Who is the Best Acquirer:
Private Equity or Industry Firms?

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ABSTRACT

Previous research on PE firms impact and the benefits of Acquisitions have been mixed. However, their comparison has been largely neglected. This study evaluates whose assets are of most value to targets: PE or Industry firms reinforcing the need of further empirical research to better resources allocation. For a sample of 92 Buyouts and 120 Acquisitions UK targets in the mid/long-term, Acquired firms significantly over-perform Buyout targets for measures combining operational and capital efficiency. These findings are related to higher sales growth, slightly better gross margins and higher discipline of debt. Nonetheless, PE firms show a positive impact on fixed costs management and at a lower level on labor productivity and working capital managing.

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I. INTRODUCTION

In an increasingly competitive and dynamic market, takeover transactions play a central role in the redeployment of economic resources moving trillions of dollars every year. The size and the growth of both Private Equity Buyouts (PE Buyouts) and Industry Acquisitions (henceforth Acquisitions) market can be seen as firms response to the progressive need of knowledge and resource base expansion that shapes the way they compete and thus their success (Ahern and Weston, 2007; Clercq and Dimov, 2008). Given the managerial implications of such frequent and impactful deals, it is surprising that the comparison between their performance has received little or no attention (Amess et al., 2008). The purpose of this study is to compare the performance achieved by firms undergoing PE Buyouts with those undergoing Acquisitions. Moreover, by comparing PE backed firms to others under similar deals we better capture the marginal effect of these agents towards their targets. We also respond to previous methodological concerns raised by using a combined approach of Propensity Score Matching (PSM) with Differences-in-Differences (DID) to assess who is better at enhancing targets performance. Lastly, we contribute to current literature by exploring a less investigated market, United Kingdom (UK), using a novel hand-collected sample and comparing a wide range of performance metrics.

Both PE Buyouts and Acquisitions have been considered by managers as highly valuable deals in which they are willing to invest. Moeller et al. (2004) reports an average premium paid by acquirers in United States (US) of 68% between 1980 and 2001 while a CMBOR' survey of 300 European managers concludes that its large majority believe their companies would no longer exist if it was not the support of PE firms (CMBOR and EVCA, 2008). These results are justified by acquisitions

advocates with the potential for value creation through the combination and redeployment of merged firms' specialized resources. More specifically, researchers claim that the existence of economies of scale (Capron, 1999) and scope (Teece, 1980; Singh and Montgomery, 1987) may not only reduce firms' costs but also boost revenue synergies through innovation and increased market coverage (Srivastava et al., 1998; Capron, 1999). In addition, financial benefits such as co-insurance (Higgins and Schall, 1975) or better access to financial resources [as a result of a risk reduction (Reed and Luffman, 1986)] can also arise from industry takeovers. Notwithstanding, non-value maximizing hypothesis, related to conflicts of interests, have also been explored (Black, 1989).

Simultaneously, the benefits of PE Buyouts have long been explained by researchers based on Agency Theories in which improved performance is seen as a result of more aligned interests through the combination of strong monitoring, the right incentives structure and the discipline of high levels of debt (Fox and Marcus, 1992; Jensen, 1993). More recently, several researchers find in Strategic Entrepreneurship Theories a complementary view to fully understand Buyouts phenomenon and better explain its upside potential (Zahra, 1995; Wright et al., 2001; Mueleman et al., 2009). Nonetheless, this theoretical value creation has not deterred Trade Unions in UK from describing PE firms as "asset strippers who destroy jobs and load companies with debt" (Jelic and Wright, 2011).

This controversy is also embedded in takeovers empirical results. While the evidence for the first wave of PE Buyouts (especially for US) points out to a superior performance (Kaplan, 1989; Smith, 1990; Opler, 1992), more recent and broader studies indicate less expressive (Guo et al., 2009; Jelic and Wright, 2011) or even negative results (Desbrières and Schatt, 2002; Scellato and Ughetto, 2013). The

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same disparity can be seen in Acquisitions research in which superior (Switze, 1996; Powell and Stark, 2005), unchanged (Ghosh, 2001) and underperformance (Martynova et al., 2006) of combined firms coexist.

Despite the debates outlined above, the similar conditions and distinct set of resources that each of those acquirers can bring to the target, to the best of our knowledge, no comparison has been made between their impact on performance. This is problematic as the managerial decisions may require the comparison between the two alternatives (Ahern & Weston, 2007), leading to potential misallocation of resources and loss of competitiveness (Amit & Schoemaker, 1993; Collis & Montgomery, 2008). Therefore, it is our intention with this study to compare the performance achieved by a target after a PE Buyout or an Acquisition.

We contribute in several ways to the existent literature. First, by comparing the performance of targets undergoing Buyouts with those of Acquisitions we contribute to more informed managerial decisions. Second, by benchmarking PE Buyouts against deals of similar nature – Acquisitions - (as opposite to the comparison to non-restructured firms) we better capture the marginal effect of PE firms upon their targets. This is fundamental to understand if the improved performance claimed by PE proponents is intrinsically associated with their unique set of capabilities or if they are rather linked to takeover activities in general. Third, taking in account the need to control for sample selection bias (Jelic and Wright, 2011) when establishing a counterfactual, and simultaneously improve matching accuracy (Barber and Lyon, 1996), we employ an innovative empirical framework combining PSM with DID analysis. After the filtering of several thousands of potential peers, PE and Acquisitions targets are matched with non-treated companies based on the similarity of pre-deal characteristics relevant to the takeover decision. This responds to

methodological concerns raised (Jelic and Wright, 2011) and better quantifies a causal relationship between performance and each of the deals, contributing to more robust results. Fourth, by comparing the performance of PE and Acquisitions targets using a large set of variables, that cover not only profitability but also the changes in revenues growth, costs structure and capital efficiency, we further contribute to a deeper understanding of the existent sources of value creation of these deals. Fifth, by focusing our research on the UK market, the second largest market for both Acquisitions and Buyouts, in which firms are obliged to account reporting for tax reasons we avoid sample constraints maintaining its global representativeness. Previous studies have extensively analyzed takeovers on the US market. This brings the additional contribution of expanding the sample coverage to less investigated geographies assessing the robustness of previous conclusions. Finally, we contribute to the current literature by examining these issues using a novel and hand-collected sample that results from the combination of several sources.

The results indicate an underperformance as high as 7.6% [when measured using Return on Assets (ROA)] of PE in comparison to Acquisition targets. The evidence is only significant for measures combining operational and capital efficiency (such as ROA or Operating Cash Flows (OCF) over Assets) and it is concentrated in the last years of analysis. After the deal, Acquired firms over-perform PE targets by a yearly average higher than 3% (for both measures). Moreover, individual analyses lead us to conclude that this results from a significant over-performance and underperformance of Acquisitions and PE targets, respectively. Two potential explanations arise. First, considering that Buyouts are cash constrained deals, PE targets experience significant decreases in capital investment (Muscarella and Vetsuypens, 1990; Kaplan, 1989), namely in R&D (Long and Ravenscraft, 1993), and

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assets divestitures (Kaplan, 1991) that generate cash in the short-term but may affect future performance. Second, after a process of integration that is initially inevitably suboptimal, Acquired firms deep their restructurings efforts fully benefiting from new sources of value (Barkema and Schijven, 2008).

Following Gaspar (2012), we decompose the operational measures into its main components: revenues growth, cost structure and capital efficiency. The evidence, although fragile, indicates that the underperformance o PE targets has its roots in a lower ability to boost sales (less 14% change in last year sales growth) as well as to improve cost of sales management (less 8% change in last years gross margin) when compared to those from Acquisitions (also when compared to their peers). We hypothesized that these results reflect an opportunistic behavior of PE firms translated by cuts in structural expenditure [namely in research and development (R&D), marketing and advertising] that ultimately reduce sales growth. A second explanation is related to the existence of both revenue and cost synergies after Acquisitions. It is possible that the combination of the merged firms capabilities increases market coverage (Srivastava et al., 1998), reputation (Capron and Hulland, 1999) and innovation (Capron, 1999), ultimately boosting sales. In addition, scale economies in purchasing and managing inventories may generate higher gross margins.

We also find strong evidence that PE targets experience lower increases in leverage than Acquired firms (less 6% on a yearly basis). As suggested by Desbrières and Schatt (2002), lower leverage reduces debt discipline and consequently PE mechanisms to enhance performance.

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Lastly, despite the previous conclusions, we do find some evidence of PE firms positive impact namely in what concerns the efficiency of fixed operating costs (less 9% on an yearly basis), working capital management (less 5% three years after the deal) and labor productivity (less 5% in the last year). Nonetheless, the last results do not seem to be sufficient to generate a superior performance of PE targets. These findings are robust when controlled for size, leverage and industry and year dummies as well as across firm specific subsamples.

The remainder of this paper is organized as follows. Section II presents the data. Section III describes the methodology. Section IV presents the results, and Section V concludes.

II. DATA

The sample is constituted by UK firms undergoing PE Buyouts or Acquisitions between 1997 and 2009. Being the second largest market for both PE Buyouts (with 20% of the global market) and Acquisitions (12% of the global market) and simultaneously obliging firms to account reporting for tax reasons, the choice of UK allows us to avoid sample constrains maintaining its global representativeness.[1] The timeframe relates to the need raised in literature to better explore the second wave of Buyouts and Acquisitions. In addition, the closing date takes into account the need to collect several years of post-deal data in order to accurately assess the changes in performance.

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[1] Despite being the largest market for both types of deals, US firms are not obliged to report their financials for tax reasons. As in the period undergoing Buyouts, targets become private companies the assessment of performance requires private information. Therefore, the choice of US would create sample constraints.

The process of constructing a reliable dataset is extremely time-consuming as it implies a great deal of manual work and several layers of filters. To better manage this process, we create an algorithm of sample selection as follows. First, the identification of deals as well as all the information to them related is based on Thomson One Banker database in which we collect more than 2,000 PE Buyouts and 35,000 Acquisitions. To avoid inaccuracies, we only consider transactions that perfectly fit into Buyout or Acquisition definitions such as Leverage Buyouts (LBOs), Management Buyouts (MBOs) or Management Buy-ins (MBIs) for PE takeovers and Privatizations, Tender Offers or Exchange Offers for Acquisitions reducing the deals available to 1,916 and 1,324, respectively. In addition, to ensure the influence of both acquirers towards their respective targets only deals with changes of control are included. Lastly, to isolate the marginal effect of acquirers, we choose those who do not present a similar transaction in the timeframe in analysis which lead to a filtered set of 1,254 Buyouts and 1,287 Acquisitions.

To obtain the necessary accounting data, Amadeus database by Bureau van Dijk, is used. Due to the inexistence of a perfect link between Thomson One Banker and Amadeus we manually search the targets in the latter collecting 540 PE and 736 Acquisitions targets. We then verify the availability of accounting information for each firm one year before and in at least one of the five years after the transaction, guaranteeing the possibility of comparing the post-performance with the situation before the deal. The same process is used to collect the control group. From a set of more than 150,000 firms we maintain a potential control group of 3,500 PE peers and 2,500 Acquisition peers belonging to the same industries of our targets.

From an initial dataset of more than 2,000 Buyouts and 35,000 Acquisitions, the final sample comprises 120 and 92 targets, respectively. The sample compares to

several other studies exploring the impact of Buyouts and Acquisitions in European countries and US (Guo et al., 2009; Cressy, Munari, & Malipiero, 2007; Powell & Stark, 2005), namely to the closest study of ours (Amess et al., 2008) in which the authors explore the impact of both types of deals on employment with a sample of 233 Buyouts and 215 Acquisitions.

Figure 1 reports a further breakdown of the sample features allowing the comparison between the PE and Acquisitions samples.

Panel A shows the number of deals distribution for the period in analysis. A graphical analysis indicates a concentration of both types of deals in the beginning and last years of the period, similarly to other studies on the second wave (Martynova et al., 2006; Scellato and Ughetto, 2013). Despite this similarity between the two, Acquisitions seem to lag PE Buyouts two to three years.

Panel B reporting the sectorial distributions of targets shows that both Buyouts and Acquisitions mainly target firms from manufacturing (44% and 21%, respectively) and services sectors (23% and 26%, respectively).

Lastly, assessing the size of the targets, Panel C indicates a higher concentration of Acquisitions towards larger targets than Buyouts. Furthermore, Panel D shows a lower kurtosis of the PE targets leverage distribution in comparison to that of Acquired firms, despite the fact that both are positively skewed.


III. METHODOLOGY

In an extensive research, Barber and Lyon (1996) evaluate the process of abnormal performance detection, focusing on different approaches potential. Four choices must be taken carefully to an accurate performance assessment: the choice

Figure 1- Final sample breakdown

The following graphs breakdown the sample based on their main features. Panel A presents the distribution of sample deals number (both for Buyouts and Acquisitions) through the period in scope (1997-2009). Panel B presents the distribution of targets' size measured by log of operating revenue in thousands Euros and Panel C the distribution of targets' debt-to-equity. Panel D presents the sectorial distribution of the sample. All measures are defined as a percentage of the total number of observations for either PE Buyouts or Acquisitions.
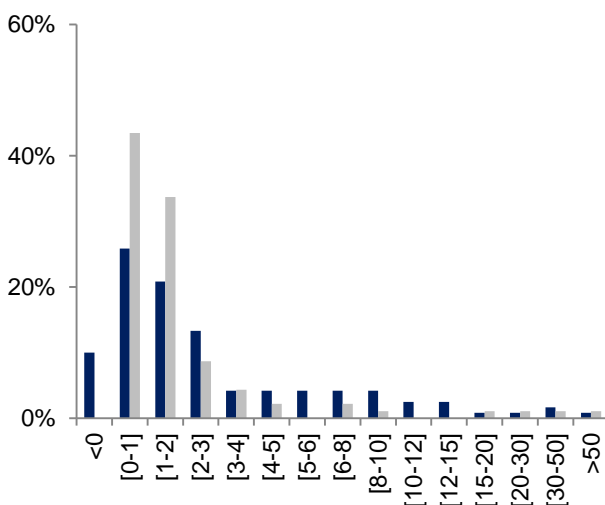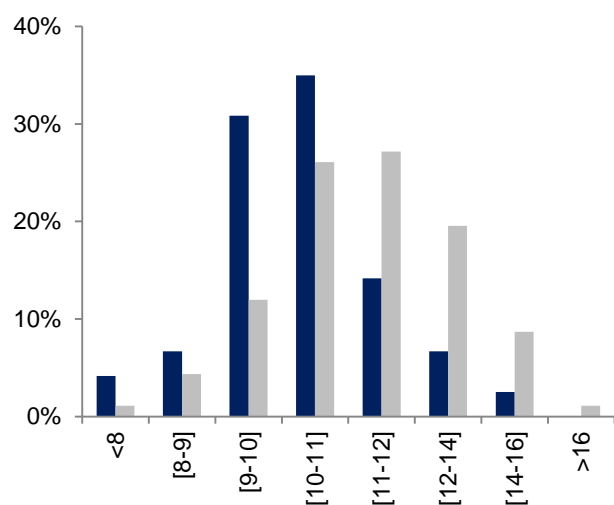
Panel A – Yearly Deals' Number Breakdown
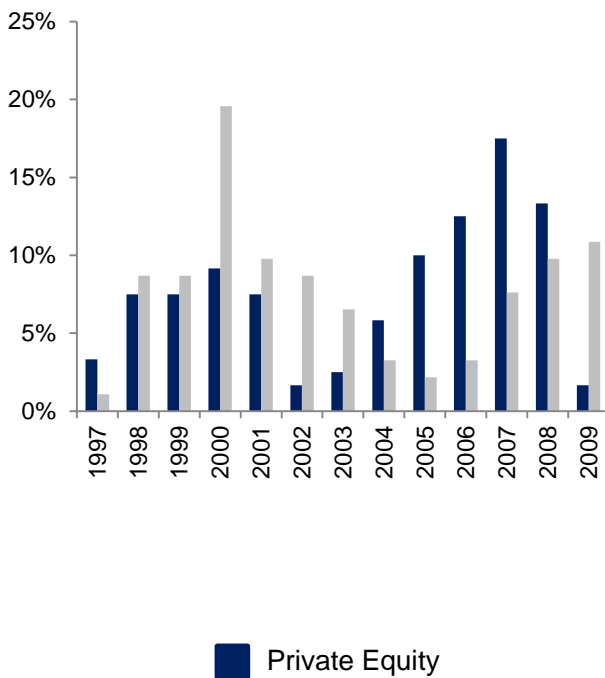
Panel B – Targets Size Breakdown

■ Private Equity   ▨ Acquisitions
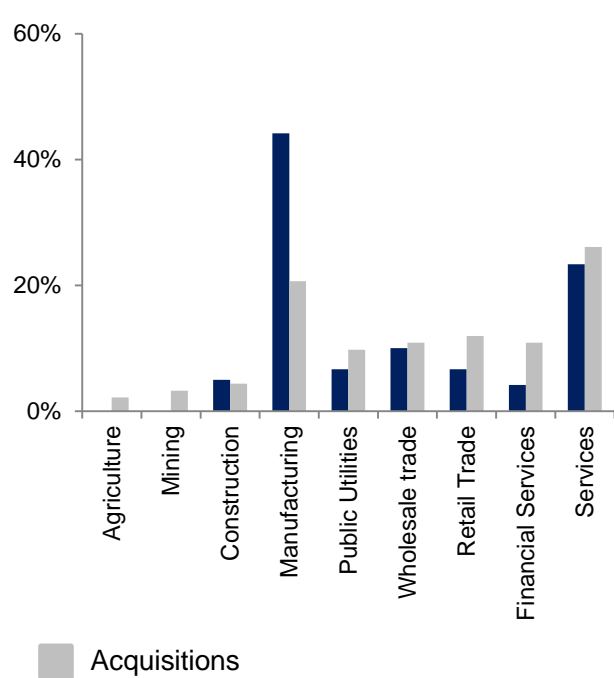
Panel C – Targets Debt-to-Equity Breakdown

Panel D – Targets Sectorial Breakdown

of the accounting measures, the benchmark of those measures, the model of expected operating performance and the statistical test executed to detect abnormal performance. In the next section, we further the methodology adopted.

III.1.Performance Measures

Considering that earnings can be easily manipulated or simply affected by changes in items that do not yield necessarily an increase in operating performance, we decide to employ cleaner performance measures such as Earnings before Interests and Taxes (EBIT). Furthermore, the fact that the type of transactions in analysis would be prone to these types of manipulations reinforces our choice to use unaffected measures that better reflect the productivity of operations (Barber and Lyon, 1996). Given that Buyouts and Acquisitions carry, generally, a lot of changes in capital expenditure we also evaluate Earnings before Interests, Taxes, Depreciations and Amortizations (EBITDA) and Operating Cash Flow (OCF) as performance measures.

Moreover, to compare the performance across firms these measures must be scaled. We divided the previous measures by two variables: assets, to account for changes in the efficiency of capital utilization (Guo et al., 2009), and by sales to measure changes in profitability. Moreover, the latter can correct the temporal misspecification between numerator (valued at cost) and denominator (measures at current value), existent when dividing by assets, and thus avoid non-linear relationships between earnings and assets (Barber and Lyon, 1996). Scaling by sales also allows to consider the increased performance due to sales growth (Barber and Lyon, 1996) and to avoid the influence of variables easily manipulated such as depreciations.

The combination of a performance measures and scaling variables lead us to consider four indicators of performance extensively used in previous research: ROA [[Powell and Stark, 2005; Scellato and Ughetto, 2013], EBITDA margin [Guo et al., 2009; Powell and Stark, 2005], EBIT margin [Kaplan, 1989; Heron and Lie, 2002] and OCF-to-Assets.

III.2.Differences-in-Differences

According to Bertrand and Zitouna (2008), "the effect of an acquisition on the outcome of a given firm is defined as the difference between the firms outcome when acquired and the outcome that this firm would have reached if it had not been acquired". Hence, to properly compare the firm and its peer performance exclusively in what concerns the effects of the treatment (in this case Acquisition or Buyout), it is important to account for the potential differences in performance existent before the transaction, constant and persistent over time (Bertrand and Zitouna, 2008). Barber and Lyon (1996) found evidence of more powerful test statistics in models comparing the change in performance (and not the level) of treated and non-treated firms. Therefore, to address the need to mitigate external shocks and increase the accuracy of the findings, we employ a methodology increasingly popular among researchers (Lehto and Böckerman, 2008; Borell and Tykvová, 2012; Scellato and Ughetto, 2013) – Differences-in-Differences (DID) estimation.

The idea is to evaluate the average effect of acquisitions on target companies. For that, the model recognizes the insufficiency of a mere temporal comparison acknowledging that a possible improvement may be due to external shocks and not exclusively to the treatment. Therefore, assuming that those external shocks impact acquired and non-acquired companies in the same way, it considers the difference in

performance between target and control after the deal with that difference before the event (Lehto and Böckerman, 2008). In the specific case of this research, we intend to compare the performance of Buyout targets with Acquired firms which, due to sample constrains, is not possible directly. Therefore, an accurate comparison implies that we assess the difference in performance between PE backed firms and Acquisitions targets both adjusted by their corresponding peers. We adapt the frequently used DID regression to accommodate for this indirect comparison. The regression is specified as follows:

$$Y_{it} = \alpha + \beta \; PE_i + \delta \; Post_{it} + \theta \; PE_i \; \times \; Post_{it} + \; \varepsilon_{it} \qquad (1)$$

where i is a firm index and t a time index (in years) with 0 being the moment of the transaction (Buyout or Acquisition). In this modified version, Y_{it} is the difference in outcome between a Buyout (or Acquisition) target and its counterfactual, PE_i is a dummy variable that takes the value 1 for PE targets and controls for differences in performance between PE and Acquisition targets (adjusted by their peers). This regression also controls for the influence of time effects on the outcome through the variable $Post_{it}$, a dummy that takes the value 1 for the period after the transactions take place and 0 otherwise. The coefficient θ, that measures the interaction of PE_i and $Post_{it}$, is our DID estimator assessing the changes in the control-adjusted performance differences between PE targets and Acquired firms after the deals. Therefore, we are interested in testing if $\theta = 0$.

In addition to Equation (1), and to better understand the evolution over the years, we construct an alternative regression:

$$Y_{it} = \alpha + \beta \; PE_i + \sum_{\tau:\tau \neq 1} \delta_{t+\tau} \; Post_{i,t+\tau} + \sum_{\tau:\tau \neq 1} \theta_{t+\tau} \; PE_i \; \times \; Post_{i,t+\tau} + \varepsilon_{it} \qquad (2)$$

where the index τ takes all the values from -2 to +5, except -1 and 0. The coefficients $\delta_{t+\tau}$ measure the change in performance between $t+\tau$ and the reference period, $t-1$. As the coefficients $\theta_{t+\tau}$ measure the performance change in each period for PE targets (adjusted by their peers performance) in relation to Acquired firms and its significance shows who is the best acquirer.

III.3. Propensity score matching

It is important to recognize that a firm cannot follow at the same time both paths of treated and non-treated, which raises the question of comparing firms performance when acquired with players sufficiently similar to enable an accurate assessment (Lehto and Böckerman, 2008; Borell and Tykvová, 2012). Moreover, Barber and Lyon (1996) find that the accuracy of the test statistics is very sensitive to the similarity between firms and their peers, concluding that a potential misspecification may be due to the tendency of accounting-based measures to mean revert over time.

Furthermore, as the purpose of this research is to understand and compare the impact of Buyouts and Acquisitions on targets performance, it is important to ensure that endogeneity and sample ex-ante features are not biasing the results (Fukao et al., 2006). More specifically, if no control for selection bias is implemented the superior performance potentially found could be the result of buyers opportunistic behavior and not of their influence towards the targets. Bearing this in mind, Rosenbaum and Rubin (1983) developed a methodology that simulates the process through which firms are selected and matches them (with their counterfactuals) based on their probability of being acquired. This score, is estimated by fitting a regression model comprising the observable features that may be relevant for the acquisition decision. In addition, by summarizing all the relevant variables to the

matching algorithm into a single index, Propensity Score Matching (PSM) enhances the accuracy of the matching process, in particular when an extensive set of variables is need to group treated and non-treated firms (Fukao et al., 2006), and consequently reduces the potential for dissimilarities.

In this research, we compare the differences in performance of PE backed firms versus their peers as well as firms undergoing Acquisitions versus their peers, which means that two potential treatments can be found: being a target of a Buyout or being a target in an Acquisition. Considering the complexity of execution of a multinomial probit model and the potential for misspecification, we follow Lechner (2002) and compute a binary probit model for each of the treatments separately.[2] The model is regressed one year before the deal with the following specification:

$$\Pr\left(\text{Treat}_{i,j,t} = 1\right) = F\left(X_{i,j,t-1}\right) \qquad (3)$$

where i is a firm index, t a time index (in years) with 0 being the moment of the transaction (Buyout or Acquisition) and j a type of deal index. Treat is a dummy variable that takes the value 1 for treated firm and 0 otherwise. The matrix X includes firms features influencing the probability of being a target namely: EBITDA Margin to account for firm operations efficiency (Palepu, 1986); profitability measured by ROIC to consider the free cash-flow (Lehn & Poulsen, 1989); Log of Sales for firm size (Palepu, 1986; Gaspar, 2012); Excess Cash as well as Debt-to-Equity ratios to consider the potential for leverage up and speed up repay (Powell, 2001; Borell and Tykvová, 2012) and firm-specific variables such as Labor Intensity and Working Capital over Sales to account for the specificity of their operations (Gaspar, 2012).

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[2] Several researchers have followed the same methodology, namely Bertrand and Zitouna (2008) or Fukao et al. (2006)

These variables embody several takeover theories, chosen by their frequency and consistency in Corporate Finance literature (Powell, 2001). To generate more stability (Barber and Lyon, 1996) and reduce the potential bias due to non-observable shocks (Borell and Tykvová, 2012), we also include industry and year dummies (Borell and Tykvová, 2012; Gaspar, 2012). We ensure that there is no multi-collinearity among the variables included.

Consistently with the view of takeovers as vehicles to replace inefficient management (Manne, 1965), the results for the probit estimation indicate that the probability of being an Acquisition target increases with a lower EBITDA Margin, the deterioration of the working capital conditions (proxy by Working Capital over Sales) and with less automated processes (proxy by Labor Intensity), in which the potential to improve performance is higher and the premium lower. In addition, Industry Acquirers are also interested in companies that present excess cash (as these resources would facilitate debt repay) and that are sufficiently large to enable synergies as suggested by Seth (1990b).[3]

Regarding PE Buyouts, the results indicate that the probability of being target and the size of the latter vary inversely which is consistent with their core business.[3] Smaller companies are easier (the number of potential acquirers is higher) to sell than large ones and typically PE firms allocate the funds available across several firms (the smaller the firm the higher the number that can be financed). Furthermore, bearing in mind the central role of debt on Buyouts (Jensen, 1989) we find that the excess of liquid resources (with potential for a quicker repay) strongly influences the probability of being a PE target (Borell and Tykvová, 2012). Lastly, there seems to be

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[3] Due to space constraints the results are excluded from this paper. To further details please contact the authors.

some evidence that they select high performing companies (Cressy et al., 2007), as the probability of undergoing a Buyout increases with the ROIC of the target.

As the matching procedure only ensures a balanced distribution of the propensity score and not of the individual covariates, we test the balancing property across all variables in order to assess the matching quality. Once matched, treated and control firms present no statistically different values on each of the covariates.[4]

Considering that the majority of the treated and control firms present a very similar probability, we use the nearest neighbor with replacement matching algorithm to select the control firms (thus diminishing the number of firms off-support and the potential bias).[5] Notwithstanding, bearing in mind that the reduction in number of distinct non-participants would increase the variance of the estimation we use an oversample method (1-to-3 nearest neighbor) increasing the information to construct the counterfactual for each participant and therefore reducing the variance (Smith and Todd, 2005). In addition, to ensure that any set of features present in the treated group can also be found in the control group (enhancing the matching accuracy) (Bryson et al., 2002) we execute a minima and maxima comparison methodology to ensure the common support condition (Caliendo and Kopeinig, 2005).[6]

IV. RESULTS

In this section we present the OLS regressions that relate Acquisitions and Buyouts and the differences in performance brought by these two types of

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[4] Due to space constraints the results are excluded from this paper. To further details please contact the authors.
[5] The use of a radius matching method would imply the inclusion of an excessive number of peers for some firms in an attempt to not exclude treated firms with more distant propensity score. We also perform 1-tp-2 nearest neighbor which do not change the results.
[6] This technique excludes all the observations with a propensity score lower than the minimum and higher than the maximum of the counterfactual group.

transactions. We first analyze the impact in main performance measures and, in a second stage, decompose those results into sources of value creation.

IV.1.Operational Performance

Table 1 reports the DID results [both for Equation (1) and (2)] across four performance measures: EBITDA Margin, EBIT Margin, ROA and OCF-to-assets. To account for arbitrary heteroskedasticity and assuming that companies follow similar behavior within industries, we clustered the standard errors by two digit SIC code.[7]

Combining both operations and capital efficiency measures (ROA and OCF-to-assets) the results of Equation (1) indicate a significant deterioration in PE targets performance after the Buyout (significant at 5%). There seems to be evidence of a sharp decline in profitability with a yearly 3.4% and 3.1% average reduction in PE targets ROA and OCF-to-assets, respectively, compared to the effect of Acquisitions. Nonetheless, from a yearly analysis [Equation (2)], it can be notice that this outcome is not immediate but is rather concentrated in the last years of analysis (from year t+3 onwards). This effect is stronger 4 and 3 years after the deal (for the same variables, respectively), with the DID estimations suggesting declines as high as 7.8% and 5% (significant at 1% and 5%). Our results are aligned with those of Scellato and Ughetto (2013) regarding the performance of PE targets after the deals (using a similar methodological approach) and with those of Powell and Stark (2005) regarding the effect of Acquisitions. Contrarily, both EBITDA and EBIT suggest a comparable to slight underperformance (the DID estimation is not significant) of PE targets in comparison to Acquired firms.

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[7] We also test it using robust standard errors which did not impact the final results.

Table 1- DID regression of PE target vs to Acquired firms performance

This table presents the impact of PE deals in comparison to Acquisitions on firms performance measured by EBITDA Margin, EBIT Margin, ROA and OCF-to-Assets. EBITDA margin is defined as EBITDA over Operating Revenues. EBIT Margin is EBIT over Operating Revenues. ROA is defined as EBITDA over Assets and OCF-to-Assets is computed as Operating Cash Flow over Assets. Model (I) estimates the Equation (1) while model (II) estimates Equation (2). The regressors are defined as the following. PE is a dummy variable that takes the value 1 for PE targets and 0 for Acquired firms. Post is a dummy variable that takes the value 1 if the observation relates to the period after the deal and 0 otherwise. The post dummies (variables Post t-2, Post t+1 up to Post t+5) take the value 1 for observations 2 years before the deal up to 5 years after the deal and 0 otherwise. The year before the deal is used as reference point and the transaction year is excluded from the analysis. The variables Post t-2 x PE up to Post t+5 x PE represent interaction variables between the Post dummies and the PE variable, respectively. Min-Max Nr deals presents the minimum/maximum number of PE or Acquisition deals by year. T-statistics are presented in parenthesis under the respective coefficient and are calculated using standard errors clustered by industry. The symbols *,**,** denote a significance level of 10%, 5% and 1%, respectively.

Dependent Variable	EBITDA Margin		EBIT Margin		ROA		OCF-to-assets	
	(I)	(II)	(I)	(II)	(I)	(II)	(I)	(II)
PE	-0.022	-0.027	-0.006	-0.007	0.075***	0.084***	0.064***	0.068***
	(-0.74)	(-0.84)	(-0.19)	(-0.23)	(4.53)	(5.23)	(4.75)	(4.44)
Post t x LBO	-0.006		-0.004		-0.034**		-0.031**	
	(-0.22)		(-0.14)		(-2.17)		(-2.03)	
Post t-2 x LBO		0.010		0.001		-0.018		-0.010
		(0.54)		(0.09)		(-0.93)		(-0.59)
Post t+1 x LBO		0.043		0.028		-0.019		-0.011
		(1.36)		(0.82)		(-0.73)		(-0.52)
Post t+2 x LBO		0.003		0.013		-0.028		-0.034
		(0.10)		(0.34)		(-1.24)		(-1.51)
Post t+3 x LBO		-0.009		-0.031		-0.052**		-0.050*
		(-0.23)		(-0.66)		(-2.03)		(-1.99)
Post t+4 x LBO		-0.022		-0.016		-0.076***		-0.048**
		(-0.67)		(-0.56)		(-3.38)		(-2.43)
Post t+5 x LBO		-0.049		-0.025		-0.053**		-0.041
		(-1.17)		(-0.80)		(-2.55)		(-1.65)
Constant	0.050**	0.054**	0.026	0.034	-0.030**	-0.030**	-0.011	-0.010
	(2.14)	(2.05)	(1.16)	(1.47)	(-2.32)	(-2.52)	(-1.04)	(-0.74)
Post dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Min-Max Nr Deals	35-115	35-115	37-115	37-115	43-113	43-113	39-115	39-115
R-squared	0.0050	0.0100	0.0008	0.0052	0.0363	0.0415	0.0306	0.0360

We interpret the underperformance of PE backed firms in the last years of analysis, as being the result of strong cuts in capital expenditure (Kaplan, 1989; Long and Ravenscraft, 1993) and assets divestitures (Kaplan, 1991) immediately after the deal, switching long-term performance for short-term gains. Simultaneously, following a suboptimal period of integration, Acquired targets engage in organizational restructuring activities unlocking new sources of value (Barkema and Schijven, 2008).

These arguments are consistent with the results of an individual analysis in which we separately test the effect of each deal on targets performance adjusted by their counterfactual. We find that PE targets significantly underperform their peers (up to 5.5% and 4.7% for OCF-to-Assets and ROA, respectively), while Acquired firms show a superior ROA of almost 3%, four and five years after the deal.[8]

From Table 1, it is also noteworthy the significance (at 1% level) of the coefficient for the variable PE that indicates the superior performance (in terms of ROA and OCF-to-Assets) of PE backed firms in comparison to Acquisition targets. This result seems to indicate that PE firms have strong selection capabilities shown by the acquisition of high performing targets (Cressy et al., 2007). Moreover, it further reinforces the existence of a self-selection pattern (Jelic and Wright, 2011).

Bearing in mind that Acquired firms are generally larger and have some Debt-to-Equity differences in comparison to Buyout targets, we regress Equations (1) and (2) controlling for size and leverage. We also include industry and year dummies adjusting for industry specific and economic shocks. We find that, when measuring results using ROA or OCF-to-Assets, these sample specificities do not explain the

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[8] Due to space constraints the results are excluded from this paper. To further details please contact the authors.

differences in performance. Moreover, the evidence using control variables is quite similar to our previous results reinforcing its robustness.[9]

Despite the previous conclusion that, globally, size and leverage do not explain the superior performance of Acquired firms, we subdivided both types of firms according to their position towards the median size and leverage of PE and Acquisition targets distribution. We find that the differences in ROA are greater when comparing larger firms as well as when comparing higher leveraged firms (significant at 5% or 10%).[9] This is consistent with the fact that smaller companies offer less synergetic effects as well as the fact that PE may find less obstacles to change in smaller firms. Regarding leverage, as the Acquired firms Debt-to-Equity median is higher than that from PE targets, the discipline of debt is more intense in the former deals which, indeed, leads firms to perform better.

IV.2.Sources of value

Considering that evidence suggests the underperformance of PE targets in comparison to firms undergoing similar deals, we further decompose previous measures into its main components.

Following Gaspar (2012), measures of revenues growth, cost structure and capital efficiency are assessed. Tables 2 and 3 show the results of fitting the Equation (1) and (2) using Sales Growth, Gross Margin, Fixed Operational Costs-to-Sales (henceforth Fixed Costs-to-Sales), Labor Cost-to-Sales, Capital Turnover, Working Capital-to-Sales, Operating Assets-to-Sales and Leverage as dependent variables.

Table 2 reports the revenue growth and cost structure results from which we increase our understanding on the causes of PE targets underperformance. The

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[9] Due to space constraints the results are excluded from this paper. To further details please contact the authors.

significance and the negative sign of sales growth DID coefficient [Equation (2)] for the last year of analysis, although fragile, suggests a lower ability of PE firms to boost revenues when compared with Acquirers. In fact, when compared with the difference before the deal, PE targets experience a decline in growth sales as high as 14.3% (coefficient significant at 5%). Moreover, a similar pattern can be found in the yearly analysis of gross margins (negative and significant at 10% level DID coefficient in t+5), indicating a deterioration on the management of inputs.

Two potential, non-exclusive, explanations can arise regarding these results. First, PE targets may be suffering from an opportunistic behavior, where long-term performance is stolen by a reduction in structural investments such as capital expenditure (Muscarella and Vetsuypens, 1990; Kaplan, 1989), R&D (Long and Ravenscraft, 1993), marketing and advertisement expenses. The strategy would lead to a reduction in brand awareness as well as innovation, ultimately decreasing sales growth. This hypothesis seems to be consistent with our high level results (negative and significant coefficients concentrated in the last years of analysis). Second, these results may not be due to an underperformance of PE backed firms but rather an over-performance of Acquired firms. It is possible that the rise in latter sales growth corresponds to the materialization of revenue synergies previously suggested in Acquisitions literature (Capron, 1999). More specifically, the combination of acquiring and acquired capabilities may generate positive effects on market coverage (Srivastava et al., 1998), innovation (Capron, 1999) and reputation (Capron and Hulland, 1999). Furthermore, we also support the superior evolution of Acquisitions targets gross margins based on the potential for costs synergies namely by the existence of scale economies in purchasing and inventory management (Seth, 1990a).

Table 2- DID regression of PE target vs Acquired firms' growth and cost structure

This table presents the impact of PE deals in comparison to Acquisitions on Cost Structure and Sales Growth. Sales Growth is defined as Operating Revenues in year t over Operating Revenues in year t-1 minus 1.Gross margin is Gross Profit divided by Operating Revenues. Fixed Costs over Sales corresponds to Fixed Operating Expenses over Operating Revenues. Labor Costs over Sales is Labor Costs over Operating Turnover. Model (I) estimates the equation (1) while model (II) estimates equation (2). The regressors are defined as the following. PE is a dummy variable that takes the value 1 for PE targets and 0 for Acquisition targets. Post is a dummy variable that takes the value 1 if the observation relates to the period after the deal and 0 otherwise. The post dummies (variables Post t-2, Post t+1 up to Post t+5) take the value 1 for observations 2 years before the deal up to 5 years after the deal and 0 otherwise. The year before the deal is used as reference point and the transaction year is excluded from the analysis. The variables Post t-2 x PE up to Post t+5 x PE represent interaction variables between the Post dummies and the PE variable, respectively. Min-Max Nr deals presents the minimum/maximum number of PE or Acquisition deals by year. T-statistics are presented in parenthesis under the respective coefficient and are calculated using standard errors clustered by industry. The symbols *,**,** denote a significance level of 10%, 5% and 1%, respectively.

Dependent Variable	Sales Growth		Gross Margin		Fixed Costs-to-Sales		Labor Costs-to-Sales	
	(I)	(II)	(I)	(II)	(I)	(II)	(I)	(II)
PE	0.066	0.058	-0.019	-0.024	-0.030	-0.024	-0.004	-0.012
	(1.36)	(1.03)	(-0.70)	(-0.84)	(-0.66)	(-0.52)	(-0.14)	(-0.40)
Post t x LBO	-0.071		-0.011		-0.092**		-0.023	
	(-1.51)		(-0.51)		(-2.34)		(-1.53)	
Post t-2 x LBO		0.019		0.011		-0.013		0.016
		(0.33)		(0.66)		(-0.43)		(1.27)
Post t+1 x LBO		-0.019		0.030		-0.086**		0.008
		(-0.27)		(1.54)		(-2.23)		(0.39)
Post t+2 x LBO		-0.093		-0.002		-0.073*		-0.028
		(-1.47)		(-0.07)		(-2.01)		(-1.24)
Post t+3 x LBO		-0.043		0.009		-0.090*		0.001
		(-0.52)		(0.24)		(-1.71)		(0.04)
Post t+4 x LBO		-0.054		-0.026		-0.110***		-0.032
		(-0.82)		(-0.79)		(-2.75)		(-1.22)
Post t+5 x LBO		-0.143**		-0.081*		-0.165**		-0.046*
		(-2.38)		(-1.78)		(-2.58)		(-1.71)
Constant	-0.023	-0.041	0.043*	0.047*	0.138***	0.131***	0.015	0.023
	(-0.77)	(-0.97)	(1.85)	(1.83)	(3.71)	(3.53)	(0.47)	(0.73)
Post dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Min-Max Nr Deals	35-102	35-102	25-97	25-97	38-114	38-114	39-116	39-116
R-squared	0.0105	0.0190	0.0040	0.0093	0.0250	0.0286	0.0044	0.0117

Table 3- DID regression of PE target vs Acquired firms' capital efficiency

This table presents the impact of PE deals in comparison to Acquisitions on Capital Efficiency. Capital Turnover is defined as Operating Revenues over Capital Invested. Working Capital-to-Sales is defined as Working Capital over Operating Revenues. Operating Assets over Sales is defined as Fixed Assets excluding Other Fixed Assets over Operating Revenues. Leverage is Long-Term Loans plus Short-Term Loans divided by Total Assets. Model (I) estimates the Equation (1) while model (II) estimates Equation (2). The regressors are defined as the following. PE is a dummy variable that takes the value 1 for PE targets and 0 for Acquisition targets. Post is a dummy variable that takes the value 1 if the observation relates to the period after the deal and 0 otherwise. The post dummies (variables Post t-2, Post t+1 up to Post t+5) take the value 1 for observations 2 years before the deal up to 5 years after the deal and 0 otherwise. The year before the deal is used as reference point and the transaction year is excluded from the analysis. The variables Post t-2 x PE up to Post t+5 x PE represent interaction variables between the Post dummies and the PE variable, respectively. Min-Max Nr deals presents the minimum/maximum number of PE or Acquisition deals by year. T-statistics are presented in parenthesis under the respective coefficient and are calculated using standard errors clustered by industry. The symbols *,**,** denote a significance level of 10%, 5% and 1%, respectively.

Dependent Variable	Capital Turnover		Working Capital-to-Sales		Operating Assets-to-Sales		Leverage	
	(I)	(II)	(I)	(II)	(I)	(II)	(I)	(II)
PE	0.752	0.783	0.028	0.021	-0.341**	-0.354**	-0.006	-0.013
	(1.14)	(1.04)	(1.21)	(0.81)	(-2.28)	(-2.36)	(-0.19)	(-0.45)
Post t x LBO	0.303		-0.026		0.020		-0.065**	
	(0.36)		(-1.26)		(0.26)		(-2.49)	
Post t-2 x LBO		-0.085		0.015		0.028		0.015
		(-0.11)		(0.66)		(0.48)		(0.56)
Post t+1 x LBO		-0.533		0.003		0.113		-0.070*
		(-0.48)		(0.12)		(1.51)		(-1.80)
Post t+2 x LBO		-0.482		0.021		0.022		-0.081**
		(-0.52)		(0.65)		(0.20)		(-2.30)
Post t+3 x LBO		0.535		-0.062**		-0.090		-0.028
		(0.58)		(-2.16)		(-0.66)		(-0.78)
Post t+4 x LBO		1.141		-0.046		0.042		-0.024
		(1.02)		(-1.46)		(0.29)		(-0.61)
Post t+5 x LBO		0.998		-0.029		0.070		-0.120**
		(0.84)		(-0.92)		(0.46)		(-2.14)
Constant	-0.408	-0.291	-0.034*	-0.029	0.262*	0.270**	-0.037	-0.034
	(-0.78)	(-0.62)	(-1.78)	(-1.45)	(1.96)	(2.06)	(-1.42)	(-1.25)
Post dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Min-Max Nr Deals	39-109	39-109	37-113	37-113	31-115	31-115	27-98	27-98
R-squared	0.0074	0.0159	0.0021	0.0125	0.0436	0.0462	0.0238	0.0353

This is further reinforced by the results of an individual analysis, in which we detect that PE targets slightly underperform their peers in terms of both sales growth (significant in year t+2 at 5%) and gross margins. Simultaneously, Acquired firms slightly over-perform their counterfactual in terms of revenues generation (significant in the last year at 10%) and, in the last years of analysis, in terms of gross margins.[10]

In spite of the evidence of PE Buyouts global underperformance, few indicators suggest areas of positive impact. Table 2 shows a significant drop in fixed costs over sales ratio for all post deal years [Equation (2)], indicating an improvement in fixed expenses management (coefficients significant at 10% or less). In fact, PE targets experience an average yearly decrease in this ratio of 9.2% following the deal [Equation (1)]. From an individual analysis, this seems to be driven by a superior expenses management of PE targets (significant in year t+4 at 1%) while the Acquired firms show an efficiency drop over the years.[10]

Looking closely to the components of fixed costs, when compared to Acquisition targets, we find that PE targets experience a significant (10% level) rise in labor productivity in the last year of analysis [Equation (2)]. Our individual results explain this rise based on a significant over performance of PE backed firms adjusted by their counterfactual in the first years [as also suggested by Gaspar (2012)] and, simultaneously, an unsystematic improvement in productivity of Acquired firms.[10]

Table 3 reports the results for capital efficiency and leverage. No significant differences are found regarding either capital turnover or operating assets ratio for the period after the deal. Nonetheless, we do find some evidence of an improvement in PE targets efficiency in managing working capital despite its lack of persistence (only the coefficient in t+3 is negative and significant at 5%). While the working

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[10] Due to space constraints the results are excluded from this paper. To further details please contact the authors.

capital evolution is comparable, although weaker, to the evidence of Gaspar (2012), the same cannot be said regarding the remaining ratios of capital efficiency (the same author suggests a significant increase on capital management).

Lastly, the negative and significant leverage DID coefficient (at 5% level) indicates a lower indebtness of PE targets when compared to Acquired firms (although they both experience higher increases in debt than their peers). As suggested by Desbrières and Schatt (2002), the lower levels of debt and consequently the decrease in its disciplinary function may help to explain the underperformance of PE targets.

So far the evidence is consistent with the existence of cost and revenue synergies in the case of Acquired firms that generate higher sales growth and gross margins, outweighing the benefits of PE Buyouts. Furthermore, these benefits are diminished by the lower levels of debt and thus the less discipline imposed. Notwithstanding, we do find some strong evidence of improved management of fixed costs and weaker evidence of higher labor productivity and better working capital management.

V. CONCLUSION

Previous research on the benefits of PE Buyouts and Acquisitions has been largely controversial with positive and negative results coexisting in the current literature. Despite the potential of substitutability between them in managerial decisions (Ahern and Weston, 2007), their comparison is practically inexistence and they have always been analysed separately in corporate restructuring literature (Amess et al., 2008). This is problematic as different forms of acquisitions may expand firms' resources into completely distinct directions (Ahern and Weston, 2007) affecting its competitiveness (Amit and Schoemaker, 1993; Collis and Montgomery,

2008). Therefore, a unified framework, connecting different forms of acquisitions, is fundamental to improve our understanding of those deals, potentiating better allocations of resources and contributing to firms' success. Moreover, as the assessment of PE buyouts generally uses as contractual a non-restructured firm, the frequently reported over-performance of PE backed targets may be a general effect of takeovers and not a result of PE firms influence. We recognize that to further capture the marginal effect of PE firms, we need to compare the changes occurring after the deal with those happening in deals under similar conditions. Thus, this study intends to evaluate whose assets are of most value to targets: PE or Industry firms.

For a sample of over 90 and 120 UK Acquired firms and PE targets, respectively, the results indicate that following the deal the latter significantly underperforms the former. Individually, we perceive that the results are driven by a significant underperformance and over-performance of PE and Acquisitions targets, respectively. This seems to be justified by lower capability to boost sales and efficiently manage inputs. In fact, when comparing both deals with their peers we find that while Acquisitions targets show slight positive difference for both drivers in the last years of analysis, PE backed firms underperform their counterfactual. We also find evidence that PE targets experience lower changes in leverage levels than Acquired firms which may decrease the disciplinary role of debt and further explain their underperformance. Notwithstanding, we do find strong evidence that PE-backed firms experience an improvement in fixed costs management and weaker evidence of a superior productivity of the labor factor and of working capital management both when compared to Acquisitions targets and their counterfactuals.

These results are robust when accounting for important firm specific features namely size, leverage and industry and year dummies. Furthermore, neither size nor

leverage seem to explain the differences in performance between PE and Acquisition targets, which implies that the superior performance is not driven by the type of firms acquired. Nonetheless, the subsample analysis shows that the distance between PE and Acquisitions is higher when considering larger or higher leveraged targets.

Overall these results raise important managerial implications. First it is fundamental that managers act with caution when choosing the strategy to follow in the need of ownership restructuring, thus avoiding misallocation of resources and loss of competitiveness. Second, PE firms should revise their business model directing their strategies to long lasting value creation activities as their reputation, and thus their ability to exit investments, may be at risk if these results are further confirmed.

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