this analysis are reported in Table 5 and the inference is carried out by using heteroskedasticity-robust standard errors.

## 5. Results

### 5.1. Operating performance

Results are presented in Table 4. Columns (1) to (4) show that PE investments foster growth of target firms. Specifically, PE-backed firms achieve higher EBITDA and sales and employ more than their control counterparts after the deal. In the three years after the deal, EBITDA are €3.2 million to €3.97 million higher than in controls (see column (1)). As the median value of EBITDA for targets at time -1 is €4.92 million (see

Panel A of Table 3), the post-deal difference between PE and non-PE-backed firms that we document is economically relevant. The increase in EBITDA is driven by the expansion of sales, as shown in column (2) of Table 4. Sales growth is associated with a significant increase in the number of employees, as shown in column (3). In contrast, EBITDA margin does not change after the deal, as shown in column (4). This leads us to argue that PE investors tend to pursue EBITDA growth by developing new sales and boosting employment, rather than by improving profitability of existing sales.

*Table 4 about here*

Results are consistent with those in recent studies, bearing in mind that the latter focus on LBOs. Boucly et al. (2011), for instance, find that targets increase EBITDA and sales by 18% and 12%, respectively. The PE-backed firms investigated by Chung (2011) outperform controls by a similar magnitude along the same dimensions. Consistently with these findings, we argue that in European and private-to-private deals PE investors are more effective at freeing the growth potential of targets than at improving their efficiency. Our results on employment are consistent with Boucly et al. (2011) and Chung (2011). The evidence discussed is therefore consistent with Hypothesis 1, and in contrast with early criticisms that LBOs improve targets' profitability at the expense of employees.<sup>18</sup>

Differentiating between MINs and MAJs, we find a much larger effect on EBITDA for the former group. The central and right-hand side panels of Table 4 report the breakdown by type of deal. We know from Section 3 that in the years before the

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<sup>18</sup> In unreported results we investigate the possible sources of post-deal growth. We find significant changes in capital expenditures, particularly in the first year after the deal. On the contrary we do not detect any major effect to outsourcing of target production, compensation and working capital management. Moreover, PE investors appear to approach majority and minority targets in the same way at the operational level. Overall these results provide support to the conclusion that PE investors enhance the value of target firms more promoting growth than through efficiency seeking measures.

transaction, MAJs and MINs are not different along a number of observables. In the years following the investment, however, EBITDA in MAJs are at most €2.2 million greater than in controls (see column (9) of Table 4). In MINs, EBITDA are at least about €5.0 million larger than in control firms (see column (5)). Sales and employment grow for both types of targets, and marginally more in MINs.<sup>19</sup> In neither group we do detect an increase in EBITDA to sales. These findings are supportive of Hypothesis 2. Interestingly, we find that the effects on employment and sales present different patterns over time for the two types of deals (see the p-values from the F test for the equality of the PE effect in the first, second, and third year after the deal reported in the last row of Table 4). While for MAJs the effect is statistically constant in the three years after the operation, the pattern of the effect for MINs varies over time, increasing more sharply from the first to the third year.

## 5.2. Governance

We now look at changes to the board associated with a PE investment. We focus on the more influential board roles, namely, those of the CEO, chairperson, and vice chairperson.<sup>20</sup> We gathered board data one year before and one year after the deal. We

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<sup>19</sup> PE investments can be carried out through a capital increase, the acquisition of incumbent owners shares or a combination of the two. The amount of new resources brought to the target company with a capital increase can affect the subsequent growth and therefore affect our results, especially if PE investors treated MAJs and MINs differently (48% of MAJ and 61% of MIN are characterized by a capital increase). To investigate this source of effect heterogeneity in Table 4, we add to equation (1) one additional variable consisting of the interaction between  $p_{it}$ ,  $d_i$  and a dummy that takes value one if the PE investment was carried out through capital increase. The coefficient on this new variable identifies differences between investments with and without capital increase. The results from this specification, available upon request to the authors, are obviously less precise but convey the following message. Effects on EBITDA and EBITDA margin are largely independent of capital increase. The same conclusion applies if we estimate regressions separately for MINs and MAJs. Also PE investment effect on employment appears to be independent of capital increase, as it is positive and significant both with and without it. On the other hand, the effect on sales appears to be driven by investments with a capital increase.

<sup>20</sup> For control firms we gathered data on directors serving as CEO, chairperson, and vice chairperson one year before and one year after the deal of the corresponding matched target, while for targets we have data about all the directors serving on the board from two years before to three years after the deal. Given the constraint on the data about controls' board, we performed our analysis on the subset of data available for both targets and controls, i.e. the directors serving as CEO, chairperson and vice chairperson. It is worth underlining that according to the Italian law, the board can delegate executive tasks to one or more directors. This is the reason why more than one director can be labeled as CEO.

restrict our sample to 186 targets and 2,104 controls for which we have information on boards at times -1 and +1. This sample considers about 5,200 directors.

Panel A in Table 5 shows the effect of PE investments on boards of MINs and MAJs. We start with turnover (i.e, the percentage of new board members among the most influential roles), new CEOs (i.e, an indicator for having at least one new CEO at time +1), and new chairpersons (i.e., an indicator for having at least one new chairperson or vice chairperson at time +1).<sup>21</sup>

We find that PE affects significantly board composition, changing both the role of existing directors and placing new representatives. As expected, the effect is more substantial for MAJs where turnover of key roles is almost three times as much that for MINs - see columns (1) and (4) in Panel A of Table 5. In MINs, PE investors appoint a new chairperson and, to a lesser extent, a new CEO. However, the change induced by PE investors is marginally significant (at the 10% level). In MAJs PE investors change directors likely with the objective of gaining full control over the management. In MINs instead they tend to leave the roles of CEO and chairperson/vice chairperson to the incumbent owners/managers, presumably without replacing directors with less responsibilities.

*Table 5 about here*

The PE investment effect on MAJ boards does not come as a surprise. Other empirical studies on LBOs show that PE investors tend to substitute CEOs more frequently than other types of owners (Gong and Wu, 2011; Guo et al., 2011; Acharya et al., 2013). New appointments resulting from PEs can possibly change board size and

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<sup>21</sup> If a chairperson serves also as CEO, that individual is counted as the CEO.

demographics. We test this against our data considering age, gender and localness of CEOs, chairpersons and vice-chairpersons in the boards. In particular, we are interested in examining whether PE-backed firms modify the composition of key directors (CEO, chairperson and vice chairperson), their age, gender, and localness. Results are presented in Panel B of Table 5. Overall, we find that board characteristics of MINs are not altered with the entry of the PE investor. In contrast, we find important changes for MAJs. After the deal, boards are younger and with more male directors. Furthermore, the percentage of “local” directors (i.e., directors born in the same province where the company is headquartered) decreases significantly.

The index of “localness” considered here deserves further discussion. Given the characteristics of our targets, arguably the localness within boards is reinforced by strong ties among managers, who often belong to the same family (or highly connected families). At the same time, directors appointed by the PE investor may not be locals. Empirical papers about the effect of social connections on performance show that strong ties between executives/directors tend to be detrimental to firm performance (Battistin et al., 2012) or, in a somewhat more complementary vein, that directors with foreign experience (i.e., loosely connected) produce positive effects on market performance (Giannetti et al., 2015). According to this stream of research, we would expect that, whenever PE-backed firms weaken ties between target board members, company operating performance should improve because the non-connected directors help remove poorly performing managers or bring in valuable new experience to the firm. Our evidence, in contrast, suggests that PE investments exert a stronger effect on target operating performance when fewer changes are made to the board.

We conjecture that our empirical evidence should be interpreted in light of firm ownership. Most of our sample consists of relatively small, family owned, and privately

held firms. For these, localness of key directors might indicate that they have contributed to the firm's foundation/development and might still be central to its activity.<sup>22</sup> PE investors seem better off at keeping incumbent owners/entrepreneurs as leading directors, while monitoring and advising the firm. This is the most frequent setting in MINs.

To provide empirical grounds for such an explanation, we collected, whenever available, ownership data at time -1 and time +1 for all control firms in our working sample for which we had information on boards (41.5% of the initial sample). Then, we labeled "family firms" those controls whose equity in both time -1 and time + 1 was directly controlled by one or more individuals or by a partnership.<sup>23</sup> This definition is somewhat conservative, since it could well be that a firm is owned by a corporation that, in turn, is controlled by one or more individuals (i.e., the entrepreneur and/or members of his/her family). However, since the definition we adopted points to a very simple ownership structure, it defines a reasonable proxy to identify firms whose shareholders are involved to some degree in the management of the company. We consider family firms those where at least 50% of the equity is owned by one or more individuals or by a partnership. The results discussed in what follows remain qualitatively unchanged if the equity threshold is set at the 55%, 60%, 65%, or 70% level. Thus, we only report the results obtained from the 50% threshold.

We then run the regressions (1) and (2) presented in Section 4.1 for (a) the subset of family targets and controls and (b) the subset of non-family targets and controls, the latter group being made up of firms controlled by other companies (e.g., subsidiaries) or listed in the stock exchange. It is worth noting that the dummy for family ownership is not

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<sup>22</sup> In our sample of 191 PE targets, we find that localness is 30% higher in family firms than in non-family firms and this difference is statistically significant at the 1% level. This evidence is corroborative of localness being a good proxy of firms run by families.

<sup>23</sup> In Italy, partnerships may be formed in forms approximately equivalent to a general partnership (*società in nome collettivo*, SNC) or limited partnership (*società in accomandita semplice*, SAS).

collinear with the PE deal type. Thus, we have enough variability in the data to replicate the main analysis after stratification. Overall, the results reported in Table 6 confirm that PE investors are more effective when they acquire a minority stake in the equity of the target and when they invest in family firms, as predicted by Hypothesis 3. More precisely, when dealing with family firms (Table 6, Panel A), PE investors manage to boost profitability and sales only if they acquire a minority interest. On the contrary, if their interest in the target is greater than 50% (MAJs), they do not provide any meaningful change in EBITDA and sales. If anything, they significantly lower the EBITDA margin. The picture is somehow symmetric for non-family-owned targets (Table 6, Panel B); PE investors do not affect MINs, which in the years following deals are not distinguishable from their controls, while they significantly increase sales for MAJs. Even in MAJs, though, there is no effect on profitability.

*Table 6 about here*

The evidence is consistent with the idea that PE investors are capable of providing value to firms whose founders are strongly involved in management but only if PE investors complement them with a minority share. If the PE investor, as in family firm majorities, substitutes the existing owners and board members, the advantages (e.g., the reduction in family firms' agency costs) are offset by a negative balance between PE investor and existing owners' and directors' strategic resources. On the contrary, for those firms whose tie with the founding family has already been loosened, PE investors better contribute to value with a majority stake and thus full assumption of responsibility in the board of directors.



## 6. Conclusions

Our results show that PE investor foster growth, yielding higher sales, EBITDA, employment and capital expenditures. In contrast, we do not detect any effect on the EBTIDA margin. We conclude that PE investments increase the value of portfolio companies through the promotion of growth more than through restructuring and efficiency-seeking measures.

The stratification by MINs and MAJs reveals stronger effects for the former group. Interestingly, majority and minority targets in our sample are statistically undistinguishable before the deal with respect to industry, size, age, and several measures of performance. Therefore, the only difference between the two groups seems to be the share acquired by the PE funds. This suggests that MINs and MAJs may not be inherently different classes of financial operations.

We find that PE investors affect board composition by changing the role of existing directors and the appointment of new representatives. The change is more pronounced in MAJs, where the board's demography is also affected: the deal leads to younger boards, less local directors, and a higher quota of male directors. Finally, we show that PE investors foster growth of family firms, but only if they acquire a minority share. On the contrary, non-family-owned targets grow more than their controls only if the PE investor acquires a majority interest.

These results provide empirical support to our hypotheses. MAJs outperform their controls and this is most likely due to a reduction in agency costs and, possibly, to a more favorable resource profile of the PE investors compared with that of the previous owners. MINs outperform their controls as well as MAJs. This evidence suggests that, through MINs, PE investors implement a governance structure effective at reducing agency costs while capable of integrating their and the incumbent owners' strategic resources. The

evidence on the family firms subsample further corroborates this conclusion. When the links between incumbent owners and firm direction are stronger, the incumbent owner's permanence within the company is essential, since the PE cannot compensate for the lost of their resources and knowledge.

We acknowledge some limitations of our analysis. First, we use data from only one country and therefore it is possible that institutional and environmental specificities limit the external validity of our findings. Second, since PE investments are not random, our results on the differential performance by MINs and MAJs may reflect the ability to recognize promising deals and not a substantial impact of target firms' operations that PE investors are able to produce. To address this issue, we used propensity score matching to select controls most similar to the targets in the years before the deal, along several dimensions. Moreover, our analytical strategy controls for unobservable differences by means of firm fixed effects that are likely proxies of firm core competencies. Albeit unlikely, we cannot, however, exclude the impact of unobservable dimensions that are not time invariant.

Table 1: Expected contribution of PE to portfolio companies.

|  | MAJs  | MINs   |
|--|---|--|
| <b>Agency costs</b>                    | Reduction in private firms agency costs, since PE investors are “better owners” | Reduction in private firms agency costs, since PE investors act as large minority shareholders |
| <b>Entrepreneurship/<br/>Resources</b> | Substitution of private owners’ strategic resources.                            | Combination of private owners and PE strategic resources                                       |

Table 2: Data about deals and targets.

Panel A: data about deals

|                                 |      |
|---------------------------------|------|
| Median Equity Stake MAJs (perc) | 73,0 |
| Median Equity Stake MINs (perc) | 22,5 |
| Number of deals                 | 191  |
| Number of Private Equity houses | 104  |

Panel B: Target industry

|                                    | All targets | MAJs | MINs |
|------------------------------------|-------------|------|------|
| Manufacturing                      | 142         | 72   | 70   |
| Wholesale and retail               | 11          | 7    | 4    |
| Information and telecommunications | 20          | 6    | 14   |
| Other                              | 18          | 5    | 13   |
| Total                              | 191         | 90   | 101  |

Panel C: Target ownership type

|                    | All targets | MAJs | MINs |
|--------------------|-------------|------|------|
| Listed             | 4           | 0    | 4    |
| Family and private | 164         | 75   | 89   |
| Subsidiary         | 18          | 14   | 4    |
| Other              | 4           | 1    | 3    |
| Not known          | 1           | 0    | 1    |
| Total              | 191         | 90   | 101  |

Table 3: Target and control firms. All statistics are computed for year -1, with the exception of sales growth and EBITDA growth, which measure the change from year -2 to year -1.

| Panel A: targets             | All targets |        | MAJs   |        | MINs   |       |
|------------------------------|-------------|--------|--------|--------|--------|-------|
|                              | Median      | SD     | Median | SD     | Median | SD    |
| Log(Sales)                   | 3.65        | 1.30   | 3.65   | 1.11   | 3.68   | 1.45  |
| EBITDA (mil €)               | 4.92        | 32.84  | 4.64   | 32.64  | 16.73  | 5.13  |
| EBITDA/Sales                 | 0.12        | 0.47   | 0.15   | 0.15   | 0.07   | 0.12  |
| Net Invested Capital (mil €) | 13.78       | 133.89 | 12.99  | 115.69 | 66.52  | 14.43 |
| Net Invested Capital/Sales   | 0.36        | 0.40   | 0.36   | 0.35   | 0.45   | 0.36  |

|                            |       |       |       |      |        |       |
|----------------------------|-------|-------|-------|------|--------|-------|
| Capital Expenditures/Sales | -0.03 | 0.18  | -0.03 | 0.08 | -0.02  | -0.03 |
| Net Debt/EBITDA            | -1.01 | 81.68 | -0.70 | 2.85 | -13.42 | -1.21 |
| Sales Growth               | 0.11  | 0.75  | 0.09  | 0.92 | 0.28   | 0.13  |
| EBITDA Growth              | 0.12  | 2.64  | 0.07  | 3.18 | 0.32   | 0.13  |
| log(# of Employees)        | 5.16  | 1.37  | 5.15  | 1.09 | 5.44   | 5.21  |

| Panel B: controls            | All controls |       | MAJs controls |       | MINs controls |       |
|------------------------------|--------------|-------|---------------|-------|---------------|-------|
|                              | Median       | SD    | Median        | SD    | Median        | SD    |
| Log(Sales)                   | 3.34         | 1.29  | 3.49          | 1.14  | 3.26          | 1.38  |
| EBITDA (mil €)               | 2.73         | 10.30 | 2.91          | 9.03  | 2.54          | 11.08 |
| EBITDA/Sales                 | 0.10         | 0.14  | 0.11          | 0.14  | 0.09          | 0.14  |
| Net Invested Capital (mil €) | 13.28        | 80.77 | 13.70         | 50.09 | 12.95         | 96.07 |
| Net Invested Capital/Sales   | 0.43         | 0.52  | 0.45          | 0.39  | 0.42          | 0.60  |
| Capital Expenditures/Sales   | 0.02         | 0.13  | 0.03          | 0.10  | 0.02          | 0.15  |
| Net Debt/EBITDA              | -1.42        | 14.88 | -1.32         | 18.58 | -1.49         | 11.79 |
| Sales Growth                 | 0.08         | 34.07 | 0.07          | 37.82 | 0.09          | 31.24 |
| EBITDA Growth                | 0.07         | 31.38 | 0.10          | 48.59 | 0.06          | 6.13  |
| log(# of Employees)          | 4.92         | 1.21  | 4.98          | 1.08  | 4.88          | 1.29  |

| Panel C: comparison of MAJ vs MIN                   | MAJ   |        | MIN    |        | p-value |
|---|-------|--------|--------|--------|---------|
|   | Mean  | SD     | Mean   | SD     |         |
| Log(Sales) one year before the deal                 | 3.64  | 1.11   | 3.81   | 1.45   | 0.26    |
| EBITDA (mil €) one year before the deal             | 12.01 | 32.64  | 16.73  | 33.03  | 0.19    |
| EBITDA/sales one year before the deal               | 0.14  | 0.15   | 0.07   | 0.62   | 0.27    |
| Net invested capital/sales one year before the deal | 42.91 | 115.69 | 66.52  | 147.92 | 0.35    |
| Capital expenditure/sales one year before the deal  | 0.05  | 0.08   | 0.02   | 0.24   | 0.23    |
| Net debt/EBITDA one year before the deal            | -0.78 | 2.85   | -13.42 | 111.79 | 0.28    |
| Sales growth in the two years before the deal       | 0.21  | 0.92   | 0.28   | 0.56   | 0.66    |
| EBITDA growth in the two years before the deal      | 0.45  | 3.18   | 0.32   | 2.05   | 0.37    |
| Log(employees) one year before the deal             | 5.18  | 1.09   | 5.44   | 1.57   | 0.18    |
| Firm age on the year of the deal                    | 36.39 | 22.93  | 42.41  | 40.88  | 0.13    |

| Panel D: board demographics   | All targets |      | MAJs  |      | MINs  |       | All controls |      |
|-------------------------------|-------------|------|-------|------|-------|-------|--------------|------|
|                               | Mean        | SD   | Mean  | SD   | Mean  | SD    | Mean         | SD   |
| Age of directors              | 54.72       | 9.60 | 54.56 | 8.50 | 54.86 | 10.47 | 55.06        | 9.93 |
| Number of directors           | 1.98        | 1.03 | 2.11  | 1.17 | 1.87  | 0.89  | 2.18         | 1.29 |
| Percentage of male directors  | 0.92        | 0.20 | 0.91  | 0.22 | 0.93  | 0.18  | 0.89         | 0.25 |
| Percentage of local directors | 0.55        | 0.43 | 0.54  | 0.42 | 0.55  | 0.44  | 0.56         | 0.44 |

**Note:** Last column of Panel C reports the p-value of the test for the significance of the difference between the means of MINs and MAJs one year before the deal. Variables in Panel D are as follows: *Average age* is the average age of the CEO, chairperson, and vice chairperson; *number of directors* is the numbers of CEOs, chairpersons, and vice chairpersons; *percentage of locals* is the percentage of CEOs, chairpersons, and vice chairpersons who were born in the same province where the firm is headquartered; and *male quota* is the percentage of male CEOs, chairpersons, and vice chairpersons.

Table 4: PE effect on target size and profitability.

|   | Targets             |                      |                      |                      | MINs                |                      |                      |                      | MAJs               |                      |                      |                      |
|---|---------------------|----------------------|----------------------|----------------------|---------------------|----------------------|----------------------|----------------------|--------------------|----------------------|----------------------|----------------------|
|   | (1)                 | (2)                  | (3)                  | (4)                  | (5)                 | (6)                  | (7)                  | (8)                  | (9)                | (10)                 | (11)                 | (12)                 |
| Variables                                   | EBITDA              | Ln sales             | Ln employee          | EBITDA /sales        | EBITDA              | Ln sales             | Ln employee          | EBITDA /sales        | EBITDA             | Ln sales             | Ln employee          | EBITDA /sales        |
| 1st-year effect                             | 3.200***<br>(0.853) | 0.183***<br>(0.0334) | 0.151***<br>(0.0331) | -0.0120<br>(0.00821) | 4.883***<br>(1.442) | 0.248***<br>(0.0450) | 0.242***<br>(0.0522) | -0.0133<br>(0.0111)  | 1.303*<br>(0.733)  | 0.120**<br>(0.0478)  | 0.0498<br>(0.0334)   | -0.00961<br>(0.0123) |
| 2nd-year effect                             | 3.453***<br>(0.904) | 0.250***<br>(0.0418) | 0.221***<br>(0.0382) | -0.0148<br>(0.00981) | 5.486***<br>(1.544) | 0.335***<br>(0.0541) | 0.308***<br>(0.0568) | -0.00516<br>(0.0142) | 1.170<br>(0.744)   | 0.162***<br>(0.0620) | 0.121***<br>(0.0454) | -0.0255*<br>(0.0132) |
| 3rd-year effect                             | 3.971***<br>(1.038) | 0.267***<br>(0.0497) | 0.252***<br>(0.0429) | -0.0100<br>(0.00901) | 5.457***<br>(1.739) | 0.345***<br>(0.0621) | 0.361***<br>(0.0607) | -0.00224<br>(0.0127) | 2.230**<br>(0.915) | 0.185**<br>(0.0776)  | 0.129**<br>(0.0548)  | -0.0194<br>(0.0126)  |
| Average effect<br>(first 3 years<br>pooled) | 3.533***<br>(0.850) | 0.233***<br>(0.0392) | 0.206***<br>(0.0359) | -0.0123<br>(0.00795) | 5.271***<br>(1.447) | 0.308***<br>(0.0498) | 0.302***<br>(0.0542) | -0.00688<br>(0.0115) | 1.547**<br>(0.697) | 0.155***<br>(0.0596) | 0.0979**<br>(0.0401) | -0.0182*<br>(0.0107) |
| Observations                                | 14,201              | 14,130               | 12,322               | 14,135               | 8,377               | 8,281                | 7,094                | 8,348                | 5,824              | 5,849                | 5,228                | 5,787                |
| Number of id                                | 2,692               | 2,685                | 2,459                | 2,692                | 1,557               | 1,552                | 1,394                | 1,557                | 1,135              | 1,133                | 1,065                | 1,135                |
| Firm fixed effects                          | YES                 | YES                  | YES                  | YES                  | YES                 | YES                  | YES                  | YES                  | YES                | YES                  | YES                  | YES                  |
| Time controls                               | YES                 | YES                  | YES                  | YES                  | YES                 | YES                  | YES                  | YES                  | YES                | YES                  | YES                  | YES                  |
| Clustered SE                                | YES                 | YES                  | YES                  | YES                  | YES                 | YES                  | YES                  | YES                  | YES                | YES                  | YES                  | YES                  |
| Prob > F                                    | 0.454               | 0.009                | 0.000                | 0.794                | 0.787               | 0.019                | 0.003                | 0.543                | 0.185              | 0.326                | 0.063                | 0.287                |

Robust standard errors are in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

**Note:** This table reports estimates (see equation 1 and 2 in Section 4.1) from the equations that control for firm fixed effects, by target and PE type. The available data for targets refer to outcomes as measured from two years up to three years after the deal. For firms in the control group, the time series are centered at the year of the deal for the corresponding target (which varies between 1995 and 2004). Standard errors, in parentheses, are clustered at the firm level, allowing for heteroskedasticity and serial correlation. The last row reports the p-values for the equality of the PE effect in the first, second, and third years after the deal. The EBITDA are measured in millions of euros; for descriptive statistics of the outcomes, see Table 3. For brevity, we report only the coefficients that refer to the PE investment effect, which we allow to vary over time in the first three years after the deal; the p-values for the hypothesis that the effects are constant over time are reported in the last row of the table. The first 4 columns of the table reports the results obtained by pooling the targets without distinguishing between MINs and MAJs. The two remaining panels present the results by deal type.

Table 5: board roles and demographics.

| Panel A: board roles   | MINs                 |                    |                    | MAJs                 |                      |                      |
|------------------------|----------------------|--------------------|--------------------|----------------------|----------------------|----------------------|
|                        | (1)                  | (2)                | (3)                | (4)                  | (5)                  | (6)                  |
|                        | Turnover             | newceo             | newchairperson     | turnover             | newceo               | new chairperson      |
| Dummy for target       | 0.169***<br>(0.0423) | 0.103*<br>(0.0558) | 0.126*<br>(0.0692) | 0.503***<br>(0.0443) | 0.297***<br>(0.0633) | 0.463***<br>(0.0780) |
| Observations           | 1,832                | 1,832              | 1,832              | 1,819                | 1,819                | 1,819                |
| Sector fixed effects   | YES                  | YES                | YES                | YES                  | YES                  | YES                  |
| Province fixed effects | YES                  | YES                | YES                | YES                  | YES                  | YES                  |
| Time controls          | YES                  | YES                | YES                | YES                  | YES                  | YES                  |
| Robust SE              | YES                  | YES                | YES                | YES                  | YES                  | YES                  |

| Panel B: board characteristics | MINs              |                      |                  | MAJs                |                      |                     |
|--------------------------------|-------------------|----------------------|------------------|---------------------|----------------------|---------------------|
|                                | (1)               | (2)                  | (3)              | (4)                 | (5)                  | (6)                 |
|                                | Average age       | Percentage of locals | Male quota       | Average age         | Percentage of locals | Male quota          |
| Dummy for target               | -1.110<br>(0.787) | -0.030<br>(0.036)    | 0.004<br>(0.015) | -2.336**<br>(1.107) | -0.232***<br>(0.054) | 0.076***<br>(0.024) |
| Observations                   | 1,832             | 1,832                | 1,832            | 1,819               | 1,819                | 1,819               |
| Sector fixed effects           | YES               | YES                  | YES              | YES                 | YES                  | YES                 |
| Province fixed effects         | YES               | YES                  | YES              | YES                 | YES                  | YES                 |
| Time controls                  | YES               | YES                  | YES              | YES                 | YES                  | YES                 |
| Robust SE                      | YES               | YES                  | YES              | YES                 | YES                  | YES                 |

Robust standard errors are in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

**Note:** This table reports the estimates (see equation 3 in Section 4.2) from equations that use two observations per firm (89 MINs and 76 MAJs). For firms in the control group, the time series of outcomes are centered at the year of the deal for the corresponding target (which varies between 1995 and 2004). Standard errors, in parentheses, are robust to heteroskedasticity. The variable *turnover* is the percentage of new key board members, *new CEO* equals to one if there is at least one new CEO at time +1 and zero otherwise, and *new chairperson* equals to one if there is at least one new chairperson or vice chairperson at time +1. The variable *average age* is the average age of the CEOs, chairpersons, and vice chairpersons; *percentage of locals* is the percentage of CEOs, chairpersons, and vice chairpersons who were born in the same province where the firm is headquartered; and *male quota* is the percentage of male CEOs, chairpersons, and vice chairpersons.

Table 6: PE effect on target size and profitability in family vs non-family firms.

| Variables                                | Panel A: Family targets and controls |                    |                     |                      |                   |                  |                    |                      | Panel B: Non-family targets and controls |                  |                    |                      |                  |                    |                    |                      |
|--|--------------------------------------|--------------------|---------------------|----------------------|-------------------|------------------|--------------------|----------------------|--|------------------|--------------------|----------------------|------------------|--------------------|--------------------|----------------------|
|  | MINs                                 |                    |                     |                      | MAJs              |                  |                    |                      | MINs                                     |                  |                    |                      | MAJs             |                    |                    |                      |
|  | (1)                                  | (2)                | (3)                 | (4)                  | (5)               | (6)              | (7)                | (8)                  | (1)                                      | (2)              | (3)                | (4)                  | (5)              | (6)                | (7)                | (8)                  |
|  | EBITD<br>A                           | Ln<br>sales        | Ln<br>employe<br>e  | EBITD<br>A<br>/sales | EBITD<br>A        | Ln<br>sales      | Ln<br>employe<br>e | EBITD<br>A<br>/sales | EBITD<br>A                               | Ln<br>sales      | Ln<br>employe<br>e | EBITD<br>A<br>/sales | EBITD<br>A       | Ln<br>sales        | Ln<br>employe<br>e | EBITD<br>A<br>/sales |
| 1st-year effect                          | 3.827**<br>(1.485)                   | 0.235**<br>(0.045) | 0.231***<br>(0.061) | -0.018<br>(0.013)    | 0.295<br>(0.533)  | 0.105<br>(0.074) | 0.0750*<br>(0.045) | -0.019<br>(0.014)    | 14.57**<br>(6.179)                       | 0.157<br>(0.245) | 0.180<br>(0.190)   | 0.080<br>(0.050)     | 5.504<br>(3.641) | 0.165**<br>(0.077) | -0.008<br>(0.042)  | 0.027**<br>(0.013)   |
| 2nd-year effect                          | 5.737***<br>(1.675)                  | 0.297**<br>(0.057) | 0.299***<br>(0.064) | -0.014<br>(0.013)    | 0.522<br>(0.784)  | 0.130<br>(0.095) | 0.133**<br>(0.056) | -0.041**<br>(0.017)  | 4.014<br>(6.721)                         | 0.256<br>(0.243) | 0.185<br>(0.256)   | 0.104<br>(0.081)     | 3.410<br>(2.259) | 0.265**<br>(0.101) | 0.084<br>(0.104)   | 0.027<br>(0.022)     |
| 3rd-year effect                          | 6.273***<br>(1.947)                  | 0.301**<br>(0.071) | 0.340***<br>(0.069) | -0.010<br>(0.013)    | 1.914*<br>(0.996) | 0.137<br>(0.111) | 0.130*<br>(0.068)  | -0.032**<br>(0.015)  | 0.458<br>(7.348)                         | 0.297<br>(0.185) | 0.336<br>(0.265)   | 0.090<br>(0.075)     | 1.215<br>(1.947) | 0.274**<br>(0.118) | 0.044<br>(0.104)   | -0.005<br>(0.022)    |
| Average effect<br>(first 3 years pooled) | 5.212***<br>(1.612)                  | 0.276**<br>(0.054) | 0.286***<br>(0.062) | -0.014<br>(0.012)    | 0.838<br>(0.687)  | 0.123<br>(0.089) | 0.109**<br>(0.050) | -0.030**<br>(0.013)  | 6.970<br>(5.913)                         | 0.226<br>(0.213) | 0.226<br>(0.234)   | 0.091<br>(0.068)     | 3.382<br>(2.230) | 0.235**<br>(0.087) | 0.0411<br>(0.075)  | 0.017<br>(0.015)     |
| Observations                             | 2,127                                | 2,093              | 1,800               | 2,094                | 1,726             | 1,728            | 1,525              | 1,714                | 1,591                                    | 1,564            | 1,468              | 1,586                | 1,260            | 1,292              | 1,195              | 1,281                |
| Number of<br>id                          | 389                                  | 387                | 349                 | 389                  | 329               | 329              | 307                | 329                  | 270                                      | 266              | 260                | 271                  | 238              | 240                | 231                | 241                  |
| Firm fixed<br>effects                    | YES                                  | YES                | YES                 | YES                  | YES               | YES              | YES                | YES                  | YES                                      | YES              | YES                | YES                  | YES              | YES                | YES                | YES                  |
| Time<br>controls                         | YES                                  | YES                | YES                 | YES                  | YES               | YES              | YES                | YES                  | YES                                      | YES              | YES                | YES                  | YES              | YES                | YES                | YES                  |
| Clustered<br>SE                          | YES                                  | YES                | YES                 | YES                  | YES               | YES              | YES                | YES                  | YES                                      | YES              | YES                | YES                  | YES              | YES                | YES                | YES                  |
| Prob > F                                 | 0.100                                | 0.125              | 0.039               | 0.784                | 0.065             | 0.823            | 0.158              | 0.192                | 0.163                                    | 0.639            | 0.176              | 0.535                | 0.0984           | 0.505              | 0.621              | 0.284                |

Robust standard errors are in parentheses. \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1

**Note:** This table reports the estimates (see equation 1 and 2 in Section 4.1) from equations that control for firm fixed effects, by target and PE type. The available data for targets refer to outcomes as measured from two years up to three years after the deal. For firms in the control group, the time series are centered at the year of the deal for the corresponding target (which varies between 1995 and 2004). Standard errors, in parentheses, are clustered at the firm level, allowing for heteroskedasticity and serial correlation. The last row reports the p-value for the equality of the PE effect in the first, second, and third years after the deal. The EBITDA are measured in millions of euros. For descriptive statistics of the outcomes, see Table 3.



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