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# Familial relationships and firm performance: the impact of entrepreneurial family relationships

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## ABSTRACT

While the family may serve as a resource for entrepreneurs, it has been studied separately in different disciplines. In this paper, we combine the arguments on familial relationships (family firm literature) and skill variety (regional learning literature) to analyse how different forms of entrepreneurial family relationships (co-occurrences) facilitate firm performance, and how familial relationships moderate the effects of skill variety on firm performance. Using longitudinal data (2002–2012) on a sample of privately owned firms with up to 50 employees with matched information on all employees, our results show that entrepreneur–children relationship is the dominant dyad familial relationship in family firms. The fixed effects estimates demonstrate that entrepreneurial family relationships do affect firm performance but that this is dependent on the type of familial relationship. Children and spouses show a positive relationship with firm performance while siblings of the entrepreneur show no significant relationship with performance. The estimates further indicate that familial relationships involving spouses abate the negative effects of having too similar or too different types of skills. The paper thus contributes to new knowledge regarding not only whether family relationships matter for performance, but also in what way they matter.

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Entrepreneur; familial relationships; familiness; trust; skill variety; firm performance

## 1. Introduction

Until recently, the role of the family (family co-occurrence) has been studied separately in the literatures on entrepreneurship, family business and economic geography, with scant discussions across these disciplines (Müller 2016; Nordqvist and Melin 2010). For instance, entrepreneurship scholars have largely focused on the role of entrepreneurial families in relation to the creation of new businesses and the pursuit of opportunities. In contrast, family business scholars have traditionally directed their attention towards the role of the family in firm governance and succession issues (Dyer 2006; Nordqvist and Melin 2010), while others have focused on the inter-generational conflicts and opportunism in family firms (Green 2011; Kellermanns and Eddleston 2004; Schulze, Lubatkin, and Dino 2003; Schulze et al. 2001). Economic geographers have also argued that the family is a source of effective and efficient learning, and that it contributes to the differences in firm performance across regions (Adjei, Eriksson, and Lindgren 2016).

Consequently, an increasing number of studies in both family business and economic geography have begun examining the impacts of family co-occurrence on firm performance and regional development (Adjei, Eriksson, and Lindgren 2016; Basco 2015; Cruz, Justo, and De Castro 2012;

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Nordqvist and Melin 2010). Prior studies have shown that trust is a key relational social capital in family relationships, which can help to identify, understand, and acquire valuable knowledge and to form alliances (García-Villaverde, Parra-Requena, and Molina-Morales 2017; Huggins and Johnston 2010). However, detailed analyses of how different familial relationships within the firm affect firm performance are underdeveloped (Jennings, Breitzkreuz, and James 2014), with the exception of a few recent studies. Bird (2014) has, for example, shown that spousal and sibling relationships have a positive and negative impact, respectively, on firm growth, and Brannon, Wiklund, and Haynie (2013) found that spousal and biological relationships have a positive and negative impact, respectively, on achieving first sales. Hence, these studies point to the fact that different familial relationships have different impact on the success of firms.

The aim of the present paper is to bring further clarity to the question of what types of family relationships within the firm may positively influence performance. We do this by linking the entrepreneurship and family firm literature to the discussion in the regional learning literature on how different dimensions of proximities influence firm performance (Boschma 2005; Huber 2012). In regard to the proximity concept, it has been argued that people's cognitive characteristics are major determinants of their ability to learn and collaborate within the firm (Maskell and Malmberg 1999b; Nooteboom 1999). While empirical evidence supports this claim, one study reported that firms with a high degree of complementary skill sets (i.e. neither too similar nor too different) are more competitive (Boschma, Eriksson, and Lindgren 2009). However, the role of the family and family firm has been almost totally neglected in the regional learning literature, despite the fact that family relationships are believed to be a good proxy for embeddedness and social proximity, which influence the long-term success of industrial districts (Gurrieri 2008; Johannisson et al. 2007). Therefore, in the present paper, we argue that different forms of relationships in the entrepreneur's family (children, spouse and siblings) are particularly strong forms of social relations that can transform the influence of cognitive proximity in the firm (Huber 2012). Hence, entrepreneurial family constellations could potentially bridge the skills distances within firms or alter the role played by cognitive distance. However, since family relationships are characterized by different cohesion levels and conflicts (Brannon, Wiklund, and Haynie 2013; Danes and Stafford 2017; Kellermanns and Eddleston 2004; Zahra 2012), the mediation effect may vary.

We analyse this using a sample of privately owned firms with a maximum of 50 employees drawn from a matched employer–employee database covering all firms and workers in Sweden between 2002 and 2012. This database makes it possible to connect all entrepreneurs or firm owners and their family members through a unique family identification code. In this paper a family firm is defined as a firm with two or more workers related to the entrepreneur, or the firm owner, and one of these people is involved in a managerial role (Adjei, Eriksson, and Lindgren 2016).

Our findings suggest that familial relationships involving spouses and/or children are more important for firm performance and hence, abate the negative effects of similarities as well as large differences in competences on firm performance. Based on this we claim to make two main contributions to the literature. First, our research is one of the few studies investigating the economic effects of different forms of entrepreneurial family relationships on firm performance. This contribution is important because most previous studies have merely identified the various forms of entrepreneur family relations present in family firms (e.g. Birley, Ng, and Godfrey 1999). Second, we offer an in-depth analysis of the moderating role of entrepreneurs' family involvement in relation to the influence of skill variety on firm performance. In so doing, we add to the literature on regional learning by highlighting the association between these two factors.

The remainder of the paper is organized as follows. Section 2 reviews the literature on regional learning and family employment. This section further discusses how familial relationships may moderate the effects of skill variety on firm performance. Section 3 describes the data and variables used in the study. Section 4 presents the empirical model and the results, and Section 5 discusses the results and concludes.

## 2. Family employment (co-occurrence) and the moderating effect on firm performance

### 2.1. Regional learning – skill variety

Recent decades have seen an increase in knowledge and learning as the main drivers of the economy. It is commonly claimed that the importance of knowledge for sustained firm and regional competitiveness exceeds that of physical capital (Becker 1964). This heightened awareness of the economic importance of knowledge and human capital has led to the consideration of knowledge as localized and diffused spontaneously through ‘local buzz’ and as the most important of all production factors (Maskell and Malmberg 1999a; Storper and Venables 2004). Knowledge can be tacit or codified in nature; however, Lorentzen (2008) argues that there is a tacit element in every form of knowledge, as tacit knowledge is needed to use codified knowledge. Maskell and Malmberg (1999b) argued that the success of a firm is no longer determined by locational advantages or distance to physical inputs, which through globalization have become progressively ubiquitous, but highly determined by the availability of relevant knowledge, because it is through this resource that external knowledge can be exploited to generate novelty (Cohen and Levinthal 1990).

In the current economic geography literature, the idea that knowledge and human capital are superior factors of production has been highlighted using the role of relatedness (skill variety) – which represents cognitive distance and the insight that it should neither be too great nor too small (Boschma, Eriksson, and Lindgren 2009). Optimal cognitive distance is important for knowledge exchanges. Cohen and Levinthal (1990) argued that the foundation of developing a competitive advantage is the ability to utilize both endogenous and exogenous knowledge – hence the ability of a firm to have related competencies because knowledge is dispersed among different economic actors (Antonelli 2000). This means that the knowledge held by actors prior to any learning process is very important and constitutes the ‘absorptive capacity’ represented by basic skills, common experience and language. Absorptive capacity ‘confers the ability to recognize the value of new information, assimilate it and apply it to commercial ends’ (Cohen and Levinthal 1990, 128). People’s cognitive characteristics are major determinants of their ability to collaborate within the firm (Nooteboom 1999).

While Boschma, Eriksson, and Lindgren (2009) indicated that firms with a high share of cognitively related in-house staff perform better than firms with a high human capital ratio, there is a divergence in the existing empirical work on knowledge as a resource. Boschma, Eriksson, and Lindgren (2009) found related skill inflows to be beneficial to productivity in Sweden, whereas unrelated skill inflows were found to economically benefit productivity in capital-intensive industries in Sweden (Östbring and Lindgren 2013). Results from the Copenhagen region show that related skill inflows are detrimental to the economic performance of Danish firms (Timmermans and Boschma 2014). To fully understand this argument, we contend that it will be prudent to combine different resources in the firm. Thus, failure in one resource may be compensated by the other, because localized generation of knowledge is determined by the combinative capabilities (Kogut and Zander 1992) of the firm. This argument is fully entrenched in the regional science literature discussing the relationship between proximity dimensions and learning (Boschma 2005; Huber 2012; Shaw and Gilly 2000). This body of literature argues that the interaction between different proximity dimensions and their ability to complement one another is important to understanding the geography of firm performance. This echoes the claim that family relation is conceptually linked to learning processes. Thus, family relation may be an important contingency in shaping the economic effect of skill variety on firm performance.

### 2.2. Family relations (co-occurrences) in the regional learning context

The family and/or family relationships represent an important source of resources in the form of social and human capital (Becker 1964; Coleman 1988; Granovetter 1985). This has made the family an important source of labour for Small and Medium Scale Enterprises (SMEs), especially family businesses

(Aldrich and Langton 1998; Olson et al. 2003). This echoes the claim that family relations are important source of capital, which is conceptually linked to regional learning literature discussions on the proximity dimension (Boschma 2005; Huber 2012). The regional learning literature argues that family relationships may stimulate learning processes due to the level of trust and commitment embedded in the relationship – given that one key facilitating factor of learning and knowledge sharing is trust. Trust in familial relations serves to coordinate efforts to exchange tacit or highly complex knowledge (Maskell and Malmberg 1999a). For instance, Boschma (2005) suggested that social proximity (in terms of committed relationships) in the firm may decrease the cognitive distance between partners over time. Trust in the family, in particular, constitute an incentive for familial learning processes, thus making the family an important player in the regional learning framework (Gurrieri 2008) and hence for cooperation and competition in industrial clusters (Mathews and Stokes 2013).

Apart from trustful familial relationships facilitating learning, family relationships are also believed to be highly beneficial because they lower agency and transaction cost by offering bundles of inimitable, rare, and valuable resources via the interactions between individual family members, the family unit, and the firm. The interactions can lead to the creation of systemic synergies, known as distinctive firm familiness or constrictive firm familiness (Habbershon and Williams 1999), with the potential to induce either competitive advantages or disadvantages (Chrisman, Chua, and Steier 2005).<sup>1</sup> Family managers are associated with lower agency cost due to the alignment of interests (Jensen and Meckling 1976). When agents have divergent interests, the principal incurs costs by having to establish control and monitoring mechanisms, however employing a family member may eliminate these expenses (Dyer 2006). Where family members have divergent interests, this may cost the principal (Schulze et al. 2001). Dyer (2006) argued that, because altruism is part of families, family members are often reluctant to monitor, evaluate or discipline each other; such value systems can lead to opportunism, thus undermining firm performance. Family members in family firms may be stewards because they may view pro-organizational and collectivistic behaviours as having higher utility than individualistic and self-serving behaviours (Davis, Schoorman, and Donaldson 1997; Donaldson and Davis 1991) because firm successes are tied to the family's welfare (Corbetta and Salvato 2004). Family employment increases the competitiveness of the firm because families carry with them a unique and valuable set of resources in the form of experience, mutual trust, identity, commitment, etc. These valuable and inimitable assets are able to create a sustainable competitive advantage (Barney 1991; Wernerfelt 1984). Moreover, it is important to examine and understand the consequences of the different sources of firm familiness, since familiness can also be described as the different interactions and commitments of family members in the family firm.

### ***2.3. Moderating effects of entrepreneurial family relationships on the relationship between skill variety and firm performance***

Prior studies have reported that family co-occurrence is relatively more common in smaller regions compared to larger regions (Adjei, Eriksson, and Lindgren 2016; Holm, Westin, and Haugen 2017). Therefore, the contingency effects of the family on skill variety ought to be an important policy focus for regional planning. Aldrich and Cliff (2003) argued that the operationalization of 'family effect' raises fundamental methodological implications concerning how the family is defined, as family firms comprise several family members with different tie levels, which eventually affect their economic behaviours. Brannon, Wiklund, and Haynie (2013) identified two ways to operationalize the 'family effect' in the firm: biological linkages (children and siblings) and spousal relationships. For the entrepreneur, the different forms of family relations in which he/she is embedded represent a rich repository of resources – economic, educative, and connective – that can both promote and constrain entrepreneurial activities. This implies that entrepreneurial processes and firm successes are influenced by access to the idiosyncratic resources and capabilities generated when the family system and the business coexist (Habbershon and Williams 1999; Nordqvist and Melin 2010). While

family members may offer ready employment for family businesses (Olson et al. 2003), they also carry a set of non-economic utilities that can affect different dimensions of the business (Arregle et al. 2007; Sirmon and Hitt 2003).

Although the family may be a repository of resources for an entrepreneur, it may be overly simplistic and straightforward to assume that the level of cohesion and commitment is the same in all family relationships (Moor and Komter 2012; Wiklund et al. 2013). Cantor (1979) argued that family relations are sets of nested circles reflecting a hierarchy of relationships, cohesions, commitments and associated agency costs and benefits. For instance, children maintain and nurture strong relationships with their parents and siblings, but as they grow and form their own families, new emotional relations develop in these new constellations. It is noteworthy that the family is a social group with varying levels of cohesiveness and solidarity between family members (Wiklund et al. 2013). This generates different strengths of ties between family members and influences unique levels of cohesiveness, which may subsequently impact the economic behaviours of family members (Granovetter 1985; Wiklund et al. 2013). Therefore, because family firms involve several family members and relationships in complex networks (Hasenzagl, Hatak, and Frank 2018) as well as varied socioemotional attachment to the family firm (Miller and Le Breton-Miller 2014), it is necessary to examine the roles of the different familial relationships on firm performance and their potential moderating effects on skill variety.

In biological relationships (i.e. children and siblings), there is a stronger tendency for family members to share life histories based on experiences, mutual trust and values. Rieg and Rau (2017) contend that dyad family relations (like father–children, couples, etc.) are shaped by certain characteristics such as trust and age relationships. This makes the relationships enduring and salient (Brannon, Wiklund, and Haynie 2013). We argue that the enduring nature of entrepreneur–children relationships reduces problems like intergenerational differences, which are common in multigenerational family firms where the older generation feels reluctant to let the younger generation share the decision-making powers (Green 2011; Kellermanns and Eddleston 2004; Levinson 1971). Altruistic behaviours among family members influence relationship conflict and hence help to mitigate negative performance effects (Kellermanns and Eddleston 2004), especially among nuclear family members. Conversely, in entrepreneur–children relationships, we expect committed interpersonal relationships and alignment with the overall organizational goal to reduce ‘moral hazard’ as well as cognitive distance. Moreover, entrepreneur–children relationships are considered to facilitate the adoption and transfer of diverse personal experiences (Reagans and McEvily 2003). We expect the entrepreneur–children relationship, which is based on mutual trust and shared experience, to enhance productivity, and to mitigate or lower the negative effect of similar and unrelated competences. Thus, we predict:

**Hypothesis 1.** Strong entrepreneur–children relationships (co-occurrence) in the firm will mitigate/lower the negative effects of similar and very different skill sets, and enhance the positive effects of related skills and human capital on productivity.

In family firms, sibling rivalries may be a threat to collaboration, which in turn may have negative implications for firm success (Green 2011; Levinson 1971). Because sibling relationships in the firm correspond to already established relationships in the house (e.g. equal control and access), sibling rivalry or relationship conflict may arise if it is felt that such privilege is being undermined through the actions of others (Green 2011). Unlike task and process conflict between siblings, relationship conflict may be characterized by annoyance, resentment and irritation that often interfere with work efforts (Kellermanns and Eddleston 2004). However, we expect siblings in family firms to be stewards, because their welfare is tied to the success of the family business. At the same time, siblings may have considerable knowledge about the routines and practices of the firm, especially when it is an inherited firm. For this reason, we can expect such embedded knowledge in sibling relationships to moderate the effects of skill variety. Thus, we predict:

**Hypothesis 2.** Strong entrepreneur–sibling relationships (co-occurrence) in the firm will mitigate/ lower the negative effects of similar and very different skill sets and enhance the positive effects of related skills and human capital on productivity.

In spousal relationships, couples develop an understanding of each other's strengths and weaknesses (Brannon, Wiklund, and Haynie 2013). Couples can also develop a collective identity connected to the firm, residing in the couple's relationship (Danes and Stafford 2017). This is because couples communicate, understand and clarify their individual identities and over time develops a shared cognitive understanding. This understanding can be employed as a resource in family and business lives. Earlier entrepreneurship scholars have indicated that entrepreneurial couples often have similarities in career orientation (Greenhaus and Beutell 1985). This reduces any form of conflict and promotes localized learning process among couples. Moreover, because entrepreneurial couples are able to mix family and business activities, this creates some flexibility that is absent in other forms of relationship constellations. Thus, we predict:

**Hypothesis 3.** Strong entrepreneur–partner relationships (co-occurrence) in the firm will mitigate/ lower the negative effects of similar and very different skill sets and enhance the positive effects of related skills and human capital on productivity.

### 3. Data and variables

#### 3.1. Data

The empirical material used in the present study was drawn from Swedish registers containing matched longitudinal employer–employee data. The database connects information on all workers (gender, age, education, etc.) and workplaces (sector, spatial coordinates, etc.). Concerning our interest in capturing the influence of entrepreneurial family relations on firm performance, the family identification code in the database enabled the connection of all family members in every firm. Data on privately owned SMEs (single-plant firms) with a maximum of 50 employees in 2002 were used in the analysis covering the period 2002–2012.<sup>2</sup> The Swedish Standard Industrial Classification 2002 (SNI02) was used to define the industrial sectors. The industry classifications were restricted to three-digit SNI02. The geographical reference point for the analysis is the local labour market region. Sweden is divided into 290 municipalities, which are further aggregated into 72 local labour market regions called FA regions.<sup>3</sup> The FA regions are constructed based on labour commuting patterns between municipalities, representing regions where people can live and work without long commuting distances.

#### 3.2. Variables

##### 3.2.1. *Dependent variable: labour productivity*

We define firm performance as firm productivity, expressed as per capita value added. Used in many studies (Adjei, Eriksson, and Lindgren 2016; Boschma, Eriksson, and Lindgren 2009; Eriksson and Lindgren 2009), value added is a more straightforward measure of industrial output (Rigby and Essletzbichler 2002) than other measures like patents and citations, which exclude large parts of the economy. Moreover, productivity is a key measure of business efficiency (Palia and Lichtenberg 1999). In the present case, per capita value added was calculated by compensating for the effects of inflation, and dividing value added by the number of employees to find average labour productivity. Log values were used to reduce distributional skewness in the data.

### 3.2.2. Independent variables: entrepreneur's family relations (co-occurrence)

Our classification of entrepreneurial family relations follows the traditional classifications of the family (nuclear and extended family; children, partner/spouse and siblings), which is similar to the biological and spousal relationship suggested by Brannon, Wiklund, and Haynie (2013). Apart from being more straightforward than defining family relations based merely on co-residence, this classification avoids omission of the functional aspects of the family, which do not completely vanish if family members live apart. Moreover, because the present paper focuses on the functional aspect of the family, our measurement of different forms of entrepreneurial family relationships is based on the structures and functions of the family.<sup>4</sup> Using the information on occupational status, we first identified the entrepreneur or firm owner. We then used the family identification code to connect all employees with their family members using the entrepreneur as a pointer. After having established the family connections within the firm, the connections were subdivided into three forms of entrepreneurial family relationships: entrepreneur-children relationship – the number of the entrepreneur's children working in the same firm; entrepreneur-partner relationship – a binary variable for whether the entrepreneur's partner is working in the firm; and lastly, entrepreneur-sibling relationship – the number of the entrepreneur's siblings working in the same firm.

### 3.2.3. Control variables

In-house skill variety was used as the main control variable. This is defined based on the educational background of all employees by means of entropy measurements, as proposed by Boschma, Eriksson, and Lindgren (2009). We calculated the similarity in formal skills (SIM) for each plant as the inverted entropy at the three-digit education level. In Equation (1),  $P_i^3$  is the share of three-digit education categories  $i$ , and  $N^3$  is the number of three-digit education categories. A high score means that the in-house formal skills or competencies are more similar, which does not promote novelty and productivity. The scores were log transformed to reduce the effect of distributional skewness of the variable.

$$SIM = \frac{1}{\sum_{i=1}^{N^3} P_i^3 \log_2 \left[ \frac{1}{P_i^3} \right]} \quad (1)$$

Similarly, we calculated relatedness in formal skills (REL) as the weighted sum of entropy at the three-digit level within each two-digit education category.  $P_j^2$  in Equation (3) is the share of two-digit education categories, found by summing the shares of all three-digit education categories belonging to  $S_i^2$ .  $H_j$  in Equation (4) is a weight that controls the degree of similarity within the two-/three-digit education categories. A high score indicates higher in-house formal skill-relatedness, which promotes localized learning processes and productivity.

$$REL = \sum_{j=1}^{N^2} P_j^2 H_j \quad (2)$$

where:

$$P_j^2 = \sum_{i \in S_i^2} P_i^3 \quad (3)$$

and:

$$H_j = \sum_{i=S_i^2} \frac{P_i^3}{P_j^2} \log_2 \left[ \frac{1}{P_i^3 / P_j^2} \right] \quad (4)$$

The last entropy variable calculated is the degree of unrelatedness in formal skills (UNREL), which is measured at the one-digit education categories.  $P_i^1$  in Equation (5) is the share of one-digit education

categories. A high score indicates higher formal skills differences, which hinders localized learning and productivity. Due to the de-compositional structure of the variables, they have been proven to not capture identical features of skill composition (cf. Frenken, Van Oort, and Verburg 2007).

$$\text{UNREL} = \sum_{i=1}^{N^1} P_i^1 \log_2 \left[ \frac{1}{P_i^1} \right] \quad (5)$$

Other firm-level controllers were also included. We included an indicator for human capital, defined as the share of workers with at least a Bachelor's degree. The inclusion of both skill variety and human capital is motivated by Östbring, Eriksson, and Lindgren (2016), who argued that the impact of skill variety depends on the level of human capital present in the firm. We controlled for the effect of employment size (firm size) because we expect larger firms to be more productive than smaller firms due to internal division of labour (Eriksson and Lindgren 2009). We included an indicator of capital intensity measured as the depreciation of fixed assets, which was collected from the income statement of the firms. We expect an increase in capital to positively influence productivity. To reduce distributional skewness, log per capita was used. The models included two regional variables likely to co-determine firm productivity: regional size and specialization. Regional size is measured as the total number of employees in a region to reflect the total employment stock and human capital in the region. Specialization is defined by the location quotient (LQ), indicating the relative ratio of employees in a specific industry in a region, compared to the same industry in the whole of Sweden. If  $LQ > 1$ , this implies that the industry is more concentrated in the region compared to the national distribution of employment. We expect firms located in larger and specialized regions to be superior performers compared to similar firms in smaller and diverse regions.

## 4. Empirical model and results

### 4.1. Empirical model

Given the panel structure of the data, we estimated fixed effects models (FE). FE estimation accounts for potential unobserved firm-specific factors like business practices, which in our case is a key issue. The models include time, region and industry fixed effects to control for unobserved factors not captured in the models (e.g. year-specific effects, technological differences across sectors, institutional differences across regions), and cluster-robust standard errors to remedy heteroscedasticity.<sup>5</sup> Furthermore, the models are weighted by firm size to play down the influence of very small firms, with a potentially greater variation that may cause inconsistent estimates. The model is simplified as:

$$\ln P_{it} = \beta_0 + \beta_1 [\text{Entrepreneur's family relations}_{it-1}] + \beta_2 [\text{Control}_{it}] + \beta_3 [\text{Entrepreneur's family relations}_{it-1} * \text{Skill variety}_i] + v_i + \varepsilon_{it} \quad (6)$$

$\ln P_{it}$  is the average labour productivity (or per capita productivity) in firm  $i$  at time  $t$ ,  $\text{Entrepreneur's family relations}_{it-1}$  is the vector of family ties, and  $\text{Control}_{it}$  is the vector of control variables.  $\text{Entrepreneur's family relations}_{it-1} * \text{Skill variety}_i$  is the interaction term.  $v_i$  is the individual-specific error term, and  $\varepsilon_{it}$  is the idiosyncratic error term. To minimize the effect of reverse causality, the first lag ( $t-1$ ) of the independent variables (entrepreneur's family ties) was used in the models. The control variables were measured at time  $t$ . Table 1 presents the summary and definitions of the variables. Table A1 in the Appendix presents the descriptive statistics of the variables, while Table A2 presents the correlation matrix and variance inflation factor (VIF) for the variables. Based on Table A2, we can conclude that no serious problems of multi-collinearity are likely to influence our results.

**Table 1.** Summary and definitions of variables.

Variable	Definition
<b>Dependent variable</b>	Per capita value added (2002–2012)
Labour productivity (log)	
<b>Independent variable</b>	Count of entrepreneur's children in the same firm
<b>(Family relations)</b>	
Entrepreneur–children	
Entrepreneur–partner	Dummy = 1 if entrepreneur's partner is in the same firm
Entrepreneur–sibling	Count of entrepreneur's siblings in the same firm
<b>Control variable</b>	
SIM. (log)	Degree of similarity of formal education
REL.	Degree of relatedness of formal education
UNREL.	Degree of unrelatedness of formal education
Firm size (log)	Number of employees in the firm
Higher education	Share of workers with a minimum of Bachelor's degree
Capital	Measured as the depreciation of fixed assets
Regional size (log)	Employment by region
Specialization	Location Quotient (LQ): the relative ratio of employees in a specific industry in a region compared to the same industry in the whole of Sweden

**Table 2.** Description of dyadic relationships (Family relationships/co-occurrences).

Category/Familial relationships		Entrepreneur	Sibling	Partner	Children
Share of different familial co-occurrence		-	12	33	55
Gender	Male (%)	88	72	9	73
	Female (%)	12	28	91	27
Average age	All	59	51	55	33
	Male	59	51	58	33
	Female	60	51	54	33
Mean income (100s, SEK)	All	3104	2306	2350	2077
	Male	3163	2417	2546	2216
	Female	2682	2014	2330	1703
Educational level	All				
	Low (%)	33	30	18	18
	Medium (%)	58	66	71	76
	High (%)	9	4	11	6
	Male				
	Low (%)	34	33	24	19
	Medium (%)	58	64	62	77
	High (%)	8	3	14	4
	Female				
	Low (%)	27	21	18	16
	Medium (%)	60	73	71	74
	High (%)	13	6	11	10

Low – Up to elementary school; Med – Upper secondary or two-year university; High – three-year university degree or higher.

#### 4.2. Family business in Sweden

Like in many economies, there is no clear-cut consensual definition of family business in the Swedish context. A commonly used definition is: at least two family members actively engaged in management and ownership (Adjei, Eriksson, and Lindgren 2016; Bird and Wennberg 2014). Swedish family businesses are relatively active in different sectors of the economy, but highly represented in sectors like agriculture and forestry industry (90%), retail (62%), manufacturing (61%) and maintain a higher share in rural areas (Emling 2000). Swedish Family firms contribute substantially to local economic development (Bjuggren, Johansson, and Sjögren 2011). The abolishment of the inheritance and gift tax in 2004 has helped families to pass the business to the next generation. In the Swedish context, it is the norm that family members have key positions in the management of the family business. Over 90% of family businesses have a family member as company leader (Emling 2000). The business culture among Swedish family firms is stronger, sustainable over a longer period of time, and more noticeable and describable for people both inside and outside the business (Hall, Melin, and Nordqvist 2001). This is common among SMEs, where ownership is often concentrated in one family or individual.

### 4.3. Description of the familial relationships in the firms

Table 2 details some characteristics of the dyadic entrepreneur family relationships. There are more male entrepreneurs (88%) than female entrepreneurs (12%). The dominant familial relationship in the firm is the entrepreneur–children relationship (55%), followed by the entrepreneur–partner relationship (33%) and the entrepreneur–sibling relationship (12%). These figures support our notion that most SME family businesses are indeed nuclear family based. The dominant gender in the dyadic relationships is male, which is particularly evident in all the relationships. Hence, male entrepreneurs mainly involve their sons in the family business. While there are no major differences in age distribution across the different familial relations, some differences in income are observed. Regarding the entrepreneurs, the males have a relatively higher average income compared to the females – in effect, male entrepreneurs have a 15% higher average income than female entrepreneurs. Male siblings, partners and children earn relatively more than their female counterparts. Furthermore, in Table 2, we present the educational characteristics. Among the entrepreneurs, a majority (58%) have a medium education (i.e. upper secondary or two-year university). By gender composition, both female entrepreneurs and females in all the familial relationships have a relatively higher education than their male counterparts do. Looking at the educational status of children, we find that relatively fewer children in the same firm with their parents have a low education. This shows that family employment, especially when children and their parents are in the same firm, does not necessarily mean that the children have a low education or are unskilled, but it may symbolize a mechanism for the transmission of specific forms of human capital (Chevalier 2001).

### 4.4. Estimation results

Table 3 presents the results from the FE models in a stepwise manner. In Model 1, when only the entrepreneur–children and the controllers are included, the entrepreneur–children relationship has, as we expected, a positive and significant impact on productivity. In Model 2, entrepreneur–partner has a positive and significant impact on productivity, while relationships involving entrepreneur–sibling are positive but not significant in Model 3. The respective effects are robust when estimated together (Model 4). In all of these models, the control variables showed the expected signs and remained significant in the subsequent models. In brief, as expected, higher human capital positively affects productivity, as does the level of capital. Concerning the in-house formal skill variety, our results are in line with previous studies showing that similar (SIM) occurrences of skills (significant and negative) and unrelated (UNREL) occurrences of skills (significant and negative) have a negative impact on productivity (Boschma, Eriksson, and Lindgren 2009; Östbring and Lindgren 2013). It is rather the occurrence of related skills (REL) that enhances performance due to potential complementarities that facilitate interactive learning. There is a negative relationship between firm size and productivity – small firms do relatively worse than large firms. The regional variables also show that both diversity and specialization positively affect productivity.

Models 5, 6, 7 and 8 include the interactions of the different familial relationships with higher education ratio and skill variety (SIM, REL and UNREL). As the coefficients of the interaction variables in Models 5–8 show the same sign as in Model 9 where all interactions are estimated jointly, we discuss only the significant interaction variables reported in Model 9. The results show that the level of education (human capital) does not influence the role of different family relationships, while family relationships involving entrepreneur–children abate the negative effects of similarity in formal education (SIM) on productivity. As a matter of fact, the significance of the entrepreneur–children variable disappears (see also Model 6), which indicates that the positive and significant estimate of Model 1 and 4 is mainly found in firms where the children have an educational level similar to that of their parent entrepreneur. However, our estimates do not find any moderating effect of unrelated variety, which is why we can only partly confirm Hypothesis 1.

**Table 3.** Additive and multiplicative FE models with cluster-robust standard errors (within parentheses) on the effects of entrepreneurial family relationships/co-occurrences on productivity. \* $p < 0.1$ , \*\* $p < 0.05$  and \*\*\* $p < 0.01$ .

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Entrepreneur-children	0.014*** (0.003)			0.014*** (0.003)	0.014*** (0.003)	-0.010 (0.013)	0.014*** (0.003)	0.014*** (0.003)	-0.009 (0.013)
Entrepreneur-partner		0.012*** (0.004)		0.012*** (0.004)	0.013*** (0.005)	0.013*** (0.004)	-0.028** (0.013)	0.012*** (0.004)	-0.027*** (0.013)
Entrepreneur-sibling			0.009 (0.009)	0.009 (0.009)	0.009 (0.009)	0.010 (0.009)	0.009 (0.009)	-0.002 (0.017)	-0.003 (0.017)
Entrepreneur-children $\times$ higher education				-0.001 (0.005)	-0.001 (0.005)				-0.000 (0.005)
Entrepreneur-partner $\times$ higher education				-0.004 (0.008)	-0.004 (0.008)				-0.004 (0.008)
Entrepreneur-sibling $\times$ higher education				0.003 (0.012)	0.003 (0.012)				0.002 (0.012)
Entrepreneur-children $\times$ SIM						0.056*** (0.017)			0.055*** (0.017)
Entrepreneur-children $\times$ REL						0.007 (0.008)			0.007 (0.008)
Entrepreneur-children $\times$ UNREL						-0.000 (0.006)			-0.001 (0.006)
Entrepreneur-partner $\times$ SIM							0.046** (0.021)		0.045** (0.021)
Entrepreneur-partner $\times$ REL							0.022* (0.011)		0.021* (0.011)
Entrepreneur-partner $\times$ UNREL							0.016** (0.007)		0.016** (0.007)
Entrepreneur-sibling $\times$ SIM								0.014 (0.023)	0.017 (0.023)
Entrepreneur-sibling $\times$ REL								-0.018 (0.021)	-0.018 (0.021)
Entrepreneur-sibling $\times$ UNREL								0.011 (0.010)	0.010 (0.010)
SIM	-0.084*** (0.006)	-0.084*** (0.006)	-0.084*** (0.006)	-0.084*** (0.006)	-0.084*** (0.006)	-0.093*** (0.006)	-0.086*** (0.006)	-0.084*** (0.006)	-0.095*** (0.006)
REL	0.020*** (0.006)	0.020*** (0.006)	0.020*** (0.006)	0.020*** (0.006)	0.020*** (0.006)	0.018*** (0.006)	0.015** (0.006)	0.021*** (0.006)	0.014** (0.007)
UNREL	-0.016*** (0.003)	-0.016*** (0.003)	-0.016*** (0.003)	-0.016*** (0.003)	-0.016*** (0.003)	-0.016*** (0.004)	-0.018*** (0.004)	-0.017*** (0.003)	-0.018*** (0.004)
Higher education	0.010*** (0.003)	0.010*** (0.003)	0.010*** (0.003)	0.010*** (0.003)	0.011*** (0.004)	0.010*** (0.003)	0.010*** (0.003)	0.010*** (0.003)	0.011*** (0.004)
Firm size	-0.213***	-0.212***	-0.211***	-0.213***	-0.213***	-0.213***	-0.212***	-0.213***	-0.212***

(Continued)



We find no support for Hypothesis 2 – that siblings would have a significant influence on productivity – because neither the entrepreneur-sibling variable nor any of the interactions are significant in any model. Finally, family relationships involving entrepreneur-partner are positively correlated with related competencies (REL), as well as mitigating the negative impact of similar and unrelated competences. This partly confirms Hypothesis 3, as the interactions between partner and similar and unrelated skills are positive. However, while the interaction with related competences is also positive, it has a somewhat weaker association with productivity than the impact of related skills alone. To determine the nature of the interactions, we plotted the effects of family relationships on the probability of achieving a higher productivity at different levels of skill variety (SIM, REL and UNREL) in [Figure 1](#). The curves slope upward, indicating that family relationships involving children and partners help overcome the negative effects of SIM and UNREL and enhance the positive effects of REL.

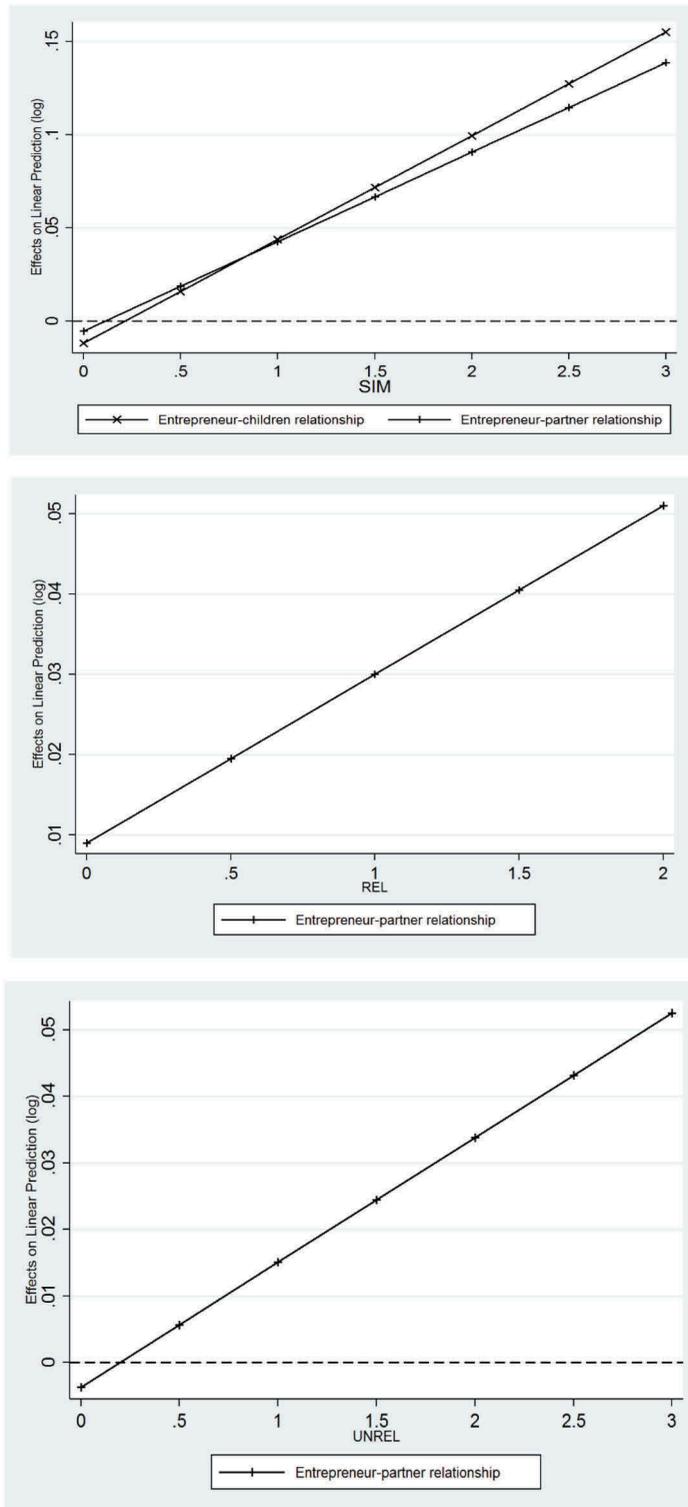
With a large number of observations, variables may easily be significant without any real impact and consequently, it may be difficult to untangle the relative effects of each variable. For this reason, we estimated the marginal effects of the variables (at means) for Models 4 and 9 to show the relative effect of each variable (see [Table 4](#)). We will limit the analyses to the interaction variables, as the coefficients of the control variables showed the signs we expected. Moreover, the most influential variable in terms of the effect on productivity is capital, as one unit change in capital is more likely to increase productivity by 52 percentage points ([Table 4](#), Model 4). The interaction variables in [Table 4](#), Model 9, further explain the moderation effects of familial relationships. The marginal effect for entrepreneur-children X SIM indicates that there is a likelihood that SIM will increase productivity by 6 percentage point for every additional child in the firm. Model 9 further shows that SIM, REL and UNREL are more likely to increase productivity by 5, 2 and 2 percentage points, respectively, if an entrepreneur has his/her partner working in the same firm.

## 5. Discussion and conclusion

### 5.1. Findings and implications

At the beginning of the paper, we suggested that research in entrepreneurship and family business has largely failed to consider the implications of different familial relationships on firm performance. We have examined the implications of three forms of family relationships using the entrepreneur as the link (i.e. children, siblings and spousal relationships) and four measures of competence in the firm (i.e. ratio of higher education, similar skill set (SIM), related skills (REL) and unrelated skills (UNREL)). From this point of departure, we explain how different family constellations moderates the impacts of skill variety.

Our findings indicate that family relationships involving children and couples in the firm are more likely than any other family constellations to positively impact productivity. This may be the result of the effective communication and commitment level in these kinds of relationships. This implies that the interactions between children and spousal relationships may represent a distinctive and positive familiness. In simple terms, the results indicate that a firm in which the entrepreneur's partner and children are employed performs better than one in which they are absent. On the other hand, our analyses show no indications that sibling relationships would have any significant influence on productivity. Thus, while the family is argued to be an important source of capital (Sirmon and Hitt 2003), it appears that this is only the case when it involves children and/or spousal relationships. These findings corroborate the suggestion that family firms comprise several forms of family relationships with different levels of ties, which consequently affect their economic outcomes (Wiklund et al. 2013). This also supports the argument that family relationships are sets of nested circles reflecting a hierarchy of relationships, and cohesions with associated agency costs and benefits. Couples and children are likely better able to flexibly adapt both the family and business roles to leverage their family relationships to incur a competitive advantage, while sibling relationships may be burdened by pre-existing relational conflicts – which may result in the



**Figure 1.** The predictive effects of entrepreneurial family relationships (children, partner and sibling) and formal skill variety (SIM, REL and UNREL) on productivity. Only the significant interactions are shown.

**Table 4.** Marginal effects of the variables. The effect size and firm-clustered standard errors (in parentheses) are reported. \* $p < 0.1$ , \*\* $p < 0.05$  and \*\*\* $p < 0.01$ .

	Model 4	Model 9
Entrepreneur–children	0.010*** (0.003)	–0.012 (0.013)
Entrepreneur–partner	0.017*** (0.005)	–0.026* (0.014)
Entrepreneur–sibling	0.010 (0.009)	–0.007 (0.017)
Entrepreneur–children × higher education		–0.000 (0.005)
Entrepreneur–partner × higher education		–0.005 (0.008)
Entrepreneur–sibling × higher education		–0.001 (0.011)
Entrepreneur–children × SIM		0.056*** (0.017)
Entrepreneur–children × REL		0.004 (0.008)
Entrepreneur–children × UNREL		–0.000 (0.006)
Entrepreneur–partner × SIM		0.048** (0.021)
Entrepreneur–partner × REL		0.021* (0.011)
Entrepreneur–partner × UNREL		0.019*** (0.007)
Entrepreneur–sibling × SIM		0.016 (0.023)
Entrepreneur–sibling × REL		–0.014 (0.021)
Entrepreneur–sibling × UNREL		0.013 (0.010)
SIM	–0.089*** (0.006)	–0.101*** (0.006)
REL	0.022*** (0.006)	0.017*** (0.007)
UNREL	–0.017*** (0.004)	–0.020*** (0.004)
Higher education	0.011*** (0.003)	0.012*** (0.004)
Firm size	–0.207*** (0.006)	–0.205*** (0.006)
Capital	0.522*** (0.005)	0.523*** (0.005)
Regional size	0.069*** (0.009)	0.069*** (0.009)
Specialization	0.005* (0.002)	0.005* (0.002)
<i>n</i>	67,480	67,480
<i>N</i>	330,869	330,869

generation of negative feelings and resentment among siblings (Brannon, Wiklund, and Haynie 2013; Kellermanns and Eddleston 2004), that in turn can negatively affect communication, learning and performance.

We were also interested in whether the proximity invoked by family ties might alter, or be affected by, the effects of other proximities. We focus particularly on cognitive proximity – related variety (skill variety), as previous studies on Swedish data have found this to be more important than human capital per se (Boschma, Eriksson, and Lindgren 2009). Our results, however, do not completely support this argument. An insignificant interaction term implies that the respective main effects are independent of each other; thus, in this case, the presence of entrepreneur-sibling relationships in the firm does not alter the effect of higher education on productivity.

Moreover, our findings indicate that some family relationships and skill variety are dependent on each other. Considering the significant interactions, the effect of family relationships on productivity is different at different levels of skill variety (see [Figure 1](#)). In other words, [Figure 1](#) shows that the effects of skill variety on productivity are different when there are different family relationships present in the firm. The results show that family relationships involving children and/or a partner/spouse abate the negative effects of a high level of skill similarity (SIM) on productivity. In small family firms, the moderating effect of entrepreneur–children relationship on skill similarity may reflect the idea of skill or occupational inheritance, whereby children receive education or training similar to that of their parents for the purpose of planned inheritance. Furthermore, the results indicate that entrepreneur–partner relationships abate the negative effects of unrelated variety (UNREL) – thus, the presence of an entrepreneur–partner relationship in the firm positively affects productivity at every level of unrelatedness in formal education. In regard to spousal relationships, this shows that although entrepreneurial couples often may have similarities in career orientation ([Greenhaus and Beutell 1985](#)), couples may also offer some form of local diversity in cognitive capabilities that can promote learning and novelty in the firm. Basically, the pool of decision making resources increase, which can offer new perspectives despite similarities in skills. This indicates that, in spousal relationships, shared experiences, commitment, diversity, and trust may be as important as cognitive resources. Moreover, the presence of a spousal relationship with related competencies is positively correlated with productivity, although only with a moderate impact.

In conclusion, the results indicate that family firms are not homogeneous in terms of family co-occurrences and the benefits derived from familiness ([Melin and Nordqvist 2007](#)). The heterogeneity in family firms can be attributed to the fact that family firms comprise varied familial relationships that are managed differently and interact differently with the family unit and the firm. Again, the results indicate that employing family members, especially one's children and spouse, may be a strategy to reduce the transaction and agency costs of training to align skills and competencies in the firm.

## **5.2. Limitations and future directions**

Though our sample has several benefits in relation to its longitudinal nature, its wide coverage and its ability to capture most aspects of the firm and the region in which the firm operates, our sample is also associated with a limitation in that we do not comprehensively capture the synergistic family relationships. However, like other studies, we use inferences that rely on theoretical justifications. Future studies would benefit from explicitly examining the nature and role of the different forms of family relationships. In the present paper, we examined relatedness as the educational background of the employees. Within economic geography, alternative measures of relatedness have emerged – for example experience from previous employment in a related industry ([Östbring, Eriksson, and Lindgren 2016](#)). Yet scholars interested in this topic may wish to examine the relationships between different forms of family relationship and experience. Finally, we studied firm performance as productivity, because productivity is argued to be the most efficient measure of firm success ([Palia and Lichtenberg 1999](#)). Examining the impacts of familial relationships on non-economic indicators will also be of great theoretical and practical value, as family firms are driven by both economic and non-economic goals. The present study should offer promising avenues for future research on this under-researched dimension of proximity, as there is still a great need to carve out the role of the family and family businesses in regional development in different spatial contexts. Future studies could also highlight the possible job creation potentials of rural and urban familial relationships and family businesses. In so doing, such studies could examine whether these firms have higher survival rates and substantially contribute to regional job creation.

### 5.3. Conclusion

In the present paper, we used FE models to examine how different forms of familial relationships (or co-occurrences) moderate the effects of skill variety on productivity. Even though these topics have separately received extensive attention in the family business and the regional learning literature, this paper provides one of the first attempts to systematically assess how the interactions between familial relationships and skill variety influence firm performance. The results indicate that the presence of family relationships in the family firm (i.e. children and/or spousal relations) is important for productivity. Moreover, the results indicate that family relationships involving spouses abate the negative effects of similarity and unrelatedness in skills on productivity. The results have substantial implications for regional development, as small family firms are prime actors in sustaining regional growth.

The findings have practical implications for research in entrepreneurship, family business, and regional learning in the context of regional development. First, the male dominance in firm ownership, and fathers engaging their sons in the firms, is a mirror of the limitations facing female entry into entrepreneurship. The skewed gender dimension needs to be considered when developing policies supporting entrepreneurship in general, and family succession in particular since it predominantly targets men and not women. Moreover, the findings indicate that family firms are not characterized by the same level and degree of firm familiness. The implication for the family business literature is that there is the need to further examine the antecedents of family relationships and how they produce different firm familiness. Finally, the study has implications for contemporary discussions on proximity dimensions (cognitive proximity – skill variety) within the regional learning literature, not least by showing empirically that skill-relatedness influences productivity, but also by showing that spousal relationships abate the negative effects of similarity (SIM) and unrelatedness (UNREL) in skills on productivity. This is a major contribution, given Basco's (2015) argument that the role of familial relationships is virtually absent in the regional development literature and Boschma's (2005) call to combine different forms of proximities. This provides an opportunity to look into the black box and examine how this complexity (interaction between familial relationships and skill variety) ought to be understood and managed. This can specifically help entrepreneurs to recognize the extent to which family participation in the firm can produce better results.

### Notes

1. *Distinctive firm familiness* is the aspect of firm familiness that provides familial advantage and *constrictive firm familiness* is a negative or encumbrance firm familiness when a firm does not invest in replenishing, augmenting, managing, and upgrading its familiness as a valuable resource (Habbershon and Williams 1999).
2. The term plants refers to single-plant firms. For this reason, plant and firm mean the same thing in the analysis. We used firms  $\leq 50$  because we observe a large share of family members in these firms.
3. Our definition of local labour market regions is based on the work by Statistics Sweden (SCB).
4. Family structure is the 'number of members of the family and [concerns] the designation of familial positions such as parent, spouse, child, other kin, etc.' whereas family function is the manners 'in which families satisfy members' physical and psychological needs and ...meet [their] survival and maintenance needs' (Smith 1995, 9).
5. In our sample, 47% of the firms are in metropolitan regions; 36% and 27% in larger and smaller regional centres, respectively. 45% of the firms are in services other than finance and KIBS; 26% in manufacturing.

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## Appendix

**Table A1.** Summary statistics.

Variable		Mean	Std. Dev.	Min	Max	Observations
Labour productivity	Overall	5.940	0.718	-1.386	10.581	<i>N</i> = 451,555
	Between		0.666	-0.288	10.001	<i>n</i> = 82,111
	Within		0.436	-1.173	10.033	T-bar = 5.5
Entrepreneur-children	Overall	0.177	0.457	0.000	6.000	<i>N</i> = 334,858
	Between		0.421	0.000	6.000	<i>n</i> = 67,736
	Within		0.226	-2.423	3.177	T-bar = 4.9
Entrepreneur-partner	Overall	0.107	0.309	0.000	1.000	<i>N</i> = 334,858
	Between		0.285	0.000	1.000	<i>n</i> = 67,736
	Within		0.136	-0.793	1.007	T-bar = 4.9
Entrepreneur-sibling	Overall	0.036	0.199	0.000	5.000	<i>N</i> = 334,858
	Between		0.195	0.000	4.000	<i>n</i> = 67,736
	Within		0.084	-2.764	2.236	T-bar = 4.9
SIM.	Overall	0.329	0.295	0.000	2.031	<i>N</i> = 451,555
	Between		0.245	0.000	1.271	<i>n</i> = 82,111
	Within		0.178	-0.648	1.706	T-bar = 5.5
REL.	Overall	0.063	0.179	0.000	1.459	<i>N</i> = 451,555
	Between		0.161	0.000	1.318	<i>n</i> = 82,111
	Within		0.102	-0.844	1.052	T-bar = 5.5
UNREL.	Overall	0.545	0.604	0.000	2.585	<i>N</i> = 451,555
	Between		0.554	0.000	2.482	<i>n</i> = 82,111
	Within		0.298	-1.308	2.472	T-bar = 5.5
Higher education	Overall	0.150	0.357	0.000	1.000	<i>N</i> = 451,555
	Between		0.323	0.000	1.000	<i>n</i> = 82,111
	Within		0.182	-0.759	1.059	T-bar = 5.5
Firm size	Overall	0.871	0.857	0.000	5.690	<i>N</i> = 451,555
	Between		0.844	0.000	5.043	<i>n</i> = 82,111
	Within		0.303	-1.933	4.172	T-bar = 5.4
Capital	Overall	5.428	0.856	-1.099	10.344	<i>N</i> = 446,476
	Between		0.753	-0.091	10.344	<i>n</i> = 81,931
	Within		0.463	-0.894	9.761	T-bar = 5.4
Regional size	Overall	8.811	1.448	3.367	10.786	<i>N</i> = 451,555
	Between		1.438	3.497	10.786	<i>n</i> = 82,111
	Within		0.191	3.488	12.898	T-bar = 5.5
Specialization	Overall	0.173	0.551	-3.138	6.776	<i>N</i> = 451,555
	Between		0.504	-2.923	6.015	<i>n</i> = 82,111
	Within		0.261	-3.796	4.629	T-bar = 5.5

**Table A2.** Correlation matrix and VIF.

	VIF	1	2	3	4	5	6	7	8	9	10	11
<b>1</b> Entrepreneur-children	1.11	1										
<b>2</b> Entrepreneur-partner	1.13	0.08	1									
<b>3</b> Entrepreneur-sibling	1.03	0.01	0.01	1								
<b>4</b> SIM.	1.60	0.18	0.15	0.07	1							
<b>5</b> REL.	1.75	0.15	0.17	0.08	0.09	1						
<b>6</b> UNREL.	2.51	0.22	0.20	0.10	0.54	0.22	1					
<b>7</b> Higher education	1.37	-0.06	0.00	-0.04	-0.11	-0.08	-0.06	1				
<b>8</b> Firm size	4.17	0.29	0.28	0.15	0.49	0.57	0.71	-0.13	1			
<b>9</b> Capital	1.15	0.04	0.08	0.01	-0.01	0.04	0.02	0.08	0.06	1		
<b>10</b> Regional size	3.68	-0.04	0.00	-0.03	-0.07	-0.03	-0.02	0.15	-0.08	0.03	1	
<b>11</b> Specialization	1.63	0.07	0.07	0.05	0.03	0.17	0.12	-0.02	0.22	0.05	-0.26	1