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Determinants of the performance of private equity backed SMEs: an empirical analysis at the European level

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ABSTRACT

This paper extends previous research to investigate the determinants of the operating performance of small and medium-sized enterprises (SMEs) backed by private equity (PE). The paper is based on a sample of 208 unique private equity-backed firms operating at the European level. A multivariate linear regression model is estimated, in which the private equity-backed firms' operating performance—as measured by ROA, Revenues/Total Assets, and EBIT/Total Assets—is a function of a variety of factors. These include whether or not the firm is an SME, the presence of family shareholders, and various features specific to the expertise of the private equity investor, as well as the industry, country, and years covered. The analysis is limited to private equity deals that occurred in the European Region between 2005 and 2017. According to the results, the effectiveness of private equity in improving the operating performance of target companies in the three years post-investment is impacted by whether or not the backed firm is an SME. This research paper aims to further existing publications on the link between the involvement of the private equity investor and the status of the backed firm as an SME.

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1. Introduction

In the past decade, the Private Equity (PE) industry has achieved unprecedented growth in terms of fundraising, investment, and returns, compared to previous time periods (Bain & Company, 2021). The activity of private equity funds is peculiar, and every transaction is unique.

Despite the negative impact of the Covid-19 outbreak on the private equity industry, activity began to recover starting from the third quarter of 2020. In fact, the last quarter of 2020 registered the highest number of buyout deals of any other quarter across the past 5 years (PWC, 2021). According to surveys conducted within the study by PWC, (2021), optimism remains among private equity players for a favorable industry outlook over the next few years.

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One of the key issues in the study of private equity is the limited availability of information. Private equity investors are not required to disclose details about their transactions and are often unwilling to do so. Moreover, even when some information is publicly available, it is rarely exhaustive. This is especially true when the investment renders the transaction private and thus unlisted. In Europe, private equity activities are closely tied to SMEs.

Small and medium enterprises (SMEs) are commonly known as the "backbone of the European economy," given their contributions in terms of employment and value added to the European economy. The lack of a universally-agreed definition of an SME has led to many issues in research and regulation. This paper uses the definition established by the European Commission, which classifies an SME based on employment and either turnover or balance sheet total.

Private equity has increasingly become a viable financing alternative for various types of companies, especially SMEs. Besides financial gains, there are numerous non-financial benefits that private equity investors offer to SMEs during the decision-making process. These benefits often manifest as heightened professionalization and improved corporate governance.

Therefore, analyzing whether specific factors of a backed company influence its performance post-investment is worthwhile. Specifically, this paper aims to investigate features that impact a company's operating performance and assess their likely effects in the three years following a private equity investment.

The study includes deals finalized in the European region between 2005 and 2017, encompassing the years of the Global Financial Crisis and the European Sovereign Debt Crisis. For transactions completed in 2017, the study also considers the impact of the Covid-19 outbreak on target companies.

Data for this study are sourced from the Zephyr Bureau van Dijk's database, one of the most comprehensive repositories for global private equity transactions.

The ensuing sections discuss the literature review, research methodology, and empirical model. Section 4 presents the empirical findings, followed by commentary in Section 5. Section 6 concludes and outlines the research limitations.

2. Literature review and aims of the paper

The private equity investor is not a typical financial investor, who funds either the growth of the investee company or its turnaround in case of financial distress. In addition to providing capital and financial leverage, the private equity investor can serve as a strategic player in the decision-making process of the target company. This is because, after the investment, the private equity investor becomes a shareholder of the corporation, thus having the ability to affect the target company's operations (Caselli & Negri, 2021). According to research by Kaplan and Stromberg (2009), companies receiving a private equity investment experience enduring and long-lasting benefits for at least 5 years after the exit of the private equity fund. An analysis performed by Bernstein et al. (2010) shows that industries with a high level of private equity investments grow faster in terms of productivity and employment than those with a lower level of private equity involvement. Brettel et al. (2009) argue that a

major problem for SMEs is the lack of adequate information about different financing alternatives as well as inadequate access to finance. The main reasons include that SMEs usually have limited skills and experience to reap the benefits of capital markets (particularly of secondary market transactions). Secondly, in SMEs, agency problems and costs related to the separation of ownership and control are less relevant than those in larger firms. This is because, in smaller firms, there usually exists either a close relationship between the owner and the manager or both roles are taken by a single individual. While this is advantageous from a private equity standpoint, a majority of small businesses are not publicly traded and therefore are not required to meet regulatory standards. Moreover, most decision-makers of small firms often lack the adequate experience to pursue value-maximizing strategies and make decisions based on their intuition and business acumen.

Most SMEs in the European region share a governance characteristic: family ownership. The relevance of this specific governance structure is important to examine for several reasons. First, Henn & Lutz (2017) empirically show that family-owned companies tend to divest a smaller share than non-family-owned ones, as they are more unwilling to relinquish control; this affects the ability of the private equity investor to influence decision-making and generate earnings. Secondly, in a family-owned enterprise, agency costs are minimized, making it relatively easier for a family business to achieve a competitive advantage and thus for a private equity investor to positively impact the company's performance (Dawson, 2011). Croce and Marti (2016) found that family-owned firms with low productivity growth are more likely to access private equity financing and then experience an improvement in productivity and growth. Finally, Salerno (2019) empirically shows that private equity-backed family firms outperform private equity-backed non-family firms, and this holds true also for VC-backed firms compared with non-VC-backed ones after the first round (Croce et al., 2013). However, despite numerous empirical studies having demonstrated a positive relationship between private equity investment and company performance (Bernstein & Sheen, 2016), or having analyzed the effects of being a family-owned SME on the relationship with the private equity investor, these studies do not consider the backed company's determinants with an impact on operating performance. More specifically, this paper contributes to the current literature by showing that private equity financing affects the operating performance of a target company differently depending on its financial and organizational characteristics; in particular, if the target company is an SME, the ability of the private equity investor to create value will be impacted. Additionally, to wholly analyze the determinants of performance, the private equity investor's experience and country, temporal, and industry factors are taken into account. Furthermore, the existing literature focuses mostly on the impact of private equity financing across a broad and mixed range of companies in the US market. Thus, the impact of private equity activity on the European economy and on this specific type of organization is worth studying. Investigating whether private equity investments benefit the performance of SMEs is relevant for many reasons and has many implications. First, the majority of companies in the European region fall under the classification of SME, and private equity activity is increasing in Europe. Therefore, whether or not private equity involvement is affected by the target

company being an SME is important to explore. Secondly, private equity investors can enrich their screening process by considering the target company's characteristics and their own experience. Finally, demonstrating the impact of private equity investments on SME performance can affect policy decision-making in supporting (or not supporting) this type of financing.

3. Research methodology

3.1. Overview

A regression analysis is performed to test whether the performance of the private equity backed company is influenced by several features, including firm-specific and private equity investors' characteristics, other than country and temporal factors. As mentioned above, several variables were found to have had an impact on the performance post-private equity investment of the target firms, as confirmed by some common findings of the existing literature on the topic.

3.2. Sample and data description

A dataset consisting of private equity transactions in the European region from 2005 to 2017 has been applied. This decision was taken so to include in the analysis the effects on the balance sheet of the targets of the Global Financial Crisis (2008–2009), the European Sovereign Debt Economic Crisis (2011–2013) and the outbreak of the Covid-19 pandemic (2019–2021). This time frame allows studying the outcome of private equity investments, regardless of any major and unexpected event disrupting the economic environment.

A database search on Zephyr Bureau van Dijk was carried out to find the number of institutional private equity transactions. Setting the target geography as the Euro Area, including the UK, and the time period from 2005 to 2021, 7,100 transactions were retrieved. After removing duplicates, balance sheet data and company-specific information in the Orbis Bureau van Dijk and Eikon DataStream databases were collected. Namely, annual data on revenues, total assets (fixed, variable, and intangible), number of employees, earnings, net income, equity, and company debt have been identified. After having removed transactions with missing values, the final sample is composed of 208 unique private equity backed firms.

Firms are distinguished in 16 industries according to the NACE 2 Industry Classification (Table 1). Also, information on the country where the target company is incorporated is available and the majority of deals occurred in France, Germany, The Netherlands and Italy (Table 2).

Moreover, following the classification established by the European Commission Recommendation 2003/361, SMEs constitute roughly 36% of firms in the sample. In addition, the identity of the owner of the majority of shares in the target companies is retrieved and, for the purpose of this paper, a family-owned company is defined as the one where the Global Ultimate Owner (GUO)[1] satisfies the criterion to be equal to "One or more named individuals or families"[2]. Family owned companies represent

Table 1. Descriptive statistics - industry composition.

Industries	Frequency	%	Cumulative Frequency	Of which SME	% of SMEs
Mining and quarrying	1	0.48	0.48	0	0.00
Manufacturing	58	27.88	28.37	20	26.67
Electricity, gas, steam and air conditioning supply	1	0.48	28.85	1	1.33
Water supply; sewerage, waste management	2	0.96	29.81	1	1.33
Construction	4	1.92	31.73	1	1.33
Wholesale and retail trade; repair of motor vehicles	21	10.1	41.83	6	8.00
Transportation and storage	4	1.92	43.75	2	2.67
Accommodation and food service activities	8	3.85	47.6	1	1.33
Information and communication	30	14.42	62.02	12	16.00
Financial and insurance activities	24	11.54	73.56	9	12.00
Real estate activities	12	5.77	79.33	5	6.67
Professional, scientific and technical activities	29	13.94	93.27	10	13.33
Administrative and support service activities	8	3.85	97.12	4	5.33
Human health and social work activities	4	1.92	99.04	2	2.67
Arts, entertainment and recreation	1	0.48	99.52	1	1.33
Other service activities	1	0.48	100	0	0.00
Total	208	100		75	100

Source: Zephyr Bureau van Dijk's database, Orbis Bureau van Dijk, and Eikon databases.

Table 2. Descriptive statistics - country composition.

Country of the Target	Frequency	%	Cumulative Frequency.	SME	%
Austria	4	1.92	1.92	2	2.67
Belgium	4	1.92	3.85	2	2.67
Estonia	1	0.48	4.33	1	1.33
Finland	7	3.37	7.69	3	4.00
France	74	35.58	43.27	37	49.33
Germany	50	24.04	67.31	10	13.33
Greece	4	1.92	69.23	1	1.33
Ireland	3	1.44	70.67	1	1.33
Italy	19	9.13	79.81	6	8.00
Lithuania	2	0.96	80.77	1	1.33
Luxembourg	2	0.96	81.73	0	0.00
Portugal	1	0.48	82.21	0	0.00
Slovenia	1	0.48	82.69	0	0.00
Spain	10	4.81	87.5	3	4.00
The Netherlands	26	12.5	100	8	10.67
Total	208	100		75	100

Source: Zephyr Bureau van Dijk's database, Orbis Bureau van Dijk, and Eikon databases.

Table 3. Descriptive statistics - tabulation of SMEs and family owned companies.

	FAMILY		
SME	0	1	Total
0	125	8	133
1	44	31	75
Total	169	39	208

Source: Zephyr Bureau van Dijk's database, Orbis Bureau van Dijk, and Eikon databases.

roughly 20% of the total sample size, and about 41% of SMEs in the sample are also family owned businesses (Table 3).

In particular, 79% of total revenues is concentrated in the top 20% firms, suggesting that the greatest number of firms is of low-average size compared to a few number of very large firms (Table 4). This peculiarity is specific to the European

Table 4. Percentile share of revenues figures.

Percentile shares (proportion)				
Sales (in € bln)		Number of obs = 2,034		
	Coefficient	Std. Err.	95% Conf.	Interval
0-20	0.003	0.000	0.003	0.004
20-40	0.017	0.001	0.015	0.019
40-60	0.047	0.002	0.043	0.051
60-80	0.146	0.006	0.135	0.157
80-100	0.787	0.008	0.772	0.802

Source: Zephyr Bureau van Dijk's database, Orbis Bureau van Dijk, and Eikon databases.

economy, traditionally characterized by a greater number of Micro and Small companies than medium-large ones.

The aim of this paper is to investigate the performance of private equity backed firms in the period 2005–2017.

a. Understand whether *firm-specific characteristics* have an impact on the post-private equity investment performance of the firm
b. Understand whether*country-level, industry-level and temporal-level factors* have an impact on the post-private equity investment performance of the firm
c. Understand whether*private equity investors' characteristics* have an impact on the post-private equity investment performance of the firm

3.3. Empirical model

A linear multivariate regression model has been assumed to investigate the connection between private equity investment and the performance of equity-backed SMEs. Accordingly, the equation (1) with Ordinary Least Squares (OLS), with the target company's operating performance being a function of whether or not the company is a SME, the involvement of family shareholders, the expertise of private equity investors, and other company-specific features, is estimated.

Let Y_{it} be a measure of the operating performance of the private equity backed company:

$$Y_{it} = \alpha_i + \sum_{j=1}^{k} \beta_j X_{jit} + \varepsilon_{it} \tag{1}$$

In particular, the model takes the specification of Equation (2),

$$\begin{aligned} Operating\ \ Performance_{it} =& \alpha_i + \beta_1 CapitalRatio_{jit} + \beta_2 CapitalProductivity_{jit} \\ &+ \beta_3 GrowthOpportunity_{jit} + \beta_4 SME_{jit} + \beta_5 Family_{jit} \\ &+ \beta_6 PEexperience_{jit} + \beta_7 Capex_{jit} + \beta_8 Leverage + \varepsilon_{it} \end{aligned} \tag{2}$$

where t denotes the time dimension, i denotes a specific firm ($i = 1, 2, \ldots, 208$) and j ($j = 1,2, \ldots, 8$) denotes the number of control variables;

Y_{it} represents the dependent variable of interest in year t for firm i. To meet OLS assumptions, the average residual error is assumed to be zero.;

This paper considers three different measures of operating performance:

1. **ROA**, computed as the ratio of net income and total assets, measures the ability of the company to generate profit from investments in total assets.
2. **Revenues/Total Assets** is one of the most commonly used indicators of profitability and growth and is considered to be one of the key value creation measures of a private equity investment (Lahmann et al., 2017).
3. **EBIT/Total Assets** is operating income before interest and taxes scaled by total assets (e.g., Bena and Ortiz-Molina, 2013). Given that the numerator already factors in the effect of depreciation and amortization, the ratio is a measure that can be used to compare the operating performance of companies across industries.

α is a constant term, usually used in a regression analysis to control for any variation in the dependent variable that is not captured by the independent variables;

β_j is the coefficient of the independent variable $X_{t,}$ to capture the variation in the dependent variable for each unit change in the independent variable;

X_{jit} is the set of control variables in the year t; A set of variables that can be considered relevant in determining the operating performance of firms are included in the regressions (e.g., Dushnitsky & Lenox, 2006; Meles et al., 2014). The annual values from 2005 to 2020 of the selected variables are retrieved from Refinitive's Eikon Database.

- **Capital ratio** is calculated as the book value of equity over total assets (Salerno, 2019). This ratio is helpful to capture the characteristics of the target firms' financial structure (Meles et al., 2014; Salerno, 2019).
- **Capital productivity** is computed as the ratio of the annual level of sales over fixed assets, so to measure the ability of the company to generate revenues from long-term investments (Meles et al., 2014; Salerno, 2019).
- **Growth opportunity** is calculated as intangible assets over total assets (Salerno, 2019). The investment share in intangibles has generally risen in over the past quarter century and is usually correlated with higher total factor productivity, and thus higher growth. This is particularly true after the Covid-19 pandemic, that accelerated the shift to a dematerialized economy[3].
- The indicator dummy **SME** will take the value of 1 if the target firm employs less than 250 people and has an annual turnover of less than, or equal to, €43 million, and it takes the value of 0 otherwise.
- **FAMILY** is a dummy variable that will be set to 1 if the private equity backed company is family owned and 0 otherwise. As mentioned above, it will take the value of 1 if the Global Universal Ownership criteria in Orbis is equal to "One or more named individuals or families".
- **PEexperience** is a variable where the experience of the private equity investor is measured by the number of deals performed in the period considered. As a

general rule, the higher the private equity experience, the greater the value it can add to target companies (Dyck & Pomorski, 2016). Consistently with this assumption, Bernstein and Sheen (2016) finds that the private equity investment is more effective in improving the performance of the company when the private equity fund has prior industry experience. At the same time, an experienced private equity investor can also make mistakes because of overconfidence that can result in errors during the screening and investment periods (Shepherd et al, 2003), thus having a negative impact on the targets' performance.

- **CAPEX** represents the value of total capital expenditures. It is an important value driver in SMEs' buyout investments (Lahmann et al., 2017). This because, the most straightforward way to cut costs (and so to improve the performance) for a company is to lower high capital and R&D expenditures, to achieve operational improvements. In particular, in private equity deals the private equity investor usually invests in long-term assets to boost the growth and expansion of the company. Thus, it is an important element affected by the private equity investment and conditioning the financial results of a company.
- **Leverage** is the ratio between the annual value of Net Debt over Ebitda. This variable measures the degree to which the target firm is able to cover its debts, taking into account the company's ability to pay interest expenses. When deciding on the capital structure, companies face the dilemma of whether the benefits in terms of tax savings of increasing leverage are offset by the cost of a greater likelihood of bankruptcy (Modigliani & Miller, 1963). The private equity investor uses risk capital and leverage to create value in the target and usually the higher the leverage, the greater the return that can be earned (Battistin et al., 2017; Lahmann et al., 2017). Also, financial engineering and the optimization of the capital structure of a company target of a private equity investment are among the keyways in which the private equity fund can add value. This is because debt can provide various benefits that are particularly relevant in private equity transactions, including the tax shield advantage (Lahmann et al., 2017).

ε is an error term that captures any variation in the dependent variable that is not explained by the independent regressors.

Table 5 exhibits a summary of the control variables used in the model.

All the models take into account the effect of three specific variables:

- Country of the private equity backed company;
- Industry of the private equity backed company;
- Year.

4. Results

A set of regressions on Stata were run to investigate the impact of private equity investments on ROA, Revenues/Total Assets, and EBIT/Total Assets of the target companies. In a first section, a regression is run considering the variables at the same time, for the entire period 2005-2020. In a second section, the sample is divided by

Table 5. Description of variables.

Variables	Symbol	Description	Source
Dependent Variables			
Operating Performance 1	ROA	Net income / Total Assets	Salerno, (2019)
Operating Performance 2	Rev_TA	Revenues / Total Assets	Battistin et al. (2017)
Operating Performance 3	EBIT_TA	EBIT / Total Assets	Salerno (2019)
Independent Variables			
Capital Ratio	Capital Ratio	Book value of total equity / Total Assets	Meles et al. (2014)
Growth Opportunity	Growth	Intangible assets / Total Assets	Salerno (2019)
Capital Productivity	Profitability	Sales / Fixed Assets	Salerno (2019)
SME	SME	Dummy variable equal to 1 if SME; 0 otherwise	Lahmann (2017)
Governance	FAMILY	Dummy variable equal to 1 if family owned; 0 otherwise	Berrone et al. (2012)
CAPEX	CAPEX	Capital expenditures	Achleitner et al. (2010)
PE Experience	PEexperience	Number of deals in which the PE was involved in the period 2005-2020	Salerno (2019)
Leverage	Leverage	Net Debt / EBITDA	Battistin et al. (2017)

Source: Orbis Bureau van Dijk and Eikon.

investment period and separate regressions are run to study how the operating performance of the target companies is determined in the three years following the private equity investment.

4.1. Regression analysis over 2005-2020

This regression analysis is performed to get a general sense of the relationship that exists among the variables. The estimated model has a significantly positive explanatory power, as measured by the R-Squared, thus meaning that the control variables are very good at explaining the variability of the selected measures of operating performance.

4.1.1. ROA

The variables included in the regression are able to explain the variation in ROA of the target companies over the period 2005-2020 (Table 6). A first regression that aims to explain the variation of ROA using capital ratio, growth opportunity and capital productivity has a coefficient of determination of 29.3%. In particular, capital ratio has a significantly positive effect on ROA, capital productivity has a statistically significant negative coefficient on ROA, both at the 1% significance level, whereas growth opportunity does not have a statistically significant coefficient on ROA. Adding the dummy variable *SME* to the regression, the explanatory power of the model increases to an R-squared of 30%. Indeed, the dummy variable *SME* has a statistically significant negative coefficient associated with it of −0.0437. This means that, being an SME reduces the ROA by 4.37% than a firm that does not fall under the classification of SME. Moreover, adding the dummy variable *FAMILY* to the regression, the explanatory power of the model does not change. In fact, the dummy

Table 6. Regression analysis over 2005–2020 - ROA.

VARIABLES	(1) ROA	(2) SME	(3) FAMILY	(4) Additional Controls
Capital Ratio	0.134***	0.134***	0.134***	0.134***
	(0.00586)	(0.00583)	(0.00583)	(0.00483)
Growth Opportunity	0.0338	0.0285	0.0284	−0.0124
	(0.0286)	(0.0279)	(0.0279)	(0.0258)
Capital Productivity	−0.00256***	−0.00247 final tables editable***	−0.00247***	0.000559*
	(0.000240)	(0.000238)	(0.000238)	(0.000302)
SME		−0.0437***	−0.0437***	−0.0477***
		(0.0149)	(0.0150)	(0.0139)
FAMILY			1.75e-05	−0.0256
			(0.0241)	(0.0210)
PEexperience				−0.00145
				(0.000978)
CAPEX				1.98e-07***
				(7.02e-08)
Leverage				0.00003
				(0.0009)
Constant	−0.0233***	−0.0141	−0.0141	0.0568
	(0.00977)	(0.0100)	(0.0102)	(0.0965)
R-Squared	0.293	0.30	0.30	0.401

Standard errors in parentheses.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.
Notes: Panel regression analysis of operating performance of the sample of SMEs and non-SMEs PE-backed companies is reported considering the European Union as geographical region. The dependent variable is ROA (column 1). SME is a dummy variable that takes the value 1 for SME and 0 for non-SME. FAMILY is a dummy variable that takes the value 1 for family business and 0 otherwise. Control variables are: Capital Ratio, Growth Opportunity, Capital Productivity, PE experience, CAPEX, Leverage. **NB**: only statistically significant years, industries and countries are reported for simplicity.
Source: Zephyr Bureau van Dijk's database, Orbis Bureau van Dijk, and Eikon databases.

variable *FAMILY* does not have a significant coefficient and leaves unchanged the coefficients on the other variables. Finally, including in the regression the variables *PEexperience, CAPEX, Leverage* and individual fixed-effects to account for the different countries, industries and years, increases the explanatory power of the model (R-squared of 40.1%). Among the variables included, CAPEX has a statistically significant positive coefficient associated with it.

4.1.2. Revenues/total assets

The second measure of operating performance of the companies under study is the ratio of revenues over total assets. Also in this case, the regressors are able to explain the variation in this measure of operating performance of the target companies over the period 2005-2020. Separate regressions were run using the same procedure as for ROA and adding the other regressors one by one to better assess the impact of each control variable on both the dependent variable and the overall explanatory power of the model (Table 7).

The first regression that aims to explain the variation of *Revenues/Total Assets* using capital ratio, growth opportunity and capital productivity has a relatively low explanatory power. However, both capital ratio and growth opportunity have a significantly negative effect on *Revenues/Total Assets*, whereas capital productivity has a statistically significant positive coefficient on *Revenues/Total Assets*. All the three control variables are statistically significant at the 1% level. Adding the dummy variable *SME* to the regression, the explanatory power of the model increases to an R-squared

Table 7. Regression analysis over 2005–2020 - Revenues/total assets.

VARIABLES	(1) Rev_TA	(2) SME	(3) FAMILY	(4) Additional Controls
Capital Ratio	−0.0613***	−0.0610***	−0.0610***	−0.0553***
	(0.0130)	(0.0127)	(0.0127)	(0.0127)
Growth Opportunity	−0.939***	−1.029***	−1.026***	−0.989***
	(0.0988)	(0.0974)	(0.0975)	(0.101)
Capital Productivity	0.00281***	0.00307***	0.00307***	0.00797***
	(0.000591)	(0.000580)	(0.000580)	(0.000932)
SME		−0.363***	−0.365***	−0.238***
		(0.0437)	(0.0438)	(0.0451)
FAMILY			0.126	0.302**
			(0.150)	(0.142)
PEexperience				0.00653
				(0.00662)
CAPEX				−3.24e-07
				(2.17e-07)
Leverage				−0.0002
				(0.00228)
Constant	1.323***	1.415***	1.405***	0.956
	(0.0475)	(0.0479)	(0.0495)	(0.638)
R-squared	0.07	0.082	0.084	0.321

Standard errors in parentheses.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.
Notes: Panel regression analysis of operating performance of the sample of SMEs and non-SMEs PE-backed companies is reported considering the European Union as geographical region. The dependent variable is Revenues_TA that is the ratio between Revenues and Total Assets (column 1). SME is a dummy variable that takes the value 1 for SME and 0 for non-SME. FAMILY is a dummy variable that takes the value 1 for family business and 0 otherwise. Control variables are: Capital Ratio, Growth Opportunity, Capital Productivity, PE experience, CAPEX, Leverage. **NB**: only statistically significant years, industries and countries are reported for simplicity.
Source: Zephyr Bureau van Dijk's database, Orbis Bureau van Dijk, and Eikon databases.

of 8%. The dummy variable *SME* has a statistically significant negative coefficient associated with it of −0.363. This means that, as dictated by the linear model, being an SME reduces the Revenues/Total Assets ratio by 36.3% than a firm that does not fall under the classification of SME. As in the case of the regression with ROA as a dependent variable, adding the dummy variable *FAMILY* to the regression with *Revenues/Total Assets* as a dependent variable, the explanatory power of the model does not change. However, differently from that case, here the dummy variable *FAMILY* does have a significantly negative coefficient. This means that being family owned reduces *Revenues/Total Assets* by 36.5% than a firm that is not family-owned. Finally, including in the regression the variables *PEexperience, CAPEX, Leverage* and individual fixed-effects to account for the different countries, industries and years, increases the explanatory power of the model significantly, reaching an R-squared of 32.1%. The additional control variables contribute to increasing the explanatory power of the model to 40.1%.

4.1.3. EBIT/total assets

The third and final measure of operating performance studied is the ratio of EBIT over Total Assets. The variables included in the regression are able to explain the variation in *EBIT/Total Assets* of the target companies over the period 2005–2020 (Table 8). The first regression that aims to explain the variation of *EBIT/Total Assets* using capital ratio, growth opportunity and capital productivity has a coefficient of determination of 10.1%. In particular, while capital ratio has a significantly positive

Table 8. Regression analysis over 2005–2020 - EBIT / total assets.

VARIABLES	(1) EBIT_TA	(2) SME	(3) FAMILY	(4) Additional Controls
Capital Ratio	0.0512***	0.0510***	0.0510***	0.0478***
	(0.00607)	(0.00605)	(0.00606)	(0.00505)
Growth Opportunity	0.0294	0.0254	0.0244	0.00395
	(0.0317)	(0.0313)	(0.0314)	(0.0288)
Capital Productivity	−0.00271***	−0.00264***	−0.00264***	0.000642**
	(0.000254)	(0.000253)	(0.000253)	(0.000326)
SME		−0.0336**	−0.0327**	−0.0396***
		(0.0164)	(0.0164)	(0.0151)
FAMILY			−0.0152	−0.0436*
			(0.0281)	(0.0239)
PEexperience				−0.00164
				(0.00112)
CAPEX				1.82e-07**
				(7.73e-08)
Leverage				0.00003
				(0.0001)
Constant	0.0440***	0.0511***	0.0524***	0.122
	(0.0110)	(0.0114)	(0.0116)	(0.110)
R-Squared	0.101	0.106	0.106	0.136

Standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Notes: Panel regression analysis of operating performance of the sample of SMEs and non-SMEs PE-backed companies is reported considering the European Union as geographical region. The dependent variable is EBIT_TA that is the ratio between EBIT and Total Assets (column 1). SME is a dummy variable that takes the value 1 for SME and 0 for non-SME. FAMILY is a dummy variable that takes the value 1 for family business and 0 otherwise. Control variables are: Capital Ratio, Growth Opportunity, Capital Productivity, PE experience, CAPEX, Leverage. **NB**: only statistically significant years, industries and countries are reported for simplicity.
Source: Zephyr Bureau van Dijk's database, Orbis Bureau van Dijk, and Eikon databases.

effect on *EBIT/Total Assets*, capital productivity has a statistically significant negative impact on *EBIT/Total Assets*. Both control variables are statistically significant at the 1% significance level, whereas growth opportunity does not have a statistically significant coefficient on *EBIT/Total Assets*.

Including the dummy variable *SME* to the regression increases the explanatory power of the model to 10.6%. Indeed, consistently with the other regressions, the dummy variable *SME* has a statistically significant negative coefficient of −0.0336. Thus, being an SME reduces the *EBIT/Total Assets* by 3.36% than a firm that is not an SME.

The dummy variable *FAMILY*, when included in the regression, does not significantly increase the explanatory power of the model. In fact, the dummy variable *FAMILY* does not have a significant coefficient and leaves unchanged the coefficients on the other variables.

Finally, including in the regression the variables *PEexperience*, *CAPEX*, *Leverage* and individual fixed-effects to account for the different countries, industries and years, increases the explanatory power of the model (R-squared of 13.6%). In particular, adding those regressors turns SME in a variable that has a statistically significant impact on *EBIT/Total Assets* at the 10% level. Also, *CAPEX* has a statistically significant positive coefficient associated with it. Neither the specific country nor the single industry seems to have a statistically significant impact in determining the *EBIT/Total Assets* ratio of the firms.

To further develop the regression model, a regression with the interaction term for the variables *SME* and *FAMILY* is run to understand whether the operating

Table 9. Regression analysis over 2005–2020 with interaction term SME_FAMILY.

VARIABLES	(1) ROA	(2) Rev_TA	(3) EBIT_TA
Capital Ratio	0.135***	−0.0547***	0.0484***
	(0.00485)	(0.0129)	(0.00514)
Growth Opportunity	−0.00758	−0.974***	0.00885
	(0.0260)	(0.102)	(0.0294)
Capital Productivity	0.000589*	0.00827***	0.000651**
	(0.000303)	(0.000943)	(0.000330)
SME_FAMILY	−0.0825**	−0.221*	−0.0876**
	(0.0325)	(0.126)	(0.0362)
PEexperience	−0.00174*	0.00666	−0.00188
	(0.000981)	(0.00677)	(0.00115)
CAPEX	2.19e-07***	−2.83e-07	1.98e-07**
	(7.06e-08)	(2.19e-07)	(7.83e-08)
Leverage	2.62e-05	−0.000249	2.90e-05
	(9.76e-05)	(0.000230)	(0.000101)
Constant	0.0473	1.257*	0.0935
	(0.0958)	(0.643)	(0.110)
R-Squared	0.396	0.293	0.129

Standard errors in parentheses.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.
Notes: Panel regression analysis of operating performance of the sample of SMEs and non-SMEs PE-backed companies is reported considering the European Union as geographical region. The dependent variables are ROA, Rev_TA, EBIT_TA (columns 1,2,3). SME_FAMILY is the interaction variable that takes the value 1 if the company is both SME and family owned, and 0 otherwise. Control variables are: Capital Ratio, Growth Opportunity, Capital Productivity, PE experience, CAPEX, Leverage. **NB**: only statistically significant years, industries and countries are reported for simplicity.
Source: Zephyr Bureau van Dijk's database, Orbis Bureau van Dijk, and Eikon databases.

performance of the company is affected differently if, in addition to being an SME, the company is also family owned. Interaction terms have become widely recognized in the field of applied economics since can lead to interesting findings (Rajan & Zingales, 1998).

The interaction variable is found to be significant at a 95% confidence level whenever the dependent variables are ROA and EBIT/Total Assets, and at a 90% confidence level whenever the dependent variable is Revenues/Total Assets. In particular, being both an SME and a family owned company has a negative impact on the operating performance as opposed to being neither SME nor family owned (Table 9). This is of interest given that, as already mentioned in the literature review Section, many SMEs in Europe are also family owned.

4.2. Regression analysis by investment year

This Section of the paper aims to investigate the effect of the control variables on the ROA, Revenues/Total Assets and EBIT/Total Assets in the three years after the investment of the private equity in the target companies. To conduct the analysis, the sample of transactions is divided according to the year when the investment occurred, so as to get a better insight on how the operating performance of the target companies changed after the private equity investor's input. All regressions performed are worth noting to have good explanatory power. In the sections below, the paper reports the tables with the most interesting and relevant findings per model, indeed those for the investment years 2008 and 2012 (Table 10).

Table 10. Regression analysis by investment year – 2008 and 2012.

	Investment Year: 2008									Investment Year: 2012								
	ROA t + 1RO		At + 2ROA	t + 2Rev_TA	t + 1Rev_TA	t + 2Rev_TA	t + 1EBIT _TA t + 1EBIT	_TA t + 2EBIT		_TA t + 3ROA	t + 1ROA	t + 2ROA	t + 2Rev_TA	t + 1Rev_TA t + 2Rev_TAt + 3EBIT		_TA t + 1EBIT	_TA t + 2EBIT	_TAt + 3
CRt + n	0 .42 1* **	0.456***	0.505***	0.434	0.413	0.663***	0.394***	0.431***	0.523***	0.0630	0.0183	0.0406	0.678*	0.788**	0.753**	0.0533	0.0744	0.0288
P-value	(0.0523)	(0.0612)	(0.0732)	(0.352)	(0.363)	(0.320)	(0.0504)	(0.0582)	(0.0661)	(0.0662)	(0.0649)	(0.0616)	(0.349)	(0.325)	(0.334)	(0.0723)	(0.0709)	(0.0694)
GOt$_{+n}$	−0.0425	−0.0098	−0.0661	−1.494***	−1.412***	−1.386***	−0.0517	−0.0419	−0.151	−0.140	−0.157*	−0.198**	−2.435***	−2.457***	−2.388***	−0.159	−0.178*	−0.216**
P-value	(0.0599)	(0.0739)	(0.0947)	(0.406)	(0.435)	(0.421)	(0.0577)	(0.0699)	(0.0865)	(0.0893)	(0.0862)	(0.0816)	(0.470)	(0.431)	(0.443)	(0.0975)	(0.0942)	(0.0920)
	CPt+$_n$0.0019***	0.0019***	0.0017***	0.0179***	0.0155***	0.0163***	0.0033***	0.0035***	0.0052***	0.00343	0.00553	0.00735*	0.0700***	0.0609***	0.0615***	0.00445	0.00646	0.00984**
P-value	(0.0004)	(0.0005)	(0.0006)	(0.0044)	(0.0047)	(0.0049)	(0.0006)	(0.0007)	(0.0010)	(0.0026)	(0.0037)	(0.0037)	(0.0137)	(0.0185)	(0.0199)	(0.0028)	(0.00404)	(0.00414)
SMEt+$_n$-0.111*	**	−0.118***	−0.122***	−0.487***	−0.373***	−0.610***	−0.114***	−0.114***	−0.0978**	−0.00238	0.00667	−0.0548**	0.285	0.390***	0.370***	0.0139	0.0195	−0.0490*
P-value	(0.0261)	(0.0319)	(0.0409)	(0.173)	(0.185)	(0.174)	(0.02506)	(0.0299)	(0.0370)	(0.0357)	(0.0284)	(0.0236)	(0.188)	(0.142)	(0.128)	(0.0389)	(0.0310)	(0.0266)
FAMILY t + n0.0475		0.0391	0.0346	0.302	0.191	−0.394	0.0806*	0.0882	0.0166	−0.104	−0.0744	−0.0549	−0-0558-0.161		−0.389	−0.193**	−0.195**	−0.262***
P-value	(0.0425)	(0.0598)	(0.117)	(0.281)	(0.348)	(0.486)	(0.0405)	(0.0563)	(0.102)	(0.132)	(0.145)	(0.170)	(0.361)	(0.378)	(0.401)	(0.0814)	(0.0860)	(0.0932)
PEexp	−0.0048**	−0.0055**	−0.0092**	0.0249***	0.0279***	0.0344***	−0.00381*	0.00379	0.00320	0.00136	0.00280	0.00177	0.109***	0.118***	0.121***	0.00157	0.00332	0.00255
P-value	(0.0022)	(0.0028)	(0.0041)	(0.0154)	(0.0175)	(0.0186)	(00216)	(0.00281)	(0.00385)	(0.00382)	(0.00396)	(0.00325)	(0.0202)	(0.0168)	(0.0176)	(0.00417)	(0.00367)	(0.00366)
CAPEX t + n4.21e-07		−2.82e-07	−7.43e-07		5.33e-067.92e-06*	−1.96e-06	8.32e-07*	3.07e-07	5.66e-07	7.37e-08	2.02e-07	2.24e-07	−4.57e-07	−5.71e-07	−4.61e-07	3.97e-081.78e-07		2.97e-07
P-value	(5.12e-07)	(7.48e-07)	(1.28e-06)	(3.48e-06)	(4.47e-06)	(5.42e-06)	(4.99e-07)	(7.21e-07)	(1.13e-07)	(1.85e-07)	(2.48e-07)	(2.60e-07)	(9.73e-07)	(1.24e-06)	(1.41¡-06)	(2.02e-07)	(2.93e-07)	(0.0222)
	Levt + n0.0021*	0.0018	0.0136***	−0.0006	−0.0356*	−0.0337*	0.00269**	0.00182	0.0146***	−0.0007	−0.00753*	−0.00392	−0.0130	−0.0487**	−0-0656**	−0.00159	−0.0092**	−0.00661
P-value	(0.0012)	(0.0030)	(0.0042)	(0.00838)	(0.0184)	(0.0228)	(0.0506)	(0.0658)	(0.0786)	(0.00350)	(0.00396)	(0.00496)	(0.335)	(0.499)	(0.574)	(0.0694)	(0.109)	(0.119)
Constant	0.00162	−0.0627	−0.0214	1.076***	1.092***	1.618***	−0.00049	−0.0563	−0.0696	0.00104	−0.0697	−0.0556	−0.275	−0.212	−0.217	0.0340	−0.0385	−0.0640
P-value	(0.0510)	(0.0680)	(0.0864)	(0.287)	(0.322)	(0.321)	(0.0506)	(0.0658)	(0.0786)	(0.0636)	(0.0998)	(0.106)	(0.335)	(0.499)	(0.574)	(0.0694)	(0.109)	(0.119)
R-sq	**61.9%**	**62.0%**	**77.2%**	**35.6%**	**36.6%**	**57.0%**	**57.8%**	**58.6%**	**74.3%**	**12.3%**	**16ã%**	**29.2%**	**78.6%**	**85.3%**	**86.8%**	**13.3%**	**17.7%**	**26.7%**

Notes: The dependent variables are ROA, Rev_TA, EBIT_TA. Control variables are: Capital Ratio (CR), Growth Opportunity (GO), Capital Productivity (CP), SME, FAMILY, PE experience (PEexp), CAPEX, Leverage (Lev). **NB**: only statistically significant years, industries and countries are reported for simplicity.
Source: Zephyr Bureau van Dijk's database, Orbis Bureau van Dijk, and Eikon databases.

There are three major findings that are common for the regression for the 3 dependent variables:

- The variable *SME* has a negative coefficient. The size of the coefficient decreases as progress is made from the first to the third year after the investment. This would suggest that over time, the private equity investor is able to minimize over time the negative characteristics that make being an SME have a negative effect on the operating performance of the backed firm;
- The variable *PEexperience* is statistically significant and positively correlated with the backed firms' operating performance. This finding goes against a recent finding of Salerno (2019) who claimed that the higher experience of the investor causes him to be overconfidence that leads to mistakes in the screening and investment processes, negatively impacting the targets. Instead, here the positive coefficient is consistent with the general idea that an experienced private equity investor, especially in periods of crises, is able to improve the performance of the backed firms.
- Many variables, even though not significant after the first investment year, turn relevant in the second or third year.

The capital coefficient and capital productivity are expected to have a statistically significant positive coefficient, while growth opportunity has a negative one.

4.3. Soundness checks

Multicollinearity among the independent variables has been tested to verify whether the regression analysis would be sound and meet the standard assumptions of OLS method The correlation coefficient between the two variables was first computed. Although there is some correlation—as is to be expected, since referring to the same financial variables- none is too high (no correlation coefficient dangerously close to 1 or −1), as in Table 11.

An additional test is performed to check for multicollinearity, indeed the Variance Inflation Factor (VIF). The rule of thumb is that whenevera variable has a VIF value higher than 10, further analysis may be needed. Tables 12–14 exhibit that all VIFs look fine.

Table 11. Pairwise correlation.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Capital Ratio	1.000							
(2) Growth Opportunity	0.024*	1.000						
(3) Capital Productivity	−0.001*	0.054*	1.000					
(4) SME	−0.027*	−0.140*	0.091*	1.000				
(5) FAMILY	−0.055*	−0.081*	0.045	0.003	1.000			
(6) PEexperience	−0.007*	−0.122*	0.013*	0.065*	0.111	1.000		
(7) CAPEX	−0.029*	−0.017*	−0.131*	0.196*	−0.081*	−0.119	1.000	
(8) Leverage	0.003*	0.055*	−0.008*	−0.034	−0.013	−0.035*	0.022*	1.000

Note: $^{*}p < 0.05$.
Source: Zephyr Bureau van Dijk's database, Orbis Bureau van Dijk, and Eikon databases.

Table 12. VIF for robustness checks with ROA.

Variables	VIF	1/VIF
(1) Capital Ratio	1.07	0.9317
(2) Growth Opportunity	1.45	0.6917
(3) Capital Productivity	1.43	0.6982
(4) SME	1.33	0.7522
(5) FAMILY	1.31	0.7624
(6) PEexperience	1.34	0.7467
(7) CAPEX	1.22	0.8192
(8) Leverage	1.06	0.9401

Source: Zephyr Bureau van Dijk's database, Orbis Bureau van Dijk, and Eikon databases.

Table 13. VIF for robustness checks with Revenues_TA.

Variables	VIF	1/VIF
(1) Capital Ratio	1.01	0.9920
(2) Growth Opportunity	1.04	0.9644
(3) Capital Productivity	1.04	0.9605
(4) SME	1.04	0.9569
(5) FAMILY	1.04	0.9620
(6) PEexperience	1.05	0.9491
(7) CAPEX	1.06	0.9405
(8) Leverage	1.00	0.9963

Source: Zephyr Bureau van Dijk's database, Orbis Bureau van Dijk, and Eikon databases.

Table 14. VIF for robustness checks with EBIT_TA.

Variables	VIF	1/VIF
(1) Capital Ratio	1.01	0.9920
(2) Growth Opportunity	1.04	0.9644
(3) Capital Productivity	1.04	0.9605
(4) SME	1.04	0.9569
(5) FAMILY	1.04	0.9620
(6) PEexperience	1.05	0.9491
(7) CAPEX	1.06	0.9405
(8) Leverage	1.00	0.9963

Source: Zephyr Bureau van Dijk's database, Orbis Bureau van Dijk, and Eikon databases.

5. Discussion

The purpose of this paper is to investigate the relationship between being an SME and the performance of the private equity backed companies. The private equity investment creates value in the target firm based on the considered measures of operating performance.

Existing literature points out the private equity investors' opportunity to create value is more compelling when the target company is an SME. This is because the specific organizational and governance characteristics of this type of company allow the private equity investor to consolidate and boost the SME's strengths while mitigating its weaknesses (Marti et al., 2013; Croce & Marti, 2016).

Relying on a sample of European private equity-backed companies granted funding in 2005–2017, evidence supports that non-SMEs backed by private equity perform somewhat differently than SMEs backed by private equity. Therefore, the type of organization of the target enterprise does influence the ability of the private equity investor to create value. If the target enterprise is an SME or a family-owned

company, the private equity investor's opportunity to create value will be different. The results show mixed effects: having an SME sometimes results in lower operating performance than if the target firm did not fall into this classification, and conversely. Evidence of this is given by the coefficient of the SME variable taking positive or negative values depending on the measures of operational performance being considered. This result can be analyzed under two perspectives. On the one hand, the owners of SMEs play a key role in making decisions, also due to the close personal relationship with other employees, thus opening to the possibility to have conflicts of interest and to prioritize the pursuit of personal rather than business goals. Also, given that usually small companies cede a lower stake to external investors to retain control, this undermines the private equity investor's ability to create firm value. On the other hand, in small companies, agency costs are minimized (Dawson, 2011), allowing the private equity investor to implement strategic actions more easily and to bring in more professionalism and structure.

For the proportion of companies in the sample that are family owned targets, results seem to suggest that the presence of family shareholders has a negative impact on the target companies' ability to better their operating performance. As already mentioned, among the typical drawbacks of private equity investments in family firms is the unwillingness of the latter to divest control to third-party investors and, when doing so, only the minority interests are permitted. As a result, holding a minority stake can prevent the private equity investor from implementing all the changes that would be needed to actually turnaround the performance of the backed firm (Achleitner et al., 2008).

While being an SME have both positive and negative effects on the performance of the backed company, while family ownership only negatively affects the performance, results show that being both an SME and family owned has a negative impact on the operating performance of the backed firm. This finding would suggest that when the target SME is family owned, the ability of the private equity to minimize the weaknesses of such an organizational form of company is impaired.

Another important finding is that the higher experience of the private equity investor is associated with a higher operating performance of the target during the holding period. In particular, the positive effect of the greater experience on the backed firm's performance increases over the course of the holding period. This is especially true when the investment period was a year of crisis. This result contradicts the idea that experienced private equity investors suffer from overconfidence that leads to mistakes in the screening process (Shepherd & Zacharakis, 2002). On contrary, it suggests that regardless of the specific industry, experienced private equity investors have a greater ability to create value in the target companies than less experienced investors, and are particularly suited to assist companies in periods of crises. This result is more in line with the findings of the existing literature (Dyck & Pomorski, 2016).

In addition, the Leverage variable was remarkably relevant in determining the operating performance of target companies receiving private equity investment during the years of the Global Financial Crisis. Private equity investors commonly increase both operational and financial risk of the target company by, *inter alia*, increasing leverage. While this increase in risk could facilitate the illiquidity and/or bankruptcy of the target firm, the analysis performed shows that actually in the years of the

private equity involvement, the higher leverage was positively correlated with a better operating performance. This finding would suggest that at least for the years of the Global Financial Crises, the benefits from the higher leverage resulting from the private equity investment offset the cost of the greater financial and operational risk.

Unsurprisingly, the variables representing the backed companies' capital ratio, growth opportunity and CAPEX are positively associated with the private equity backed companies' operating performance. This is consistent with general evidence from the literature (Salerno, 2019; Meles et al., 2014; Lahmann et al., 2017).

In particular, a relevant outcome of the analysis is that certain variables, even though not significant after one year, become significant in the second and third year after the private equity investment. This is an additional finding that supports the idea that, differently from a bank loan, private equity investments represent an effective alternative source of finance to backing SMEs' growth, with a positive impact on operating performance and profitability. This because the private equity investor actively influences the target company's operations, thus directly and/or indirectly impacting on the variables that ultimately determine the performance of the firm.

6. Conclusions and limits

In conclusion, the paper has several implications. For the private equity investor, has a beneficial impact in understanding which characteristics of a company can affect the operating performance in the post-investment period, and in better selecting companies.

During the screening process, where private equity investors have to choose the company to invest in, relevant is whether the company is an SME and family-owned for them to take into account. This is because those governance characteristics (and the resulting organizational and ownership structures) will influence their ability to improve the backed firms' performance. Thus, being an SME affects the ability of the private equity to create firm value in the three years after the investment.

Moreover, public policies can take in account the beneficial (or not) effects of private equity investments on the SMEs. Thus, in general terms, it can be argued that private equity financing allows SMEs to have the financial resources needed to grow, innovate and gain a competitive advantage. This is particularly relevant when considering the role that SMEs and family-owned companies have in the European economy, strongly related to the focus of the paper on this economic area.

Overall, the private equity investor affects positively the operating performance and profitability of SMEs in the three-year post-investment period; in particular, when it comes to the investor characteristics, the more experienced the private equity investor, the greater the improvement in performance that can be achieved.

The analysis performed has various limits that, however, offer a fertile ground for future research.

First of all, the paper does not consider the performance of the target firms in the years before the private equity investment. This is a limitation because the screening ability of the private equity investor is not isolated. Second of all, the paper does not investigate the performance of the private equity backed firm at exit. Therefore,

whether, after exiting private equity, the firm can keep implementing the changes made by the private equity investor or whether the performance is impaired having lost the support of the qualified investor would be interesting to investigate. Third of all, the sample size, in particular with regards to family owned companies, is limited. This is due both to the confinement of the geographic region to Europe as well as the limited availability of data. The limited public availability of data on private equity transactions is still one of the main issues constraining research, yet a key issue to be addressed if progress is to be made in the investigation of such a relevant topic. Then, it would be interesting to analyse the performance of SMEs after the private equity investment in regions where SMEs do not account for the majority of total firms, distinguishing between venture capital and buy-out investments. Finally, it would be interesting to examine separately the impact of private equity investments in different periods of crises, so to test whether the resilience of private equity can be proved for different external negative shocks.

Notes

1. Orbis Bureau van Dijk.
2. This criterion of family firm is consistent with the definition provided by Holderness and Sheehan (1988).
3. https://www.mckinsey.com/business-functions/marketing-and-sales/our-insights/getting-tangible-about-intangibles-the-future-of-growth-and-productivity.

Disclosure statement

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Appendix

Table A1. List of the main articles in private equity - research and methodology used.

Author(s)	Year	Title	PE Related Methodology
Zahra, S.A.	1995	Corporate entrepreneurship and financial performance: The case of management LBOs	MANCOVA, with repeated measures, and ANCOVAs
Howorth, C., Westhead, P. and Wright, M.	2004	Buyouts, information asymmetry and the family management dyad	Qualitative case study methodology
Maury, B.	2006	Family ownership and firm performance: empirical evidence from Western European corporations	Regression analysis
Balboa, Marti and Zieling	2006	Does VC really improve portfolio companies' growth? Evidence from growth companies in Continental Europe	Regression analysis
Chrisman, J.J., Chua, J.H., Kellermanns, F.W. and Chang, E.P.C.	2007	Are family managers agents or stewards? An exploratory study in privately held family firms	Regression analysis
Miller, D., Le Brerton-Miller, I., Lester, R.H. and Cannella Jr, A.A.	2007	Are family firms really superior performers?	Tobin's q
Espel, P., Brettel, M., Breuer, W., Abedin, A.	2009	Private Equity for SME: A behavioral model of the demand-side perspective	Regression analysis
Dawson, A.	2011	Private Equity investment decisions in family firms: The role of human resources and agency costs	Regression analysis
Boucly, Q., Sraer, D. and Thesmar, D.	2011	Growth LBOs	Regression analysis
Tappeiner, F., Howorth, C., Achleitner, A-K. and Schraml, S.	2012	Demand for private equity minority investments: A study of large family firms	Qualitative case study methodology
Zellweger, T.M., Kellermanns, F.W., Chrisman, J.J. and Chua, J.H.	2012	CEOs: The importance of intentions for transgenerational control	Anova, Regression, Levene tests
Scellato, G. and Ughetto, E.	2013	Real effects of private equity investments: Evidence from European buyouts	OLS regressions
Marti J., Menéndez-Requejo S. and Rottke O.M.	2013	The impact of venture capital on family businesses: Evidence from Spain	Regression analysis
Meles, A., Monferrà, S. and Verdoliva, V.	2014	Do the effects of private equity investments on firm performance persist over time?	Regression analysis

(*continued*)

Table A1. Continued.

Author(s)	Year	Title	PE Related Methodology
Fernandez-Olmos, M., Gargallo-Castel, A. and Giner-Bagues, E.	2015	Internationalisation and performance in Spanish family SMEs: The W-curve	Panel data analysis, Longitudinal analysis, Regression
Battistin, E., Bortoluzzi, P., Buttignon, F. and Vedovato M.	2016	Minority and majority private equity investments: firm performance and governance	Difference-in-difference approach
Duréndez, A., Ruiz-Palomo, D., Garcia-Pérez-de-Lema, D. and Dieguez-Soto, J.	2016	Management control systems and performance in SM FFs	Regression analysis
Lahmann, A.D.F., Stranz, W., Velamuri, V.K.	2016	Value creation in SME private equity buy-outs	Qualitative case study methodology
Carrasco-Hernandez, A.J. and Jimenez-Jimenez, D.	2017	Knowledge management, flexibility and firm performance: The effects of family involvement	Regression analysis
Pérez-Lopez, M.C., Gomez-Miranda, M.E., Argente-Linares, E. and Lopez-Sanchez, L.	2017	The Internationalisation of Spanish FFs through business groups: Factors affecting the profitability and the moderating effect of the family nature of the Spanish business	Regression analysis
Salerno, D.	2018	Does the private equity financing improve performance in family SMEs?	Regression analysis
Arteche, L., Prado, C. and Fernandez, A.	2020	Value creation in private equity-backed family firms: a regression analysis	Regression analysis

Source: Authors.