

Value creation in private equity-backed family firms: a regression analysis

Creación de valor en empresas familiares respaldadas por capital privado: un análisis de regresión

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Abstract

Private equity (“PE”) is mostly invested in established firms, of which family firms (“FFs”) are the dominant form. Since the study of the PE activity in FFs is still in its infancy, the authors suggest a regression model to identify the factors determining the value creation in PE-backed FFs. This paper shows that: (i) PE participation increases public middle-market FF’s valuation, and; (ii) the quotation on stock exchanges has a positive effect on the valuation of the PE-backed FFs.

Key words: family firms, private equity, small and medium-sized enterprises, value creation

Resumen

Como el estudio de la actividad del capital riesgo (“CR”) en empresas familiares (“EEFF”) todavía está en estadios iniciales, proponemos un modelo de regresión para identificar los factores que determinan la creación de valor en EEFF participadas por el CR. Este artículo muestra que: (i) la participación del CR aumenta la valoración de las EEFF pequeñas y medianas cotizadas, y; (ii) la cotización en bolsa tiene un efecto positivo en la valoración de las EEFF participadas por el CR.

Palabras clave: empresas familiares, capital riesgo, pequeñas y medianas empresas, creación de valor

1. Introduction

Small and medium-sized enterprises (hereinafter, “SMEs” or “the middle-market sector”) play an important role in our financial system provided that they represent 99% of all businesses in Europe. SMEs have strong difficulties to obtain external funds for growth. The diversification of their financing sources is a key issue to allow room for growth and internationalization today and the PE is, in some cases, the main source of long term financing for them that has many advantages against other sources of financing. PE is an effective alternative to traditional financing for SMEs as it provides with solid and sustainable business models to better deal with economic cycles. The majority of SMEs are FFs and many of them are facing succession around the world (Shanker & Astrachan, 1996; Upton & Petty, 2000), with the challenge of ensuring succession of the business being a pressing global

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phenomenon; but PE has largely been ignored as a possible solution (Higashide & Birley, 2002; Howorth, Westhead & Wright, 2004)

FFs play a significant role in the global economy (Anderson & Reeb, 2003; Astrachan & Shanker, 2003; Chrisman, Chua & Wu, 2007; Klein, 2000; Morck & Yeung, 2003) and are the dominant form of economic enterprise throughout the world (Astrachan, 2010; Chrisman, Chua & Steier, 2003; La Porta, Lopez-de-Silanes & Shleifer, 1999). Most firms, even large ones, are controlled by families (Burkart, Panunzi & Shleifer, 2003) Nonetheless, all over the world, FFs tend to concentrate in the size group of SMEs (Arosa, Iturralde & Maseda, 2010; Sciascia & Mazzola, 2008; Westhead & Howorth, 2006)

FFs are a heterogeneous group with varying degrees of family influence, differences in size, industry and geography (Chrisman, Chua, Pearson & Barnett, 2012; Chua, Chrisman, Steier & Rau, 2012; Tsang, 2002). Several authors have shown that access to finance is not only one of the top areas in FF research but also a growing area since the availability of enough financial resources is of critical importance for the FF's survival and growth.

Although FFs play a vital role in the world economy, they have received relatively little attention despite their presence in the literature has increased substantially in the last decade: among the topics of interest, growth and succession are recognized as the main challenges for FFs. Several authors have suggested that future research on FFs should expand on nonfamily routes to succession, seeing that many FFs may not be able or willing to choose a family successor (Dawson, 2011)

During the holding period, PE firms, along with the existing or new management team, try to increase the economic value of the firm (Barber & Goold, 2007; Kaplan & Strömberg, 2009). It is generally recognized that PE transactions are associated with enhanced performance and productivity though changes in incentive and governance mechanisms (Cumming, Siegel & Wright, 2007; Wright, Thompson & Robbie, 1992). Prior research suggested also that the impact of these transactions both on the firms and on the society should be addressed by future studies (Dawson, 2011)

In contrast, we find that bank-related products remain as the most relevant financing source for SMEs (with the majority of them in the form of FFs) nowadays, while other market-based instruments such as equity (that includes the PE) are very far less considered a potential source of finance: family owners are usually averse to incorporating new shareholders.

The scientific study of the PE sector with activity in the family owned SMEs market segment belongs to a relatively recent past, they are often overlooked in finance studies and absent in theory development: the first article indexed in the Web of Science appeared in year 1992 and significant volumes of high impact research did not appear until year 2007.

Despite the above, corporate governance and the ownership transfer process are attracting academic attention (Scholes, Wright, Westhead, Burrows & Bruining, 2007); and research on selling or acquiring a FF is gaining momentum (Chrisman et al., 2012; Dawson, 2011, Granata & Chirico, 2010; Niedermeyer, Jaskiewicz & Klein, 2010; Wennberg, Wiklund, Hellerstedt & Nordqvist, 2011) what is justified given, between other reasons, the international significance of family succession challenges that lead to the sale of the business (Scholes, Westhead & Burrows, 2008; Wright et al., 2001)

PE represents an alternative source to finance investment opportunities: in addition to the funding provided, managerial support and other value-adding activities seem to explain the superior performance of PE-backed firms (Barry, 1994; Sapienza, 1992). In the past three decades there has been an increasing role of PE industry in the financing of enterprises especially in case of firms that have great growth potential but are in need of external financing. In this respect, many papers have already addressed the issue of the positive impact that PE investors

have on their investee firms and the results of most empirical studies show that PE-backed companies outperform non-PE-backed ones.

PE investors also invest in family-controlled businesses. In this context, Martí, Menéndez-Requejo and Rottke (2013) argue that PE may facilitate firm changes in management, organization, governance and ownership to support the FF's survival and future performance. But, in general, little attention has been paid in the literature to the effect of PE involvement in FFs: there is a gap in the literature, which may be due to the reluctance of FFs to accept PE investors. These specialized investors could play an important role in two critical issues, namely succession and growth (Martí et al., 2013). FFs, which rely heavily on internal or family resources, may have a greater need for the managerial resources that PE can provide (Astrachan & McConaughy, 2001; Block, Jaskiewicz & Miller, 2011). In fact, FFs without able and willing family successors are frequently sold to non-family managers through management buyouts – hereinafter, “MBOs” - (Chrisman et al., 2012). But very little is known about the factors that influence FF owners' decisions to seek PE investment: FF owners may be more averse to giving away control over the family business to outsiders, and this may affect their attitudes towards PE (Tappeiner, Howorth, Achleitner & Schraml, 2012)

Martí et al. (2013) contributed to the limited existing evidence on the effect of PE involvement in FFs, especially regarding key strategic decisions such as growth and succession. This research found that, when PE majority stakes are considered, PE managers are able to implement their management culture and, therefore, the results would not be different from those expected in other investee firms. Lansberg (1999) argued that few FFs are capable of successfully transferring their businesses to the next generation of family members.

However, academics and practitioners have failed to explore in detail alternative succession routes (Birley & Westhead, 1990). In summary, by themselves, many FFs do not have the necessary resources and capabilities to grow or to manage generational succession (Howorth et al., 2004; Shanker & Astrachan, 1996; Sirmon & Hitt, 2003; Upton & Petty, 2000)

As previously mentioned, ownership and management succession are one of the biggest challenges for FFs. Succession is the most frequently studied topic in the family business literature (Chua, Chrisman & Sharma, 2003) but the exploration of nonfamily routes to succession has not received much attention in the academic literature (Birley & Westhead, 1990; Howorth et al., 2004). It is frequently viewed negatively as a problem that must be overcome but it can, however, represent an opportunity for the firm (Dyck, Mauws, Starke & Mischke, 2002).

Selling the FF to PE firms can be a viable option to secure firm survival if perpetuation of family ownership is not feasible (Chrisman et al., 2012; Dehlen, Zellwegere, Kammerlander & Halter, 2014; de Massis, Chua & Chrisman, 2008). Given that FFs face considerable challenges involving family succession (Sharma, Chrisman & Chua, 2003), selling the FF promises a way to secure survival (Wright et al., 2001). PE is an alternative source of financing that also includes value adding services.

Nevertheless, FFs often do not consider it because it implies accepting an external shareholder on the board (Martí et al., 2013). In addition, family shareholders feel uncomfortable with the control and reporting implications of a PE relationship (Harvey & Evans, 1995), as well as with the high returns that PE investors aim to obtain in a short period of time. Another explanation of the reluctance of FFs to approach PE investors is related to valuation. Owners in FFs tend to add an 'emotional value' (Zellweger & Astrachan, 2008) on top of the enterprise value that a financial analyst would estimate, thus limiting the chances of reaching an agreement with the PE investor (Martí et al., 2013)

From a PE firm's perspective, FFs represent an important investment opportunity as they can increase the firm's value. Opening up the FF's capital to PE investors has two advantages: continuity of the firm and, in some cases, sustained family presence in the business (Dreux, 1992; Howorth et al., 2004)

The low use of external equity financing by FFs has also been a focus of research in the past. In FFs, financing has been linked to strategic decisions such as the timing of succession (Kimhi, 1997), the sale of the business (Bhattacharya & Ravikumar, 2001) and the internationalization (Benito-Hernández, Priede-Bergamini & López-Cózar-Navarro, 2014)

In contrast to family sellers, the PE firm's key interest is the economic or financial value of the firm, that is, the ability to generate present and future cash flow (Damodaran, 2002; Dawson, 2011; Makri, Hitt & Lane, 2010)

In general, FF owners balance financial and non-financial resources of PE with the need to cede control rights: non-financial resources are valued more highly when resolving family issues (Tappeiner et al., 2012). Despite more and more FFs open their capital for outside investors, existing studies mainly conclude that family companies are more reluctant than others to hand over control to outside investors.

An objective of this study is to fill the gap in our understanding by examining the effects of PE ownership in FFs in terms of its effect on company valuation. Specifically, this study investigates whether and in what proportion PE involvement affects FFs growth in terms of revenues. The results of the study have important implications for research in both PE and FFs. By showing that PE has a positive effect on company growth, the results indicate that future studies on FF financing should include considerations about PE involvement.

This article is organized as follows. In Section 2, we describe the data set, the variables, and our model followed by Section 3, in which we present our empirical results. We make our conclusions in Section 4.

1.1. Research questions

As previously mentioned, a PE deal may be an alternative solution for the succession problems of FFs: PEs may find ample growth opportunities in FFs by introducing related product segments, increasing geographic scope, and pursuing non-organic growth via mergers and acquisitions (Scholes, Wright, Westhead, Bruining and Kloeckner, 2009; Smith & Triantis, 1995; Tong, Reuer & Peng, 2008). However, the academic research into PE in FFs is still in its infancy (Tappeiner et al., 2012) and most studies of PE examines leveraged buyouts (Wood & Wright, 2009). Recognizing that PE involvement has a positive effect on the investee firms, we examine a set of research questions related to the effect it specifically has on FFs. The major questions are:

- Does PE involvement have an effect on revenues of the backed FF?
- Does PE involvement have an effect on revenues of the backed public FF?
- Does PE involvement have an effect on revenues of the backed private FF?

2. Methodology

This research proposes a model of analysis in which dependency relations between the variables analyzed will be established. For this reason, the dependent and independent variables that will form the model will be identified and the predictability of the model will be analyzed; in this way, our proposed model is framed within those that are based on dependency relationships between the variables.

Taking into account the above and following the classification exposed by Fernández (2016), we will be able to understand which technique is the most appropriate for our study: our study establishes relationships of dependence between variables and also a relationship between the variables that make up the proposed model is proposed. In this way and following the work of Prado (2009), the most appropriate technique for our research is that of Multiple Linear Regression. This technique has been widely used in FF and PE research as shown in Table 1:

Table 1
List of the main articles in FF and PE
research and techniques used

Author(s)	Year	Title	PE Related	Methodology
Zahra, S. A.	1995	Corporate entrepreneurship and financial performance: The case of management leveraged buyouts	Yes	MANCOVA, with repeated measures, and ANCOVAs
Howorth, C., Westhead, P. and Wright, M.	2004	Buyouts, information asymmetry and the family management dyad	Yes	Qualitative case study methodology
Maury, B.	2006	Family ownership and firm performance: empirical evidence from Western European corporations	No	Firm performance is measured by Tobin's q and ROA. The relationship between firm performance and family ownership is analyzed through regressions.
Balboa, Martí and Zieling	2006	Does VC really improve portfolio companies' growth? Evidence from growth companies in Continental Europe	Yes	Several regressions before and after the VC investment is carried out are run.
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	No	Regression
Miller, D., Le Breton-Miller, I., Lester, R.H. and Cannella Jr., A.A.	2007	Are family firms really superior performers?	No	Tobin's q (market value to assets)
Dawson, A.	2011	Private equity investment decisions in family firms: The role of human resources and agency costs	Yes	Regression
Boucly, Q., Sraer, D. and Thesmar, D.	2011	Growth LBOs	Yes	Regression
Tappeiner F., Howorth C., Achleitner A-K. and Schraml S.	2012	Demand for private equity minority investments: A study of large family firms	Yes	Qualitative case studies of 21 large FB in Germany.
Zellweger, T.M., Kellermanns, F.W., Chrisman, J.J. and Chua, J.H.	2012	Family control and family firm valuation by family CEOs: The importance of intentions for transgenerational control	No	Anova, Regression, Levene tests
Scellato, G. and Ughetto, E.	2013	Real effects of private equity investments: Evidence from European buyouts	Yes	OLS regressions
Martí J., Menéndez-Requejo S. and Rottke O.M.	2013	The impact of venture capital on family businesses: Evidence from Spain	Yes	Regression
Fernández-Olmos, M., Gargallo-Castel, A. and Giner-Bagües, E.	2015	Internationalisation and performance in Spanish family SMEs: The W-curve	No	Panel data analysis for the 2006-2011 period. Longitudinal analysis with non-linear terms. Regression.
Battistin, E., Bortoluzzi, P., Buttignon, F. and Vedovato M.	2016	Minority and majority private equity investments: firm performance and governance	Yes	Difference-in-differences approach.
Duréndez, A., Ruíz-Palomo, D., García-Pérez-de-Lema, D. and Diéguez-Soto, J.	2016	Management control systems and performance in SM FFs	No	Regressions
Carrasco-Hernández, A.J. and Jiménez-Jiménez, D.	2017	Knowledge management, flexibility and firm performance: The effects of family involvement	No	Regression analysis
Pérez-López, M.C., Gómez-Miranda, M.E., Argente-Linares, E. and López-Sánchez, 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	No	Linear regression

Source: authors' research

2.1. Description of the sample

The sample used for the analysis is made up of data from 1647 SMEs that are or have been backed by a PE, from 73 countries and 11 sectors for year 2017. The database used is Capital IQ, which belongs to S&P Global Inc. (NYSE: SPGI). S&P Global provides independent ratings, benchmarks, analytics and data to the capital and commodity markets worldwide. S&P Global Inc. was founded in 1860 and is headquartered in New York.

The screen criteria to generate the sample was as follows:

- Size of the company: SMEs (total revenues between 10 and 50 million Euros and total employees between 50 and 250)

- Ownership status: Current Sponsor-Backed or Prior Sponsor-Backed.

The sample consists of 1647 SMEs and their annual data on Revenues, Ebitda and Net Debt. The sectorial classification, the country and the shareholders are also included. The most representative countries by total revenues in 2017 are shown in Table 2. The most representative sectors by total revenues in 2017 are: Information Technology (21% of total); Financials (16%); Industrials (15%), and; Health Care (13%)

Table 2
Distribution of the sample by top 10 countries in year 2017

Nº Country of Incorporation	Total Revenue (€EURmm)	Total EBITDA (€EURmm)	Total Net Debt (€EURmm)	Total Employees	% of Total Revenue
1 United States	10.633,9	-4.114,0	-3.868,9	48.797	25,0%
2 Japan	10.368,5	908,9	-2.997,3	47.099	24,4%
3 United Kingdom	3.979,9	232,7	-1.010,4	22.199	9,4%
4 France	1.860,3	-137,1	-60,8	9.966	4,4%
5 Canada	1.626,2	-4,7	688,0	8.544	3,8%
6 Cayman Islands	1.331,1	-20,6	-22,5	7.894	3,1%
7 India	1.294,2	171,2	448,2	8.978	3,0%
8 Germany	941,6	16,9	1.000,9	5.236	2,2%
9 Australia	902,8	-7,2	218,4	4.756	2,1%
10 China	848,0	156,1	-85,4	4.763	2,0%
Rest of countries (63)	8.774,7	-410,2	6.663,4	52.066,0	20,5%
Total general	42.561,2	-3.208,0	973,5	220.298	100,0%

Source: Capital IQ database

2.2. Description of the control group

The control group used for the analysis is made up of data from 1209 SMEs that have never been backed by a PE, from 85 countries and 11 sectors for year 2017. The database used is also Capital IQ. The screen criteria to generate the control group was as follows:

- Size of the company: SMEs (total revenues between 10 and 50 million Euros and total employees between 50 and 250)
- Ownership status: Never Sponsor-Backed or Current and Pending Corporate Investments or Prior Corporate Investments or All Independent Corporations.

The control group consists of 1209 SMEs and their annual data on Revenues, Ebitda and Net Debt. The sectorial classification, the country and the shareholders are also included. The most representative countries by total revenues in 2017 are shown in Table 3. The most representative sectors by total revenues in 2017 are: Financials (20%), Industrials (18%), Information Technology (14%) and Consumer Discretionary (11%)

Table 3
Distribution of the control group
by top 10 countries in year 2017

Nº Country of Incorporation	Total Revenue (€EURmm)	Total EBITDA (€EURmm)	Total Net Debt (€EURmm)	Total Employees	% of Total Revenue
1 Japan	9.464,7	811,6	-2.051,2	42.626	17,0%
2 United States	9.298,3	-3.424,6	-5.391,1	43.958	16,7%
3 Australia	4.748,7	351,2	2.280,8	18.128	8,5%
4 India	3.878,4	393,8	1.938,7	27.374	7,0%
5 Cayman Islands	3.497,4	-16,3	-668,2	20.123	6,3%
6 Taiwan	2.556,3	430,9	3.157,8	15.774	4,6%
7 United Kingdom	2.460,3	76,4	-1.410,5	14.793	4,4%
8 Germany	2.339,1	25,0	11.419,3	13.064	4,2%
9 France	2.042,4	-32,8	203,3	10.331	3,7%
10 Canada	1.522,9	-20,8	1.414,7	8.245	2,7%
11 Rest of countries (75)	14.526,9	530,4	28.781,8	83.757	24,8%
Total general	56.335,4	-875,1	39.675,5	298.173	100,0%

Source: Capital IQ database

2.3. Model for the research questions

To examine the research questions – whether PE involvement has an effect on FF sales – we estimate Model 1:

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots + \beta_k X_{ki} + \mu_i$$

where x_1, x_2, \dots, x_k are the independent or explanatory variables.

The multiple regression model requires fulfilling or performing the following hypotheses:

- 1) Linearity: to fit a model to a data set it is necessary that they comply with equation (1). If there are more than two explanatory variables, equation (1) is a hyperplane and we can not visualize the appearance of the data.
- 2) $E(u_i)$: the average value of the error is zero. This hypothesis implies that the adjustment to be made is centered on the data and it is expected that the regression plane or hyperplane is centered in the point cloud of the data.
- 3) $\text{Var}(u_i) = \sigma^2 = \text{constant}$. This hypothesis implies that the cloud of data points always has a similar width.
- 4) Independence $E(u_i u_j) = 0$. This hypothesis implies that observations are independent.
- 5) Normal $u_i - N(0, \sigma^2)$. This hypothesis refers to errors, which are normally distributed, following a Gaussian bell.

The coefficient of determination, R^2 , gives us the amount of variability of y that x explains. It defines (2),

$$R^2 = \frac{VE}{VT} = \frac{\sum_{i=1}^n (\hat{y}_i - \bar{y})^2}{\sum_{i=1}^n (y_i - \bar{y})^2} = \frac{\sum_{i=1}^n (\hat{y}_i - \bar{y})^2}{ns_y^2}$$

The coefficient of determination provides information on whether x and y are closely related or not. This, defined in (2), has the problem that it increases its value when including new variables, even when they are not significant. To avoid this problem, the coefficient of determination corrected by degrees of freedom is defined (3):

$$\bar{R}^2 = 1 - (1 - R^2) \frac{n-1}{n-k+1}$$

The utility of the regression models in the valuation of family companies invested by PE is limited because there are some aspects that are difficult to quantify. However, the regression methodology appears to be the most powerful when it comes to the formulation of rigorous criteria in this field. The use of regression analysis in the value creation in FFs must consider the problem of the selection of independent variables under two conditions: increase the coefficient of determination and reduce the correlation between explanatory variables.

Normally for the selection of variables in the regression analysis, eliminating multicollinearity, the factorial analysis of main components is used. It is a useful procedure in studies with a large amount of information, difficult to manage and analyze, and which is often partially redundant.

3. Results

In this section the authors analyze the relationship between the revenues of a FF in 2017 and a series of variables related to them, these are: participation by a PE ("PE backed"), quotation on the stock exchanges ("Public"), main sector of activity ("Primary sector"), main industry of activity or subsector ("Primary industry"), country of headquarters ("Country of incorporation"), level of Ebitda ("Ebitda 2017"), level of net debt ("Net debt 2017") and total employees ("Employees 2017")

In order to predict how a series of variables X influences another Y , that is, to determine this relationship between variables, a multiple regression model is constructed:

Table 4
Model summary

Model	R	R ²	Adjusted R ²	Standard error	Statistics of change				
					Change in R ²	Change in F	gl1	gl2	Sig. Change in F
1	.352	0.124	0.12	0.1817	0.124	27.629	11	2147	0,000

Source: authors' research

Table 5
Regression results

Model	Non-standardized coefficients		Standardized coefficients Beta	t	Sig.
	B	Desv. Error			
(Constant)	0.831	0.050		16.558	0.000
PE Backed	0.041	0.009	0.102	4.618	0.000
Public	0.067	0.012	0.124	5.721	0.000
Primary sector	-0.001	0.002	-0.014	-0.472	0.637
Primary industry	0.000	0.000	0.018	0.594	0.553
Country of incorporation	-0.001	0.000	-0.088	-4.249	0.000
EBITDA 2017 Log	0.068	0.007	0.205	9.226	0.000
Net debt 2017 Log	0.027	0.006	0.095	4.246	0.000
Employees 2017 Log	0.171	0.021	0.166	8.115	0.000

Source: authors' research

As shown in Table 4, R² is 12.4% and the model has statistical significance. All variables are significant except for the primary sector and the primary industry. R² = 12.4% means that the model variables explain 12.4% of the revenues of a family business in 2017.

- The following variables have a t>2, so it is accepted that they are significant: (i) the participation by a PE (t = 4.618); (ii) the stock exchange (t = 5.721); (iii) the home country of the FF (t = 4.249); (iv) the Ebitda of 2017 (t = 9.226); (v) the net debt of 2017 (t = 4.246), and; (vi) the total number of employees in 2017 (t = 8.115)

By having a positive sign, an increase of any of these variables will produce an increase in the revenues of the FF, everything else constant. They are all determining factors in the valuation of a family business in 2017.

Next, a multi-group analysis was carried out, where the performance of listed companies (Public) and unlisted (Private) FFs was analyzed.

3.1. Results for public family firms

Table 6
Model summary

Model	R	R ²	Adjusted R ²	Standard error	Statistics of change				
					Change in R ²	Change in F	gl1	gl2	Sig. Change in F
1	.340	0.116	0.111	0.18167	0.116	23.777	10	1816	0.000

Source: authors' research.

Table 7
Regression results

Model	Non-standardized coefficients		Standardized coefficients	t	Sig.
	B	Desv. Error	Beta		
(Constant)	0.856	0.051		16.712	0.000
PE backed	0.043	0.010	0.101	4.451	0.000
Primary sector	-0.001	0.002	-0.007	-0.216	0.829
Primary industry	0.000	0.000	-0.028	-0.838	0.402
Country of incorporation	-0.000	0.000	-0.001	-0.041	0.967
EBITDA 2017 Log	0.062	0.008	0.190	7.804	0.000
Net debt2017 Log	0.028	0.007	0.099	4.081	0.000
Employees 2017 Log	185	0.023	0.180	8.028	0.000

Source: authors' research

As shown in Table 6, R^2 is 11.6% and the model has statistical significance. All variables are significant except for the primary sector, the primary industry and the country of incorporation. $R^2 = 11.6\%$ means that the model variables explain 11.6% of the revenues of a public family business in 2017.

- The following variables have a $t > 2$, so it is accepted that they are significant: (i) the participation by a PE ($t = 4.451$); (ii) the Ebitda of 2017 ($t = 7.804$); (iii) the net debt of 2017 ($t = 4.081$), and; (iv) the total number of employees in 2017 ($t = 8.028$)

By having a positive sign, an increase of any of these variables will produce an increase in the revenues of the public FF, everything else constant. They are all determining factors in the valuation of a public family business in 2017.

3.2. Results for private family firms

Table 8
Model summary

Model	R	R^2	Adjusted R^2	Standard error	Statistics of change				
					Change in R^2	Change in F	gl1	gl2	Sig. Change in F
1	.543	0.295	0.273	0.16441	0.295	13.402	10	321	0.000

Source: authors' research

Table 9
Regression results

Model	Non-standardized coefficients		Standardized coefficients	t	Sig.
	B	Desv. Error	Beta		
(Constant)	1.088	0.102		10.646	0.000
PE backed	0.009	0.022	0.020	0.395	0.693
Primary sector	-0.002	0.004	-0.032	-0.534	0.594
Primary industry	0.001	0.000	0.159	2.521	0.012
Country of incorporation	-0.002	0.000	-0.415	-8.245	0.000
EBITDA 2017 Log	0.087	0.017	0.263	5.125	0.000
Net debt2017 Log	0.037	0.014	0.143	2.727	0.007
Employees 2017 Log	0.136	0.048	0.135	2.839	0.005

Source: authors' research.

As shown in Table 8, R^2 is 29.5% and the model has statistical significance. All variables are significant except for PE backed and the primary sector. $R^2 = 29.5\%$ means that the model variables explain 29.5% of the revenues of a private family business in 2017.

- The following variables have a $t > 2$, so it is accepted that they are significant: (i) the primary industry of the private FF ($t = 2.521$); (ii) the home country of the private FF ($t = 8.245$); (iii) the Ebitda of 2017 ($t = 5.125$); (iv) the net debt of 2017 ($t = 2.727$), and; (v) the total number of employees in 2017 ($t = 2.839$)

By having a positive sign, an increase of any of these variables will produce an increase in the revenues of the private FF, everything else constant. They are all determining factors in the valuation of a private family business in 2017.

4. Discussion

The results of our analysis should reduce the distance between the public middle-market FFs and external investors like the PE, which is large mainly due to the "empathy gap" between owners and investors (Poutziouris, 2011) or because of the preferred retention of control rather than firm's growth and development (Wu, Chua & Chrisman, 2007)

In addition, the results about the positive effect of the quotation on stock exchanges fit with the idea that PE means risk capital invested in a wide range of companies and industries: from funds provided to start-ups and privately-owned SMEs to acquisitions of multinational companies and even entire mature publicly-traded companies (Gilligan & Wright, 2010)

Based on the results obtained for public FFs, from the point of view of an investor, it will be more interesting to invest in a PE-backed family business because, according to the results of this study, they have a greater probability of obtaining a greater volume of revenues and this will in turn increase its value. In addition, in line with Cumming et al. (2007) and Wright, Thompson and Robbie (1992), they obtain better performance and productivity, once they have acquired enough size to access the stock market.

As a future line of research, the authors propose to analyze the characteristics of these companies in greater depth and, in the case of public FFs, analyze the impact of the PE on the average quotation in relation to the

market where it is listed, and even the composition of its shareholders structure, in order to check in greater depth how the presence of the PE affects the value of the FF.

The results for private FFs, where the impact of the PE on the revenues is smaller than in the public ones, support the idea that FFs that avoid external influences may be reluctant to take on any form of external finance, including PE (Poutziouris, 2001; Upton & Petty, 2000) butg this could constrain their ability to grow.

5. Conclusions

This paper shows that PE participation can increase public middle-market FF's valuation. The results also indicate that the quotation on stock exchanges has a positive effect on valuation of FFs. The primary sector and the primary industry are not determining factors in the valuation of a FF in 2017 except for private FFs, where it is accepted that the primary industry is significant.

In the case of private FFs, it is observed that they are companies with less PE presence when analyzing the descriptive data, with a lower economic flow and, possibly because they are in a previous phase, and their size is also smaller. All this causes that the impact of the PE on the revenues is smaller than in the public ones, a situation that leads them not to take advantage of the benefits that the PE can provide, which is why this variable in this case is not significant.

Following the research of Martí et al. (2013), the authors suggest a model to determine whether the PE has an impact on FF's value through the measurement of differential growth of revenues of the portfolio companies to test if these specialized investors could play an important role in growth and therefore in company valuation. We base our analysis on Ahlers, Hack and Kellermanns (2014), who recommended further empirical investigation of how factors such as ownership and management structure, company objectives, company size and generations involved in the firm influence FF valuation.

This analysis is expected to open a new path for the scientific field since the exploration of nonfamily routes to succession has not received much attention in the academic literature (Birley & Westhead, 1990; Howorth et al., 2004) and given that one possible solution to the succession problems is to open up the FF's capital to PE investors (Dawson, 2011). This study aims at filling the gap about PE as a non-family succession route for FFs, and giving continuity to the positive effect generated by PE within the FFs market segment.

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