UNIVERSIDADE CATÓLICA PORTUGUESA

Private equity and value creation

An Iberian Outlook of portfolio companies

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by

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"If I have seen further, it is by standing on the shoulders of giants" - Isaac Newton

Abstract

$11.7 trillion. The private equity industry had around $11.7 trillion in assets under management in 2022. These entities are a huge piece of today's economy and society having a meaningful and impactful decision-making power. This paper reports the findings from the analysis on the existence of value creation and the company-level mechanisms behind it in companies that received private equity ownership. The paper uses a comprehensive dataset with 568 Portuguese and Spanish transactions and explores a wide range of financial and operational indicators and an extended time window from 2001-2018 to understand if there is indeed value creation and what are the mechanisms behind it. The key findings, which we believe are our main contribution, support the view of private equity ownership as a growth-enabling period allowing companies to pursue locked opportunities and projects. We find this growth-oriented perspective as the main mechanism behind value creation. An idea that is consistent with the resource-based view (RBV) theory as the theoretical framework to explain private equity value creation that overlaps the cost reduction approach of agency theory. All in all, our research confirmed the idea that private equity ownership has a positive impact on their portfolio firms. However, regarding the mechanisms behind value creation, we do not find enough evidence to accept the standardized operational and financial engineering through which these entities create value. The evidence also highlights that these entities are skilled investors in selecting targets with a good business model and/or a competitive advantage.

Keywords: private equity, portfolio companies, Iberian Market, value creation

Resumo

$11.7 triliões. As empresas de *private equity* detinham cerca de $11.7 triliões em ativos sob custódia. Estas representam um papel fulcral na economia e sociedade atuais, com uma capacidade de tomada de decisões significativas. O presente artigo apresenta os resultados da análise à existência de criação de valor e quais os mecanismos adjacentes à mesma em empresas que foram adquiridas por *private equity*. O artigo utiliza uma base abrangente de 568 transações em empresas Portuguesas e Espanholas, explorando um conjunto vasto de indicadores financeiros e operacionais num período estendido entre 2001 e 2018 que visa entender a criação de valor e mecanismos adjacentes. Os principais resultados do estudo, que acreditamos serem a maior contribuição do mesmo, suportam a visão de que o período após a entrada de uma *private equity* revela-se como uma oportunidade de crescimento e permite a prossecução de projetos e valor que até então estava anulado. Encontramos evidência de que este é o principal contributo para a criação de valor. Uma ideia que é consistente com a teoria da visão baseada em recursos (RBV) como a principal componente teórica para explicar a criação de valor por parte destas entidades, visão essa que se sobrepõe à abordagem de redução de custos e ineficiências propostas pela teoria da agência. No geral, o nosso estudo confirma a ideia de que as empresas de *private equity* têm um impacto positivo nas suas empresas. No entanto, não encontramos evidências suficientes para explicar completamente os mecanismos propostos pela literatura de engenharia financeira e operacional. Destacamos também a evidência de que as *private equity* são investidores habilidosos na seleção de alvos com bons modelos de negócio e ou vantagem competitiva.

Palavras-chave: private equity, empresas de portfólio, mercado ibérico, criação de valor

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List of abbreviations

CAPEX: Capital Expenditures

CG: Corporate Governance

CEO: Chief Executive Officer

D/E: Debt-to-equity

EBIT: Earnings before interest and tax

EBITDA: Earnings before interest, taxes, depreciations, and amortizations

GP: General Partners

KPIs: Key performance indicators

LPs: Limited Partners

NDE: Net-debt-to-EBITDA

ND: Net debt

OLS: Ordinary Least Squares

PE: Private equity

ROA: Return on assets

ROE: Return on equity

ROIC: Return on invested capital

RBV: Resource based view

SG&A: Selling, General and Administrative

VC: Venture Capital

NOPAT: Net operating profit after tax

1. Introduction

1.1. Is private equity worth your attention?

$11.7 trillion.

The private equity industry had around $11.7 trillion in assets under management in 2022 (McKinsey and Company, 2023), growing at a pace of 20% in new funds since 2017 and from only $1 trillion in 2007.

Private equity portfolio companies are spread throughout most industries and countries. These entities are a huge piece of today's economy and society that have meaningful and impactful decision-making power.

The private equity concept arose with a specific, recognizable group of investors and companies as a so-called "superior form of organization" (Jensen, 1989). These entities have been playing a significant role as an alternative form of financing since their emergence, and their importance and size has only grown (S. Kaplan, 1989).

Understanding the impact and the existence of value creation in these managed companies is of major importance for several agents such as investors, managers, policymakers, regulators, creditors or even employees. Moreover, the common investors in private equity funds are institutional investors whose returns will fund long-term liabilities such as insurance claims or employee pensions.

The impact on performance and existence or not of value creation is a multifaceted and difficult area of research even within close fields such as finance, strategy, and human resources. To some extent, the complexity, opaqueness, and lack of sufficiently detailed data in the industry make this academic discussion even more difficult (Achleitner et al., 2010).

These are some of the reasons behind the deficit of sufficient research on this topic but there is also an overall mix of results regarding the impact and the existence or not of value creation.

A considerable part of the research within the area standardizes that there is value creation (e.g., S. Kaplan, 1989; Smith, 1990; Wright, 2001). However, since the second wave of private equity transactions in 2005-2007, the results provided a more mixed picture where some studies reported only a few small improvements in the operating performance (Guo et al., 2011) or also evidence of growth but a decrease in profitability (Scellato & Ughetto, 2013a).

Among others, private equity firms have been accused of asset flipping (e.g., Wilson et al., 2012), bringing huge job losses and few gains in operating performance (e.g., Davis et al., 2014) or even to be using excessing leverage and contributing to systematic risk (e.g., Wilson et al., 2012).

Despite the importance of private equity and the growing number of deal activity, to the best of our knowledge, most of the research is focused on a few developed countries that were the initial adopters of this type of investment.

For instance, most of it in the US (Guo et al., 2011; S. N. Kaplan & Schoar, 2005), some in Europe (Achleitner et al., 2010; Scellato & Ughetto, 2013) and the majority of European research in specific countries such as the UK (Cressy et al., 2007; Meuleman et al., 2009; Wilson et al., 2012).

Nevertheless, the important and transformative role that PE firms play in their portfolio companies during the holding period is widely recognized (Cumming et al., 2007) and given their importance in our society, we accentuate the need for further research and conclusions about this topic.

1.2. Our contribution

In this context, the present research seeks to shed new light on the topic by studying the value creation in portfolio companies (for both equity and

debtholders). Following the spirit of Bergström et al. (2007), we define value creation from an aggregated societal perspective and that it is achieved through operational and financial improvements in portfolio companies.

To pursue this objective, we formulate our research questions: *(1) Does PE ownership improve the financial and operational performance of their portfolio companies? and (2) What are the mechanisms behind these improvements?*

Using a sample of 568 Portuguese and Spanish companies that received private equity ownership from 2001-2018. Our sample is dominated by domestic transactions (60%) and represents a median lower-to-mid market company with a median of €59 million in deal enterprise value.

We employed a set of OLS regressions to measure the impact of this ownership in portfolio companies, using a robust set of operational and financial indicators (return-on-equity, return-on-assets, and return-on-invested-capital). To robust the conclusions, we analyzed the median changes and the significance of several variables and ratios to understand company-level changes (e.g., sales growth, operational indicators and margins, investment levels, leverage). And then a second set of regressions was applied to study the mechanisms and major explanatory variables of the changes in financial and operational performance.

We believe that we do contribute to the literature, by i) giving conclusions to the ongoing debate about the impact of PE ownership, ii) a fresh update focused on the Iberian market where the research is scarce, and iii) proposing a standardized framework of analysis considering an input-output perspective that is followed throughout the literature review, methodology and results.

The remainder of this study is structured as follows. In section 2, we provide a revision of the current status of the literature. Section 3 provides the rationale behind the methodology process and chosen variables. Section 4 describes the data collection process and construction of datasets. Section 5 opens up the discussion and main findings. Section 6 presents the conclusion.

2. Private equity and value creation

2.1. Building on previous research: a look on private equity

Obtaining the necessary financing is alongside investment and operation one of the key decisions for value creation, the ultimate goal of a company. Financing is then crucial for a company to operate its business and pursue new projects with perceived positive net present value (Berger & Udell, 1998).

Companies may choose to obtain financing from a variety of sources and diverse types. The choice of financing and the type of financing available is influenced by the company's financial growth cycle, which affects the chosen capital structure and the access to different financing options, such as public or private markets (Berger & Udell, 1998). These options also vary according to the availability and attractiveness of those different financing options, where some might, or not, offer a more efficient and effective way to organize and run businesses (Jensen, 1989; S. N. Kaplan, 1991)

One of these supposedly more efficient and effective ways is through private equity (PE), which emerges in this framework when a surge of highly leveraged and hostile takeovers in the 1980s, took private many public companies in the US (Battistin et al., 2017).

In its comprehensive demystification of the PE world, Gilligan et al. (2014) decomposes the two terms of PE, with "Private" referring to risk capital provided outside the public markets, and "equity" as the array of instruments that equitably share the revenues and losses of a company. PE firms are firms that invest in this type of capital in different companies (portfolio companies).

As stated by Berger & Udell (1998) the type of financing is influenced by the company's financial growth cycle paradigm and there are different optimal capital structures within the different points of this cycle. Investments made by PE firms will also range through companies that are early-stage ventures,

businesses requiring capital to grow or also well-established businesses (Bradford & Smith, 1997; Gilligan et al., 2014).

The usage of the term PE may vary by region, with PE being used synonymously with venture capital (VC) and early-stage investments in the United States (Croce & Martí, 2016) but tending to refer to buyouts or later-stage investments in Europe. However, there is also a part of the literature that includes both VC and buyouts under the term private equity (Bradford & Smith, 1997; Gilligan et al., 2014; S. N. Kaplan & Schoar, 2005; Metrick & Yasuda, 2009).

PE investments involve both the acquisition of majority or minority equity stakes (Battistin et al., 2017) and typically leave part of these stakes in the hands of their management teams (Holthausen & Larcker, 1996), a value that is estimated to be about 15% of the equity, where CEO possesses around 8% of overall shares (Gompers et al., 2016), more on this common mechanism later on.

PE investments are organized in a way that deserves conceptualization due to the higher complexity and lower transparency that they have compared with other asset classes.

PE firms are organized in similar ways, namely as limited partnerships. In these funds, the investors, or limited partners (LPs), provide capital to a fund that is managed by a PE firm, which acts as a general partner (GPs). LPs are normally institutional investors (pension funds, investment funds, investment banks, insurance companies) who commit capital to be managed and raised by GPs. Each fund or limited partnership has a limited life, usually 10 to 12 years, in which the GPs have up to five years to invest the capital and an additional five to seven years to return the capital to the LPs (Gilligan et al., 2014; S. N. Kaplan & Strömberg, 2009).

The GPs make the investment decisions but also receive a substantial part of the profits, this part is normally defined at the fund inception and consists of both

fixed and variable components. These terms and conditions are impacted by both the fund size and past performance (Metrick & Yasuda, 2009).

2.2. A brief history

Over the past 30 years, PE has accounted for an increasing share of the investment made in the global economy. Equity investments outside the public markets have already existed for some time, however, the term PE emerged and was adopted in the 1980s (Gilligan et al., 2014).

The first major wave of PE investments appeared at the same time as the expression. The first "buy-out boom" was characterized by an increasing number of highly leveraged "public-to-private" transactions (Guo et al., 2011), where a private superior form of organization was being achieved by combining a concentrated ownership stake, a high-powered incentive for management and a lean efficient organization (Jensen, 1989).

This first wave was dominated by the United States, Canada, and to a lower extent by the UK. At the time, 93% of the world transaction value was registered in these countries (Battistin et al., 2017; S. N. Kaplan & Strömberg, 2009).

The growth in this decade was achieved by two main factors: the appetite for the early decade outperforming returns of these investments and the creation of a high-yield debt market that enabled investors to issue high-yield debt to fund acquisitions (Gilligan et al., 2014). The 1980s saw a sharp increase in the number of transactions reaching close to $77 billion in 1988, up from only $1.4 billion in 1979 (S. N. Kaplan, 1991).

After that, and following the recession of the early 1990s, the junk bond market crashed and a large number of these highly leveraged transactions resulted in defaults and bankruptcy, while the number of new "public-to-private" transactions almost disappeared.

After the turn of the century and following the mid-1990s favourable economic conditions, the second wave of PE arose. From 2005 until 2007, this wave was characterized by massive and more leveraged deals, larger funds and consequently an explosion of the private equity industry as a whole (Gilligan et al., 2014; Guo et al., 2011).

This time, the private equity phenomenon was not concentrated only in the United States, where the largest transactions took place during the first wave. The phenomenon has not only spread rapidly to Western Europe and the UK but has also expanded the industry scope, with infrastructure and services companies becoming popular targets (Kaplan & Strömberg, 2009).

The wave of PE reached its peak in 2007 when PE funds managed around $1 trillion of capital (Metrick & Yasuda, 2009; Wilson et al., 2012).

Following the abrupt and violent financial crisis, banks needed to hold cash, retrieving liquidity from the market, and affecting lending, consequently the highly leveraged PE deals suffered a decrease in value and volume.

In the aftermath of the financial crisis, PE had to adapt and recognize weaknesses and strengths (Gilligan et al., 2014).

Despite the high number of insolvencies and bankruptcies, the low-interest rates period that followed the financial crisis allowed the PE industry to maintain some levels of investment and keep current portfolio companies. Favourable economic conditions are, confirmed by history, a precedent for PE activity and the amount of leverage used in the deals (S. N. Kaplan & Strömberg, 2009).

2.3. Portfolio companies framework

A company that seeks or is targeted by a PE fund becomes, after the sale of the equity stake, a portfolio company. This new ownership provides them with access to different know-how, financing options, management teams, and networks, among others. These new tools are corroborated by S. N. Kaplan &

Schoar (2005) that observes the correlation between GPs' experience, fund size and enhanced performance. PE firms that have industry or stage specialization are more likely to improve firm-level performance (Cressy et al., 2007), as a consequence of the accumulated know-how and networks inside the industry.

However, the impact on performance and the existence or not of value creation in these portfolio companies is a multifaceted and difficult area of research even within close fields such as finance, strategy, and human resources (Large & Muegge, 2008) and to some extent, the opaqueness of the industry and the lack of sufficiently detailed data makes the academic discussion on value creation in portfolio companies more difficult (Achleitner et al., 2010).

The proposition that PE portfolio companies turn themselves into a greater form of organization, with improved performance and governance, has some strong early supporters (Jensen, 1989). There is also the premise that these portfolio companies show productivity and profitability improvements relative to non-portfolio companies (Wilson et al., 2012) and are better at dealing with economic slowdowns or recessions (S. N. Kaplan & Strömberg, 2009). Contrary to early beliefs, these changes are more focused on increasing growth rather than on reducing costs (Gompers et al., 2016).

As referred, the concept of value creation is a multi-layered and complex research objective and despite the tendency to recognize that PE firms create value for their portfolio firms, the sources of this added value and performance improvements are still unclear.

From a structure point of view in the literature review and to try to harmonize the literature, we will follow S. N. Kaplan & Strömberg (2009) where the author categorizes three main sets of changes that normally portfolio companies go under – financial, governance and operational engineering but by trying to apply a model perspective of input and output approach followed by (Morris, 1994).

Inputs are the set changes and mechanisms that PE as a new shareholder apply to their portfolio companies, outputs are the results or financial effects from this new form of operating.

2.3.1. Inputs perspective

2.3.1.1. Corporate governance mechanisms & management practices

The global interest in corporate governance (CG) arises because of the well-known vital role that it plays in the operational framework of a company. This awareness and related practices have been developing rapidly and worldwide (Grantham, 2020). The enforcement and application of CG mechanisms in a company encourage and positively affects the decision-making process (Hebble & Ramaswamy, 2005) and it is clear that CG is an important factor to improve firm-level performance (Abdullah, 2016).

In this context, prior and existing research has relied on and given the greatest attention to agency theory as the main theoretical support to explain PE inputs and impacts on portfolio companies' performance. (Jensen, 1989) publishes an essay that becomes known as "Jensen's hypothesis", affirming a correlation between the increased managerial ownership and oversight control that PE ownership offer, and the agency problems mitigation as the main driver for value creation and enhanced performance.

We can further identify three main levers or mechanisms under this framework of increased ownership concentration that are incentive alignment, management restructuring, and board reorganization.

Incentive alignment is widely accepted as the main source of the value provided by PE and is normally one of the main motivations for the acquisition (Battistin et al., 2017; Cumming et al., 2007; Guo et al., 2011; S. Kaplan, 1989). The mechanism to align the incentives consists of one side to concentrate the

ownership and on the other, to provide management teams with significant equity stakes, aiming to increase their motivation and reorganize their activities towards an owner value creation perspective. Gompers et al. (2016) report that usually PE firms allocate 15% of equity to management and in some cases also to employees, with the CEO holding on average 8% of these shares. This new ownership structure creates a strong stimulus that motivates the management teams to eliminate inefficiencies, find new venues of growth, and improve cash flows and overall performance (Palepu, 1990; Phan & Hill, 1995).

Management restructuring and board reorganization are also common practices during the holding period of a portfolio company, which are only feasible due to concentrated ownership. Besides the incentive alignment between managers and owners, a strong and effective leadership is crucial for the success of a company and for the implementation of strategic levers (Cuny & Talmor, 2007). Therefore, PE firms tend to apply changes to potentially underperforming management teams to enhance value-creation efforts (Easterwood et al., 2001; Seth & Easterwood, 1993). The board reorganization is another common governance improvement, this new board is expected to provide effective service and support functions. The representation of institutional investors is common and there is also a decrease in the size of the board (Cumming et al., 2007; Gilligan et al., 2014; Gompers et al., 2016).

In terms of management practices and performance, after creating incentive alignments and restructuring the management and/or the board of directors, PE companies work under a mechanism of improved monitoring and a debt-discipline value focus.

The reduction of agency costs is also driven to a large extent by the increasing and active monitoring practices implemented by PE firms (Palepu, 1990), where the new and more focused board of directors play a crucial role (Wright et al., 1994). This increased oversight and monitoring guarantees that the company

does not engage in value-destruction activities or decisions. PE monitoring does not focus only on the top management but on the company as a whole. It is common to create and implement new key performance indicators (KPIs) with a strong focus on value-creation drivers such as cash flow, EBITDA, return on invested capital (ROIC) or free-cash-flow indicators (Viral et al., 2008). The literature shows that improved monitoring and oversight during the holding period creates a higher probability of success and performance (Cumming et al., 2007; Gilligan et al., 2014).

Building upon the agency theory, the concept of debt having a disciplining effect on management decisions is another input for value creation that is introduced by PE firms. This concept is introduced by Jensen (1989) as the "control function of debt" and the fact that it induces change by re-shifting the utilization of free cash flow to value creation projects and repayments of debt.

One of the main characteristics of these PE deals is the high level of leverage that are used to finance the acquisition, which will limit the cash flow available to the management and as so create a disciplinary effect on managers' decisions (Gompers et al., 2016; Guo et al., 2011; Seth & Easterwood, 1993). These further decreases agency costs and increases the probability of success and enhanced performance.

2.3.1.2. Operational & financial engineering

Operational and financial improvements are another well-researched area of value creation inputs that PE firms implement in their portfolio companies. S. N. Kaplan & Strömberg (2009), defends that besides corporate governance changes, portfolio companies are subject to operational and financial engineering.

In terms of operational improvements, the main ones are made in terms of organizational effectiveness, overhead and production optimization. Phan & Hill (1995) defend that companies go under an organizational change that aims to

increase/cut efficiency/inefficiency by reducing hierarchical complexity, decentralizing power, and creating better and faster flows of information which ultimately leads to a better decision-making process and therefore represents a value creation input induced by PE firms participation.

This more efficient organization suffers a reduction in overhead costs and an increase in profitability which is known as another source of inputs for value creation (Gompers et al., 2016). The reduction of overhead structure, management layers and reporting lines are applied side by side with the outsourcing, offshoring, and automation of services as cost improvement inputs (Gompers et al., 2016).

The production and operations of the business are also targets for change, S. Kaplan, (1989) argues that streamlining operations through standardization of products, cost-efficient production systems or even economies of scale are levers used by PE firms to increase profitability. Davis et al. (2014) found that buyouts bring gains in terms of total factor productivity, where less productive plants or establishments are closed, and highly productive plants are open.

PE firms are known as skilled financial managers and can create value by optimizing the financial structure of portfolio firms. The optimization of the debt-to-equity ratio (D/E ratio) reduces corporate tax (and also discipline management) through tax shields and thus improvements in cash flow (Guo et al., 2011). These PE firms actively manage their financial structure and on average target a median D/E ratio of 60% and a median net-debt to EBITDA of 4 to 1 (Gompers et al., 2016).

The extensive network and experience of GPs allows them to provide support to access debt financing in terms of quantity and conditions, which can also improve cash flow. The long-term relations and track record that PE firms have with financial institutions enable their companies to secure favourable terms for

loan agreements, bond underwritings and other financial mechanisms (Bruining et al., 2002; Collins et al., 2001).

As financial managers, PE firms seek to improve the efficiency and utilization of assets by optimizing working capital and capital requirements. This is made through effective inventory management, significant changes in management information systems and the link between assets and their value-creation potential. This more effective use of the capital affects the company's cash flows and profitability (Yeh, 2012) and thus is considered as another input that PE firms have on their portfolio companies that enhances performance and value creation.

2.3.1.3. Growth enabling & strategic revitalization

The literature demonstrates that PE transactions are a transformative force that influences the strategic course of portfolio companies (Easterwood et al., 2001; Meuleman et al., 2009; Seth & Easterwood, 1993). As so, besides the improved management, corporate governments practices, financial and operational efficiency inputs, PE firms have equally ambiguous growth plans and strategic shifts in the way of their portfolio companies.

Battistin et al., (2017) studies a sample of 191 portfolio companies and the effects of PE ownership in these companies, the results show that PE firms increase their value through the promotion of growth and strategic shifts more than by all restructuring and efficiency-seeking measures. Gompers et al. (2016) surveys a sample of 79 PE investors with roughly $750Bn of assets under management and their pre-investment expected sources of value creation, to find that the growth of sales is the dominant one.

Recent studies use the resource-based view (RBV) theory as the theoretical framework to explain PE value creation. This contrasts with the agency theory by stating that PE increases value more through focused growth rather than cost-savings and efficiency measures. This is partially explained by the early focus on

"public-to-private" transactions where governance issues were more common and therefore agency theory seems adequate.

As PE investments spread to different size companies, industries, and countries there was the need to find other value-creation drivers. Nowadays, PE financing is seen as a source of dynamic capabilities that employes their resources to improve the competitive advantage and promote economic growth in portfolio companies (Ciao, 2018).

Wright (2001) also demonstrates how PE can create entrepreneurial freedom and promote locked upside and growth. The author develops a growth-oriented perspective by recognizing that PE promotes strategic innovation and capitalizes on new opportunities.

The high leverage, financial monitoring and corporate governance mechanics that rely upon the agency theory may also give strategic flexibility and risk-taking associated with growth. The new ownership creates windows of opportunity towards growth and entrepreneurship (Meuleman et al., 2009).

2.3.2. Outputs perspective

2.3.2.1. Financial effects

There are several pieces of the literature and studies trying to understand the outcomes of these newly introduced practices, mechanisms and changes that PE apply on their portfolio companies. However, it is yet to be proven definitively the positive effects that PE participation has.

We can divide the studies and the respective results accordingly with the two waves that existed in the PE market.

The first wave of research, with samples focused on transactions that happened in the 1980s and early 1990s, reported strong and convincing evidence about superior financial effects in portfolio companies during the holding period. In one of the most well-known studies, S. Kaplan (1989) found that these portfolio

companies had significantly greater gains in terms of operating income than the industry average. For example, this was also confirmed by (Smith, 1990) in terms of operating cash flow per revenue dollar and employee. Additionally, the author confirms that these changes are sustainable for several years after the initial entry of the PE.

Overall, the first wave of studies observed improvements in a wide subset of measures such as revenue and employment growth, profitability, operating performance, and cash flow, among others (Wilson et al., 2012).

The transactions involving PE firms from the 2000s until the 2010s served as the basis for the second wave of research. This time the results were more of a mixed picture between positive, neutral, and negative impacts.

Most of the studies found evidence of positive financial effects after the entry of a PE, by implying a greater return-on-equity (ROE) (Malamud Rossi & Martelanc, 2013), return on invested capital (ROIC) (Bergström et al., 2007) and increased profitability (Achleitner et al., 2010; Wilson et al., 2012).

However, there are also studies of the second wave that report comparable or even underperforming gains of portfolio companies relative to their industry benchmarks. For example, Guo et al. (2011) found that there is only a slight improvement in operating performance when compared with the industry, however, it is less on average than the one found in the first wave. When observing the European market, (Scellato & Ughetto, 2013) also finds mixed evidence such as growth in total assets and employees but a decrease in the industry-adjusted profitability after the entry of the PE firm.

3. Methodology

With the purpose of standardising the literature, our results, and the conclusions we can draw from them, we keep following the same approach as in the literature review organizing ideas and methods in an input-output perspective.

Having in mind the input-output management model from Morris (1994), firstly we will address the financial effects (outputs) of PE ownership.

Secondly, we will study the changes (inputs) that PE have on portfolio companies with direct measures that try to address the existence of financial and operational engineering as suggested by S. N. Kaplan & Strömberg (2009).

We also aim to contrast the main two theoretical frameworks used to explain PE value creation, the agency and resource-based view (RBV) theories by contrasting growth and cost-cutting in portfolio companies.

In terms of governance mechanisms and management practices, our paper does not address them, however, the rationale behind these changes is that they ultimately affect companies financial and operational performance.

The methodology is organized into two sections. An initial approach to study the outputs or the final effects of the several changes that PE apply after their entry and if those create or not value through improvements in financial and operational performance. To do so, we formulate the following hypothesis:

H1: PE ownership improves operational and financial performance of portfolio companies.

A second approach that aims to study the inputs of PE ownership by addressing the so claimed differences in growth, cost structure, productivity, operational and financial management. But also, understanding by which and how much these mechanisms and changes impact the financial performance and create value.

To do so we formulate the following hypothesis:

H2: PE ownership is a growth enabler and strategic revitalizer for portfolio companies.

H3: PE ownership provides operational engineering to portfolio companies.

H4: PE ownership provides financial engineering to portfolio companies.

3.1. PE outputs – financial effects

To test our first hypothesis (*H1*), we follow an approach close to Healy et al. (1992), where the author applies a simple linear regression to study abnormal industry-adjusted cash-flow returns in mergers.

This approach is comparable to an event study, where the period before and the period after a certain event is considered, in our case the entry of a PE company. We then consider a measure of financial performance in the years prior to and in the years before the entry of the PE company. Then an adjustment related to the industry is applied, which corresponds to the median changes of the company NACE Code 3-digits peers and the corresponding year.

The coefficient will be interpreted as the correlation that prior performance has on post-performance and the intercept is therefore independent on the pre-PE returns and should be, by definition, attributed to PE skill.

Our three models consist of the following OLS regressions (i=1, . . .n) being n sample size:

(A)– Return-on-equity (ROE)

$$ROE^{post}_{adj\ i} = \alpha + \beta_1 ROE^{pre}_{adj_i} + \beta_2 Age_i + \beta_3 Size_i + \beta_4 leverage_i + i_i + y_i + e_i$$

(B) – Return-on-assets (ROA)

$$ROA^{post}_{adj\ i} = \alpha + \beta_1 ROA^{pre}_{adj_i} + \beta_2 Age_i + \beta_3 Size_i + \beta_4 leverage_i + i_i + y_i + e_i$$

(C) – Return-on-invest-capital (ROIC)

$$ROIC^{post}_{adj\ i} = \alpha + \beta_1 ROIC^{pre}_{adj_i} + \beta_2 Age_i + \beta_3 Size_i + \beta_4 leverage_i + i_i + y_i + e_i$$

This first approach uses three different values of financial and operational performance in order to provide a robust overview and truly understand the final effects/ outputs of PE ownership as formulated in *H1*.

ROE[1] measures the performance in terms of profitability to shareholders (Desbrieres & Schatt, 2002; Malamud Rossi & Martelanc, 2013). *ROA*[1] measures performance in terms of efficiency of the business and operations, provides an additional measure with the real side of the company (Achleitner et al., 2010a; Scellato & Ughetto, 2013a; Wilson et al., 2012). *ROIC*[1] aims to measure the ability of the company to allocate capital to profitable and efficient investments (Bergström et al., 2007).

The values ^{post} are computed as the median yearly value of each variable for each portfolio company in the years [t+1, +2, +3)] subtracted by the correspondent industry adjustment for each company and year ($_{adj}$). The values ^{pre} are computed in the same way.

All the variables are controlled for company *leverage* ($leverage_i$, defined as the median D / E ratio for each firm in years [t+1, +2, +3)), *size* ($Size_i$, defined as the log of total assets in the same time window) and for *age* (Age_i, defined as the difference between the foundation date and the date of the transaction).

Additionally, industry and year dummies were added to control for year effects and industry effects (only when the variables are not industry adjusted).

3.2. PE inputs – growth, operational & financial engineering

To study our remaining hypothesis (*H2, H3, H4*) and the inputs that PE companies implement on their portfolio companies, a multivariate analysis was used. The purpose is to understand the relation in the differences of ROE, ROA,

[1] All the variables and the corresponding computation are presented in the data section, please see table 4 for more detail on each variable used.

and ROIC and the several growth, operational and financial inputs provided by PE companies after their entry.

We follow the spirit of Guo et al., (2011) and regress a dependent variable against a set of explanatory variables that aim to assess growth, financial, and operational engineering. The following cross-section[2] OLS regressions were applied:

(D)– Return-on-equity (ROE)

$$\Delta ROE = \alpha + \beta_1 SalesG + \beta_2 \Delta AT + \beta_3 \Delta CS + \beta_4 \Delta NDE + \beta_5 ROE^{Pre} + \beta_6 Age + \beta_7 Size + i_i + y_i + e_i$$

(E) – Return-on-assets (ROA)

$$\Delta ROA = \alpha + \beta_1 SalesG + \beta_2 \Delta AT + \beta_3 \Delta CS + \beta_4 \Delta NDE + \beta_5 ROA^{Pre} + \beta_6 Age + \beta_7 Size + i_i + y_i + e_i$$

(F) – Return-on-invest-capital (ROIC)

$$\Delta ROIC = \alpha + \beta_1 SalesG + \beta_2 \Delta AT + \beta_3 \Delta CS + \beta_4 \Delta NDE + \beta_5 ROIC^{Pre} + \beta_6 Age + \beta_7 Size + i_i + y_i + e_i$$

The dependent variables are the same used in the first approach. ΔROE, ΔROA, and $\Delta ROIC$ are the changes in each metric for each portfolio company before and after the PE entry.

To estimate this difference, we relied on previous literature (Cressy et al., 2007; S. Kaplan, 1989) and considered a time-window ranging from one year before the entry to three years after that entry (t-1 vs t+3).

This time window is expected to provide enough time to experience the effects of the changes implemented by PE. In our perspective by considering only the year -1 or +3 we could be not capturing the real changes, as there are many exogenous factors that could affect each of these variables for a particular year.

[2] Although the original data was a balanced panel consisting in multiple observations for various companies over different years, the regression used is based on two different time periods. Therefore, the data was reorganized as cross-sectional, with the year fixed effects being made via dummies. This approach is used by Guo et al. (2011) and widely used in other similar studies.

Therefore, we used two Δ changes: i) median value of years t[+1, +2, +3)] minus value in year t[-1] and ii) median value in years t[+1, +2, +3)] minus median values in years [t-1, -2, -3)]. These two periods were used for both the dependent and independent variables.

SalesG (sales growth), *ΔAT* (changes in asset turnover ratio), *ΔCS* (changes in capex over sales), *ΔNDE* (changes in the net debt to EBITDA ratio) and *ROE*/*ROA*/*ROIC*^{PRE} are our explanatory variables.

To answer to our second hypothesis (*H2*), *SalesG* and *ΔCS* were used to measure the impact of growth and contrast the ongoing debate suggesting that PE main venue of value creation is growth enabling and strategic revitalization of the company rather than inefficiency and cost cutting (Battistin et al., 2017; Ciao, 2018; Gompers et al., 2016; Malamud Rossi & Martelanc, 2013; Wright, 2001).

ΔAT and *ΔNDE* were used as explanatory variables to access the operational and financial engineering (recall third and fourth hypothesis – *H3 and H4*) as the literature defends that this is one of the main methods trough which PE create value. *ΔNDE* allow us not only to access the levels of leverage but also the relation between cash-flow generated and debt service obligations (Cressy et al., 2007; S. Kaplan, 1989).

Lastly, to follow the spirit of the first regression (Healy et al., 1992), we inserted in the equation the level of pre performance (*ROE*/*ROA*/ *ROIC*^{PRE}) to understand the effect on post-performance but also to measure the optimization of strategic, operating, and financial decisions, following also other authors such as Guo et al. (2011).

All the dependent variables are controlled for size and age as defined in the first regression. Additionally, industry and year dummies were added to control for year effects and industry effects.

Complementary to this regression and aiming to provide more detail and conclusions about our last 3 hypothesis *(H2, H3, H4)* , we measured the statistical significance of the median changes in several absolute variables and ratios year by year. This should allow us to understand in more detail the growth, operational and financial engineering frameworks for value creation before and after. This more detailed look on the year-by-year median changes follows the spirit of some literature, for instance Guo et al (2011).

To determine the median change in each relative variable or ratio (V), we used the following formula $V_i^{post} - V_i^{pre}$, which give us directly the percentage change. Similarly, to determine the median change in the absolute variables we used $\frac{V_i^{post} - v_i^{pre}}{ABS|v_i^{pre}|}$. In the above-mentioned formulas, ^{post} assumes each year after and ^{pre} assumes each year before the PE entry (from t [-3] to t [+3], V represents the relative or absolute variable for each company I in year t.

4. Data

4.1. Sample

Aiming to study the outputs and effects of PE ownership in Iberian PE-backed companies, the sample of this study comprises 568 Portuguese and Spanish companies (transactions) that received PE funding from 2001 to 2018, where Spain represent 85% of the selected transactions.

Transaction Year	% of sample	Observations
2001	1%	5
2002	1%	5
2003	1%	7
2004	1%	7
2005	2%	10
2006	6%	34
2007	7%	38
2008	4%	23
2009	4%	20
2010	6%	32
2011	4%	23
2012	4%	22
2013	5%	27
2014	6%	34
2015	10%	56
2016	11%	60
2017	15%	85
2018	14%	80
Total		568

Table 1-Transactions breakdown by year

In order to amplify and contribute to the literature, the time window chosen comprises the largest possible period for which data was available.

However, the degree of financial disclosure and information from the early 2000s is low which explains the low percentage of the sample in those years. Despite the mentioned fact, as reported in table 1 we are still able to see the rising of the second wave of PE transactions in 2005-2007 and the massive drop in the aftermath of the financial crisis.

Table 2 reports the sectors (based on NACE Code Rev.2) with the most transactions in our sample, where is important to denote the weight of wholesale, retail trade and manufacturing as the main interest targets of PE companies.

Industry	% of sample	Observations
G: Wholesale and retail trade	21%	119
C: Manufacturing	19%	108
H: Transportation and storage	11%	62
I: Accommodation and food service activities	9%	51
F: Construction	8%	45
M: Professional, scientific and technical activities	6%	34
Q: Human health and social work activities	7%	40
A: Agriculture, forestry and fishing	4%	23
Others	13%	74
L: Real estate activities	2%	11
Total	100%	568

Table 2 - Transactions breakdown by sector

4.2. Data collection

Data was retrieved from two different databases: Mergermarket and Sabi. The first provides extensive information about M&A deals, including but not limited to the name of the target, buyer and seller, completion date, deal description, deal value and sector of activity of involved companies. The second provides financial information on Portuguese and Spanish companies.

The process of data collection was a complex and long stage of this study. Since the two databases do not have a direct link or common denominator, the process of collecting and matching the information between the two databases had to be done manually.

However, it provides a large and detailed data sample which is incremental to the literature and important for the purpose of these studies.

The search criteria for deal finding inside Mergermarket and following a similar approach as Cressy et. al. (2007), was based on the following: i) target

geography[3] (Portugal or Spain), ii) Buyer/Seller sector[4] (Private Equity) and iii) announced date (between 01/01/2008 and 01/12/2018).

In the second stage, Sabi was used to search for each company and to retrieve financial information regarding each portfolio company for each defined variable and year.

Several criteria was applied in order to create the most reliable and robust sample. Table 3 summarizes the process of data collection and the evolution of sample size.

Criteria	Observations
Initial sample merger market	**1960**
Companies with more than one PE entry	-320
Financial and insurance sector	-302
Holding companies	-108
Government or other public entities sponsors	-40
No financial information available for key variables	-622
Final Sample	**568**

Table 3 - Sample collection process

Important to clarify the exclusion of government or other public entities as part of the sponsors, since these entities may have a broader set of public goals rather than pure value creation (Meuleman et al., 2009). Banks and other financial institutions as well as holding companies, which were not identifiable to their correct industry, were taken out of the sample.

Since our methodology requires a very large number of variables and data, the lack of financial information on SABI for key variables or years was the main motive for the large reduction of the sample size.

[3] It is important to note that the geography criteria in Mergermarket consider the dominant geography (e.g., a target that has subsidiaries in Poland but is headquartered in Portugal is considered in the sample)

[4] Private equity, which is defined as "companies that specialize in originating, arranging, and financing investments in acquisitions of assets/businesses principally using 3rd party funds.

4.3. Variables and descriptive statistics

In this section we report the variables used, the transaction related descriptive statistics and the company related descriptive statistics.

4.3.1. Variables

For the sake of synthesis in text we present in table 4 the calculations behind each variable or ratio that was used during the study, some of which were already referred.

Variables	Definition / Observations
	Dependent Variables
ROE	Final year's net income / shareholders's equity
ROA	Final year's net income / total assets
ROIC	EBIT x (1-tax rate) / invested capital invested capital = shareholders equity + short-term debt + long-term debt
	Explanatory / Studied Variables
Sales Growth	Compound annual growth rate of sales (
Asset growth	Compound annual growth rate of total assets
Asset Turnover	Sales / Total assets
Sales / Employee	Total sales / total employees
SG&A / Sales	Selling, general and administrative expenses
Cost / Employee	Employee expenses / total employees
EBITDA Margin	EBITDA / Sales
Working capital	Inventories + Receivables + other current assets - payables - other current liabilities
Capex	Fixed assets in year t - fixed assets in year t-1 + depreciations in year t
Net debt	Long term debt + short term debt - cash & cash equivalents
Cash-flow / Sales	Cash-flow / Sales
	Control variables
Age	Transaction year - company's foundation year
Size	Logarithm of total assets

Table 4 - Variables used in the study.

4.3.2. Transaction related

Our sample[5] was dominated by domestic PE activity (60%) with PE companies from Portugal or Spain. However, it is worth to highlight the presence of the UK and US in the Iberian economy as reported in Table 5, which also reports the top 10 private equity firms by acquisition number.

[5] All transaction related statistics were retrieved from Mergermarket.

Top # 10 PE by number of acquisitions					
#	Company	Nº	#	Company	Nº
1	Nazca Capital	8	**6**	Espiga Equity Partners	6
2	Portobello Capital Gestion	6	**7**	CVC Advisers	5
3	Corpfin Capital	7	**8**	MCH Private Equity	5
4	GED Iberian Private Equity	7	**9**	3i Group	4
5	Magnum Capital	6	**10**	Oxy Capital	4

Top # 10 PE country by number of acquisitions					
#	Country	Nº	#	Country	Nº
1	Spain	271	**6**	Germany	22
2	United Kingdom	70	**7**	Italy	16
3	Portugal	67	**8**	Switzerland	15
4	USA	60	**9**	Netherlands	12
5	France	41	**10**	Belgium	10

Table 5 - Top 10 PE by company and country

In terms of deal value there is some disclosure in our sample (232 out of 568) with an average deal value of €225 million and median €59 million which means that most of the PE's that acquire in Iberia, target low to mid-market companies.

In terms of valuations, the transactions in our sample range from:

- 0.4x to 5.6x Enterprise Value / Revenues multiple
- 4.6x to 25.6x Enterprise Value / EBITDA multiple
- 7.5x to 98x Price-to-earnings multiple

4.3.3. Company related

Table 6 reports a number of company-related descriptive statistics for our sample.

Descriptive statistics in table 6 reveal the same conclusions for the target companies, which are low-to-mid market transactions (median sales of €19 million and assets of €21 million).

Variables *A: Absolute Values*	Average	Median	Standard Deviation	1st Quartile	3rd Quartile
Sales (€M)					
T [-3 to -1]	81.2***	19.1	349.5	7.8	53.4
T [+1 to +3]	92.2	27.3	312.6	10.2	66.5
Total Assets (€M)					
T [-3 to -1]	290.8	20.8	2158.4	8.4	56.7
T [+1 to +3]	386.1	30.8	2425.6	11.8	78.0
Sales / Employee (€k)					
T [-3 to -1]	464.7	185.4	1698.5	92.7	373.8
T [+1 to +3]	480.5	189.3	1829.4	99.2	346.1
Cost / Employee (€k)					
T [-3 to -1]	43.6	35.9	45.8	25.8	47.7
T [+1 to +3]	47.0	39.4	41.2	28.2	51.6
EBITDA (€M)					
T [-3 to -1]	15.5	2.0	122.6	0.5	5.6
T [+1 to +3]	28.4	2.2	287.3	0.2	7.1
Capex (€M)					
T [-3 to -1]	0.1	0.7	110.3	0.2	2.0
T [+1 to +3]	3.1	1.0	32.9	0.3	2.7
Net debt (€M)					
T [-3 to -1]	169.2	6.0	1007.5	1.2	24.5
T [+1 to +3]	223.9	9.8	1174.3	2.5	40.7
Cash-flow (€M)					
T [-3 to -1]	11.9	1.6	107.0	0.5	4.7
T [+1 to +3]	22.6	1.8	263.7	0.2	6.0
B: Relative values					
Asset turnover (x)					
T [-3 to -1]	1.2x	1.0x	1.1x	0.5x	1.6x
T [+1 to +3]	1.1x	0.9x	0.9x	0.4x	1.5x
SG&A / Sales (%)					
T [-3 to -1]	77%	36%	351%	24%	55%
T [+1 to +3]	51%	38%	131%	25%	60%
EBITDA Margin (%)					
T [-3 to -1]	37%	13%	232%	7%	25%
T [+1 to +3]	35%	13%	154%	6%	24%
Working capital / Sales (%)					
T [-3 to -1]	69%	21%	218%	11%	36%
T [+1 to +3]	96%	21%	140%	10%	37%
Capex / Sales (%)					
T [-3 to -1]	25%	3%	266%	1%	7%
T [+1 to +3]	9%	4%	42%	1%	8%
ND / EBITDA (x)					
T [-3 to -1]	9.1x	2.2x	52.3x	0.5x	5.2x
T [+1 to +3]	8.0x	2.3x	23.5x	0.7x	5.6x
Cash-flow / Sales (%)					
T [-3 to -1]	76%	10%	2226%	4%	18%
T [+1 to +3]	10%	8%	176%	2%	16%

Table 6 - Descriptive statistics of key financial and operational metrics[6]

[6] Table 6 presents the key variables at a company level from the period pre-PE entry to the period post. The values from the period pre are computed as the median yearly values for each of the variables in the years -3, -2, and -1 before the transaction. The values for the period post are computed in the same way.

It is important to highlight the growth in most of the indicators from periods t[-3, -2, -1] to t[+1, +2, +3]. However, given the very high standard deviations for all the variables the conclusions that could be obtained from them are limited.

This increase is not only reflected in growth indicators such as sales, assets, or capital-expenditures (capex) but also on cost-structure such as selling, general and administrative expenses (SG&A) over sales or cost per employee, which initially suggest a focus on growth rather than cost-efficiency measures, more conclusions on this topic should be drawn from the results section.

The purpose of this section is not to be extensive since statistic tests will be performed in the second approach of our methodology to measure the median changes in each variable and ratio throughout the periods of PE entry.

4.4. Control group

The first approach of our methodology requires an industry adjustment to assess the difference in ROE, ROA, and ROIC of each company related to the industry.

Using a similar methodology similar with Kaplan (1989) the control group are those companies which have the same 3-digit NACE Rev 2. Code. Several codes were identified for each transaction and the median industry change was subtracted to the respective variable for each transaction and year.

On a second approach, and since our method requires a considerable number of variables at company-level, we used the same 3-digit codes as dummy variables, since in our opinion and considering the detail of the variables a proper median industry adjustment would have to consider more than just the NACE code on 3-digits and given the sample size it is not feasible.

5. Findings and discussion

5.1. Output perspective

Recalling the literature review and the importance of PE activity in the economy and society, it is essential to add to the ongoing debate on the impact of PE on portfolio companies.

Especially, to access if value creation and performance enhancements exist or not, since the second wave of studies has provided mixed results and arguments for both sides. Having this in mind the first hypothesis was formulated and tested.

	Raw			**Adjusted**		
	ROE^{Post}	**ROA^{Post}**	**$ROIC^{Post}$**	**ROE^{Post}**	**ROA^{Post}**	**$ROIC^{Post}$**
Constant	**0.2892*** **	**0.1204***	**0.2199*** **	**0.3001***	0.0768	**0.3788** **
	(0.0497)	(0.0824)	(0.0005)	(0.0601)	(0.2692)	(0.0485)
ROE^{Pre}	**0.2945*** **			**0.2725*** **		
	(0.0000)			(0.0004)		
ROA^{Pre}		**0.4888*** **			**0.5145*** **	
		(0.0000)			(0.0000)	
$ROIC^{Pre}$			**0.3344*** **			**0.3187*** **
			(0.0000)			(0.0000)
Age	**(0.0014)***	0.0001	−0.0003	0.001	0.0001	−0.0002
	(0.0504)	(0.6856)	(0.4789)	(0.1471)	(0.6670)	(0.7430)
Size	−0.0074	−0.0016	0.003	0.0006	−0.0017	−0.0066
	(0.3241)	(0.6528)	(0.2095)	(0.9423)	(0.6313)	(0.2266)
Leverage	**(0.0246)*** **	0.0009	−0.0021	0.0038	0.001	0.0059
	(0.0091)	(0.7701)	(0.5742)	(0.6532)	(0.7153)	(0.3324)
Industry dummi	Yes	Yes	Yes	No	No	No
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	413	404	421	413	404	412
R Squared	0.2750	0.3494	0.3383	0.2580	0.3671	0.3365

Table 7 - Financial and operational performance regressions[7]

[7] Table 7 reports the regression results for a sample of companies that were acquired by a PE, measuring three variables (ROE, ROA, ROIC). The dependent variable in each model is the median measure in the years +1, +2 and +3 following the entry of the PE (post). The independent variable is the median match measure in the years -1, -2 and -3 before the entry of the PE (pre). All regressions are OLS heteroskedasticity and autoregression adjusted. The symbols ***, **, and * are used to denote significance at the 1%, 5%, and 10% levels (two-sided), respectively.

Following Healy et al. (1992) approach, the coefficient of the independent variables (ROE, ROA, ROIC) in the years before (pre) is interpreted as the correlation that prior performance has on post-performance (post) and the intercept is therefore independent on these pre returns.

After being controlled for industry, size and leverage this intercept (constant) should be by definition attributed to PE skill, table 7 reports our results.

In line with the first wave of research and with some more recent studies, the estimated amount of post-PE entry performance left unexplained and attributed to PE skill indicates a considerable impact of PE in portfolio companies.

Notably, the impact attributed to PE skill is more relevant in ROIC (models 3 and 6), which presents a significant (1% level) and positive impact of PE on portfolio firms of around 21.9 p.p. for the raw sample and 37.9 p.p. for the industry adjusted sample.

These findings are in line with Bergström et al. (2007) that reported a positive increase in ROIC during the holding period of PE, demonstrating the ability to allocate capital to profitable investments.

It is also worth highlighting the difference from the raw to the industry adjusted sample, demonstrating ability to outperform the industry which might be attributed to the extensive GPs experience, know-how and networks (Cressy et al., 2007; S. N. Kaplan & Schoar, 2005).

The measures ROE and ROA show a positive impact from PE ownership, though the impact and the levels of significance were considerably lower. Concerning the differences in the indicator and given that ROIC includes NOPAT (EBIT x (1 - tax rate)) we find evidence of a more positive impact on a cash measure rather than a non-cash measure such as net income.

All the values have been winsorised between 0.05 and 0.95 percentiles. Control variables are the age of the company measured in years, Size as the log of total assets in year +1, and leverage as the net-debt-to-EBITDA ratio in year +1. P-values are denoted between parentheses.

It is more than worth noticing that all the pre indicators (ROE^{Pre} , ROA^{Pre}, and $ROIC^{Pre}$) are statistically significant at 1% level and positively correlated with the dependent variable. This supports already known evidence that firms with superior (inferior) financial performance are more prone to achieve higher (lower) results in the future.

However, we can further extend the rationale and the results to also suggest that PE firms make a natural and good pre-selection of targets.

Gompers et al. (2016) found that PE companies put more weight on choosing the business model and competitive advantage rather than the expected value creation, management team or valuation.

In a European study of PE-backed buyouts, Cressy et al. (2007) suggests that skill in investment and target selection might be one of the majors factors behind superior performance in portfolio companies. This is consistent with our findings, PE companies do find and select targets that have a good business model and/or some competitive advantage that enables them to be top performers in the future.

Overall, and given our results, we find evidence that allow us to accept the first hypothesis formulated (*H1)*, stating that PE ownership improve and has a positive impact on operational and financial performance of portfolio companies.

5.2. Input perspective

The concept of value creation is a multi-layered and complex research objective. Having this in mind, this section aims to test our second, third, and fourth hypothesis.

Our objective is to understand the different changes and inputs that PE companies apply to their portfolio companies and how they relate to value creation.

5.2.1. Growth enabling

Firstly, the objective is to contrast the growth enabler with the cost and inefficiency-cutting role as inputs provided by PE to their portfolio companies. To do so we computed the median yearly changes in a set of measures that cover growth and cost structure. The results are presented in table 8.

Variable	% changes from:				
	-3 to -2	**-2 to -1**	**-1 to 1**	**1 to 2**	**2 to 3**
Sales growth	**9.8%*** **	**7.7%*** **	**13.9%*** **	**4.9%*** **	**3.0%*** **
P-value	*(0.0000)*	*(0.0000)*	*(0.0000)*	*(0.0000)*	*(0.0012)*
Sample	*373*	*373*	*373*	*373*	*373*
Asset growth	**7.9%*** **	**4.6%*** **	**14.1%*** **	**4.6%*** **	**1.7%*** **
P-value	*(0.0000)*	*(0.0000)*	*(0.0000)*	*(0.0000)*	*(0.0004)*
Observations	*395*	*395*	*395*	*395*	*395*
Sales / Employee	**3.7%*** **	**2.7%*** **	1.7%	1.7%	**1.9%***
P-value	*(0.0000)*	*0.0017*	*0.2346*	*(0.4500)*	*(0.0803)*
Observations	*334*	*334*	*334*	*334*	*334*
SG&A / Sales	**-1.4%** **	-0.9%	**2.6%*** **	**2.0%*** **	**1.9%** **
P-value	*(0.0302)*	*(0.2672)*	*(0.0034)*	*0.0028*	*(0.0307)*
Observations	*316*	*316*	*316*	*316*	*316*
Cost / employee	**2.2%*** **	**2.4%*** **	**3.5%*** **	**2.2%*** **	**1.9%*** **
P-value	*(0.0000)*	*(0.0005)*	*(0.0000)*	*(0.0002)*	*(0.0031)*
Observations	*338*	*338*	*338*	*338*	*338*
Capex	n.a	5%	**23.3%*** **	**5.7%***	**2.9%** **
P-value		*(0.2448)*	*(0.0000)*	*(0.0549)*	*(0.0406)*
Observations		*296*	*296*	*296*	*296*
Capex / Sales	n.a	**-6.6%*** **	**8.7%** **	**8.1%** **	1%
P-value		*(0.0085)*	*(0.0775)*	*(0.0277)*	*(0.4680)*
Observations		*296*	*296*	*296*	*296*
# employees	**3.2%*** **	**3.7%*** **	**9.4%*** **	**1.9%*** **	**0.3%***
P-value	*(0.0000)*	*(0.0000)*	*(0.0000)*	*(0.0000)*	*(0.0940)*
Observations	*316*	*316*	*316*	*316*	*316*

Table 8 - Percentage changes of growth and cost structure indicators[8]

As reported, we highlight the growth trend both in assets and sales that the median PE portfolio company in our sample presents (statistically significant at

[8] Table 8 reports the median percentage changes in a set of variables covering growth and cost structure. The time window ranges from 3 years before to 3 years after the private equity entry in each company. A Wilcoxon sign-rank test was used to test if the median percentage change is significantly different from zero. The symbols ***, **, and * are used to denote significance at the 1%, 5%, and 10% levels (two-sided), respectively. P-values are denoted between parentheses.

1% level). Evidence found by many other recent studies (Battistin et al., 2017; Boucly et al., 2011; Cressy et al., 2007; Guo et al., 2011). This increase is significantly higher from year -1 to year 1, suggesting a growth of around 14% in sales and assets.

Moreover, PE targets also presented an economic and statistically significant growth trend in the years before the transaction which supports the conclusions drawn from the first approach. Based on our data, it can be inferred that PE companies are skilled investors in selecting targets with a good business model and/or some competitive advantage. Regarding investment, evidence suggests a significant increase in capital expenditure (capex) levels in absolute terms and measured as a percentage of sales.

Our research indicates a growth-oriented perspective from PE management, allowing portfolio companies to pursue locked opportunities and projects (Boucly et al., 2011). This finding contrast with some important studies (S. Kaplan, 1989). We also hypothesize that given the decrease in the levels of investment over sales in the year before, this could be one of the motivations for the company to accept private equity funds.

In terms of cost cutting and efficiency, we do not find evidence that these changes exist. Actually, we observe the opposite, a continuous increase in the SG&A costs over sales and also an increase in the cost per employee.

Our results are consistent and give us evidence to accept our formulation *(H2)* that PE ownership is a growth enabler and strategic revitalizer for portfolio companies. However, these findings will be discussed in more detail in the section ahead along with the results from the multivariate regression analysis.

5.2.2. Operational and financial engineering

As theorized by S. Kaplan (1989) and used by many, the operational and financial engineering are alongside corporate governance mechanisms, the basis

to explain value creation behind PE ownership. The results in table 9 present the median yearly changes in ratios and indicators that aim to test our third and fourth hypothesis *(H3 and H4)*.

Variable	% changes from:				
	-3 to -2	**-2 to -1**	**-1 to 1**	**1 to 2**	**2 to 3**
EBITDA	**13.5%*** **	**11.0%*** **	**7.7%** **	1%	2%
P-value	(0.0000)	(0.0001)	(0.0247)	(0.3721)	(0.3821)
Observations	394	394	394	394	394
EBITDA margin	**3.9%** **	2.6%	**-5.9%** **	**-5.3%*** **	-0.8%
P-value	(0.0228)	0.1094	(0.0140)	(0.0000)	(0.2613)
Sample	392	392	392	392	392
Asset turnover	1%	**2.3%** **	**1%*** **	-1%	1%
P-value	(0.1236)	(0.0122)	(0.0087)	(0.2309)	(0.3699)
Observations	373	373	373	373	373
Cash-flow / Sales	0%	3%	**-4.8%** **	-8.1%***	-1%
P-value	(0.3639)	(0.1670)	(0.0479)	(0.0000)	(0.4856)
Observations	372	372	372	372	372
Working capital	**12.3%*** **	**7.9%*** **	**8.8%*** **	-1.8%	0%
P-value	(0.0007)	(0.0035)	(0.0006)	(0.1424)	(0.1568)
Observations	373	373	373	373	373
WK / SALES	2%	-1%	2%	**-4.1%** **	-1%
P-value	(0.4324)	(0.3041)	(0.1598)	(0.0216)	(0.3921)
Observations	369	369	369	369	369
Net Debt	0.2%	**-6.3%** **	**10.4%** **	1.1%	**3.9%** **
P-value	(0.2048)	(0.0220)	(0.0242)	(0.2792)	(0.0018)
Observations	230	230	230	230	230
ND / EBITDA	-0.1x	**-0.2x** **	0.0x	-0.1x	**0.2x*** **
P-value	(0.1089)	(0.0586)	(0.1401)	(0.2789)	(0.0013)
Observations	209	209	209	209	209
D/E ratio	-4.8%	**-10.2%***	**2.2%** **	-3.1%	**0.1%** **
P-value	0.4493	0.0766	0.0244	0.2759	0.0492
Observations	206	206	206	206	206

Table 9 – Percentage changes of operational and financial indicators[9]

In terms of operational engineering, our data reveals mixed results. EBITDA in absolute value has grown from the years t [-3, -2,-1] to t [+1] and after that, no

[9] This table reports the median percentage changes in a set of variables covering operational and financial indicators. The time window ranges from 3 years before to 3 years after the private equity entry in each company. A Wilcoxon sign-rank test was used to test if the median percentage change is significantly different from zero. The symbols ***, **, and * are used to denote significance at the 1%, 5%, and 10% levels (two-sided), respectively. P-values are denoted between parentheses.

significant difference arises. EBITDA margin has suffered a statistically significant decrease of -5.9% and -5.3% from the year before to two years after the transaction. Similar results arise from cash-flow in terms of sales.

Our analysis reveals an, at least, short-term operational margin and cash-conversion decrease. The decrease is consistent with the results found in table 8 (increase in SG&A over sales, cost per employee and capex levels).

Concerning asset turnover, we find only a 1% increase from the year before to the year after. In terms of working capital levels, we observed an increase in the absolute value (normal considering the experienced growth) but a decrease in the ratio of working capital over sales only significant from year +1 to +2. Recalling table 8, there is also no significant evidence of an increase in the sales per employee.

The evidence we have gathered so far do not allow us to sustain and accept our third hypothesis stating that PE ownership provides operational engineering to portfolio companies. The test of this hypothesis will be completed with the multivariate regression.

As for financial engineering, we observe a significant increase in the levels of net-debt and D/E ratio immediately after the PE entry and also an increase in the D/E ratio. The levels of leverage compared with the capacity to generate operational cash-flow, measured as ND/EBITDA, do not show any significant increase, or decrease. We do find a significant increase in all these variables from year 2 to year 3. We hypothesize that the high level of capex, substantially higher levels of working capital and deteriorated levels of operational margin and cash-flow generation (tables 8 and 9) might create the need for additional financing and should justify the increase in leverage in year +3.

This result is partially consistent with the literature in year +1 and not consistent in year +3, where is it observed a significant increase in leverage after

the entry and a subsequent deleverage supported by an auto-financing ability (Achleitner et al., 2010; Guo et al., 2011).

All in all, there is no sufficient evidence to accept or reject our fourth hypothesis stating that PE ownership provides financial engineering to portfolio companies.

5.2.3. Determinants of value creation

Variables	Δ [-1 to 3]			Δ [-3 to 3]		
	ΔROE	**ΔROA**	**ΔROIC**	**ΔROE**	**ΔROA**	**ΔROIC**
SalesG	**0.1498***	**0.0268****	**0.0736*****	**0.0913***	**0.0302****	**0.0553*****
	(0.0553)	(0.0464)	(0.0086)	(0.064)	(0.0144)	(0.0059)
Δ Asset turnover	0.0207	0.0431	**0.1134****	**0.2223****	**0.061****	**0.1885*****
	0.8905	(0.1646)	(0.0353)	(0.0306)	(0.0173)	(0.0000)
Δ Net debt / EBITDA	−0.0057	**−0.0081*****	**−0.0196*****	−0.0151	**0.0056***	**0.0134*****
	0.6769	(0.0057)	(0.0001)	(0.2741)	(0.0981)	(0.0183)
Δ Capex / Sales	−0.7652	**0.4206*****	0.3151	−0.4734	**0.3353*****	0.2711
	0.2873	(0.0053)	(0.2166)	(0.3554)	0.0095	0.1894
(ROE / ROA / ROIC) ^{Pre}	**−0.403*****	**−0.6629*****	−0.0703	**-0.4976*****	**−0.1832**	**−0.0425**
	(0.0000)	(0.0000)	0.5381	0.0016	(0.1025)	0.6202
Age	−0.0072	−0.0003	**−0.0018***	−0.0030	**0.001****	−0.0014
	0.0157	(0.5717)	(0.0786)	(0.1146)	(0.0305)	0.0629
Size	0.0109	0.0227	0.02212	−0.0009	**0.015**	**0.0091**
	0.8873	(0.1735)	(0.4363)	(0.9856)	(0.2492)	0.6628
Constant	0.3367	−0.1340	**−0.2141**	**−0.0152**	−0.1201	**−0.0667**
	(0.6184)	(0.3545)	(0.4008)	0.9724	(0.2871)	0.7217
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	270	270	270	254	254	254
R Squared	0.6816	0.6693	0.5961	0.5788	0.5993	0.6501

Table 10 - Multivariate regression analysis[10] [11]

[10] Please see methodology and data section, namely table 4 to recall the chosen variables.

[11] This table reports the cross-section multivariate regression results for a sample of companies that were acquired by a PE, measuring three dependent variables (ΔROE, ΔROA, Δ ROIC). The variables in the first three models are the median change in the measure from year -1 to median +1 to +3. The variables from the remaining three models are the median changes from years [-3, -2, -1] to years [+1, +2, +3]. All regressions are OLS heteroskedasticity and autoregression adjusted. The symbols ***, **, and * are used to denote significance at the 1%, 5%, and 10% levels (two-sided), respectively. All the values have been winsorised between 0.05 and 0.95 percentiles. Control variables are the age of the company measured in years, Size as the log of total assets in year +1, and leverage as the net-debt-to-EBITDA ratio in year +1. P-values are denoted between parentheses.

Lastly, to robust the findings of previous sections, a cross-sectional regression was applied to understand in depth the determinants of PE ownership and to provide conclusions about our hypothesis.

To add to the recent literature and incorporate our view on what should be a more robust analysis, we also measured the changes considering the median values from period [-3, -2, -1], while most of the literature only considers year -1 (please recall methodology to understand our rationale behind it). Table 10 reports our results.

Globally, the regressions in table 10, show that the changes in performance (measured as ROE, ROA, and ROIC) from before to after the entry of a PE in a company are largely explained by the growth in sales, the changes in the asset turnover ratio, and the levels of pre-performance.

Regarding the changes in the level of investment (proxied by capex over sales) our research indicates that the relation is positive in both the periods but only significant for ROA.

In terms of leverage, the impact is negative and significant in the first period and positive and significant considering the median 3 years after changes.

These results can be highlighted accordingly with our three hypothesis:

H2: PE ownership is a growth enabler and strategic revitalizer for portfolio companies.

Recalling the results for the median changes at the company-level in table 8, our observations point to a significant growth both in assets, sales, and investment levels year by year after the entry of the PE.

This trend is consistent with the results obtained from the multivariate regression (table 10) where sales growth is significant and positively correlated with all the performance indicators in all the models.

AS PE spread to different size companies, industries, and countries there was the need to find other value creation drivers rather than just cost-cutting and inefficiency-cutting measures.

PE are a transformative force that influences the strategic course of their portfolio companies (Meuleman et al., 2009) and can create entrepreneurial freedom and locked upside and growth (Wright, 2001).

Our data supports the idea that growth is the investment most expected source of value creation (Gompers et al., 2016) and that PE are indeed a source of dynamic capabilities that allow the portfolio company to improve their competitive advantage and be an engine for growth (Battistin et al., 2017; Boucly et al., 2011; Wilson et al., 2012) .

Overall, the evidence we have gathered lends support to accept our second hypothesis, stating that PE is a growth enabler and strategic revitalizer for portfolio companies. We see this as the main and more robust finding of our study.

This new ownership provides portfolio companies with new know-how, outside experience, industry specialization, financing options, management teams and networks, which must provide companies with new venues and upside for growth.

This is consistent with more recent literature where a resource-based view (RBV) theory is used as theoretical framework, where PE create value through focused growth rather than by cost and inefficiency savings.

There were early defenders of PE as a way to restore strategic focus (Seth & Easterwood, 1993), but the majority of the adopters of RBV theory came after the second wave of PE deals, for instance Boucly et al. (2011) or Wilson et al. (2012), among others.

Our data led us to support the RBV theory as the main theoretical framework to explain PE and value creation, where the development of internal assets and

new opportunities for growth overlaps the cost reduction approach of agency theory.

This difference from to the first wave makes sense since a major part of the studies were focusing on "public-to-private" transactions, where agency problems and spread ownership prevailed and therefore agency theory seemed more adequate. In private firms the concentrated ownership structure and the commonly family owned and managed company is less prone to have this problems. However, we do suggest a better distinction of the two theoretical dimensions to overcome the current mixed results and we accentuate the necessity for further research based on RBV theory.

H3: PE ownership provides operational engineering to portfolio companies.

The results from table 10, show no significant impact of the changes in asset turnover on financial and operational performance when considering only year -1. In the models where the change is based on the median of three years before, the evidence supports the argument of operational engineering (positive and statistically significant impact).

This indicates that PE portfolio companies create value through improvements in the utilization and efficiency of their assets to generate sales, providing evidence of higher productivity and operational efficiency (Bergström et al., 2007; Guo et al., 2011; Wilson et al., 2012).

In the previous section, data suggested an operational decrease in margins (EBITDA and cash-flow) and only a slight increase in sales per employee. Since our analysis only covers 3 years post entry, we recognize that the focus on growth, new investment and projects might somehow deteriorate operational indicators.

Our observations do not give us enough evidence either to accept or reject our third hypothesis that PE ownership provides operational engineering to their portfolio companies.

Hence, we accentuate the importance of a continued study focusing on supplementary and more detailed operational metrics that cover a larger time window. Since the average period of a PE is between 5 to 7 years (Gilligan et al., 2014) we admit that could be an initial focus on new projects, accelerated growth and then a posterior focus on operational improvements closer to the exit.

H4: PE ownership provides financial engineering to portfolio companies.

Regarding financial engineering, the results from table 10 follow the same incongruency as operational indicators, being observed a small but negative impact when considering year -1 and a small but positive when considering the median of 3 years before. In any way, the changes in ND/EBITDA have a small impact on changes in financial performance indicators.

The evidence we have gathered suggests an increase in leverage levels (recall table 8) and an improvement in the efficiency and utilization of assets by optimizing working capital and capital requirements. There was also strong evidence supporting the idea of a good pre-selection of targets, suggesting that PE companies are skilled investors.

We defend that more data needs to be analyzed to understand the financial engineering provided to portfolio companies. Namely, the support to access debt financing in terms of quantity and conditions (Bruining et al., 2002), the active management of financial structure (Gompers et al., 2016) or the optimization of D/E ratio in a way that reduces corporate tax trough tax shields and improves cash-flow (Guo et al., 2011).

Again, the results of our study do not reveal enough support to accept or reject our fourth hypothesis that formulates the existence of a positive impact in the financial engineering provided by PE ownership.

6. Conclusions

All in all, our paper sought to fill in the gap of actual research and contribute to the ongoing debate about the impact of PE ownership in portfolio companies. This study provides evidence and conclusions about PE ownership in Iberia, a market that is dominated by SMEs and in which there is scarce research on the topic.

We analyzed a sample of 568 Portuguese and Spanish transactions during the time window of 2001-2018 using a set of sophisticated regressions to understand if there is indeed value creation (defined by improvements in financial and operational performance of portfolio companies) and what are the mechanisms and main changes behind this improvements.

Regarding the first research question, the data and evidence in our study allows us to claim a positive impact of private equity ownership in portfolio companies. A set of OLS regressions, both raw and adjusted to the corresponding industry, show a significant and positive impact in performance measured by return-on-invested-capital (ROIC) and to a smaller extent in return-on-equity (ROE). These results demonstrate the PE ability of allocating capital to profitable investments and even to outperform the industry with accumulated know-how, experience, and networks.

It is also more than worth noticing, the strong support found to state that private equity companies are skilled investors and do put a lot of weight in finding targets with good business models and/or some competitive advantage that allows them to be outperformers in the future.

Regarding the second research question and what we believe is our main and strongest finding, is that PE ownership is a growth enabler and strategic revitalizer for portfolio companies. We find support to the view that PE are a transformative force that changes the strategic course of their companies and

serves as a source of dynamic capabilities and therefore, assists as a growth catalyst to increase value and returns.

This is an important finding to the literature given the debate about the use of agency or resource-based view theories as theoretical frameworks of analysis in PE ownership and value creation. Our data led us to support the RBV theory, where the development of internal assets and new opportunities for growth overlaps the cost reduction approach of agency theory.

The literature categorizes that besides changes in corporate governance mechanisms and practices, there is operational and financial engineering applied to portfolio companies. We also formulated hypothesis about this mechanisms of value creation, yet we do not find evidence enough to support them. The results are mixed and as so we cannot reject the existence of these type of mechanisms. We accentuate the need for further and more detailed discussion and empirical data on this topics.

All in all, we do believe that these entities might be a superior form of organization as Jensen (1989) hypothesized, but since we are in different times the focus of value creation shifted from corporate governance and inefficiency gains to a use of private equity know-how, accumulated expertise, industry networks, strategics shifts and promotion of growth to create value for portfolio companies.

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