

# Productivity Growth in Private-Equity–Backed Family Firms

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**We study the reluctance of family firms to accept private equity (PE) investors and the impact of PE on family firms' performance. We analyze the productivity growth in a sample of 257 PE-backed family firms, 143 of which were run by the founding generation. We compare these firms with both non-PE-backed family firms and non family PE-backed firms. We find that family firms accessing PE show lower productivity growth before the initial PE round, which is driven by an imbalance between inputs and output, especially in founder-controlled firms. Our results also confirm the positive impact of PE involvement on productivity growth in founder-controlled firms.**

## Introduction

Family firms are the backbone of the private economy (Anderson & Reeb, 2003; Astrachan & Shanker, 2003) but many of them are unable to access both the resources and capabilities needed to sustain competitive advantage and to grow (Sirmon & Hitt, 2003; Upton & Petty, 2000). Private equity<sup>1</sup> (hereinafter, PE) investors may support their future performance with both funding and managerial advice. From the perspective of the behavioral agency model, however, family members will usually want continued control over the firm's affairs to preserve their socioemotional wealth (SEW) regardless of economic or financial considerations (Berrone, Cruz, Gómez-Mejía, & Larraza-Kintana, 2010; Cruz, Gómez-Mejía, & Becerra, 2010; Gómez-Mejía, Cruz, Berrone, & De Castro, 2011; Gómez-Mejía, Takacs-Haynes, Núñez-Nickel, Jacobson, & Moyano-Fuentes, 2007). SEW priorities highlight several intrinsic characteristics of family firms, such as the desire for family control and influence, the identification of family members with the firm, the preservation of binding social ties among family members, the emotional

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1. We adopt the definition of the European Private Equity and Venture Capital Association: "PE is the provision of equity capital by financial investors—over the medium or long term—to non-quoted firms with high growth potential. Venture capital is, strictly speaking, a subset of private equity and refers to equity investments made for the launch, early development, or expansion of a business" (EVCA, 2007, p. 6). Similarly, the American National Venture Capital Association also states that venture capital is a subset of private equity, along with buyouts and other mezzanine investments.

This is the accepted version of Croce A., Martí J., "Productivity Growth in Private-Equity–Backed Family Firms" (ENTREPRENEURSHIP THEORY AND PRACTICE, 2016, 40:1, 657-683).

The final publication is available at: <http://dx.doi.org/10.1111%2Fetap.12138>

attachment of family members, and the dynastic succession (Berrone, Cruz, & Gomez-Mejia, 2012). Hence, family principals may be more averse to giving away control over the family business to PE institutions (Poutziouris, 2001; Tappeiner, Howorth, Achleitner, & Schraml, 2012), which is reflected by a limited historical presence of family firms in the portfolios of PE investors (Martí, Menéndez-Requejo, & Rottke, 2013).

Despite this fact, there are still an important number of family firms approaching PE investors for various reasons, among which seeking funding or an exit to family members should be highlighted. We aim to concentrate on the first one by analyzing why this motivation prevails over the reluctance to accept external shareholders. In this regard, we agree with Berrone et al. (2012) and Chrisman and Patel (2012) that there are circumstances (e.g., financial hardship) which could switch the emphasis on SEW preservation in favor of financial considerations, thus leading to the acceptance of PE investors. Our first aim is to analyze whether mostly troubled family firms seek funding from PE investors. Furthermore, in our work, we do not ignore the importance of the generation running the business, as highlighted in previous research on entrepreneurship in family firms (Kellermanns & Eddleston, 2006; Salvato, 2004). We argue that the lack of resources to grow will be more acute in the first generation and, hence, it is more likely that the reluctance is waived mostly in (financially) troubled founder-controlled family firms.

Our second aim is to check to what extent PE investors help in improving family firm performance. Prior research has confirmed a positive effect of PE on employment, sales, cash flow, innovation, and productivity (e.g., Bertoni, Colombo, & Croce, 2010; Bertoni, Colombo, & Grilli, 2011; Bertoni, Ferrer, & Martí, 2013; Bottazzi & Da Rin, 2002; Chemmanur, Krishnan, & Nandy, 2011; Croce, Martí, & Murtinu, 2013; Engel & Keilbach, 2007; Harris, Siegel, & Wright, 2005; Kortum & Lerner, 2000; Lichtenberg & Siegel, 1990). There is limited evidence, however, on the impact of PE on family firms (Astrachan & McConaughy, 2001; Martí et al., 2013). We aim to ascertain to what extent the above-mentioned intrinsic characteristics found in family firms may lead to a significant impact of PE involvement on their performance.

We contribute to the literature in two ways. First, we provide evidence that mostly (financially) troubled family firms, most of which are growing, access PE investors. This finding lends support to the reluctance of family members to accept external shareholders predicted by the behavioral agency theory. Second, we also provide evidence on the impact of PE involvement on performance, especially in founder generation family firms. The positive impact is found despite the potential conflicts that may arise due to the confrontation of the family management culture with that of the external investors.

The empirical part of the paper is based on a sample of 257 PE-backed family firms identified from the total population of firms that were involved in a PE investment in Spain between 1995 and 2006. We resort to total factor productivity (hereinafter, TFP) to measure firm performance before and after the first PE investment. In order to test the reluctance of family members to accept PE investors and the impact of those investors on performance, we need to compare TFP of investee family firms with that of other family firms not funded by PE investors. In addition, we also aim to ascertain whether poor performance is also found in non family firms before accessing PE investors. Similarly, regarding the impact of PE involvement, we aim to check whether the post-investment performance of investee family firms is significantly different from that found in both non-PE-funded family firms and non family PE-backed firms. For this purpose, we create two different matched control groups: a sample of 358 non-PE-backed family firms and a sample of 1,315 non family firms, 728 of which received PE in the same period.

The rest of the paper is structured as follows. The theoretical base and our research hypotheses are discussed in the next section, followed by a section devoted to a description of the sample and the methodology. The results are presented next, and then we provide a description of our robustness checks. Finally, we discuss the contributions and implications of our results and conclude.

## **Theory and Research Hypotheses**

### **Family Firms' Interest in Seeking PE**

Even though family firms “are credited for encouraging the entrepreneurial talent, a sense of loyalty, long-term strategic commitment, pride in the family tradition, and corporate independence” (Poutziouris, 2001, p. 277), they are also “fertile fields for conflict” (Harvey & Evans, 1994, p. 331). Family firms can suffer from nepotism, lack of professionalism, and rigidity in adapting to new challenges (Poutziouris). In addition, they are often unable to access the resources and capabilities needed to sustain competitive advantage and to grow (Sirmon & Hitt, 2003; Upton & Petty, 2000). The lack of financial resources is one of the principal factors affecting the development, growth opportunities, and long-term survival of private family businesses (Romano, Tanewski, & Smyrniotis, 2000). Opening up the family firm’s capital to external investors, such as PE investors, is a reasonable solution to these problems. In this regard, PE investors contribute to overcoming the lack of financial and/or managerial resources in their investee firms to enhance firm value and performance.

With some recent exceptions, principally looking at the selection issue from the point of view of external investors, few previous studies analyze PE involvement in family firms. Upton and Petty (2000) find evidence that the existence of a qualified successor is the principal criterion used by venture capitalists to decide whether or not to participate in a transition process of a family firm. They find that venture capitalists are also interested in growth businesses with a strategic business plan. Dawson (2011) focuses on whether the decision-making criteria used by PE investors to select family firms differ from those applied to non family ones. She finds that PE investor investment criteria rely on the presence of intangible resources in the target firm, such as the experience of family members. Furthermore, the presence of non family managers matters for PE investors because it signals that, by hiring a professional, the target firm has already demonstrated a willingness to delegate and to open up to outsiders.

In contrast, in this paper, we adopt the perspective of family firms to analyze in what circumstances they are willing to approach PE investors. Few studies analyze the family business–PE relationship from the demand side. They suggest that family firm owners may be more averse to handing over control of the family business to outsiders, and this may affect their attitudes toward external investors such as PE institutions. Poutziouris (2001) indicates that financial development in UK family firms is governed by the “keep it in the family” tradition. Family firms are systematically more dependent on internally generated funds (i.e., retained profits) for their survival and development than non family ones. In addition, they are not enthusiastic about widening the equity base at the cost of handing over family business control. Tappeiner et al. (2012) perform case studies of 21 large family firms in Germany in which owners employ PE finance. They find that family firm owners balance the financial and nonfinancial resources provided by PE investors with the need to hand over control rights to them.

Among the barriers to growth in family firms, Upton and Petty (2000) highlight limited financial resources, reluctance to share ownership, and desire to grow via

internally generated funds. From the perspective of the behavioral agency model, family members will usually want continued control over the firm's affairs to preserve SEW regardless of economic or financial considerations (Berrone et al., 2012; Gómez-Mejía et al., 2007). Kellermanns, Eddleston, and Zellweger (2012) discuss the "dark side" of SEW: The attitude of a controlling family seeking to maintain or extend its SEW endowment may engender detrimental consequences for stakeholders. In other words, family firms may place family needs, such as strong family bonds, family firm identity, and family control, above those of the firm and its stakeholders. In the same vein, Cruz et al. (2010) show that family principals tend to create agency contracts for the top management team that are more protective of their welfare when the team is composed of family members, even though this action is decoupled from firm performance.

Nevertheless, under certain circumstances, the emphasis on SEW preservation is reduced in favor of financial considerations. Berrone et al. (2012) highlight that, although SEW preservation is the "highest order" reference point for family principals, poor performance acts as an informational clue that alters the family owners' loss framing. As Berrone et al. (p. 262) state: "Poor performance raises the specter of a dual threat: the prospect of severe financial hardship to the family's standard of living (because the family has most of its patrimony deposited in one organization) and the possibility of SEW extinction (because the firm might have to be sold, merge with another firm, be taken over by another firm, go bankrupt, be liquidated, etc.)." Empirical results are consistent with a shifting reference point in family firms but only when the family is forced to reconsider SEW as the primary reference point. Chrisman and Patel (2012) show that when performance is below aspirations, family firms are expected to increase their risk exposure (e.g., investing more in research and development [R&D]) to avoid the potential future loss of SEW from firm decline. Hence, when performance falls, family and business goals are expected to converge.

Drawing on this theoretical base, we thus expect that low-performing family firms would be more inclined to access PE to obtain needed financial and nonfinancial resources despite the first order preference to protect SEW.

We could argue, however, that PE investors would avoid investing in low-performing firms, as the former are characterized by superior screening abilities (e.g., Shepherd & Zacharakis, 2002; Tyebjee & Bruno, 1984) to select firms with good growth prospects. Nevertheless, since productivity measures the increase in output relative to the increase in inputs, low productivity growth may indicate that the investments made have not yet been translated into a similar growth in sales. In other words, low productivity growth might be reflecting an imbalance between inputs and output (e.g., an increase in investments that is not immediately followed by an increase in sales) in rapidly growing firms, which are indeed interesting targets for PE investors (Poutziouris, 2001; Upton & Petty, 2000). Therefore, it may well be that family firms could be accessing PE to complete a growth process that is already under way but requires additional external funding. In this way, the future of the firm could also be at risk, as in truly low-performing firms, if the investment process is not completed. Interestingly, Poutziouris finds that, even though most UK family firms have a high propensity to retain control over generations, 21.4% of them are "open-growth stars" willing to recruit outsiders and to raise external capital to finance their investments.

Our first hypothesis follows from this discussion.

**Hypothesis 1:** Productivity growth is negatively associated with a subsequent likelihood of family firms accessing PE investors.

## **PE Involvement and Productivity Growth in Family Firms**

According to the resource-based view, a firm's bundle of resources and competencies determines firm performance (e.g., Barney, 1991; Barney, Wright, & Ketchen, 2001). PE involvement should positively affect family firm performance through the firm's new-found access to valuable financial and/or nonfinancial resources and competencies. In addition to funding, PE investors are actively involved in their portfolio firms by both monitoring and supporting managers with value-adding services. Regarding monitoring, the alignment of interests between internal (family) shareholders/managers and PE investors is based on tailor-made contracts (Admati & Pfleiderer, 1994) and active presence on the board (Lerner, 1995; Sahlman, 1990) to avoid an opportunistic behavior of the former (Jensen & Meckling, 1976). As for added value, the services provided include help in recruiting key personnel (Hellmann & Puri, 2002), access to the network of contacts (e.g., suppliers, customers, and banks) of PE managers (Sahlman), and assistance in strategic planning. As a result, PE involvement exerts a "certification effect" on portfolio firms (Lee & Wahal, 2004; Megginson & Weiss, 1991).

There is ample evidence of the effect of PE involvement in the extant literature, especially regarding venture capital investments. Among the various measures analyzed, we could highlight R&D productivity (Kortum & Lerner, 2000), time-to-market records (Hellman & Puri, 2000), sales growth (Engel & Keilbach, 2007), investment dependency on internal cash flow generation (Bertoni et al., 2013; Engel & Stiebale, 2014), and productivity (Alemany & Martí, 2006; Chemmanur et al., 2011; Croce et al., 2013). Several other studies are also devoted to analyzing the effect of PE on the performance of consolidated firms (see, for example, Cumming, Siegel, & Wright, 2007, and Kaplan & Stromberg, 2009, for a review). Some of these studies focused on the effect on productivity in management buyouts (Harris et al., 2005) and leveraged buyouts (Lichtenberg & Siegel, 1990). Nevertheless, to the best of our knowledge, no existing studies evaluate the impact of PE on family firm performance.

There is only some initial evidence about the impact of PE on valuation (Astrachan & McConaughy, 2001) and growth (Martí et al., 2013) in family firms. Astrachan and McConaughy analyze the presence of venture capitalists in closely held family-controlled initial public offerings (IPOs). They document a positive impact on the price/earnings ratios at which closely held firms are sold as a confirmation of the certification effect provided by the external investors. Martí et al. analyze growth in PE-backed family firms depending on the minority or majority stake held by external investors.

We argue that the access to valuable resources (i.e., funding and/or other services) should be translated into higher productivity growth in family firms.

Therefore, our second hypothesis is as follows:

**Hypothesis 2:** PE involvement engenders an increase in productivity growth in investee family firms.

## **Generational Issues About PE Involvement in Family Firms**

Family firms are not a homogeneous group (Chua, Chrisman, Steier, & Rau, 2012). Salvato (2004) suggests that the entrepreneurial activities of the family firm depend on the generation running the business. Le Breton-Miller and Miller (2013) show that differences in family involvement at different stages of the life cycle (e.g., founder family firms, post-founder family firms, and cousin consortia) of a family firm may shape SEW priorities, which in turn can determine the types of boards that will facilitate survival. McConaughy and Phillips (1999) and Block (2012) find that founder-controlled firms

(hereinafter, FCFs) grow faster and invest more in capital assets and R&D than descendant-controlled firms (DCF). Conversely, DCFs are more profitable (McConaughy & Phillips). Therefore, FCFs should be most affected by the temporary imbalance between inputs and outputs that may threaten their survival. However, since Gómez-Mejía et al. (2007) indicate that the preservation of SEW is highest in the founding generation, FCFs may be more reluctant to share control with external investors than DCFs. The desire to protect SEW decreases in DCFs as other motivations (e.g., succession or liquidity) induce them to resort to PE investors (Scholes, Wright, Westhead, & Bruining, 2010). Accordingly, we hypothesize that FCFs, which are usually more reluctant to resort to external capital, will be inclined to accept PE involvement mostly in times of financial hardship. We thus develop our third hypothesis as follows:

**Hypothesis 3:** Productivity growth is negatively associated with a subsequent likelihood of FCFs accessing PE investors.

The differences among generations may also influence the expected effect of PE involvement. Existing theories do not lead to a univocal consensus on this issue. Cruz and Nordqvist (2012) suggest that the presence of PE investors will especially foster the entrepreneurial orientation in DCFs. However, we argue that the impact of PE should be stronger in FCFs for different reasons. First, if we find lower productivity growth in first-generation FCFs accessing PE, then there is also more room for improvement in those firms, as suggested by Scholes et al. (2010). Second, FCFs are younger than DCFs and the literature suggests that there is a negative relationship between age and productivity growth (Chemmanur et al., 2011). Third, the options for growth arising from wealth preservation (Ahlers, Hack, & Kellermanns, 2014) should be greater in the first generation. Fourth, the value added by PE investors is influenced by the existence of agency costs between owners and managers (Jensen & Meckling, 1976) and owners and external investors (Colombo, Croce, & Murtinu, 2014). Since ownership and management are more concentrated in FCFs than in DCFs, interests are more aligned in the former. Concentrated ownership facilitates communication, trust, and reciprocity (Simon, 1993), thus reducing information asymmetries and agency costs.

Furthermore, the intimate knowledge among family members, which is higher in FCFs, also facilitates communication and decision making (Gersick, Davis, Hampton, & Lansberg, 1997). In contrast, as the firm develops over time, the dynamics among family members change (Gersick et al.) and the interactions among family members become more complex (Kellermanns & Eddleston, 2004). More dispersed ownership in DCFs, where different family factions could have divergent perspectives and goals, could lead to an increased potential for conflict (Eddleston, Otondo, & Kellermanns, 2008; Gersick et al.). Hence, the dispersion of ownership and the diversity of roles that family members perform in the firm over the course of generations will increase conflicts of interest and information asymmetries among owners and managers and among investee firms and external investors (Howorth, Westhead, & Wright, 2004).

Blanco-Mazagatos, De Quevedo-Puente, and Castrillo (2007) posit that agency problems tend to increase because of the changing mix of economic and affective interests. Thus, once successors join the firm, agency costs deriving from the relationships among different shareholders with different motivations will increase (Chrisman, Chua, & Sharma, 2005). Higher agency costs influence the impact of PE on investee firms, as there can be difficulties in implementing the firm's strategic plan. These problems are tricky to deal with, especially for an outsider, because sources of conflict in family firms are

complex (Harvey & Evans, 1994). In short, we posit that PE investors should have a stronger impact on productivity growth in FCFs as there is more room to improve the firm's performance and agency costs are lower.

Therefore, we formulate our last hypothesis as follows:

**Hypothesis 4:** PE involvement engenders an increase in productivity growth in FCFs.

## Data and Methodology

### Sample and Control Groups

Our empirical analyses are based on a sample of Spanish family firms that received a PE investment and several control groups comprising both family firms without PE backing and non family firms (PE-backed and non-PE-backed).

The definition of PE adopted in this study is the one prevalent in Europe, including early stage, expansion, and late stage equity investments (i.e., replacement capital, buyouts, and turnaround deals). To build the sample, we used the detailed catalogue of PE deals updated by Webcapitalriesgo to prepare the official annual reports of the Spanish Private Equity and Venture Capital Association (ASCRI). Furthermore, since all Spanish companies have been obliged to report their accounts to the Official Trade Register since 1991, we were also able to add accounting information to the data related to the PE investment. The source of accounting information is the Amadeus Database. Since we need to observe pre- and post-investment periods, we focus on PE investments carried out between 1995 and 2006.

According to Martí, Salas, and Alférez (2011), 1,815 domestic PE investments were recorded in Spain between 1995 and 2005, including all stages of development but excluding financial and real estate sectors. ASCRI/Webcapitalriesgo records include 375 additional investments made in 2006 with the same characteristics, totaling a population of 2,190 companies. We were able to identify 1,833 of them in the Official Trade Registers, but full accounting data were only available in Amadeus on 1,660 companies.

Based on the information collected from the Amadeus Database, the firms' websites, the official corporate news releases (Boletín Oficial del Registro Mercantil—BORME), and press clippings, we define family firms as those whose ultimate largest shareholders were individuals belonging or closely linked to branches of the same family group at the time of the initial PE investment. This definition is in accordance with the official family business definition given by GEEF (European Group of Owner Managed and Family Enterprises) and FBN (Family Business Network) in 2008 and also adopted by the IEF (Family Business Institute in Spain). Based on this definition, we found that 346 investees were family firms.

In order to test our research hypotheses, we first construct a group of family firms that do not receive PE (i.e., non-PE-backed family firms). To define this first control group, we downloaded from Amadeus 10 independent, closely held, and non-PE-backed companies for each PE-backed family firm with the following characteristics: same activity sector and similar size (assets and sales) and age at the time of the related PE-backed initial round. We further investigated the nature of downloaded firms, identifying 380 non-PE-backed family firms.

In order to provide further robustness to our results, regarding both the pre- and post-investment performance of PE-backed family firms, we also create a second control group of non family firms, including both PE- and non-PE-backed firms. As for PE-backed non family firms, the ASCRI/Webcapitalriesgo data set includes 1,314 non family firms that received the first PE investment between 1995 and 2006. We then

downloaded a group of independent, closely held non-PE-backed companies from Amadeus via the same procedure explained above for family firms; we select firms with the same activity sector and similar size (assets and sales) and age at the time of the related PE-backed initial round. We identified 695 non-PE-backed non-family firms.

Since we base our analyses on productivity growth, estimated through the generalized method of moments (Blundell & Bond, 2000), we need at least three consecutive observations to define instruments properly. As a result, our sample size shrinks to 341 PE-backed family firms and 380 non-PE-backed family firms. As for the sample of non family firms, our data set was reduced to 1,102 PE-backed non family firms and 686 non-PE-backed non family firms.

Then, in order to control as much as possible for differences in sample composition before the entry of the PE investors, we extract two matched samples separately from both control groups. First, we use a propensity score matching method to find, for each family firm that received PE in year  $t$ , a group of non-PE-backed family firms that had the most similar probability (i.e., propensity score) of receiving PE. For a similar procedure in the PE literature, see, e.g., Brau, Brown, and Osteryoung (2004), Chemmanur et al. (2011), Croce et al. (2013), Engel and Keilbach (2007), Megginson and Weiss (1991), Puri and Zarutskie (2012), and Tian (2012). Second, we repeat the same process for each non-family PE-backed firm, identifying a similar non family non-PE-backed firm with the highest probability of obtaining PE. Propensity scores are obtained by estimating separately for family and non family firms a probit model in which the dependent variable is the probability of receiving PE and the independent variables include firm age, firm size (measured by sales), region, time, and industry dummies. This second step shrank our data set to 615 family firms, 257 of which are PE-backed. Out of these 257 PE-backed family firms, 143 received PE when the founder generation was running the business (i.e., FCFs) while the remaining 114 are DCFs. As for the sample of non family firms, it includes 1,315 firms (728 of which are PE-backed). The final sample composition is reported in Table 1 (panel A).

Nearly 14% of PE-backed firms (in both family and non family firm groups) refer to late stage PE investments, whereas the remaining cases are venture capital investments. Among family firms, the percentage of late stage PE investment is lower in FCFs (i.e., only 20 firms). In Table 1 (panel B), we report the distribution of the sample of PE-backed family firms by generation and stage of development. We show that most FCFs were at the expansion stage at the time of the first PE round, thus providing some support to the idea about the imbalance between inputs and output found in growing firms commented on in the second section. Finally, we find that the number of firms in third or following generations is too small to generate robust estimates. Therefore, we will estimate our models aggregating second and following generations. Even though we agree with Sonfield and Lussier (2004) that there are important differences between family firms in the second and following generations, the literature accepts a “decreasing” reluctance of family members to accept external shareholders in second and subsequent generations (e.g., Gómez-Mejía et al., 2007). In this way, aggregating descendant generations does not distort our analyses, which aim to compare their performance with that of FCFs before the PE investment.

In panel C of Table 1, we also report the distribution of family and non family firms, respectively, for PE-backed and non-PE-backed firms, by activity sector and foundation year. In both family and non family samples, PE-backed firms are younger and more concentrated in high-tech sectors than non-PE-backed ones. In addition, PE-backed family firms are older and more concentrated in low-technology industries than non family ones.



Table 1

## Sample Description

## Panel A. Matched Sample Composition: Number of firms

	PE-backed	Non-PE-backed	Total
Family firms	257	358	615
Founder-controlled	143	193	336
Descendant-controlled	114	165	279
Non family firms	728	587	1315
<b>Total</b>	<b>985</b>	<b>945</b>	<b>1930</b>

## Panel B. Distribution of PE-Backed Family Firms by Stage of Development and Generation Running the Business at the Time of the Initial Investment

Stage	Generation									
	1		2		3		4		All	
	N	%	N	%	N	%	N	%	N	
Startup	13	9.1%		0.0%		0.0%		0.0%	13	
Expansion	110	76.9%	68	76.4%	14	70.0%	5	100.0%	197	
Late	20	14.0%	17	19.1%	6	30.0%		0.0%	43	
Missing		0.0%	4	4.5%		0.0%		0.0%	4	
<b>All</b>	<b>143</b>	<b>100.0%</b>	<b>89</b>	<b>100.0%</b>	<b>20</b>	<b>100.0%</b>	<b>5</b>	<b>100.0%</b>	<b>257</b>	

## Panel C. Matched Sample Composition by Industry and Foundation Year

Industry	Family firms				Non-family firms			
	PE-backed		Non-PE-backed		PE-backed		Non-PE-backed	
	N	%	N	%	N	%	N	%
Primary and utilities	5	1.95%	10	2.79%	28	3.85%	31	5.28%
Manufacturing	148	57.59%	220	61.45%	252	34.62%	256	43.61%
General services	92	35.80%	121	33.80%	313	42.99%	252	42.93%
High-tech	12	4.67%	7	1.96%	135	18.54%	48	8.18%
<b>Total</b>	<b>257</b>	<b>100%</b>	<b>358</b>	<b>100%</b>	<b>728</b>	<b>100%</b>	<b>587</b>	<b>100%</b>
Foundation year								
Before 1970	31	12.06%	102	28.49%	50	6.87%	188	32.03%
1970–1979	43	16.73%	64	17.88%	36	4.95%	58	9.88%
1980–1989	87	33.85%	100	27.93%	131	17.99%	106	18.06%
1990–2000	80	31.13%	85	23.74%	346	47.53%	158	26.92%
After 2001	16	6.23%	7	1.96%	165	22.66%	77	13.12%
<b>Total</b>	<b>257</b>	<b>100%</b>	<b>358</b>	<b>100%</b>	<b>728</b>	<b>100%</b>	<b>587</b>	<b>100%</b>

Source: Based on the information collected from ASCRI, Webcapitalriesgo, and the Amadeus Database.

## Methodology

We resort to TFP growth to proxy family firm productivity growth. TFP growth measures the residual growth in a firm's output not accounted for by the growth in inputs (namely labor and capital), given the production technology in place in the firm's industry (Colombo, Grilli, Murtinu, Piscitello, & Piva (2009)). The use of productivity growth as an indicator of firm performance is well established in different streams of the literature: entrepreneurship (e.g., Colombo et al.; Cowling, 2003; Harada, 2004), finance (e.g., Chemmanur et al., 2011; Croce et al., 2013; Schoar, 2002), economics (e.g., Aghion, Blundell, Griffith, Howitt, & Prantl, 2009; Cingano & Schivardi, 2004; Hall & Mairesse, 1995), and innovation (e.g., Grilli & Murtinu, 2012).

To overcome measurement and simultaneity problems in TFP estimation, which is based on the Cobb–Douglas production function, we resort to the generalized method of moments system (GMM-SYS) estimator developed by Blundell and Bond (2000). These authors suggest that GMM-SYS (Arellano & Bover, 1995) alleviates the typical problem of weak instruments characterizing the GMM difference estimator. In accordance with Van Biesebroeck (2007), we estimate TFP separately for each industry. Due to our sample size, we only differentiate among four categories: primary and utilities, manufacturing, general services, and high technology. Then, in the final step, the residuals of the production function are used to estimate the firm's TFP growth. TFP growth is used as a dependent variable to test our research hypotheses.

We first consider the total sample, composed of both the sample of family and that of non family firms. Following the Chemmanur et al. (2011) and Croce et al. (2013) studies, we resort to this model:

$$\begin{aligned} Prod_{growth_{it}} = & \alpha_0 + \mu_i + \beta x_{i,t} + \gamma_{pre\_F} PE_{i,t}^{pre} * Family + \gamma_{pre\_NF} PE_{i,t}^{pre} * Non\ Family \\ & + \gamma_{post\_F} PE_{i,t}^{post} * Family + \gamma_{post\_NF} PE_{i,t}^{post} * Non\ Family + \varepsilon_{it} \end{aligned} \quad [1]$$

where  $Prod_{growth_{it}}$  is 1-year TFP growth of firm  $i$  in year  $t$ .  $x_{i,t}$  is a set of control variables. We include regional dummies, industry dummies, and year dummies which allow us to control for cross-sectional differences among regions, industries, and across time, respectively. We also add firm age as a control variable.  $\mu_i$  represents firm-fixed effects; they are included to control for unobserved heterogeneity at firm level that may lead to a biased estimate of PE coefficients.  $\varepsilon_{it}$  is an independent and identically distributed error term.

$PE_{i,t}^{pre}$  is a dummy variable that equals 1 for firm  $i$  receiving PE in the 4 years before the first PE round (i.e., from  $t-4$  until  $t$ , with  $t$  representing the PE investment year), and 0 otherwise.  $PE_{i,t}^{post}$  is a dummy that equals 1 after the first PE round (i.e., from  $t+1$  on), with  $t$  representing the investment year, and 0 otherwise.  $Family$  and  $Non\ Family$  are dummies that equal 1, respectively, for family and non family firms. Differences between family and non family firms before the entry of PE can be estimated through the following Wald test:  $\gamma_{pre\_F} - \gamma_{pre\_NF} > 0$ . If the coefficient is negative and significant, we can interpret this result as a confirmation of our hypothesis 1, which states that family firms show lower productivity than non family ones before the entry of PE investors. As for the impact of PE on the productivity growth of investee firms, it can be evaluated through the following Wald tests:  $\gamma_{post\_F} - \gamma_{pre\_F} > 0$  and  $\gamma_{post\_NF} - \gamma_{pre\_NF} > 0$ , respectively, for family and non family PE-backed firms. We can also evaluate whether there is a difference in the impact of PE between family and non family firms by performing the following Wald test:  $\gamma_{post\_F} - \gamma_{pre\_F} - (\gamma_{post\_NF} - \gamma_{pre\_NF}) > 0$ .

As a robustness check, we perform our analyses only on the sample of PE-backed firms (both family and non family firms) to exclude any endogeneity problems related to PE. We thus estimate this alternative model:

$$Prod_{growth_{it}} = \alpha_0 + \mu_i + \beta x_{i,t} + \gamma_{pre\_F} PE_{i,t}^{pre} * Family + \gamma_{post\_F} PE_{i,t}^{post} * Family + \gamma_{post\_NF} PE_{i,t}^{post} * Non\ Family + \varepsilon_{it} \quad [2]$$

The difference between family and non family firms before the initial PE investment can be estimated in this model by looking at the sign and the significance of  $\gamma_{pre\_F}$ . If the coefficient is negative and significant, we can interpret this result as further evidence of our hypothesis 1, indicating that family firms show lower productivity growth than PE-backed non family ones before the entry of PE investors. As for the impact of PE on the productivity growth of investee firms, it can be evaluated through the following Wald test  $\gamma_{post\_F} - \gamma_{pre\_F} > 0$  for family firms, while for non family ones, we look at the sign and the significance of the coefficient  $\gamma_{post\_NF}$ . Again, we can also evaluate the difference in the impact of PE between family and non family firms by looking at the result of the following Wald test:  $\gamma_{post\_F} - \gamma_{pre\_F} - \gamma_{post\_NF} > 0$ .

Finally, we only focus on the sample of family firms. In particular, we estimate the following model separately for FCFs and DCFs to ascertain whether differences exist among generations (i.e., hypothesis 3, on the pre-investment period, and hypothesis 4, on the impact of PE).

$$Prod_{growth_{it}} = \alpha_0 + \mu_i + \beta x_{i,t} + \gamma_{pre\_F} PE_{i,t}^{pre} + \gamma_{post\_F} PE_{i,t}^{post} + \varepsilon_{it} \quad [3]$$

We look at the coefficient of  $PE_{i,t}^{pre}$  to test whether differences exist between PE- and non-PE-backed family firms before the initial PE investment. According to our research hypothesis 3, we expect a negative and significant coefficient for FCFs indicating that FCFs experiencing poor productivity growth are more willing to receive PE than other FCFs.

The impact of PE, net of the screening effect, can be estimated by performing the following Wald test:  $\gamma_{post} - \gamma_{pre} > 0$ . According to our hypothesis 4, we expect a positive and significant effect of PE on the productivity growth of investee FCFs, because of the funding provided and/or value added by the external investors.

We estimate equations 1–3 by applying a random effects estimation procedure in which we control for selection by using a matched sample (as described in the previous paragraph), and by inserting the term  $PE_{i,t}^{pre}$  that isolates productivity growth differences between PE-backed firms and non-PE-backed ones before the initial PE round. As described in the robustness check section, we also implement GMM estimations to analyze the impact of PE by controlling for its endogenous nature. We also performed an OLS estimation in which we considered firm-specific effects as being equal among all firms. The results of these estimates, which are in line with those discussed in the following section, are not reported in the text for the sake of brevity. They are available from the authors upon request.

## Descriptive Statistics

In Tables 2 and 3, we report some descriptive statistics about productivity growth measures, including both TFP and partial productivities (i.e., labor and capital productivities). We estimate labor and capital productivity growth measures as the ratio

Table 2

## Descriptive Statistics Before the Initial PE Investment

	Family firms				Non-family firms			
	Non-PE-backed		PE-backed		Non-PE-backed		PE-backed	
	Mean	Median	PE- vs. non-PE-backed	N	PE- vs. non-PE-backed	N	PE- vs. non-PE-backed	N
TFP growth	0.070	-0.072	-0.142*	0.090	0.152	0.090	-0.062	0.090
	0.025	-0.021		0.000	0.038	0.000		0.000
Capital productivity growth	358	257		587	587	728		728
	-0.003	-0.024	-0.021	0.039	0.039	0.021	-0.018	0.021
Labor productivity growth	0.007	-0.008		0.008	0.008	0.000		0.000
	354	253		573	573	712		712
Fixed assets	-0.009	-0.016	-0.007	-0.003	-0.003	0.001	0.004	0.001
	-0.001	-0.004		0.000	0.000	-0.002		-0.002
Investments	344	235		529	529	632		632
	6.707	8.088	1.381***	6.772	6.772	7.354	0.582***	7.354
Sales	6.831	7.985		6.831	6.831	7.278		7.278
	358	257		587	587	728		728
Profit margin	4.977	6.910	1.933***	5.167	5.167	6.309	1.142***	6.309
	5.215	6.903		5.276	5.276	6.326		6.326
Cash flow on sales	309	227		499	499	661		661
	7.964	8.227	0.263	7.679	7.679	7.194	-0.485**	7.194
Cash flow on sales	8.274	8.686		8.233	8.233	7.714		7.714
	358	257		587	587	728		728
Cash flow on sales	0.0174	-0.1866	-0.204***	-0.020	-0.020	-0.426	-0.406***	-0.426
	0.0205	0.0130		0.021	0.021	0.004		0.004
Cash flow on sales	349	244		557	557	673		673
	0.0895	-0.0618	-0.151***	0.055	0.055	-0.234	-0.290***	-0.234
Cash flow on sales	0.0581	0.0530		0.059	0.059	0.045		0.045
	316	244		491	491	673		673

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ . Sales, fixed assets, and payroll expenses are expressed in thousand € and deflated by CPI (reference year: 2005).

Table 3

## Descriptive Statistics After the Initial PE Investment

	Family firms				Non-family firms			
	Non-PE-backed	PE-backed	PE- vs. non-PE-backed	Non-PE-backed	PE-backed	PE- vs. non-PE-backed	PE-backed	PE- vs. non-PE-backed
TFP growth	Mean	-0.008	-0.008	0.000	-0.007	0.030	0.030	0.037*
	Median	-0.005	-0.007		0.000	0.000	0.000	
Capital productivity growth	N. obs.	3589	1809	0.003	5038	4613	4613	0.009**
	Mean	-0.003	0.000		-0.003	0.006	0.006	
Labor productivity growth	Median	0.002	0.001	0.003	0.003	0.003	0.003	
	N. obs.	3571	1789	0.002	4987	4545	4545	0.008***
Fixed assets	Mean	-0.004	-0.002	0.002	-0.005	0.003	0.003	
	Median	-0.003	-0.002		-0.002	-0.002	-0.002	
Investments	N. obs.	3539	1774	1.353***	4884	4463	4463	0.719***
	Mean	7.116	8.470		7.159	7.878	7.878	
Sales	Median	7.288	8.512		7.325	8.021	8.021	
	N. obs.	3589	1809	1.346***	5038	4613	4613	0.750***
Profit margin	Mean	5.238	6.585		5.380	6.130	6.130	
	Median	5.370	6.700		5.531	6.242	6.242	
Cash flow on sales	N. obs.	2929	1311	0.427***	3896	3547	3547	-0.026
	Mean	8.396	8.823		8.267	8.241	8.241	
Cash flow on sales	Median	8.538	9.077		8.648	8.542	8.542	
	N. obs.	3589	1809	-0.104***	5038	4613	4613	-0.197***
Cash flow on sales	Mean	0.013	-0.091		-0.044	-0.241	-0.241	
	Median	0.021	0.011		0.022	0.009	0.009	
Cash flow on sales	N. obs.	3551	1775	-0.052***	4928	4495	4495	-0.102***
	Mean	0.070	0.018		0.038	-0.064	-0.064	
Cash flow on sales	Median	0.059	0.062		0.060	0.058	0.058	
	N. obs.	3493	1775		4838	4495	4495	

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$   
Sales, fixed assets, and payroll expenses are expressed in thousand € and deflated by CPI (reference year: 2005).

between logarithms of sales and payroll expenses and the ratio between logarithms of sales and fixed assets, respectively. Statistics on size (in terms of fixed assets and sales), investments in fixed assets and profitability (i.e., profit margin and cash flow on sales) are also displayed for both family and non family firms, separating the PE from the non-PE-backed firms. We show summary statistics such as mean, median, and number of observations for each category. Moreover, for every variable we perform *t*-tests on the difference in means between the groups of PE- and non-PE-backed firms, respectively, for family and non family firms. Table 2 refers to the pre-investment period whereas Table 3 refers to the post-investment one. The separation between pre- and post-investment periods in matched non-PE-backed firms is the year of inclusion in the matched sample.

In the pre-investment period, the results indicate that TFP growth is significantly lower in the group of PE-backed family firms than in non-PE-backed ones, whereas the difference is not significant in non family firms. This result is in line with our hypothesis 1: Family firms that later access PE investors show lower TFP growth before the initial PE round. Conversely, no significant differences appear in terms of partial productivity measures between PE- and non-PE-backed firms in both family and non family firms. In order to better explore where these differences come from, we turn our attention to the characteristics of both the inputs and output of the production function. We find that inputs (i.e., fixed assets and investments) are significantly greater in PE-backed than in non-PE-backed firms. In terms of output (i.e., sales), there are no differences between PE- and non-PE-backed family firms, whereas PE-backed non family firms show even lower sales than non-PE-backed non family counterparts.

In the post-investment period, we find significantly greater sales (only in family firms while in non family firms the difference is not significant) and greater fixed assets and investments in PE-backed firms than in non-PE-backed ones. These univariate results would confirm a positive impact of PE involvement on investee firms. Conversely, the difference in TFP growth seems to be not significant between PE- and non-PE-backed family firms, whereas non family PE-backed firms exhibit a larger increase in TFP than non-PE-backed ones. The differences are smaller for profit margin and cash flow on sales, in terms of economic magnitude, than in the pre-investment period.

Descriptive statistics on the two subsamples of FCFs and DCFs show that PE-backed FCFs have higher inputs in the pre-investment period than their counterparts while the difference is not significant for DCFs. These statistics are not reported in the text for the sake of brevity but are available from the authors upon request.

Overall, these descriptive statistics support our research hypotheses: Family firms receiving PE show lower productivity growth than control group firms before the initial PE investment, whereas this difference is no longer significant once the PE investor has a stake in the family firm. This finding suggests a positive contribution of PE in enhancing the investee firm's performance. We complete the study with the multivariate analysis and also include a generational perspective in FCFs versus DCFs.

## **Empirical Results**

Table 4 reports the correlation matrix of the different variables included in our models while the estimation results of equations 1–3 are shown in Table 5. The first column of Table 5 refers to the estimates of equation 1 on the total sample including family firms (both PE-backed and non-PE-backed) and the group of non family firms (both PE-backed and non-PE-backed). In the second column, we estimate equation 2 including only PE-backed firms (both family and non family) to exclude the possible endogeneity bias

Table 4

## Correlation Matrix

	TFP growth	Labor productivity	Capital productivity	Investments (log)	Sales (log)	Profit margin	CF on sales	Fixed assets (log)	Age
TFP growth	1								
Labor productivity	0.813***	1							
Capital productivity	0.552***	0.451***	1						
Investments (log)	0.039***	0.023**	-0.092***	1					
Sales (log)	0.120***	0.049***	0.038***	0.536***	1				
Profit margin	0.073***	0.034***	-0.010	0.013	0.328***	1			
CF on sales	0.076***	0.045***	-0.008	0.053***	0.235***	0.915***	1		
Fixed assets (log)	0.027***	0.022**	-0.059***	0.850***	0.644***	0.040***	0.080***	1	
Age	-0.043***	-0.008	-0.046***	0.235***	0.431***	0.127***	0.089***	0.347***	1

\*\*  $p < .01$ , \*\*\*  $p < .001$

Table 5

## Random Effects Estimation on TFP Growth

	Equation [1]	Equation [2]	Equation [3]	
	Family and non family firms	Only PE-backed firms	Only FCFs	Only DCFs
Pre-PE in family firms	-0.040 <sup>†</sup> (0.022)	-0.080** (0.030)	-0.062* (0.030)	0.027 (0.036)
Pre-PE in non family firms	0.049* (0.022)			
Post-PE in family firms	0.010 (0.014)	-0.015 (0.028)	0.027 (0.002)	0.022 (0.019)
Post-PE in non family firms	0.040*** (0.012)	0.004 (0.029)		
Age	-0.002*** (0.000)	-0.004*** (0.001)	-0.001 (0.001)	-0.001 <sup>†</sup> (0.000)
Cons.	-0.037 (0.031)	-0.022 (0.059)	-0.084 (0.053)	-0.005 (0.041)
Year dummies	Yes	Yes	Yes	Yes
Regional dummies	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
n. obs.	21,018	9467	3982	3360
n. firms	1930	985	336	279
R <sup>2</sup> (%)	0.980	1.560	1.410	2.070
Wald test	1080.390***	689.249***	2075.400***	770.174***
<i>Post-PE impact</i>				
In family firms	0.050 <sup>†</sup> (0.030)	0.066* (0.033)	0.090* (0.044)	-0.005 (0.045)
In non family firms	-0.008 (0.026)	0.004 (0.029)		
<i>Difference between family and non family firms</i>				
Pre-PE	-0.089** (0.030)	-0.080** (0.030)		

<sup>†</sup>  $p < .10$ , \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

Estimates of equations 1–3.

The dependent variable is TFP growth.

Pre-PE is a dummy that equals 1 in the 4 years before the initial PE investment.

Post PE is a dummy that equals 1 from the first year after the initial PE investment on.

Region, industry, and year dummies are included in the estimates (coefficients are omitted in the table).

Estimates are derived from random effects regressions.

Standard errors in parentheses.

related to PE investments. In the third and the fourth columns, we focus only on family firms (both PE- and non-PE-backed). We split the sample of family firms into two groups, respectively FCFs and DCFs, and we estimate separately equation 3 to test hypotheses 3 and 4.

First, we focus on selection by PE investors. We analyze TFP growth in PE-backed family firms in the pre-investment period. In the first column of Table 5, we find that, on average, PE-backed family firms exhibit lower TFP growth than non-PE-backed firms



(both family and non family ones) before the first PE investment, with the coefficient being significant and equal to  $-0.04$ . Interestingly, we find a positive coefficient of  $0.049$  in the case of PE-backed non family firms, significant at the 5% level. Furthermore, in the last row of Table 5, we report that the difference between both coefficients is significant at the 1% level. In the second column, we compare TFP growth only in PE-backed family and non family firms. We find that the former show a lower coefficient ( $-0.08$ , significant at the 1% level) before the initial PE investment. These results confirm our hypothesis 1: Family firms receiving PE show significantly lower TFP growth than control groups before accessing PE investors. In the next two columns we switch our attention to family firms only, both PE- and non-PE-backed. In particular, in the third column we focus on FCFs and in the fourth on DCFs. As predicted, we find that FCFs accessing PE investors show significantly lower TFP growth than matched FCFs before the initial PE investment (coefficient of  $-0.062$ , significant at the 5% level), thus confirming our hypothesis 3. Conversely, no significant differences are found in the pre-investment period in DCFs.

We then turn our attention to the effect of PE involvement on TFP growth. We need to refer to the test  $\gamma_{post} - \gamma_{pre} > 0$  on “*Post-PE impact*” reported in Table 5 to estimate the effect of PE, net of the selection effect. In the first column, we find that TFP growth in PE-backed family firms is higher than that of non-PE-backed family firms after the PE investment, with a coefficient of  $0.05$ , significant at the 10% level. In contrast, we do not find a positive significant coefficient in the case of non family PE-backed firms. Furthermore, when we compare the PE impact on TFP growth after the financing round only between family and non family PE-backed firms, we find a positive differential effect in the former of  $0.066$ , which is significant at the 5% level. Therefore, we find support for our hypothesis 2 as PE-backed family firms show higher TFP growth after the initial PE investment. When we focus only on family firms (i.e., third and fourth columns), we find that, according to our hypothesis 4, the increase in TFP growth engendered by PE is significant only in FCFs and the coefficient ( $0.09$ , significant at the 5% level) is greater than that found when all family firms are grouped together. However, the test becomes insignificant when we focus on DCFs.

We also run equation 3 separately for second, third, and fourth generation family firms, in order to detect whether differences exist among DCFs. Results are in general quite homogeneous, regardless of the generation in which they are classified. These estimates are not reported in the text but are available from the authors upon request.

In Table 6, we report estimates of equation 3 using other dependent variables. We aim to provide further evidence on our results and to ascertain the possible reasons for the lower TFP growth found in family firms prior to the initial PE investment, as well as the effect of PE involvement on FCFs and DCFs. In particular, we resort to measures of partial productivity (i.e., labor and capital productivity) and indicators of output (sales) and inputs (investments in fixed assets). The first column refers to the subsample of FCFs whereas the second reports estimates on the subsample of DCFs. For the sake of clarity, the table only reports the coefficient of  $PE_{i,t}^{pre}$  representing the difference between PE- and non-PE-backed family firms in the pre-investment period and the result of the test  $\gamma_{post} - \gamma_{pre} > 0$ , indicating the impact of post-PE on family firms.

The results show that PE-backed FCFs hold greater investments in fixed assets ( $1.608$ , significant at the 0.1% level) and greater sales ( $0.464$ , significant at the 5% level) than non-PE-backed FCFs before the initial PE round. Noticeably, the fact that capital productivity growth is lower in PE-backed FCFs than in non-PE-backed ones in the pre-investment period ( $-0.019$ , significant at the 5% level) indicates that sales are not large enough to compensate for the higher investments carried out by these firms. These results again signal the real reason why FCFs approach PE investors: When compared with

Table 6

## Random Effects Estimation on Other Dependent Variables

	Equation [3]	
	Only FCFs	Only DCFs
		<b>Capital productivity</b>
Pre-PE in family firms	-0.019* (0.007)	-0.001 (0.008)
Post-PE impact in family firms	0.021** (0.007)	0.011 (0.008)
		<b>Labor productivity</b>
Pre-PE in family firms	-0.003 (0.005)	-0.001 (0.004)
Post-PE impact in family firms	0.007 (0.006)	0.005 (0.005)
		<b>Investments (log)</b>
Pre-PE in family firms	1.608*** (0.198)	1.288*** (0.225)
Post-PE impact in family firms	0.094 (0.118)	0.128 (0.139)
		<b>Sales (log)</b>
Pre PE in family firms	0.464* (0.218)	0.302 (0.247)
Post-PE impact in family firms	0.256* (0.160)	0.253** (0.112)
		<b>Profit margin</b>
Pre PE in family firms	-0.170** (0.057)	-0.085 (0.056)
Post-PE impact in family firms	0.022 (0.038)	0.019 (0.037)
		<b>Cash flow on sales</b>
Pre PE in family firms	-0.093* (0.039)	-0.072† (0.040)
Post-PE impact in family firms	0.004 (0.023)	0.040 (0.033)

†  $p < .10$ , \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

Estimates of equation 3 for different endogenous variables.

The table only reports results on: (1) Pre-PE: dummy that equals 1 in the 4 years before the initial PE investment.

(2) PE impact: Wald test measuring the impact of PE involvement, net of selection.

The remaining coefficients, including region, industry, and year dummies, are omitted for the sake of brevity and available upon request.

Estimates are derived from random effects regression.

Standard errors in parentheses.

non-PE-backed family firms, those FCFs that later receive a PE investment show significantly higher growth in investments than in sales prior to the initial PE round. As confirmation, PE-backed firms seem to be more financially constrained before receiving PE as both profit margin and cash flow on sales ratios are significantly lower in the pre-investment period than in non-PE-backed FCFs, with respective coefficients of  $-0.17$  and  $-0.093$ . In contrast, the results on DCFs are totally different. PE-backed DCFs do not show significantly different capital productivity, sales, and profit margin than their

matched non-PE-backed DCFs before the initial PE investment. Only investments and the ratio cash flow on sales are significantly different between PE- and non-PE-backed DCFs, with respective coefficients of 1.288 and  $-0.072$ , prior to the initial PE investment. Finally, neither FCFs nor DCFs show significant differences in labor productivity.

Looking at the impact of PE, we find that FCFs now show higher capital productivity than the matched non-PE-backed FCFs after the financing round. Other negative references between PE- and non-PE-backed FCFs in the pre-investment period, such as the profit margin and the cash flow on sales ratio, are no longer different in the post-investment period. Furthermore, investments are not different either, whereas there is still a positive difference (coefficient of 0.256) in sales in PE-backed FCFs. Turning to DCFs, we do not find significant differences between the PE- and non-PE-backed firms in the post-investment period, except a positive difference in the case of sales. As in the pre-investment period, no differences are found in labor productivity in the post-investment period in all family firms.

## Robustness Checks

We perform different robustness checks to provide further evidence on our results. First, we estimate equations 1–3 by using the two-step GMM-SYS estimator (Arellano & Bover, 1995; Blundell & Bond, 1998) with finite-sample correction (Windmeijer, 2005) to properly evaluate the value-adding effect of PE investors. The use of GMM-SYS allows us to estimate the impact of PE by controlling for its endogenous nature. Hence, we estimate equations 1–3 excluding the term  $PE_{i,t}^{pre}$  and considering the PE variables as endogenous (i.e., instruments start from  $t-3$ ). Moreover, we follow an approach inspired by Sørensen (2007), adding another variable ( $PE\_fundraising_{it}$ ) to the set of instruments of the GMM-SYS estimator. This variable reflects the availability of PE funds at time  $t$  in the region in which the focal FCF  $i$  operates. This variable is a good instrument since it is correlated with PE variables but independent from the error terms of the model. In this way, regardless of a firm's future productivity growth prospects, the likelihood of obtaining PE is higher if the firm operates in a geographical area with an abundance of PE. However, the effect of PE on a firm's productivity growth is independent from  $PE\_fundraising_{it}$ , and so it is a source of exogenous variation (in a similar vein, see also Bottazzi, Da Rin, & Hellmann, 2008; Chemmanur et al., 2011; Croce et al., 2013; Ivanov & Xie, 2010). In all models, the null hypothesis of absence of a negative first-order serial correlation is rejected, while the null hypothesis of absence of a second-order serial correlation is not. Moreover, the results of the Hansen J statistic reassure us about the validity of the moment conditions used in all estimations.

Following this approach we find that PE-backed family firms show higher TFP growth than non-PE-backed (family and non family) firms after the initial PE-round, with the coefficient being 0.018. In contrast, we do not find a positive and significant differential effect related to the presence of PE in non family firms. When only family and non family PE-backed firms are considered, the results also confirm that the former show significantly higher productivity growth (coefficient = 0.044) after the PE investment, providing further evidence to our hypothesis 2. Finally, focusing only on PE- and non-PE-backed family firms, the results confirm the positive impact of PE on FCFs, providing further evidence to our hypothesis 4. Conversely, no differential effect is found in PE-backed DCFs when compared with non-PE-backed DCFs.

Second, in the estimation of firm productivity, we have already controlled for “size effects.” Therefore, we do not include size in our baseline model. Nevertheless, we include the logarithm of total fixed assets as a check to control whether “firm size effects” drive our estimates. The results are in line with those presented and discussed in the previous section. Moreover, we find a positive and statistically significant coefficient of firm size in all the estimates, which indicates that greater fixed assets favor a stronger increase in productivity growth.

Finally, we exclude late stage PE investments in which reasons other than the imbalances between inputs and output could explain family firms’ interest in accessing PE. We focus on a reduced sample composed of family and non family firms invested mostly at the expansion stage and their matched control group of non-PE-backed firms. The results are completely in line with those presented and discussed in the previous section. This check indicates that the differences between venture capital and late stage PE investments do not influence our results. These tables are not reported in the text but available from the authors upon request.

## **Discussion of Contribution, Limitations, and Avenues for Future Research**

According to the behavioral agency theory, the desire to protect SEW would limit the interest of family firms in approaching PE investors (Gómez-Mejía et al., 2007). Nevertheless, since family goals tend to converge with economic or financial goals when the firm is in (financial) trouble (Berrone et al., 2012; Chrisman & Patel, 2012), in our first research hypothesis, we anticipate a negative relationship between productivity growth in family firms and the subsequent likelihood of a PE investment. In addition, the desire to protect SEW is highest in the first generation (Gómez-Mejía et al.). Hence, in our third hypothesis we predict a significantly higher negative relationship between productivity growth and the subsequent likelihood of a PE investment in those firms. In our results we find that family firms that were later backed by PE investors show significantly lower TFP growth than non-PE-backed family firms and non family PE-backed firms before the initial PE investment. Furthermore, this situation is particularly relevant when we compare PE- and non-PE-backed FCFs, thus confirming both hypotheses.

In our work, we also aim to check to what extent the positive impact on productivity found in investee firms (e.g., Chemmanur et al., 2011; Croce et al., 2013) is also present in family firms (hypothesis 2) and, especially, in FCFs (hypothesis 4). We find evidence of the positive effect of PE involvement on the performance of family firms, which is higher in the case of FCFs, also confirming both hypotheses.

This paper contributes to the extant literature in several ways. First, it contributes to increasing the limited connection between family business and PE literature. We analyze why family firms approach PE investors despite the desire to protect their SEW. Second, this paper contributes to the literature on the impact of PE on the performance of investee (family) firms. Third, we explore whether a generational perspective influences the relationship between PE investors and family firms. In this vein, we highlight that both the reason why family firms approach PE investors and the effect of PE involvement depend on the generation running the business.

Regarding the first contribution, we argue that our findings provide further evidence on family firms’ reluctance to access external sources of financing, which disappears when performance falls below a firm’s aspiration (Berrone et al., 2012). In particular, we

interpret the result on FCFs as a confirmation that the desire to protect SEW is strongest in the first generation (Gómez-Mejía et al., 2007) because it is mostly firms showing lower performance that resort to PE investors. Even though this finding could be difficult to understand from the perspective of PE investors, we also find that lower TFP could be indicating an imbalance between inputs and output in growing family firms. Therefore, PE institutions would not be investing in underperforming Spanish family firms but, rather, in firms willing to invest to take advantage of their growth opportunities, as Poutziouris (2001) found in 21.4% of UK family firms. In this way, family firms could be accessing PE to complete a growth process that is already under way but that requires additional external funding, especially in FCFs.

With regard to the second contribution, we were concerned about the potential conflict between the family's and the PE investor's management cultures, which could explain the under-representation of family firms in the portfolios of PE investors (Martí et al., 2013). Therefore, one implication of our findings, which is important for both PE investors and family firms, is that the potential conflict between their management culture and that of the family did not impede the higher TFP growth found in family firms and, more specifically, in FCFs.

Turning to the third contribution, our results suggest that PE investors have a higher impact on fostering productivity growth in FCFs because in these firms there is more room to improve the firm's performance and agency costs are lower (Blanco-Mazagatos et al., 2007; Howorth et al., 2004; Scholes et al., 2010). Conversely, we do not find a differential pattern in productivity growth in DCFs either before or after the PE investment and, hence, in accordance with the empirical results of Cruz and Nordqvist (2012), we conclude that other motivations, such as succession or liquidity, should be explored to explain why they resort to PE investors. In this vein, it is important to note that PE investors have increasingly shifted their focus to consolidated companies in the past two decades, providing an exit to some (e.g., replacement capital deals) or nearly all (e.g., buyout and turnaround deals) family shareholders.

We are aware that this study has some limitations, which open up opportunities for future research. The main limitation of our study is related to the limited sample size. Even though we have access to the whole universe of PE investments in Spain, the under-representation of family firms in the portfolios of PE investors (which were further divided between FCFs and DCFs), the constraints imposed by an efficient TFP estimation, and the difficulty in defining a matched control group limited our sample of PE-backed family firms. Second, we cannot identify which family firms in our non-PE-backed sample tried to access PE but failed to attract the investors' interest. We assume that the investors either rejected the proposal due to unforeseen potential conflicts with family principals and/or to the lack of growth opportunities. Third, we should mention the local focus, which includes only Spanish firms mostly belonging to manufacturing and general service activity sectors. A final limitation is the definition of family firms applied, which does not consider family management.

Extending the analysis to other countries may allow access to a larger sample. Moreover, including other European countries and eventually comparing U.S. and European PE industries may provide interesting insights into understanding how our results are related to the peculiarities among different institutional contexts. In addition, more research should provide further evidence of whether low TFP growth in the pre-investment period is related to the presence of financial constraints that limit the firm's growth opportunities and whether and how PE investors can help family firms to remove them. Furthermore, more research should analyze to what extent the positive impact of PE on family firms is driven solely by the funding provided or else by the value-adding services

provided by the investors (e.g., see Balboa, Martí, & Zieling, 2011). Regarding DCFs, we argue that more research should focus on other reasons for approaching PE investors, in addition to growth and performance (e.g., succession and/or liquidity). Finally, it would be interesting to study whether the reasons for PE investor rejection are different in family and non family firms.

In spite of the above limitations, this study considerably extends our understanding of the impact of PE investments on the performance of Spanish family firms. As for the managerial implications, we provide evidence of the effectiveness of the resources provided by PE investors to their portfolio firms, which result in higher TFP growth, especially in FCFs. As a practical implication of our findings, the impact of PE in FCFs should be even greater if firms showing high productivity growth, rather than those identified in our sample, approach PE investors. Our findings could help to overcome the natural reluctance of family members to accept external shareholders. From a policy perspective, education programs should focus on the contribution of PE investors to enhance the competitiveness of family firms, which are the backbone of the productive system in most countries.

## Conclusion

In this study, we analyzed TFP growth as a reference to explain why family firms access PE investors and to test whether those investors lead to a significant change in the performance of investee firms. We conclude that family firms that access PE investors are mostly growing family firms that suffer from an imbalance between inputs and output, which results in low productivity growth, especially when the founder is still running the business. In addition, we find that the funding and added value provided by PE investors lead to a significant improvement in the investee firms' productivity growth.

## REFERENCES

- Admati, A.R. & Pfleiderer, P. (1994). Robust financial contracting and the role of venture capitalists. *Journal of Finance*, 49(2), 371–402.
- Aghion, P., Blundell, R., Griffith, R., Howitt, P., & Prantl, S. (2009). The effects of entry on incumbent innovation and productivity. *Review of Economics and Statistics*, 91(1), 20–32.
- Ahlers, O., Hack, A., & Kellermanns, F.W. (2014). “Stepping into the buyers' shoes”: Looking at the value of family firms through the eyes of private equity investors. *Journal of Family Business Strategy*, doi:10.1016/j.jfbs.2014.04.002.
- Alemany, L. & Martí, J. (2006). Productivity growth in Spanish venture-backed firms. In G.N. Gregoriou, M. Kooli, & R. Kraeusl (Eds.), *Venture capital in Europe* (pp. 110–114). Amsterdam: Elsevier.
- Anderson, R.C. & Reeb, D.M. (2003). Founding-family ownership and firm performance: Evidence from the S&P 500. *Journal of Finance*, 58(3), 1301–1327.
- Arellano, M. & Bover, O. (1995). Another look at the instrumental-variable estimation of error-components models. *Journal of Econometrics*, 68(1), 29–51.
- Astrachan, J.H. & McConaughy, D.L. (2001). Venture capitalists and closely held IPOs: Lessons for family-controlled firms. *Family Business Review*, 14(4), 295–312.

- Astrachan, J.H. & Shanker, M.C. (2003). Family businesses' contribution to the U.S. economy: A closer look. *Family Business Review*, 16(3), 211–219.
- Balboa, M., Martí, J., & Zieling, N. (2011). Impact of funding and value added in Spanish venture-backed firms. *Innovation: The European Journal of Social Science Research*, 24(4), 449–466.
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99–120.
- Barney, J., Wright, M., & Ketchen, Jr., D.J. (2001). The resource-based view of the firm: Ten years after 1991. *Journal of Management*, 27(6), 625–641.
- Berrone, P., Cruz, C., & Gomez-Mejia, L.R. (2012). Socioemotional wealth in family firms: Theoretical dimensions, assessment approaches, and agenda for future research. *Family Business Review*, 25(3), 258–279.
- Berrone, P., Cruz, C., Gómez-Mejía, L., & Larraza-Kintana, M. (2010). Socioemotional wealth and corporate responses to institutional pressures: Do family-controlled firms pollute less? *Administrative Science Quarterly*, 55(1), 82–113.
- Bertoni, F., Colombo, M.G., & Croce, A. (2010). The effect of venture capital financing on the sensitivity to cash flow of firm's investments. *European Financial Management*, 16(4), 528–551.
- Bertoni, F., Colombo, M.G., & Grilli, L. (2011). Venture capital financing and the growth of high-tech start-ups: Disentangling treatment from selection effects. *Research Policy*, 40(7), 1028–1043.
- Bertoni, F., Ferrer, M.A., & Martí, J. (2013). The different role played by venture capital and private equity investors on the investment activity of their portfolio firms. *Small Business Economics*, 40(3), 607–633.
- Blanco-Mazagatos, V., De Quevedo-Puente, E., & Castrillo, L.A. (2007). The trade-off between financial resources and agency costs in the family business: An exploratory study. *Family Business Review*, 20(3), 199–213.
- Block, J.H. (2012). R&D investments in family and founder firms: An agency perspective. *Journal of Business Venturing*, 27(2), 248–265.
- Blundell, R.W. & Bond, S.R. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, 87(1), 115–143.
- Blundell, R.W. & Bond, S.R. (2000). GMM estimation with persistent panel data: An application to production functions. *Econometric Reviews*, 19(3), 321–340.
- Bottazzi, L. & Da Rin, M. (2002). Venture capital in Europe and the financing of innovative companies. *Economic Policy*, 17(34), 229–270.
- Bottazzi, L., Da Rin, M., & Hellmann, T. (2008). Who are the active investors? Evidence from venture capital. *Journal of Financial Economics*, 89(3), 488–512.
- Brau, J.C., Brown, R.A., & Osteryoung, J.S. (2004). Do venture capitalists add value to small manufacturing firms? An empirical analysis of venture and nonventure capital-backed initial public offerings. *Journal of Small Business Management*, 42(1), 78–92.
- Chemmanur, T.J., Krishnan, K., & Nandy, D. (2011). How does venture capital financing improve efficiency in private firms? A look beneath the surface. *Review of Financial Studies*, 24(12), 4037–4090.
- Chrisman, J.J., Chua, J.H., & Sharma, P. (2005). Trends and directions in the development of a strategic management theory of the family firm. *Entrepreneurship Theory and Practice*, 29(5), 555–576.

- Chrisman, J.J. & Patel, P.C. (2012). Variations in R&D investments of family and non-family firms: Behavioral agency and myopic loss aversion perspectives. *Academy of Management Journal*, 55(4), 976–997.
- Chua, J.H., Chrisman, J.J., Steier, L.P., & Rau, S.B. (2012). Sources of heterogeneity in family firms: An introduction. *Entrepreneurship Theory and Practice*, 36(6), 1103–1113.
- Cingano, F. & Schivardi, F. (2004). Identifying the sources of local productivity growth. *Journal of the European Economic Association*, 2(4), 720–742.
- Colombo, M.G., Croce, A., & Murtinu, S. (2014). Ownership structure, horizontal agency costs and the performance of high-tech entrepreneurial firms. *Small Business Economics*, 42(2), 265–282.
- Colombo, M.G., Grilli, L., Murtinu, S., Piscitello, L., & Piva, E. (2009). Effects of international R&D alliances on performance of high-tech start-ups: A longitudinal analysis. *Strategic Entrepreneurship Journal*, 3(4), 346–368.
- Cowling, M. (2003). Productivity and corporate governance in smaller firms. *Small Business Economics*, 20(4), 335–344.
- Croce, A., Martí, J., & Murtinu, S. (2013). The impact of venture capital on the productivity growth of European entrepreneurial firms: “Screening” or “value added” effect? *Journal of Business Venturing*, 28(4), 489–510.
- Cruz, C., Gómez-Mejía, L., & Becerra, M. (2010). Perceptions of benevolence and the design of agency contracts: CEO–TMT relationships in family firms. *Academy of Management Journal*, 53(1), 69–89.
- Cruz, C. & Nordqvist, M. (2012). Entrepreneurial orientation in family firms: A generational perspective. *Small Business Economics*, 38(1), 33–49.
- Cumming, D., Siegel, D.S., & Wright, M. (2007). Private equity, leveraged buyouts and governance. *Journal of Corporate Finance*, 13(4), 439–460.
- Dawson, A. (2011). Private equity investment decisions in family firms: The role of human resources and agency costs. *Journal of Business Venturing*, 26(2), 189–199.
- Eddleston, K.A., Otondo, R.F., & Kellermans, F.W. (2008). Conflict, participative decision-making, and generational ownership dispersion: A multilevel analysis. *Journal of Small Business Management*, 46(3), 456–484.
- Engel, D. & Keilbach, M. (2007). Firm level implications of early stage venture capital investment—An empirical investigation. *Journal of Empirical Finance*, 14(2), 150–167.
- Engel, D. & Stiebale, J. (2014). Private equity, investment and financial constraints—firm-level evidence for France and the United Kingdom. *Small Business Economics*, 43(1), 197–212.
- EVCA. (2007). Guide on private equity and venture capital for entrepreneurs. EVCA Special paper. Brussels: European Private Equity and Venture Capital Association.
- Gersick, K., Davis, J., Hampton, M., & Lansberg, I. (1997). *Generation to generation: Life cycles of the family business*. Boston, MA: Harvard Business School.
- Gómez-Mejía, L.R., Cruz, C., Berrone, P., & De Castro, J. (2011). The bind that ties: Socioemotional wealth preservation in family firms. *Academy of Management Annals*, 5(1), 653–707.
- Gómez-Mejía, L.R., Takacs-Haynes, K., Núñez-Nickel, M., Jacobson, K.J.L., & Moyano-Fuentes, J. (2007). Socioemotional wealth and business risks in family-controlled firms: Evidence from Spanish olive oil mills. *Administrative Science Quarterly*, 52(1), 106–137.



- Grilli, L. & Murtinu, S. (2012). Do public subsidies impact the performance of new technology-based firms? The importance of evaluation schemes and agencies' goals. *Prometheus*, 30(1), 97–111.
- Hall, B.H. & Mairesse, J. (1995). Exploring the relationship between R&D and productivity in French manufacturing firms. *Journal of Econometrics*, 65(1), 263–293.
- Harada, N. (2004). Productivity and entrepreneurial characteristics in new Japanese firms. *Small Business Economics*, 23(4), 299–310.
- Harris, R., Siegel, D.S., & Wright, M. (2005). Assessing the impact of management buyouts on economic efficiency: Plant-level evidence from the United Kingdom. *Review of Economics and Statistics*, 87(1), 148–153.
- Harvey, M. & Evans, R.E. (1994). Family business and multiple levels of conflict. *Family Business Review*, 7(4), 331–348.
- Hellman, T. & Puri, M. (2000). The interaction between product market and financial strategy: The role of venture capital. *Review of Financial Studies*, 13(4), 959–984.
- Hellmann, T. & Puri, M. (2002). Venture capital and the professionalization of start-up firms: Empirical evidence. *Journal of Finance*, 57(1), 169–197.
- Howorth, C., Westhead, P., & Wright, M. (2004). Buyouts, information asymmetry and the family management dyad. *Journal of Business Venturing*, 19(4), 509–534.
- Ivanov, V.I. & Xie, F. (2010). Do corporate venture capitalists add value to start-up firms? Evidence from IPOs and acquisitions of VC-backed companies. *Financial Management*, 39(1), 129–152.
- Jensen, M. & Meckling, W. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305–360.
- Kaplan, S.N. & Stromberg, P.J. (2009). Leveraged buyouts and private equity. *Journal of Economic Perspectives*, 23(1), 121–146.
- Kellermanns, F.W. & Eddleston, K.A. (2004). Feuding families: When conflict does a family firm good. *Entrepreneurship Theory and Practice*, 28(3), 209–228.
- Kellermanns, F.W. & Eddleston, K.A. (2006). Corporate entrepreneurship in family firms: A family perspective. *Entrepreneurship Theory and Practice*, 30(6), 809–830.
- Kellermanns, F.W., Eddleston, K.A., & Zellweger, T.M. (2012). Extending the socioemotional wealth perspective: A look at the dark side. *Entrepreneurship Theory and Practice*, 36(6), 1175–1182.
- Kortum, S. & Lerner, J. (2000). Assessing the contribution of venture capital to innovation. *RAND Journal of Economics*, 31(4), 674–692.
- Le Breton-Miller, L. & Miller, D. (2013). Socioemotional wealth across the family firm life cycle: A commentary on “Family Business Survival and the Role of Boards.” *Entrepreneurship Theory and Practice*, 37(6), 1391–1397.
- Lee, P.M. & Wahal, S. (2004). Grandstanding, certification and the underpricing of venture capital backed IPOs. *Journal of Financial Economics*, 73(2), 375–407.
- Lerner, J. (1995). Venture capitalists and the oversight of private firms. *Journal of Finance*, 50(1), 301–318.
- Lichtenberg, F.R. & Siegel, D. (1990). The effects of leveraged buyouts on productivity and related aspects of firm behavior. *Journal of Financial Economics*, 27(1), 165–194.

- Martí, J., Menéndez-Requejo, S., & Rottke, O.M. (2013). The impact of venture capital on family businesses: Evidence from Spain. *Journal of World Business*, 48(3), 420–430.
- Martí, J., Salas, M., & Alférez, A. (2011). *Economic and social impact of venture capital and private equity in Spain*. Madrid: ASCRI.
- McConaughy, D.L. & Phillips, G. (1999). Founders versus descendents: The profitability, efficiency, growth characteristics and financing in large, public, founding-family-controlled firms. *Family Business Review*, 12(2), 123–131.
- Meggison, W.L. & Weiss, K.A. (1991). Venture capitalist certification in initial public offerings. *Journal of Finance*, 46(3), 879–903.
- Poutziouris, P.Z. (2001). The views of family companies on venture capital: Empirical evidence from the UK small to medium-size enterprising economy. *Family Business Review*, 14(3), 277–291.
- Puri, M. & Zarutskie, R. (2012). On the lifecycle dynamics of venture-capital- and non-venture-capital-financed firms. *Journal of Finance*, 67(6), 2247–2293.
- Romano, C.A., Tanewski, G.A., & Smyrnios, K.X. (2000). Capital structure decision making: A model for family business. *Journal of Business Venturing*, 16(3), 285–310.
- Sahlman, W.A. (1990). The structure and governance of venture capital organizations. *Journal of Financial Economics*, 27(2), 473–521.
- Salvato, C. (2004). Predictors of entrepreneurship in family firms. *Journal of Private Equity*, 7(3), 68–76.
- Schoar, A. (2002). Effects of corporate diversification on productivity. *Journal of Finance*, 57(6), 2379–2403.
- Scholes, L., Wright, M., Westhead, P., & Bruining, H. (2010). Strategic changes in family firms post management buyout: Ownership and governance issues. *International Small Business Journal*, 28(5), 505–521.
- Shepherd, D.A. & Zacharakis, A. (2002). Venture capitalists expertise: A call for research into decision aids and cognitive feedback. *Journal of Business Venturing*, 17(1), 1–20.
- Simon, H.A. (1993). Altruism and economics. *American Economic Review*, 83(2), 156–161.
- Sirmon, D. & Hitt, M. (2003). Managing resources: Linking unique resources, management and wealth creation in family firms. *Entrepreneurship Theory and Practice*, 27(4), 339–358.
- Sonfield, M.C. & Lussier, R.N. (2004). First-, second-, and third-generation family firms: A comparison. *Family Business Review*, 17(3), 189–202.
- Sørensen, M. (2007). How smart is smart money? A two-sided matching model of venture capital. *Journal of Finance*, 62(6), 2725–2762.
- Tappeiner, F., Howorth, C., Achleitner, A.K., & Schraml, S. (2012). Demand for private equity minority investments: A study of large family firms. *Journal of Family Business Strategy*, 3(1), 38–51.
- Tian, X. (2012). The role of venture capital syndication in value creation for entrepreneurial firms. *Review of Finance*, 16(1), 245–283.
- Tyebee, T. & Bruno, A. (1984). A model of venture capitalist investment activity. *Management Science*, 30(9), 1051–1066.
- Upton, N. & Petty, W. (2000). Venture capital and U.S. family business. *Venture Capital*, 2(1), 27–39.

Van Biesebroeck, J. (2007). Robustness of productivity estimates. *Journal of Industrial Economics*, 55(3), 529–569.

Windmeijer, F. (2005). A finite sample correction for the variance of linear efficient two-step GMM estimators. *Journal of Econometrics*, 126(1), 25–51.

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The authors appreciate the comments received from Fabio Bertoni (EM-LYON) and from participants in the seminars organized by Universidad Pablo de Olavide (Seville) and EM-LYON Business School. We also thank EFMA 2012 conference participants (Barcelona) for their productive discussion. Finally, we wish to thank the editor, Prof. Franz Kellermanns, and two anonymous referees for their valuable comments and suggestions.