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learning-by-exporting among family firms**

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# The influence of family involvement and generational stage on learning-by-exporting among family firms

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## Abstract

This paper analyses the link between export activity and product innovation in family firms. Following the *learning-by-exporting* (LBE) hypothesis and considering that family firms are not homogeneous entities, we explore differences among family firms regarding the influence of export activity on product innovation based on the degree of family involvement in management and on the generational implication. Based on a sample of 797 family firms operating in 20 different manufacturing industries over the period 2007-2014, empirical findings indicate that there are significant differences between family firms in terms of the conversion process of the benefits of exporting into product innovation. The family involvement in management fosters the LBE effect on product innovation through an inverted U-shaped pattern, reaching a peak when there are 2.97 family members involved in the management of the company. Contrary to expectations, results also show a positive influence of first-generation family firms on the LBE effect on product innovation.

## Keywords:

*Learning-by-exporting*; Product innovation; Ability vs. willingness; Family firm; Family involvement in management; Family generation; Panel data methodology

## 1. INTRODUCTION

Exporting, the most prevalent form of internationalization, can be a strategic tool to facilitate firm innovation (Salomon and Shaver, 2005). This positive influence of exporting on innovation is known as the *learning-by-exporting* (LBE) effect and is driven because exporting firms, by interacting and competing in a foreign market, are exposed to knowledge that is unavailable to firms whose operations are confined to the domestic market (Love and Ganotakis, 2013). Exporters may benefit from the market and technological knowledge of different foreign agents, including customers, with whom they interact (Monreal-Pérez et al., 2012; Smith, 2014), boosting their innovative capacity by providing access to important channels of technology and learning (Salomon and Jin, 2010). In addition, since firms participating in international markets are exposed to more intense competition and exporting firms need to respond to the changing demands from overseas customers, they are forced to improve their existing products or create new ones (Wagner, 2007).

Literature to date have well confirmed the general LBE hypothesis, with theoretical arguments and empirical evidences regarding that firms' export activities induce more frequent and intense innovative behaviors (Bernard and Jensen, 1999; Clerides et al., 1998; Solvay and Sanglier, 1998; Tse et al., 2017; Wagner, 2007). However, we know less about firm specific conditions and characteristics that moderate the LBE effect and, therefore, about how the benefits of the technological learning derived from exporting are shaped by other organizational and institutional factors (Tse et al., 2017). One of these main factors is related with the family governance. Despite being the most prevalent type of business, research about consequences of family firm internationalization on innovation outcomes is very much in its early stage (De Massis et al., 2018).

Both theoretical reasons and empirical evidences lead to the belief that family firms, due to their family governance structure, differ in their LBE effects on innovation from non-family firms. The distinctive attributes of family firms (Chrisman et al., 2015), including centralized authority structures (that shape their ability or discretion to use resources), incentives for non-financial goals and asymmetrical accountability norms (both shaping their willingness or disposition to act), can be major drivers of firms' internationalization, innovativeness and learning capabilities (De Massis et al., 2016; De Massis et al., 2014; Veider and Matzler, 2016). Literature in this vein indicate thus that family firms, despite being more reluctant to internationalize than their non-family counterparts (Gómez-Mejía et al., 2010), learn more from exporting since they favour a more efficient conversion process of the experiential knowledge and technical resources accessed through exporting activity into innovation (De Massis et al., 2018; Freixanet et al., 2018).

Acknowledging the particular LBE effect in family firms, it is essential to move forward in order to know the variations of this effect among family firms which, to the best of our knowledge, has been understudied to date. Since family firms are heterogeneous entities (Chua et al., 2012) pursuing different internationalization and innovation strategies, we investigate among family firms the differing role of

family involvement and generational implication in the degree of efficiency of the conversion process of international knowledge into innovation outcomes, exploring in the LBE effect. From the ability-willingness framework (De Massis et al., 2014; Chrisman et al., 2015) we explore the involvement in management or in generation of family members as a catalyst of the LBE effect considering owners' authority and wealth concentration, preponderance of non-financial goals and risk aversion concerns. Since family firm's socioemotional and economic basics vary depending on levels of family involvement in management and on generational stage, we posit that these variations will be translated to the different the integration of economic and non-economic objectives in the decision-making related to ability and willingness propensity to internationalization and conversion process of knowledge into innovation (Boellis et al., 2016; Freixanet et al., 2018).

Therefore, our main objective with this study is to cover this gap by analysing how the unique characteristics of family firms influence the LBE hypothesis on a sample of 797 family firms over the period 2007-2014. In addressing these questions, this paper makes several contributions. First, we enrich the internationalization literature by contributing to the understanding of the conditions that moderate the LBE effect when analysing the role that the form of governance plays in the influence of exporting on innovation (Tse et al., 2017). Second, we contribute to recent research on internationalization by addressing understudied (and undertheorized) explanations regarding mechanisms through which family control shapes the processes and outcomes of family business internationalization (De Massis et al., 2018). Third, we consider literature calls regarding heterogeneity of family firms (Arregle et al., 2017; Chua et al., 2012), taking into account differences in their exporting effects based on the degree of family involvement in management and the generational implication. Fourth, we advance in the understanding of family firm innovation management (Chrisman et al., 2015), by analyzing internationalization and, more specifically, exporting as a key antecedent of innovation outcomes (Duran et al., 2016; Freixanet et al., 2018). And fifth, from the methodological point of view, we use longitudinal data to properly explore the time path (not immediate) of the impact on innovation from the learning derived from export activities (Monreal-Pérez et al., 2012).

The paper is organized as follows. The next section introduces the theoretical framework under which hypotheses are proposed. Then, we explain the methodology used for empirical analyses. An exposition results follows. Finally, the conclusions and discussion of the main results are developed.

## **2. THEORETICAL BACKGROUND AND HYPOTHESES**

The LBE hypothesis, widely confirmed by literature today, support that firm export activities induce more frequent and intense innovation behaviors (Love and Ganotakis, 2013; Salomon and Shaver, 2005; Solvay and Sanglier, 1998). Exporting firms, by interacting and competing in a foreign market, are exposed to knowledge that is unavailable to firms whose operations are confined to the domestic market (Salomon and Jin, 2010), which in turn forms the basis for the development of further

innovations (Monreal-Pérez et al., 2012; Yeoh, 2004). Exporting allows firms to access both foreign customers –that provide feedback on how to improve existing products and even offer technical, operational and product development assistance– and professional and technical expertise –via industry and trade association’s information knowledge and support as well as through host country competitors as operational benchmarks– providing additional information not available to non-exporters, that help firms to boost their innovative capacity (Love and Ganotakis, 2013; Salomon and Jin, 2010). Since firms participating in international markets are exposed to more intense competition and need to respond to the changing demands from overseas customers, they must improve their products or create new ones (Clerides et al., 1998; Wagner, 2007) enhancing their innovative capacity through accessing to important channels of technology and learning (Djankov and Hoekman, 2000; Kafouros et al., 2008; Tse et al., 2017). Therefore, exporting can be considered a strategic action through which firms can enhance their competitive position that facilitates innovation.

There is however scarce knowledge about how family governance can influence the internationalization and innovation activities and outcomes (De Massis et al., 2015a) and, in turn, how family involvement or generational implication can moderate the LBE effect. In family firms, family and business interplays create unique inputs and processes driven by the goals, intentions, motivations, resources, power, and legitimacy of the firm’s dominant coalition (Chrisman et al., 2015). Exporting can be a powerful strategic tool to family firms to acquire and maintain competitive advantage although entails significant risk (Kontinen and Ojala, 2010; Pukall and Calabrò, 2014), leading family owners and managers to arrange more complex domains where the need for external financial and human resources is necessarily greater (De Massis et al., 2018; Merino et al., 2015). It also requires a strong commitment and engagement of resources that not all family firms are prepared or willing to commit.

In this vein, some few recent studies (Duran et al., 2016; Freixanet et al., 2018) has evidenced that family firm’s idiosyncrasies render the conversion process of the benefits from the innovation or exporting efforts into innovation output more efficiently than those non-family firms counterparts. In the specific terms of the LBE effect, Freixanet et al. (2018) point out that given the owners’ higher authority, wealth concentration and pursuit of nonfinancial goals, family firms are more reluctant –less willing– to engage in internationalization and innovation activities than their non-family counterparts, but are able to more efficiently leverage their exposure to foreign markets in terms of innovation outcomes. Despite the family firms’ greater risk aversion to internationalization (Liang et al., 2014), their personalized control, low levels of formalization and bureaucracy, altruism and interest alignment (Carney, 2005; Schulze et al., 2001; Sirmon and Hitt, 2003) lead to their superior ability in identifying opportunities and acquiring knowledge from outside their boundaries (De Masis et al., 2013; Kotlar et al., 2014; Zahra, 2003) that, in turn, benefits the innovation process.

Departing from these evidences, once acknowledged that family firms differ from non-family firms in their LBE effects, it becomes key to examine the heterogeneity of this effect among family firms (Chua et al., 2012). Since not all family firms pursue similar internationalization strategies and have the

same efficiency in the conversion of exporting activity learning into innovation outcomes, we investigate among family firms, exploring the differing role of family involvement in management and family generation in the LBE effect.

## **2.2. The moderating effect of family involvement in management**

Ability is the family owners' discretion to direct, allocate, add to, or dispose of a firm's resources (De Massis et al., 2014). This ability arises from a family involvement in core governance dimension mostly reflected by ownership because, by definition, family members hold controlling ownership in the firm and typically are dominant members of the top management team (e.g., Carney, 2005; Chrisman et al., 2012). This discretion provides latitude in choosing among a range of strategic, tactical and structural options (Hambrick and Finkelstein, 1987) giving family firms a unique ability to behave idiosyncratically (Chrisman et al., 2015). When deciding upon internationalization activities, family owners and managers are particularly able to boost the internationalization, having first hand access to the new knowledge from international markets that provides the opportunity of learning by doing (Zahra et al., 2000).

Whereas ability in the form of family influence through the ownership serves as sufficiency condition for altering family firms' internationalization behaviors (regarding non-family firms), willingness comprises the goals, intentions and motivations that drive the owning family to influence on the family managers behaviors (De Massis et al., 2014). These intentions are motivated by the pursuit of family-oriented goals – such as family harmony, family social status, and family identity (Chrisman et al. 2012; Kotlar et al., 2013) – that create or preserve socioemotional wealth (Gómez-Mejía et al. 2007). Considering that the socioemotional and economic foundations can vary considerably from family firm to family firm (Chua et al., 2012), we argue that the integration of these non-economic goals in strategic decision-making related to willingness propensity to internationalization and conversion process of external knowledge into innovation will be mainly shaped by diverse configurations of family involvement in management (Boellis et al., 2016).

Although literature considers family firms to be less willing to internationalized because of their risk aversion, their reluctance to share control and their general lack of resources (e.g., Merino et al., 2015; Pukall and Calabrò, 2014), there are several reasons to believe that family involvement in management can boost internationalization and LBE effect on innovation outcomes. First, a higher degree of family involvement in management can emphasize the family firm's desire for long-term survival, eventually overwhelming risk aversion linked to the internationalization, influencing thus positively on the firm's likelihood of exporting and developing new products (Gómez-Mejía et al., 2010). Second, higher family involvement in management can improve the alignment of interests and preferences within the firm that reduce information asymmetry (Jensen, 1994). This is expected to happen naturally because some family owners may be also actively involved in management, or

indirectly, because family members, regardless of their involvement in ownership, are tied by kinship obligations that act as a binding normative moral order aligning the family agents' interests (Chrisman et al., 2004, 2012). Third, altruism among family owners and managers can be encouraged as family involvement in management grows, emphasizing then family members to selflessly promote collective ownership, creating an organizational culture of willingness and awareness of risk (Gómez-Mejía et al., 2003; Schulze et al., 2003) to pursue long-term growth strategies that include international and innovation opportunities with lower reservation process (Zahra, 2003). And fourth, family involvement in management facilitates frequent interaction with proximate others and gives more opportunities to learn from them (Veider and Matzler, 2016) while using a unique family language, which in turns helps family firm to transfer more efficiently the knowledge learned from internationalization activities to innovation outcomes (Zahra et al., 2000).

However, literature also reveals some negative consequences arising from family involvement in management, which may be especially relevant when such involvement is excessive or very high (De Massis et al., 2015b), decreasing the marginal effect of internationalization (Liang et al., 2014) and its influence in the LBE effect. In this vein, the fact that family firms tend to appoint affiliate (relatives) managers and directors, even though this limit management team skills or capabilities to monitor decision-making and to provide independent advice (Jones et al., 2008) since these nepotistic appointments decreases the likelihood that they possess competencies comparable with those of professionalized non-family managers (Boellis et al., 2016). Outside managers may have the expertise that family managers lack, but they could also usurp family authority, decrease family control over management decisions, damaging top management team cohesiveness and increasing conflicts with family managers in career and personal goal (Chrisman et al., 2012; Gómez-Mejía et al., 2003). For these reasons, family firms with very high levels of family involvement in management tend to prefer hiring family members for management positions, inhibit the development of managerial resources and capabilities needed for international expansion (Cerrato and Piva, 2012; Fernandez and Nieto, 2005; Graves and Thomas, 2006) and thus for the efficient conversion of innovation inputs coming from internationalization into outputs.

Moreover, the presence of excessive family members in management may family managers tend to be exposed to the threat of groupthink (Janis, 1982), with severe consequences in terms of redundant connections, limited availability of diverse knowledge and perspectives that are regarded to be functional and necessary for decision quality (De Massis et al., 2015b). This excess of family managers may prevail the inwardly looking logic, inhibiting the willingness of family firms to dedicate efforts and energy to internationalization and innovation activities

Therefore, it follows that the family involvement in management can be considered as an important indicator of the willingness to generate decision-making oriented to the devolvement of international and innovative activities for family firms (Chrisman et al., 2015; De Massis et al., 2014; Kotlar et al., 2014). The effectiveness of a top management team is best at moderate levels of family involvement in

management (i.e., when family and non-family managers coexist) because this group composition ensures some alignment between owners and managers and an adequate level of intragroup cohesion, as well as a sufficient degree of cognitive diversity in the top management team (De Massis et al., 2015b). Accordingly, we propose that the level of family involvement in management has an inverted-U-shaped curvilinear influence on the relationship between export activity and product innovation.

*H1: The family involvement in management has an inverted U-shaped moderating influence on the LBE effect on innovation outcomes in family firms.*

## **2.2. The moderating effect of family generation**

Generational involvement creates heterogeneity among family firms since family firm structure and management changes as the family firm progresses from one generation to the next (Kellermanns and Eddleston, 2006; Kellermanns et al., 2008). First generations of family firms are owned and managed by the founding owner whereas second and subsequent generations are those in which family members of second or later generations are involved in the ownership and management of the firm (Cruz and Nordqvist, 2012; Sonfield and Lussier, 2004). Since the generation in control is a central component of a family firm's life cycle and creates important changes in the family firm's resources, attributes, and structure (Beck et al., 2011), we expect it to influence on LBE effects on innovation outcomes of family firms.

Literature addressing the influence of generational involvement on family firms internationalization have generally shown a positive influence on international expansion as new generations enter the business (Kontinen and Ojala, 2010; Merino et al., 2015; Pukall and Calabrò, 2014). Likewise, evidences emphasize that family firms have a more innovation-oriented culture when later generations are involved in the firm, emphasizing innovation's process and outcomes (De Massis et al., 2013, 2015a; Kotlar et al., 2013; Zahra, 2005). Taken together, next generations, with their greater experience and subsequent changes in ownership and management, are thus often characterized as the drivers behind internationalization (Graves and Thomas, 2008), adding fresh momentum to the entrepreneurial opportunities that push for new ways of doing things (Pukall and Calabrò, 2014).

In terms of ability and willingness, we can find a paradox (Chrisman et al., 2015) when comparing the LBE effect on product innovation in terms of the generation involved attending to the variety of differences between first and later generations in family firms (Beck et al., 2011; Kraiczy et al., 2015). The concentrated power and decision-making authority of the founder that is present in the first generation gives these family firms the ability to undertake strategic actions with greater discretion regarding internationalization activities (Zahra et al., 2000) that impulse innovation outcomes. On the contrary, family firms in second and subsequent generation are more likely to count with more and higher experienced and educated family (or non-family) members with the necessary skills and



knowledge related to management techniques that will allow them to deal more efficiently with the LBE effect since higher education enhance problem-solving skills through the identification and evaluation of feasible solutions (Ganotakis and Love, 2012). These higher experienced and educated family members of the second and subsequent generation equally participate in decision making, providing then necessary capabilities for exporting (Liang et al., 2014) that, in turn, facilitates innovation (Beck et al., 2011).

Regarding willingness, Kellermanns and Eddleston (2006) argue that first generations show more risk-averse behaviors in comparison with later generation in family firms. The founder's desire to keep the business within the family and to maintain family wealth may lead him or her to avoid taking risks inherent to internationalization and innovation (Kotlar et al., 2013; Merino et al., 2015). In addition, later generations in family firms need to push for new ways to do things if they want to move beyond the legacy of the previous generation (Zahra, 2005) tending to have a more external orientation, that include internationalization strategies, compared with the internal focus of family firms in first generation (Cruz and Nordqvist, 2012). In this vein, as the family firm survival requires maintaining and enhancing business growth (Kellermanns et al., 2008), second and subsequent generations may put greater emphasis on enhancing business through effective internationalization as well as innovation strategies.

Therefore, we expect latter generations' involvement to have a positive moderating influence on the LBE effect on family firm innovation outcomes. As the second and subsequent generations involve in the control and management of the family firm, a higher influence of knowledge extracted from export activity on family firm innovation is expected.

*H2: The LBE effect on innovation outcomes is greater in second-and-subsequent-generation family firms than in first-generation family firms.*

### **3. METHODOLOGY**

#### **3.1. Sample and data description**

This study analyses data drawn from the Spanish Business Strategy Survey (SBSS), an institutional database that surveys a representative panel of manufacturing firms, during the period from 2007 to 2014. Since 1990, the SBSS has surveyed an average sample of 2,000 firms every year by distributing a questionnaire with 107 questions across 500 fields. The reference population is composed of firms with 10 or more employees in the Spanish manufacturing industry. The SBSS takes a broad sample of firms each year. On average within the period considered, 90.3% of the total sample responded ([www.fundacionsepi.es](http://www.fundacionsepi.es)). Because public authorities have the power and the resources to secure a high level of participation, the survey achieves a high response rate, and the sample is sufficiently large and representative of the population. In conjunction with the quality of the information collected, these

characteristics constitute the main advantage of using the secondary data produced by public agencies (Dorling and Simpson, 1999). All of the information contained in the SBSS is subject to strict controls for validity and consistency. This database has already been used in previous innovation and internationalization studies (Alonso-Borrego and Forcadell, 2010; Cassiman and Golovko, 2011; Kotlar et al., 2014; Nieto et al., 2015; Monreal-Pérez et al., 2012; Un and Asakawa, 2015) because of its validation process, the objective nature of the information collected and the reliance on multiple respondents.

Thus, we departed from 1,867 firms operating in 20 different manufacturing industries over the period 2007-2014, out of which we analyse a final sample of 797 family firms (42.71%; Table 1). In this vein, we consider family firms as those firms that self-classified themselves as family firms which, according to the survey respondent criteria, correspond to “a firm in which a familial group is actively involved in the control or management of the firm” (Kotlar et al., 2013; Merino et al., 2015). This self-classification criterion is widely accepted and used by the literature (Sánchez-Marín et al., 2017; Sonfield and Lussier, 2004; Westhead and Cowling, 1998) since makes it possible to identify appropriately companies with particular management characteristics influenced by the owning family.

**Table 1: Sample description based on main variables**

Year	Export intensity <sup>a</sup> (% over total sales)	Product innovation <sup>a</sup> (number)	Family firm (% over total firms)	Family involvement in management <sup>a,b</sup> (number of family managers)	Family generation <sup>b</sup> (% in 2 <sup>nd</sup> and subsequent generations)
2007	0.19	1.30	38.50	1.20	44.68
2008	0.19	1.22	41.16	1.18	34.89
2009	0.20	1.31	41.89	1.13	37.50
2010	0.21	1.64	42.57	1.17	43.50
2011	0.23	1.18	44.38	1.20	46.76
2012	0.26	1.05	44.78	1.19	46.47
2013	0.26	0.74	44.92	1.23	48.43
2014	0.27	0.78	44.66	1.24	51.69
Overall period 2007-2014 (1867 firms)	0.23	1.17	42.71	1.19	43.52

<sup>a</sup>Mean value

<sup>b</sup>Only on family firms (797 firms)

When studying the evolution of the data in Table 1, a number of results may be underlined: the descending values for product innovation, the intensification of the export activity, and the proliferation of family firms, being these firms in older generations as the years go by. Firstly, regarding the increase in the export activity, the result confirms the importance of export markets for firms, especially when taking into account the financial crisis, greater in the domestic markets, particularly deep in the Spanish case (Fernández-Mesa and Alegre, 2015; Eppinger et al. 2015). Secondly, the number innovative firms (based on their average number of product innovation) is lowering over the sample period: this negative tendency probably due to two factors: first, because of the financial crisis effect on the shortage of innovation activities. Second, as Cassiman and Golovko (2011) argue, the great increase in the rate of

exporters compared to the fall in product innovations can be explained by the fact that innovation may be needed to start export activity (as the self-selection models stress) but it is not necessarily needed to continue exporting. Thirdly, family firms increase its representativeness among Spanish firms, which can be explained both by the boost of entrepreneurs attitude in Spain (Fernández-Mesa and Alegre, 2015) and by the greater ease to fund a family firm, usually smaller and in which less resources have to be devoted (Fernández and Nieto, 2005). Fourthly, these family firms are increasingly older, raising the firms being in second and subsequent generation, which can be explained as a result of the increasing number of family firms being created, tolerating at a great extent short-term performance failures (Gómez-Mejía et al., 2007). Lastly, the number of family managers in family firm remain stable (around the mean value of 1.19), something expected considering the frequent small size of family firms that need usually a low number of managers to administrate them (Carrasco-Hernández and Sánchez-Marín, 2007).

### 3.2. Variables measurement

*Export intensity.* Since the LBE effect is the impact of the previously having exported on firm performance (Wagner, 2007), it is acquired once the firm access the export market and therefore gets in touch with new international partners and clients. In this line, Silva et al. (2012) point that the LBE should be measured using information on the specific mechanisms through which firms learn in order to innovate. We argue that these mechanisms and the consequent stage of internationalization are better reflected with the proportion of export sales, namely export intensity rather than with a dichotomous variable representing whether the firm exports or not (export propensity). Thus, export intensity is measured according to the proportion of export sales relative to total sales.<sup>1</sup>

*Product innovation.* Following the OECD definition (OECD, 2005), we measure innovation by valuating the gathering of product innovations. Thus, to better identify the product innovation activities of the firm (considering the heterogeneous innovative activity of the organizations and its intensity), we measure such gathering by appraising the number of new products obtained. Therefore, in measuring product innovation through new products, we follow what Story et al. (2014) define as intensive product innovation, and consequently considering that the real radical product innovation is that really breaking away from the old products, since new products are novel and unique (Norman and Verganti, 2014).

*Family involvement in management.* Following Kotlar et al. (2013), we operationalize the family involvement in the firm by the number of family members holding a position as a member of the top management team of the firm. Following literature in this line, we assume with this measure that family vision and goals are highly correlated to the extent of family involvement in the management of the firm (Chrisman et al., 2012; Gómez-Mejía et al., 2010), if the firm is managed by at least one member from

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<sup>1</sup> For the interactions including the LBE and Family involvement in Management, a dichotomous variable according to the EI value of the firm is created (if the EI value is greater than its mean value, LBE=1, and LBE=0, otherwise).

the family (Banalieva and Eddleston, 2011; Faccio and Lang, 2002). Thus, we measured such involvement by a continuous variable counting the number of owners and owner's relatives who occupy top managerial positions, as similar studies using SBSS do (Kotlar et al., 2013; Kotlar et al., 2014).

*Family generation.* Considering that direct information about generational stage of family firms are not available in our secondary database, drawing on previous research (Fernández and Nieto, 2005), we used a proxy of generation of the owning family heading the firm based on the age of the firm (Beck et al., 2011; Kraiczy et al., 2015). We have divided family firms according to a dummy variable, taking value 0 if it is first-generation family firm (when it is less than 30 years old) and taking value 1 if it is second-and-subsequent-generation family firm (when it is more than 30 years old).

*Control variables.* We use the size of the firm, the age of the firm, the gross operating margin and the sector to which the firm belongs to. Thus, first we measure *firm size* as the total personnel employed at the company on December 31st. Second, *firm age* is the period of time passed between the last year of our panel (2014) and the year of the firm foundation. Third, we operationalize the *gross operating margin*, a measurement of the company's profitability, defined as the percentage which the sum of sales, the change in stocks, and other current management income minus the purchases, external services and labour costs, represent on total sales plus the change in stocks of them and other current management income. Finally, to control for the *industry* the firm belongs to, the firm may take a value ranging from 1 to 20 according to the manufacturing subsectors the Standard Industrial Classification determines.

### **3.3. Models specifications**

Following the recommendations of Filipescu et al. (2009), we lagged the variables affecting product innovation by one time period to account for the delay between the firm investments and the results of these investments (Greenhalgh et al., 1994). Introducing these lagged variables reduces the probability that covariance problems will occur (Bernard and Jensen, 1999) and improves the probability of inferring a causal relationship (Baum, 2006).

To achieve the main goal, we specify several random effect (RE) tobit regression models because scholars have shown that these models are the best approach to modelling binary choice models with unobserved firm heterogeneity (Roberts and Tybout, 1997). The advantage of these models is that they explicitly controls for unobserved firm heterogeneity by allowing the error term to consist of a time invariant unobserved firm-specific effect ( $u_i$ ) and a random unobserved shock ( $x_{it}$ ), which varies across firms and time (Bernard and Jensen, 2004). Using a dataset identical to that used in his study, Martínez-Ros (1999) obtains evidence of the importance of unobserved variables, such as managerial ability, on the innovative behavior. The influence of this variable, which is not considered in any of our models, depicts the importance of unobserved heterogeneity and, therefore, the convenience of using RE models.

On the one hand, to test hypothesis 1 (the inverted U-shaped relationship between the LBE effect on family firm's product innovation moderated by its family involvement in management), we have first computed the quadratic form of the family involvement in management variable for firm  $i$  in the

period t-1 (Family involvement in management  $i_{t-1}$ ). Then, the interaction between this quadratic variable and export intensity<sup>2</sup>, also for family firms  $i$  in period t-1 was computed. The control variables are the firm size, the firm age, the gross operating margin (all for family firms  $i$  in t-1). Moreover, we control the subsector and the year to which each observation belongs to by creating both a sectorial and a yearly dummy, respectively. Thus, the tobit model is the following:

$$PI_{i,t} = \beta_0 + \beta_1 Cont_{i,t} + \beta_2 Export\ intensity_{i,t-1} + \beta_3 Family\ involvement\ in\ management_{i,t-1} + \beta_4 Export\ intensity_{i,t-1} * Family\ involvement\ in\ management_{i,t-1} + \beta_5 (Family\ involvement\ in\ management_{i,t-1})^2 + \alpha_i + \varepsilon_{i,t} \geq 0; i=1, \dots, n; t=1, \dots, T_i$$

On the other hand, to test the second hypothesis (the moderating effect of family generation on the LBE effect on family firm's product innovation), we compute the interaction between export intensity<sup>2</sup> for firm  $i$  in t-1 and the variable family generation for family firms firm  $i$  in t-1. The rest of variables are identical to these in the previous model. Therefore, we run the next tobit model:

$$PI_{i,t} = \beta_0 + \beta_1 Cont_{i,t} + \beta_2 Export\ intensity_{i,t-1} + \beta_3 Family\ generation_{i,t-1} + \beta_4 Export\ intensity_{i,t-1} * Family\ generation_{i,t-1} + \alpha_i + \varepsilon_{i,t} \geq 0; i=1, \dots, n; t=1, \dots, T_i$$

We have controlled by industry and year in every model by creating dummies that take value 1 if the observation belongs to a firm included in the sector or to a given year, and 0 otherwise.

### 3.4. Addressing endogeneity

The analysis may face an endogeneity problem if our explanatory variable, firm export activity, is affected by our outcome variable, the firm product innovation. As Bratti and Felice (2012) and Monreal-Pérez et al. (2012) point out, a firm's export status should be strongly correlated between the distance between its geographical location and potential destination for its products (as transportation costs generally increase with distance).

Since one thing that really concerns us is the instrumentation of our export-related first key variable, the interaction "Export intensity<sub>t-1</sub>\*family firm<sub>t-1</sub>" variable, we test the validity of "Export distance<sub>t-1</sub>\*Export intensity<sub>t-1</sub>" as an instrument of the previous variable, confirming that this a valid instrument satisfying two conditions: (1) it is relevant, that is, correlated with the potentially endogenous variable, obtaining a high value of 0.5227; p. value=0.000 and (2) it is exogenous, that is, uncorrelated (not significant) with the error term (correlation=- 0.0102, p. value= 0.2133). Then, we perform a Durbin-Wu-Hausman test<sup>3</sup> (Nakamura and Nakamura, 1981) to test for the endogeneity of our potentially endogenous variable and, therefore, to decide whether it is necessary to use an instrumental variable, i.e., whether a set of estimates obtained by least squares is consistent or not (Baltagi, 2011). Results

<sup>2</sup> Dichotomized as explained in the variables description.

<sup>3</sup> All the correlation test and the complete and detailed results of the Durbin-Wu-Hausman are available upon request from the authors.

show that the lagged Export intensity<sub>t-1</sub>\*family firm<sub>t-1</sub> variable ( $\chi^2 = 0.19$ ,  $p > \chi^2 = 0.6642$ ) is not endogenous since it is not affected by our dependent variable, the product innovation covariate.

#### 4. RESULTS

First, for a preliminary exploratory purpose, Table 2 provides information about the means, standard deviations, and correlations among the variables used in the basic econometric models (only the sample of family firms is selected). Every value is below 0.56, which is the maximum value recommended for the test of multicollinearity (Leiblein et al., 2002; Filipescu et al., 2009). We evaluate the impact of these correlations by testing for the inflation of variance (VIF), obtaining a maximum of 1.17 for the Export intensity variable<sup>4</sup>, considerably lower than 10, at which point the results are not biased by multicollinearity (Baum, 2006). Suggesting support to our suppositions, we can stress from the values shown in Table 2 that product innovation to be strongly related to export intensity, what indicates that there may exist a between these two variables.

**Table 2: Means, standard deviations and correlations**

	Mean	SD	1	2	3	4	5	6	7
1. Product innovation	1.10	7.24	1.00						
2. Firm age	31.20	18.57	0.10*	1.00					
3. Firm size <sup>a</sup>	5.79	0.30	0.01	0.10	1.00				
4. Gross operating margin <sup>a</sup>	2.06	0.95	-0.02	-0.00	-0.04	1.00			
5. Export intensity	0.21	0.27	0.10*	0.20*	0.04	-0.01	1.00		
6. Family involvement in management	1.19	1.09	0.0235	0.03*	0.02	0.01	-0.09*	1.00	
7. Family generation	0.38	0.49	0.01	-0.02	-0.14*	-0.06*	-0.01	0.03	1.00

\*Significant at 5% level

<sup>a</sup> Taken as natural logarithm

Afterwards, before carrying on the hypotheses testing, we test if the LBE effect is different among family and non family firms. In doing so, we performed two analyses: first, an analysis of variance (ANOVA), and second a Propensity Score Matching (PSM) analysis. Regarding the ANOVA, family firms show a 49% greater LBE on product innovation than non-family firms. This highly significant result ( $P < 0.001$ ) confirms that family firms are much more efficient than their non-family counterparts regarding the effect of the export activity measured through their export intensity on product innovation<sup>5</sup>.

In addition, a PSM approach, based on Rosenbaum and Rubin (1983), is executed. In this approach we minimize the self-selection bias since we compare two very similar groups according to some attributes<sup>6</sup> -in our case, firm size and manufacturing subsector- (Heckman et al., 1997). PSM is a quasi-

<sup>4</sup> VIFs for each variable are: firm age=1.12; firm size= 1.07; LBE (export intensity)= 1.17; Family involvement in management= 1.07; family generation= 1.08; gross operating margin= 1.04.

<sup>5</sup> The detailed ANOVA results can be asked upon request to the authors.

<sup>6</sup> The command “teffects psmatch” estimates the average treatment effect on the treated from observational data by propensity-score matching. Propensity-score matching estimators impute the missing potential outcome for each subject by using an average of the outcomes of similar subjects that receive the other treatment level. Similarity between subjects is based on estimated treatment probabilities, known as propensity scores. The treatment effect

experimental approach used to estimate the difference in outcomes between beneficiaries and non-beneficiaries attributable to a particular program. PSM reduces the selection bias and increases reliability in non-experimental data by using multiple matching algorithms, and chooses the one that produces the best balance statistics (Heckman et al., 1997; Jalan and Ravallion, 2003). According to our specific analysis, between these two similar groups, the family firms compose one of them (the treatment one) whereas the other valid counterfactual includes non-family firms. As can be seen in Table 3, the treatment effect is significant and positive, what indicates that the LBE effect is greater for the family firms than for the non-family firms.

**Table 3. PSM on LBE effect on product innovation of family firm vs. non-family firms**

Dependent variable: Product innovation			
ATE (Average Treatment Effect)	Coefficient	Standard error	z
Family Firm <sub>t-1</sub> × Export intensity <sub>t-1</sub> (1 vs. 0)	0.50***	0.27	2.57
Number of observations	8,641		

\*\*\*p < 0.01; \*\*p < 0.05; \* p < 0.1

After this preliminary analysis, we continue by testing our two hypotheses. To test if the relationship between the family involvement in management and the LBE effect on product innovation follows an inverted U-shape form, as proposed in hypothesis 1, we perform the correspondent tobit regression among our sample of family firms. As can be seen in Table 3, the coefficient of the quadratic interaction is significant and negative, what suggests the inverted U-shape of the interaction between the family involvement in the management and export activity of family firms. To easy these results we construct Figure 1, depicting the convex shape of the LBE effect depending on the family involvement in the management of the firm: the relationship grows until 2.97 (an inflection point occurs when the slope of a function equals zero). Note that 12.54% of the family firms have a greater amount of family managers than this point (100 out of 797 firms). Thus, the inflection point for quadratic equations of the form  $f(x) = ax^2 + bx + c$  is  $-b/(2a)$ . We have calculated this value applying this formula to the tobit regression coefficients displayed in Table 4), being the apex at the top, closing up the curve from this inflection point. Thus, this inverted U-shape confirms hypothesis 2.

**Table 4. Panel regressions on LBE effect on product innovation among family firms.**

Dependent variable: Product innovation					
		Model 1		Model 2	
		Coefficient	Standard Error	Coefficient	Standard Error
1	Firm size <sub>t-1</sub> <sup>a</sup>	-16.93***	0.49	-17.14***	0.50
2	Firm age <sub>t-1</sub>	0.00	0.01	- <sup>b</sup>	- <sup>b</sup>
3	Gross operating margin <sub>t-1</sub> <sup>a</sup>	-0.29*	0.17	-0.09	0.18
4	Industry dummies	Yes		Yes	
5	Year dummies	Yes		Yes	
6	Export intensity <sub>t-1</sub>	-1.94***	0.67	-0.29	0.40
7	Family involvement in management <sub>t-1</sub>	-1.55***	0.69		

is computed by taking the average of the difference between the observed and potential outcomes for each subject (StataCorp, 2007).

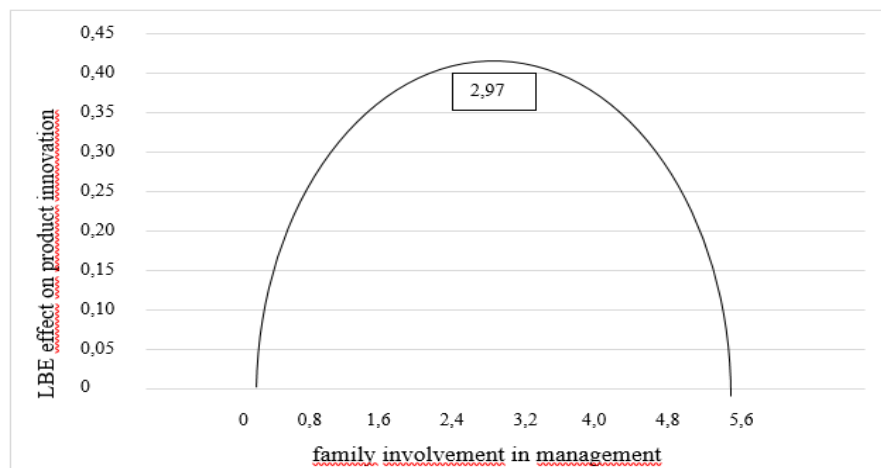
8	Export intensity <sub>t-1</sub> *Family involvement in management <sub>t-1</sub> <sup>b</sup>	1.78***	0.74		
9	Export intensity <sub>t-1</sub> * (Family involvement in management <sub>t-1</sub> <sup>b</sup> ) <sup>2</sup>	-0.30*	0.17		
10	Family generation <sub>t-1</sub>			0.84*	0.47
11	Export intensity <sub>t-1</sub> * Family generation <sub>t-1</sub>			-1.35*	0.82
12	Constant	104.95***	3.02	104.07***	3.04
14	LR chi <sup>2</sup> (29)	499.08***		487.67***	
15	Pseudo R <sup>2</sup>	0.30		0.30	
16	Log likelihood	-577.56		-563.67	

\*\*\*p < 0.01; \*\*p < 0.05; \* p < 0.1

<sup>a</sup> Taken as a logarithm.

<sup>b</sup> Dropped due to multicollinearity reasons.

**Figure 1: Inverted U-shape moderating effect of family involvement in management on the LBE effect on product innovation**



Regarding hypothesis 2, as can be seen in Table 4, the interaction coefficient of export intensity and family generation is negative and significant, which indicates a lower LBE effect on product as the family firm is in second or subsequent generations. This is the opposite of what was expected, that is, older generations would not learn more when exporting than the previous one, which can be due to the more margin to learn that first generation have, as we explain in more in detail in the next section. Finally, concerning the control variables, we can highlight the high explanatory power in every test of firm size that confirms its positive influence on the ability to obtain innovation outputs (Kotlar et al., 2013).

## 5. CONCLUSIONS AND DISCUSSION

Literature has already shown that in spite of family firms tend to be less willing to internationalize their activities (Merino et al., 2015; Pukall and Calabró, 2014), their LBE effect on innovation outputs is greater in comparison with non-family firms (Freixanet et al, 2018), being more efficient in the



conversion rate of the knowledge learned through their exporting activity into innovation output. Starting from that point, in this paper we shed light on –and fill the gap about– the link between export activity and product innovation *among* family firms. Since family firms are heterogeneous entities (Chua et al., 2012), we investigate, from the ability-willingness framework (De Massis et al., 2014; Chrisman et al., 2015), the moderating role of family involvement in management and generational stage in the LBE effect in a sample of 797 family firms over the period 2007-2014. In doing so, we contribute to the research on the consequences of family firm internationalization on innovation outcomes, which is very much in its early stage (De Massis et al., 2018), specifically advancing in the literature analyzing how the benefits of the learning derived from exporting are moderated by family governance factors.

Our results empirically confirm that family involvement in management shapes the conversion process of external knowledge into innovation drawing an inverted U-shape curve. Higher presence of the family in management implies less information asymmetry (Jensen, 1994) and more altruism which, according to the ability-willingness perspective, encourages family members to selflessly promote collective ownership (Karra et al., 2006), creating an organizational culture of willingness to pursue international and innovation opportunities with lower reservation process (De Massis et al., 2014; Zahra, 2003). But, since family firms tend to appoint affiliate managers and directors that encourage nepotism, limiting the optimal development of resources needed for exporting (Cerrato and Piva, 2012; De Massis et al., 2015b) and innovating, the positive moderating effect of family involvement on the likelihood of obtaining product innovation due to LBE effect will turn into negative, once the number of family members involved in management surpasses certain threshold – as a consequence of the negative marginal effects- (Liang et al., 2014). In particular, our results show that the number of family members to be involved in the management of the company in order to maximize conversion of the knowledge coming from exporting into innovation output is 2.97, which is considered, in the light of our results, as the ideal number of family managers to maximize the LBE effect on product innovation.

Contrary to what was expected, our finding indicates that LBE impact on product innovation decreases as the family firm is in second or following generations. Literature generally show a positive influence on international expansion (Kontinen and Ojala, 2010; Merino et al., 2015; Pukall and Calabrò, 2014) and on innovation outcomes (De Massis et al., 2013, 2015a; Kotlar et al., 2013; Zahra, 2005) as new generations enter the business, as they push international opportunities that emphasize innovations. Our result nevertheless may be explained because learning is proportional to the distance between the frontier and the start point, with decreasing marginal returns (Salomon and Jin, 2010). Therefore, since the first generation count with less experience and education than second and subsequent generations, they are further from the technological frontier and they learn more and at a faster rate than other generations. This is also the underlying argument of those works that state that the impact of exporting

upon productivity is higher for developing than developed economies and in the first year that firms start exporting compared to later years (Rowthorn, 1999).

We thus contribute with this paper to the literature showing that the heterogeneity of family firms' governance (Arregle et al., 2017; Chua et al., 2012) is a key factor to consider in the analysis of exporting and innovation relationships since it has been demonstrated its moderating influence on LBE effect on innovation outcomes (Tse et al., 2017). In addition, we advance in the understanding of processes and mechanisms through which family firms shapes the outcomes (in terms of product innovation) of family business internationalization (De Massis et al., 2018) as well as we contribute to confirm exporting activity as a key antecedent of innovation outcomes in family firms (Chrisman et al., 2015). Finally, we explore on these relationships empirically using longitudinal data to control time path of the LBE effect and theoretically using the recent ability and willingness framework (Chrisman et al., 2015; De Massis et al., 2014), making it possible to integrate concepts related to owners' authority and wealth concentration with preponderance of non-financial goals and risk aversion.

Our study has several managerial implications. Given the importance of innovating to acquire international competitiveness and considering that exporting is a direct mean to obtain product innovations, family firms' managers should try to promote both strategies simultaneously since they to complement each other (Golovko and Valentini, 2011). Moreover, in order to efficiently implement those strategies, encouraging the beneficial LBE effect, family firms should pay attention to the balanced composition of top management team. According to our computations and in the context of our study, family firms with more efficient conversion of the learning coming from exporting into innovations are those combining in a balanced way family and non-family managers. In addition, the presence of second and subsequent generations controlling family firms does not necessarily imply an improvement in the levels of internationalization and, in turn, innovation, so managers in family firms should try to push international activities that facilitates innovations from the very beginning of the firm inception. At an institutional level, the information provided by this study can be used to design policies that will support the international competitiveness of family firms not just through innovation but also through internationalization. In our study, innovation is positively associated with export intensity, which could provide justification for giving public support to family and non-family firms to promote this type of internationalization strategy to also improve their product innovation capacity.

Finally, some limitations should be mentioned. First, although our analysis is concentrated on most representative mode of internationalization, namely exporting, it leaves unexplored other interesting and unexplored international modes of entry (such as foreign direct investment, alliances, licensing and joint ventures). In this sense, Salomon and Shaver (2005) point out that although exporting facilitates information flow from the host market, it does not provide sufficient information flow to result in the predicted effects. Thus, more involved methods of international expansion are required to explore in order to know better about the process of the LBE effect from a more global perspective. Second, in spite of longitudinal analyses and the endogeneity controls, export activity and

innovation outcomes causal relationships are affected by many factors which cannot be easily controlled (Cassiman and Golovko, 2011). Future studies should strengthen these analyses and results using several measures and controls of exporting and innovation. Third, since this study relies on secondary data sources and, similar to other recent studies (Gómez-Mejía et al., 2010; Kotlar et al., 2013; Kotlar et al., 2014), we proxied family decision making through particular measures of family involvement in management and generational stage. Although we have shown that different configurations of family involvement and family generation may differ in the LBE effect, further research is needed to refine our definition of family firm, extending our understanding of the moderating role of family involvement on the relationships between internationalization and innovation.

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