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The Characteristics and Performance of Family Firms: Exploiting information on ownership, governance and kinship using total population data*

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Abstract

Family firms are often considered characteristically different from non-family firms, and the economic implications of these differences have generated significant academic debate. However, our understanding of family firms suffers from an inability to identify them in total population data, as this requires information on owners, their kinship and involvement in firm governance, which is rarely available. We present a method for identifying domiciled family firms using register data that offers greater accuracy than previous methods. We then apply it to data from Statistics Sweden concerning firm ownership, governance and kinship over the years 2004-2010. Next, we use Swedish data to estimate these firms' economic contribution to total employment and gross domestic product (GDP) and compare them to private domiciled non-family firms in terms of their characteristics and economic performance. We find that the family firm is the prevalent organizational form, contributing to over one-third of all employment and GDP. Family firms are common across industries and sizes, ranging from the smallest producers to the largest multinational firms. However, their characteristics differ across sizes and legal forms, thereby indicating that the seemingly contradictory findings among previous studies on family firms may be due to unobserved heterogeneity. We furthermore find that they are smaller than private non-family firms in employment and sales and carry higher solidity, although they are more profitable. These differences diminish with firm size, however. We conclude that the term 'family firm' contains great diversity and call for increased attention to their heterogeneity.

JEL codes: D2, G3, J2.

Keywords: entrepreneur, family firms, employment, GDP, register data

1. Introduction

Family business has become a substantial field of research over the past two decades (Bird et al., 2002; Colli 2003; Sharma 2004; Poutziouris et al., 2007; Casillas and Acedo, 2007; Benavides-Velasco et al., 2013; Garcia-Castro and Aguilera 2014; Xi et al., 2015). Empirical studies indicate that the concentration of ownership within a family is common among listed firms, pre-dominant among unlisted firms and that family firms contribute substantially to aggregate employment and income (La Porta et al., 1999; Faccio and Lang, 2002; Astrachan and Shanker, 2003; Morck et al., 2005; Bertrand and Schoar, 2006; Bjuggren et al., 2011). Family business has received increased political attention: they have been considered the backbone of private industry and a key target for policies aimed at increased employment and economic growth. Consequently, several policies designed to encourage the establishment and growth of family firms have been proposed both in Europe and the USA (European Commission 1994, 2006, 2009). Nevertheless, there is research arguing that family business is an inefficient way of organizing business activities because they put social goals, such as control and nepotism, before economic goals, such as profit and growth. The debate on the efficiency of family ownership is longstanding and remains unsettled (Landes 1949; Chandler, 1990; Dyer 2006; Bjuggren 2013; Miller and Le Breton-Miller 2015; Evert et al., 2015).

Given the prevalence of family firms, the theoretical and empirical ambiguity regarding their "successfulness" and the political attention they receive, it is crucial to further investigate their economic contribution and the impact of economic policy on family firms' performance. Both tasks require statistical records of high quality; however, administrative registers do not in general recognize ownership or kinship. This has, until recently, made it nearly impossible to use total population data to study family firms. The vast majority of firms have therefore been excluded.

A notable exception among previous studies is Bjuggren et al., (2011), who made an initial estimate of the prevalence of domestic family business and its contribution to employment and gross domestic product (GDP) in Sweden. However, albeit novel in their approach, the authors could only pinpoint kinship between owners for the largest listed firms, and they could not determine whether family members took active part in the governance of the firm, which is a requirement according to the definition proposed by the European Commission (2009). Our study partly draws on Bjuggren et al. (2011) and extends it by examining both kinship and governance in all domiciled Swedish firms. We also expand their empirical area of research by studying the characteristics and performance of family firms and

by studying family firms among all partnerships, limited liability firms and listed firms across all domestic stock markets, whereas Bjuggren et al. (2011) could study only a portion of all closely held firms and firms listed on NASDAQ OMX Stockholm.

The purpose of our study is threefold. First, we identify all domestic family firms in Sweden according to the European Commission (2009) definition (henceforth, family firms) over the period of 2004-2010. Second, we provide an estimate of the economic contribution of family firms in terms of their share of total employment and GDP. Third, we compare the characteristics (age, employment, sales, physical capital intensity, skill intensity, solidity, unit labor cost, being part of an enterprise group, being part of a multinational enterprise and participation rate in exports and quantity of exports) and economic performance (return on assets, value added and labor productivity) of family firms and private, domestically held non-family firms (henceforth, private non-family firms).

Our method of identifying family firms uses information on legal forms and ownership categories to find potential family firms.[1] Next, we utilize complete statistical records from Statistics Sweden to trace kinship among all Swedish residents and, from that, kinship among all registered owners and top managers (chief executive officers and board members) across all domestic firms. This allows us to identify all Swedish families that reside in Sweden and classify all listed and non-listed firms as family firms or non-family firms according to the European Commission (EC 2009) definition.

We find that family firms are the dominant organizational form: they range from the smallest producers to the largest multinational firms, and they are active in all industries when not crowded out by government actors. We estimate that family firms generate over one-third of GDP and total employment, of which nearly all is generated by limited liability firms, while partnerships and sole proprietorships are of less economic significance. The typical family firm is less reliant on formal knowledge, less involved in exports and has lower labor productivity than private non-family firms. Family firms are also, on average, smaller in terms of employment and sales, even within size groups. Family firms have higher solidity, yet we find them to be more profitable. Lastly, we find the differences of family firms and private non-family firms to diminish with firm size.

[1] Family firms can by definition only assume the legal forms of limited liability firm, partnership or sole proprietorship. Ownership categories is a statistical term that reports whether a firm is foreign, governmentally or privately owned.

The rest of the analysis is organized as follows. The next section reviews approaches to defining and identifying family firms. Section 3 describes our data, and Section 4 outlines the method we use to identify family firms. Section 5 reports the number and economic contribution of family firms as well as their industry and size distribution. Section 6 examines the characteristics and economic performance of family firms using descriptive statistics and econometric estimations. Section 7 provides a concluding discussion. Appendix A defines the studied variables. Appendix B reports descriptive statistics of firm characteristics across ownership categories. Appendix C contains complementary regression tables. Appendix D provides details of the procedure to estimate the contribution by family firms towards GDP.

2. Conceptual framework: defining family firms

What constitutes a family firm? This issue has been considered by numerous authors who have suggested both measurable and non-measurable definitions of family firms. A common definition in previous empirical work has been that family firms are firms where an individual or a constellation of related individuals control at least 20 percent of the firms' decision-making rights, as used by La Porta et al. (1999) and Faccio and Lang (2002). Others have adopted a more conservative approach, requiring that an individual or a constellation of related individuals control at least 50 percent of the decision making rights within a firm; e.g. Rosenblatt et al. (1985), Leach et al. (1990), Gallo and Sveen (1991), Barontini and Caprio (2005) and Classen et al. (2014).[2] Other authors have emphasized the role of family governance (e.g. Donnelley, 1964; Davis and Taguiri, 1985; Pratt and Davis, 1986; Morck et al., 1986; Handler, 1989; Anderson and Reeb, 2003; Miller et al., 2007). They emphasize that a firm is family controlled if a family is actively present in the day-to-day management. Some writers have proposed less operational definitions of family firms (Churchill and Hatten, 1987; Lea, 1998) by suggesting that family firms should be defined by whether they are created by and for the needs of a specific family or with the explicit anticipation for future generations to take over the business. Common for all the above definitions is the strict division of firms as "family firms" and "non-family firms".[3]

[2] Other studies such as Donckels and Frohlich (1991) and Lyman (1991) suggest even more conservative approaches, suggesting that an individual or constellation of related individuals should control at least 60 percent or completely control a firm for it to be classified as a family firm.

[3] A tradition which has been criticized by Astrachan and Shanker (1996) and Astrachan et al. (2002) who instead suggest that firms should be categorized by *degrees* of family control.

The empirical strategy of identifying family firms does, like the choice of how to define a family firm, vary across studies and the strategy chosen is likely governed by the information available, or lack thereof. Prior literature has generally been confined to the analysis of listed firms or firm samples, where family ownership has been identified through the business press, business reports, interviews, questionnaires, etc. An exception is Bennedsen et al. (2007) who employed register based data from Denmark to identify a sub-group of family firms among all publicly and privately held limited liability firms over the period of 1994 to 2002; namely those that changed CEOs during this period. The study identifies family firms through the use of complete register based data regarding kinship between incoming and departing CEOs in publicly held limited liability firms; where family firms are identified as all firms where the departing and incoming CEO are related by blood or marriage. It is to be noted that the study does not, however, include information on ownership.

In contrast to Bennedsen et al. (2007), Hamelin (2013) observes ownership but not kinship across a large sample of firms. It is therefore assumed that all firm owners with a given surname are related, thereby yielding a second-best approximation on the number of family firms. Another exception is Bird and Wennberg (2014) who studies the relationship between ownership, management and business formation among business start-ups in Sweden in the period of 1991 to 2007. The study identifies family firms using complete register data concerning kinship between firm managers; where family firms are identified as start-ups in which at least two members from the same nuclear family are self-employed. The study does not, however, observe ownership directly but rather through recorded business income. Due to its rather strict definition of family, the study also excludes more complex family governance structures, such as those involving grandparents, in-laws or cousins.

A last exception is Bjuggren et al., (2011) who studies ownership across firms using register data and knowledge of both Swedish corporate law and the Swedish tax system. Bjuggren et al., (2011) noted that the 1991 tax reform in Sweden introduced special rules for closely held limited liability firms and that the tax authority examined family relationships to ensure compliance with the rules. They used this information together with information on legal forms, ownership categories and detailed knowledge of owners of Swedish firms listed on NASDAQ OMX Stockholm to estimate the prevalence of domestic family business and its contribution to employment and GDP. They could not, however, identify owners and their kinship and could furthermore not determine whether family members took active part in the governance of the firm (with the exception of listed firms), which is a requirement according to the definition proposed by the European Commission (EC) (2009).

Due to the ambiguity which traditionally has characterized the discussion of what constitutes a family firm as well as the differences in identification strategies between studies, efforts have been made to unify the field's methodology. A major effort was undertaken by the European Commission in 2007 with the goal of designing a common European definition of family firms.[4] The Commission reviewed data from the academic literature and from 33 countries; the EU27, EEA and the EU candidate nations of Turkey, Croatia and Macedonia within which 90 different definitions of family firms were found. The definitions were reviewed and evaluated with the goal of proposing a simple, comparable and measurable definition of family firms; the process of which resulted in the EC (2009) definition. The resulting definition states that a firm of any size should be classified as a family firm if:

i. The majority of decision-making rights are in the possession of the natural person(s) who established the firm, or in the possession of the natural person(s) who has/have acquired the share capital of the firm, or in the possession of their spouses, parents, child or children's direct heirs.

ii. The majority of decision-making rights are indirect or direct.

iii. At least one representative of the family or kin is formally involved in the governance of the firm.

iv. Listed companies meet the definition of family enterprise if the person who established or acquired the firm (share capital) or the families or descendants possess 25 percent mandated by their share capital.

The EC (2009) definition has been adopted by the European Union and multinational family business networks such as the European Group of Owners Managed and Family Enterprises (GEEF), the Family Business Network FBN International and the Family Firm Institute (FFI). There is still, however, little consensus among family firm researchers regarding the definition of family firms, as noted by Benavides-Velasco et al. (2011), Harms (2014), Xi et al. (2015) and Diéguez-Soto et al (2015). In this study, we adopt the definition suggested by the EC (2009). This is motivated from two reasons: First, the definition is based on an extensive meta-analysis of family business from a European context, thereby leading us to believe that it is the most suitable definition for the context of our study. Second, acknowledged organizations such

[4] Other such efforts include Chua et al., (1999) and Astrachan et al. (2002).

as the European Union and multinational family business networks stand behind it. This leads us to believe that it is also likely to be further used in the future. In fact, several studies have already used it, for instance Bjuggren et al., (2011), which we draw upon and want to compare our results with.[5]

3. Data

To operationalize the EC (2009) definition of family firms we need to identify three distinct aspects of family firms:

1. firm owners, i.e., those who control the decision-making rights and how large shares of the total decision-making rights they represent,

2. their kinship relations and the identification of families, and

3. family member participation in firm governance.

The above definition goes beyond listed firms and it therefore encompasses a vast number of organizations for which there is relatively little information readily available; we therefore need to turn to administrative registers in order to identify all family firms. We have access to administratively compiled registers for Sweden that cover all firms in the 2004-2010 period. Our study is hence based exclusively on administratively compiled registers and the risk of sample bias is therefore argued to be negligible.

The register principally used is the Swedish Register Based Labor Market Statistics (*Registerbaserad arbetsmarknadsstatistik*) which contains information gathered from multiple registers; the two most important being the Swedish Business Register (*Företagsdatabasen*) and the Swedish Population Register (*Registret över totalbefolkningen)*. The Swedish Register Based Labor Market Statistics matches firms and employees, i.e., it provides matched employer-employee data covering all residents and firms.

We complement The Swedish Register Based Labor Market Statistics with data from: the Swedish Ownership Register[6] (*Ägarregistret*); the Swedish Financial Supervisory

[5] Other studies include, for example, Grundström et al., 2012 Bjuggren et al., (2013) and Backman and Palmberg (2015).

[6] The Swedish Ownership Register is supplied by Euroclear Sweden AB which is the authorized central deposit for financial securities in Sweden which receives notifications of purchases and sales of stocks in listed firms in

Authority's Central Registers of Investments and Investor Alerts (*Finansinspektionens insynsregister och börsinformation*); the Swedish Companies' Registration Office's Executive Board Register (*Bolagsverkets styrelseregister*); the Swedish Tax Authorities statistics of earnings and deductions (*Skatteregistret)*; Swedish Structural Business Statistics (*Företagens ekonomi*); and the Swedish Multiple-generation Register (*Flergenerationsregistret*); Table 1 summarizes the included registers and data.

Table 1. Registers and included data

Register	**Data**
The Swedish Business Register	Register of Swedish firms and enterprise groups
The Swedish Population Register	Register of Swedish citizens
The Swedish Register Based Labor Market Statistics	Register of Swedish firms, residents, income and taxes.
The Swedish Ownership Register	Register of owners in listed Swedish firms
The Swedish Financial Supervisory Authority's Central Register of Investments and Investor Alerts	Register of holdings in listed Swedish firms
The Swedish Companies Registrations Office's Executive Board Register	Register of executive board members in Swedish limited liability firms
The Swedish Tax Authorities statistics of earnings and deductions	Register of dividends and capital gains collected by active owners in closely held firms
The Swedish Structural Business Statistics	Register of financial information on all non-financial, private firms
The Swedish Multiple-generation register	Register of kinship between Swedish citizen

The range and detail of the included data is vast. Our data contains information on all Swedish residents and labor market participants, and all firms which are active in Sweden and have registered employees (*sysselsatta*).[7] As previously indicated, most of this information comes from the Swedish Business Register and the Swedish Population Register. The Swedish Business Register is a population register that includes all active and dormant firms in Sweden,

Sweden under the Law of Accounting of Financial Instruments (SFS1998:1479). SFS stands for The Swedish Code of Statutes

[7] A person is considered employed if a) the person is employed by the firm and has received income equivalent to at least four hours of work during the month of November, or; b) the person owns the firm and has accounted for business or labor income equivalent to at least four hours of work in the firm during the month of November.

whereas the Swedish Population Register contains information on all Swedish citizens. The Swedish Register Based Labor Market Statistics combines the two abovementioned registers and forms a matched employer-employee register which includes all active firms and all individuals who are part of the Swedish labor market. The Swedish Register Based Labor Market Statistics does, in addition to the aforementioned registers, also include information from other registers to gain information on non-residents who participate in the Swedish labor market, e.g. foreign citizens working in Sweden.

In addition to these three key registers, we make use of five other registers. First, we retrieve information on all physical and legal persons who own stocks in listed firms in Sweden from the Swedish Ownership Register.[8]

Second, we add information on all Swedish citizens who control at least 10 percent of any legal person which holds equity in a listed firm from the Swedish Financial Supervisory Authority's Central Register of Investments and Investor Alerts.[9] The information in both the Swedish Ownership Register and the Swedish Financial Supervisory Authority's Central Register of Investments and Investor Alerts is complete for all listed firms in Sweden and is presented by the type and number of shares held by each individual, the holding's size in relation to the total capital stock and the number of votes that the holding grants in the firm.[10]

Third, we retrieve information on all executive board members in limited liability firms in Sweden during a given year from the Swedish Companies' Registration Office's Executive Board Register. The information contained in the Executive Board Register is complete; all limited liability firms in Sweden must register an executive board and give detail of the board's composition under the Law of Limited Liability Firms (SFS 2005:551).

Fourth, we retrieve information on all taxable income during a given year from the Swedish Tax Authorities' statistics of earnings and deductions. The information is complete for all firms, including both owners and employees.

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[8] The only exception being nominee shareholdings which constitute less than 501 shares.

[9] A person is obliged to report control of a legal person if (s)he controls at least 10 percent of the legal person's; a) share capital; b) votes or; c) cash flow rights (SFS 2000:1087 §5).

[10] Individual ownership through so-called 'endowment insurances' are not reported as the insurance company is viewed as the ultimate legal owner.

Fifth, we retrieve financial information on all firms except financial and government organizations[11] from the Swedish Structural Business Statistics. All analysis concerning firm-level financial characteristics do, therefore, not include information on financial and government organizations. This register is, however, only complementary to our analysis and used to characterize the financial characteristics of family and non-family firms. This does not affect the identification process itself which, consequently, includes all firms.

Finally, we retrieve information on the parents of all residents (both biological and adoptive) from the Swedish Multiple-generation Register. It is a genealogical register which contains compiled information from Swedish population registers. The Multiple-generation Register has complete coverage for individuals born 1932 or later who have been registered as Swedish citizens at some point since 1968. The register is updated annually in connection to the yearly publication of the Swedish Population Register.

[11] The Swedish Structural Business Statistics does not contain information on government organizations and the financial sector as these do not report standardized financial measures such as value added.

4. Identification of family firms using total population data

Our method of identifying family firms comprises of three steps: 1) Identification of potential family firms; 2) identification of kinship and families and; 3) identification of family firms according to the EC (2009) definition using the information acquired in 1) and 2).

In total, there are about 1 million firms and organizations employing around 4 million people in Sweden. The vast number of firms makes it impossible for a researcher or research group to identify the owners manually and some indirect method using administrative registers is therefore required.

The Swedish Business Register contains part of the information needed to do so; it contains information on the legal forms of all Swedish firms and organizations: These are divided into central and local government organizations, limited liability firms, partnerships, sole proprietorships and others[12]. Information on so-called owner categories is also provided, i.e. if a firm is owned by foreigners, government (central or local) or privately owned. Moreover, the register identifies enterprise groups, which includes parent companies and their subsidiaries.[13] This means that all subsidiaries can be connected to the ultimate owner(s) of their parent companies. The register is detailed enough to make it possible to identify direct and indirect ownership as well as ultimate ownership.

The first step of the process is then to use information from the Swedish Business Register and the Swedish Register Based Labor Market Statistics to identify potential family firms; Swedish corporate law dictates that only firms of certain legal forms can be family controlled and we therefore delimit our analysis to these legal forms. Next, we use information on ownership categories to delimit the population to privately owned firms; this comes as family firms can only, by definition, be privately owned – see Section 4.1. The next step of the process comprises of exploiting information on kinship to construct a register of all Swedish families, see Section 4.2. The last step consists of applying the EC (2009) definition to identify all family firms, see Section 4.3.

[12] Including: economic associations, cooperatives and religious societies, extra-territorial organizations and bodies, foundations and funds (mutual funds, bond funds and other funds), mortgage institutions and mutual savings banks, residual estates, organizations under special legislation (e.g. environmental organizations) and unemployment funds.

[13] A firm is defined as a parent company if it controls at least half of the decision-making rights in another firm, which is then defined as a subsidiary.

4.1 Method of elimination

Family firms can only take the form of limited liability firms, partnerships and sole-proprietorships, by definition[14] and we therefore delimit our search for potential family firms to firms within these legal forms. Swedish corporate law then dictates that sole proprietors are firms which are registered on their founders who exhibit complete control over the firm and who are completely responsible for its activities. Sole proprietorships are thereby, by default, family controlled and we therefore classify all of these firms, a bit more than 200,000 employing close to 300,000 persons, as family firms.[15]

Moreover, we exempt government and foreign owned firms from the population of potential family firms. This comes as governmentally owned firms cannot, by definition, be family firms and from that we lack information regarding foreign owners, which includes both foreign citizens and Swedish citizens with residence abroad[16], which makes it impossible to identify the entire population of family owned firms among foreign-owned firms.

It then remains to identify family firms among limited liability firms and partnerships which are owned by Swedish residents – all other remaining firms are consequently identified as private, domestically held non-family firms (henceforth, non-family firms for short). In total family firms and non-family firms constitute about half a million firms employing about 1.8 million people.[17] We now proceed to identify family firms among these firms, but first we need to identify kinship and define the term "family".

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[14] Jointly owned shipping firms can also be family firms. These employ about 100 people and for simplicity we therefore include them among other organizational forms.

[15] The definition of sole proprietors as family firms is also used by the European Commission (2009) and its preceding report by Mandl (2008). Sole proprietorships may in rare cases be foreign controlled – this is the case when foreign firms (outside the EES) wish to register a local branch in Sweden. In that case, the firm is to be registered as a sole proprietorship; a Swedish citizen is then to be appointed as its proprietor and the foreign firm's domestic representative. These firms have been excluded from the term due to a lack of information on foreign firms.

[16] This group accounts for a considerable share of Swedish employment. There was an exodus of successful Swedish entrepreneurs during the 1960s, 1970s and 1980s because of a most unfavorable tax system, in many cases it had confiscatory effects. To being able to develop their firms and to keep the firms within the family many entrepreneurs with growth ambition moved from Sweden, preferably to Belgium, the Netherlands, Switzerland or the United Kingdom. The most well-known examples are IKEA and TETRA PAK, controlled by the Kamprad and Rausing family, respectively (Henrekson and Johansson, 1999; Henrekson, 2005; Henrekson and Stenkula, 2015; Johansson et al., 2016)

[17] Privately held firms without an assigned ownership category have been included among private non-family firms. These constitute a bit less than 18,000 firms employing approximately 20,000 persons. Ninety-eight percent of these firms employ one person, whereas the largest firm employs 42 persons.

4.2 Identifying kinship and defining the family

One fundamental question of the study still remains unanswered, namely; "What is a family?". The question is non-trivial in the context of family business research and the approach chosen is likely to influence the study's results, such as discussed by Handler (1989), Astrachan and Shanker (1996) and Kraus et al. (2011). In an attempt to value-neutrally define the term "family", we have chosen to include all available information of registered kinship within the Swedish Population Register and the Swedish Multiple-generation Register.

Families have primarily been identified through use of the Swedish Population Register which contains information on all Swedish citizens as well as their closest relatives, where an individual and its closest relatives are referred to as a so-called "family unit" – a group of individuals who are related across a maximum of two generations and living on the same address; usually parents and their children. All individuals are also given a function within their respective family unit, such as "wife in married couple", or "child".[18] The family unit may however be too restrictive to reflect the way in which businesses are controlled and governed. Grown up children or grandparents living on their own who are active in the business should, for example, be included. The definition of family should therefore preferably be expanded beyond the statistical "family unit".

Identification of kinship beyond the "family unit" does, however, require more elaborate methods. In order to identify more distant kinship bonds for each individual, all registered residents in the Swedish Population Register are matched against the Swedish Multiple-generation Register. From this, we are able to identify all registered parents (both biological and adoptive) for all Swedish residents. Next, all fathers out of the registered parents are selected and matched against the Swedish Multiple-generation Register in order to identify the individuals' registered grandparents. This makes it possible to identify family firms where up to three generations are active (children, parents and grandparents). Some family firms may, however, constitute of more distant relatives.

In a third step, therefore, all fathers out of the registered grandparents are selected and matched against the Swedish Multiple-generation Register in order to identify their registered parents; and so the process continues. The process is repeated for all generations until no registered father can be found. Once identified, the last identified male ancestor is then attributed as the individual's forefather, where the term 'forefather' simply refers to the eldest

[18] Individuals without registered kinship are denoted as one-person family units.

known male ancestor of a given individual. The individual's forefather is also attributed as the forefather of all subsequent male descendants.[19]

Thereafter, all known children and spouses who are related through a common forefather are identified. This constitutes what in the study is referred to as a "family". By this, we capture governance and ownership structures involving, for example, siblings, parents, grandparents and cousins. At most, up to five generations can be identified using this method, although in practice we only identify families of up to three generations, about 98 percent of the population. Fourth generation family members constitute approximately 2 percent of the population, while, fifth generation family members constitute less than .01 percent of the population. Thereby, although formally admitting families of up to five generations, the study concerns almost exclusively 1 to 3 generation firms. The choice of identifying families by the father comes as men are found to be more likely to control the family firm, e.g., 76 percent of all top managers in Sweden are males (2010). This does, however, not affect our results as our method includes all spouses, siblings and children for all individuals, including all wives, sisters and daughters.

4.3 Identifying family firms

The last part of the process is to identify family firms according to the definitions adopted. As the definitions and data are different for listed and non-listed firms and between legal forms, the method of identifying each type are described separately.

4.3.1 Identifying listed family firms

The Swedish Ownership Register reports all holdings in all listed firms and the owner of each individual equity.[20] The information has been matched against the Swedish Population Register and the Swedish Business Register in order to acquire background information on all domestic owners. The method of identifying family firms is thereafter five-staged: 1) All holdings that are registered on a *physical* person are attributed to that person. Shares may have different decision-making rights, which our method takes into consideration. 2) All holdings that are

[19] Individuals without registered fathers have been attributed kinship within their current family units. Individuals without registered parents constitute approximately 16 percent of the population (2010); 86 percent of these individuals are foreign born.

[20] This includes both domestic and foreign owners who can be both physical and legal persons. We do however not have any additional information on foreign owners apart from their names and shareholdings.

registered on a *legal* person are attributed to the *physical* owner(s) of that legal person.[21] 3) There is a handful of families exerting control of a substantial share of Swedish industry via family controlled foundations, the Wallenberg family being the most well-known. These foundations are identified manually and all holdings of these foundations are attributed to the controlling family.[22] 4) All substantial shareholdings[23] without a known physical owner are examined manually through the use of the Swedish Financial Supervisory Authority's Central Register of Investments and Investor Alerts, Sundqvist (2004-2009) and the studied company's own financial reports and press statements.[24] In the case where the process in 4) yields a positive identification of an ultimate, Swedish owner, then the holdings in question are attributed to that owner. All holdings which are not identified as privately held by Swedish residents are lastly denoted as foreign or government held. 5) In a final step, all identified Swedish holdings are consolidated to the families identified in the previous section. The families are then matched against the Swedish Companies Registrations Office's Executive Board Register to confirm that at least one family member is on the firm's executive board or holds the position of CEO. We then apply the definition of the European Commission (2009) and classify all listed firms in which a family controls at least 25 percent of the decision-making rights as family firms. The process identifies approximately 152 family firms out of 433 listed firms (about one third listed firms) employing a bit more than 78,000 persons, corresponding to about one fourth of employment in listed firms.

4.3.2 Identifying family firms among non-listed limited liability firms

Non-listed liability firms can be divided into closely and widely held firms: Closely held firms are defined as limited liability firms where at least 50 percent of the decision-making rights are controlled by a maximum of four owners, where an individual and its closest of kin[25] are regarded as one owner (Swedish Tax Authority 2008, chapter 9, p. 206; SFS 1999), whereas

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[21] This means that owners of a parent company within an enterprise group are attributed all equity held by their subsidiaries. Pyramidal ownership are hence taken into account.

[22] This applies to less than 20 foundations. One family can control several foundations.

[23] Substantial shareholdings are defined in listed firms as holdings which constitute at least 25 percent of the decision making rights within a given firm.

[24] Unidentified owners are typically non-listed firms. Unidentified owners with significant holdings in listed firms constitute approximately a hundred posts per year which have been examined manually.

[25] The closest of kin are defined as individuals who are related across a maximum of three generations, including an individual's grandparents, parents, siblings, children, nieces, nephews, and spouses to all of the above.

widely held firms are defined as all firms which do not fit this criterion. Due to their inherently concentrated ownership, closely held firms fall under special rules of taxation; the so-called 3:12 rules. Due to the presence of the 3:12 rules, the Swedish Tax Authority trace kinship among firm owners of closely held firms in order to ensure compliance with the rules. We have used this information in order to improve the accuracy of our method to identify family firms as it allows us to identify both the owners and managers of certain non-listed firms.

The 3:12 rules were imposed in connection to the Swedish tax reform of 1990-1991 and the introduction of the dual income tax system which, in short, created incentives for firm owners to shift their income from labor to capital income in order to evade the progressive marginal taxes that are imposed on high labor incomes. Consequently, the 3:12 rules were designed to prevent income shifting by imposing an upper limit to the share out of a firm's profit that can be taxed as dividend or capital gain. The rules were designed to specifically target closely held firms as these firms are, by definition, known to be controlled by a relatively small group of individuals which makes them particularly able to exploit these tax asymmetries. Firms with dispersed ownership, such as listed companies, are exempted from the rules as firms with many owners are considered less able to exploit this asymmetry (Alstadsæter and Martin, 2012).

The 3:12 rules do furthermore differentiate between active and passive owners, where active owners are defined as owners who "work and are involved in the firm to a significant extent" with the condition that "the effort of the owner or any of the owner's relatives [must] have had a significant influence on the firm's result during the year or in the previous five years" (Swedish Tax Authority, 2015). Active owners must report their capital income to the Swedish Tax Authority through a so-called K-10 form which we use to identify them. We assume the decision making rights within each firm to be equally distributed among its owners; a firm is then classified as a family firm if at least fifty percent of the submitted K-10 forms from that firm have been submitted from members of the same family.

The register of closely held firms is, however, incomplete as the tax authority normally only investigates ownership relations once a K-10 form has been submitted. Moreover, the definition of 'family' in the context of closely held firms does not fully correspond to the definition used in our study, where ownership involving aunts, uncles and cousins are not considered for closely held firms; delimiting the analysis to closely held firms would thereby possibly exclude certain family firms according to our definition. Therefore, we also include non-listed limited liability firms which are governed by an extended family and/or those which do not file K-10 forms in the analysis in order to capture the full range of family firms. For

these firms, we assume ownership and executive board influence to be closely related. Analysis of our material implies that this assumption is reasonable; among closely held firms, for which we can identify both the owning families and the executive board members, we find that over 90 percent of all owners are present in the firm's executive board. Previous research does also support this assumption (i.e. Barnhart and Rosenstein, 1998; Ben-Amar and André, 2006; Pindado and Requejo, 2015; Madison et al., 2016). In practice, this means that we identify widely held, non-listed limited liability firms as family firms if at least fifty percent of the firms' executive board members are members of the same family; thereby yielding an approximation to the European Commission (2009) definition of majority ownership in non-listed firms.

The method identifies approximately 144,000 family firms through submitted K-10 forms and an additional 19,000 family firms by executive board structure, yielding a total of almost 164,000 additional family firms (88 percent of all domestically and privately held limited liability firms), employing almost 1.1 million persons (about half of employment within all domestically and privately held limited liability firms).

4.3.3 Identifying family firms among joint and limited partnerships

Joint and limited partnerships do, by definition, not have any stocks. We therefore classify them as family controlled if at least half of the involved partners are related. In the case that the partnership is a subsidiary, it is classified according to the ownership of the parent company. The process identifies a bit less than 27,000 additional family firms (about ninety percent of all partnerships) employing approximately 58,000 persons (more than two thirds of employment in partnerships).

5. The economic contribution of family firms

5.1 Introduction

In this section we pursue the second purpose of our study – to examine the contribution of family firms towards total employment and GDP. We also examine their numbers as well as their industry and size distribution.

First, we compare family firms and other organizations across the whole population; both in aggregates and across industries. The analysis is then delimited to the legal forms in which family firms can be active, i.e., limited liability firms, partnerships and sole proprietorships. These firms are then compared across size with regard to ownership. Lastly, we study the

contribution of family firms across time. All comparisons apart from our GDP calculations concern employer firms, i.e. firms which employ at least one person, and concern the latest year of 2010 unless specified otherwise.

5.2 The population of family firms

In total, we identify almost 410,000 family firms; see Table 2. When comparing this number to the total population of employer firms, i.e. firms which employ at least one person, we find that family firms are by far the most common organizational form in Sweden accounting for approximately 90 percent of all employer firms and organizations. About half of the family firms are sole proprietorships, while limited liability firms constitute about 40 percent and partnerships less than ten percent.

Table 2: The number and share (%) of family firms and other ownership categories across legal forms, 2010

Ownership category	Family		Non-family		Foreign		Government		Total	
Legal form		%		%		%		%		%
Central and local government	-	-	-	-	-	-	672	100	672	0
Listed limited liability firms	152	35	259	60	22	5	0	0	433	0
Non-listed limited liability firms	163,902	88	14,083	8	7,574	4	1,420	1	186,979	41
Partnerships	26,806	93	2,011	7	49	0	6	0	28,872	6
Sole proprietorships	218,486	100	0	0	45	0	0	0	218,531	48
Other legal forms	0	0	20,374	90	2,130	9	189	1	22,693	5
Total	409,346	89	36,727	8	9,820	2	2,287	0	458,180	100

Notes: Statistics Sweden reports three ownership categories; if a firm or organization is foreign, governmentally or privately owned. We are able to identify family firms within the category "privately owned" and therefore report it divided into the categories "family" and "non-family" in this table. Employer firms only, i.e. firms which employ at least one person.
Sources: Registers presented in Section 3.

5.3 The economic contribution of family firms

Family firms contribute to approximately one third of all employment in Sweden, see Table 3. We furthermore find that family firms contribute to over 38 percent of Swedish GDP.[26] In other words, our results show that family firms are not only the largest employer but also the single greatest source of income in Sweden; meaning that family business is not the exception, as often depicted, but rather the rule of economic activity. These numbers become particularly interesting when considering that both businesses and wealth were highly taxed in Sweden during the 1960's, 70's and 80's which resulted in that a significant amount of family firms

[26] The method for estimating family firm GDP is presented in Appendix D.

either migrated, were sold off or perished (Henrekson and Johansson 1999: Henrekson 2005; Henrekson and Johansson 2009).

Our estimates are higher than Bjuggren et al.'s (2011) who reported the share of family firm employment and GDP to be one fourth and one fifth, respectively. This is explained by that we are, in addition to Bjuggren et al. (2011), able to identify family control by use of kinship information, whereas Bjuggren et al. could only do so based on the number of owners filing a K-10 form. By this, we are able to identify family firms among all firms, including partnerships and closely held firms that have not filed K-10 forms. What is more, our estimates are also likely higher than those of Bjuggren et al. (2011) as we are able to identify family firms across all domestic stock markets, whereas Bjuggren et al. (2011) could only do so for those listed on the NASDAQ OMX Stockholm. Our results are therefore, compared to Bjuggren et al. (2011), both more inclusive and more precise.

Family firms generate all employment among sole proprietorships, by definition. They also account for most employment among partnerships and about half of employment among limited liability firms.

Table 3: The number and share (%) of employment in family firms and other ownership categories across legal forms, 2010

Ownership category	Family		Non-family		Foreign		Government		Total	
Legal form		%		%		%		%		%
Central and local government	-	-	-	-	-	-	1,466,742	100	1,466,742	33
Listed limited liability firms	78,325	25	225,099	71	14,671	5	0	0	318,095	7
Non-listed limited liability firms	1,109,066	49	218,046	22	628,907	29	120,701	0	2,139,720	51
Partnerships	58,301	77	12,515	17	4,859	6	40	0	75,715	2
Sole proprietorships	268,568	100	-	-	87	-	-	-	268,655	6
Other legal forms	18,238	89	222,370	11	0	0	0	0	19,503	0
Total	1,532,498	35	741,030	17	662,479	15	1,466,782	33	4,402,789	100

Notes: Statistics Sweden reports three ownership categories; if a firm or organization is foreign, governmentally or privately owned. We are able to identify family firms within the category "privately owned" and therefore report it divided into the categories "family" and "non-family" in this table. Employment is assigned according to the ownership and legal form of the parent company.
Sources: Registers presented in Section 3.

Table 4 gives details of the distribution of firms across ownership categories and industries. Industries are presented in accordance with the Statistical Classification of Economic Activities in the European Community (NACE rev 1.1, first level) which is comparable to the International Standard Industrial Classification (ISIC, rev. 3.1). Family firms account for almost all employment (about 90 percent) in Agriculture and Fishing (A+B). These industries are, however, relatively small; constituting about two percent of all employment. Family firms are also the largest employer within Construction (F), Wholesale and retail trade (G), and Hotels and restaurants (H); accounting for 78, 60 and 77 percent respectively. These industries do, in addition, constitute a significant part of the economy, accounting for 6, 11 and 3 percent of all employment; i.e., more than one fifth of total employment. Family firms do furthermore employ a significant share of all persons working in Manufacturing (D), Transport (I), Real estate, renting and other business activities (K) and Other community, social and personal services (O); employing about 40 percent of the workforce within each industry. These are some of the largest industries in Sweden; employing 10, 7, 19 and 4 percent of the working population, corresponding to about 40 percent of all employment. Finally, family firms owe to a relatively large share of employment within Mining and quarrying (C); about one fifth of employment in the industry. This industry is however relatively small, amounting to 0.2 percent of all employment.

On the lesser side, family firm involvement is quite sparse among Public administration and defense (L), Education (M) and Health and social work (N); accounting for 0.1, 7 and 6

percent respectively. Public administration and defense occupy relatively few persons; constituting 3 percent of total employment. Education and Health and social work are, on the other hand, two of the largest industries in Sweden, employing 10 and 21 percent of employment respectively, i.e. almost one third of all employment.

The absence of family involvement in Public administration and defense, Education and Health is likely owing to two effects, where government predominance is both due to market regulations and to crowding out effects of private actors by government organizations in partly de-regulated markets. The absence of family firms in Public administration and defense is explained by the industry's nature as it includes the court system, military, parliament, police and similar organizations where private firms are forbidden. The absence of family firms in Electricity, gas and water supply and Education and Health and social work can conversely be explained by that these industries are subject to regulations which make it difficult for private actors to enter and grow, or are forbidden to enter the markets, although most of these markets have been de-regulated since the early 1990s (Henrekson and Johansson 2009). Private actors also compete with central and local government organizations and are therefore likely to be crowded out in certain markets.

Table 4: Employment in family firms across industries, 2010.

	Ownership category	Family		Non-family		Foreign		Government		Total	
Code	Industry		%		%		%		%		%
A	Agriculture, hunting and forestry	69,262	88	7,178	9	1,002	1	1,621	2	79,063	2
B	Fishing	1,299	94	36	3	54	4	-	-	1,389	0.03
C	Mining and quarrying	1,970	21	2,661	28	1,086	12	3,626	39	9,343	0.2
D	Manufacturing	177,597	41	39,359	9	213,892	49	1,748	0.4	432,596	10
E	Electricity, gas and water supply	5,719	21	1,926	7	7,216	27	12,295	45	27,156	1
F	Construction	192,973	78	21,726	9	25,482	10	6,147	2	246,328	6
G	Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods	277,206	60	57,145	12	116,631	25	14,887	3	465,869	11
H	Hotels and restaurants	93,509	77	9,549	8	18,816	15	282	0.2	122,156	3
I	Transport, storage and communication	140,470	43	61,140	19	105,713	33	15,661	5	322,984	7
J	Financial intermediation	30,254	25	69,103	58	16,409	14	4,206	4	119,972	3
K	Real estate, renting and business activities	357,425	43	289,757	35	107,769	13	81,015	10	835,966	19
L	Public administration and defence; compulsory social security	132	0.1	1,741	1	47	0.03	151,926	99	153,846	3
M	Education	29,106	7	42,933	10	2,557	1	360,820	83	435,416	10
N	Health and social work	53,897	6	42,766	5	37,773	4	803,820	86	938,256	21
O	Other community, social and personal service activites	63,153	38	90,630	54	5,001	3	8,674	5	167,458	4
P	Activities of households	2	67	-	-	1	33	-	-	3	0.0001
Q	Extra-territorial organizations and bodies	-	-	-	-	699	100	-	-	699	0.02
-	Unknown industry	38,524	87	3380	8	2,331	5	54	0.1	44,289	1
	Total:	1,532,498	35	741,030	17	662,479	15	1,466,782	33	4,402,789	100

Notes: Statistics Sweden reports three ownership categories; if a firm or organization is foreign, governmentally or privately owned. We are able to identify family firms within the category "privately owned" and therefore report it divided into the categories "family" and "non-family" in this table. *Industries are reported in accordance with NACE rev. 1.1.*

Another aspect of the composition of family firms is their distribution across size, as presented in Table 5. Size has proven to be an important determinant of firm growth: Micro and small sized firms have, for example, been attributed as important contributors towards employment growth (Birch, 1979; Storey, 1994; Neumark et al., 2011; de Wit and de Kok 2014), and small and/or, rapidly growing firms in particular (Birch and Medoff 1994; Delmar et al., 2003; Henrekson and Johansson 2010; Coad et al., 2014; Daunfeldt et al., 2014; Anyadike-Danes et al., 2015). In order to have comparability between ownership categories and for consistency with our later analysis, we have chosen to narrow down the analysis to the legal forms where family firms are present, i.e., limited liability firms, partnerships and sole proprietorships.

Table 5: Employment across firm sizes in family and non-family firms among sole proprietorships, partnerships and limited liability firms, 2010

Ownership category	Family		Non-family		Foreign		Government		Total	
Size		%		%		%		%		%
Micro firms	684,776	94	31,510	4	12,650	2	394	0.1	729,330	25
Small firms	415,787	74	80,892	12	60,315	10	1,889	0.3	558,883	19
Medium-sized firms	210,419	47	83,332	12	146,840	25	5,874	1	446,465	15
Large firms	203,278	17	322,926	15	549,460	30	112,584	9	1,188,248	41
Total	1,514,260	52	518,660	12	769,265	20	120,741	4	2,922,926	100

Notes: Firm sizes are defined by the number of employees, where micro (<9), small (10-49), medium (50-249) and large (>250).
Sources: Registers presented in Section 3.

Family firms contribute close to all employment among micro firms (94 percent). This is partly explained by that sole proprietorships account for about one third of all employment among micro-sized firms. The majority of all micro firm employment is, however, located within family controlled limited liability firms.

Family firms also contribute towards the lion's share of employment among small firms, where the share of family firm contribution diminishes with firm size. These results are expected; small firms are thought to be characterized by a higher concentration of ownership than larger firms, where ownership is likely to be diffused as firms grow (Demsetz and Lehn, 1985; Himmelberg et al., 1999). Foreign owners also have stronger preferences for investing in larger firms and family firms are, in addition, crowded out by government, which employ people in large firms. Still, family firms contribute to about one eighth of all large firm employment.

Lastly, we conclude that the dynamics observed in Table 2 to Table 5 are stable over the studied time period, where the contribution of family firms towards total employment is presented in Table 6 below.

Table 6: Shares of total employment according to ownership categories, 2004-2010, percent

Ownership category	2004	2005	2006	2007	2008	2009	2010
Family firms	32	33	33	34	34	35	35
Non-family firms	18	18	18	17	17	16	16
Foreign owned firms	14	13	13	14	14	15	15
Government organizations	36	36	36	35	34	34	34

Sources: Registers presented in Section 3.

6. The characteristics and performance of family firms

We now turn to the comparison of the characteristics and performance of family firms and non-family firms, where comparisons are made across 15 variables: age, being an exporter, being part of an enterprise group, being part of a multinational corporation, employment, exports, labor productivity, physical capital intensity, return on assets (EBIT and EBITDA), sales, skill intensity, solidity, unit labor cost and value added. The included variables and definitions are presented in Appendix A. Foreign firms are excluded from the analysis as they include both family and non-family firms and we cannot distinguish between them.[27]

Accounting principles and liability do furthermore differ across legal forms. This means that firms with different legal forms are established and governed according to different ambitions and purposes of the owners. This means, in extension, that there is limited comparability between legal forms. Sole proprietorships and partnerships are, for example, generally considered to be chosen as legal forms by owners lacking growth ambitions compared to those of limited liability firms (cf. Harhoff et al., 1998). There are, in addition, several other factors which make it difficult compare firms across legal forms: Firstly, limited liability firms have shares and Swedish law requires them to hold at least 50,000 Swedish krona (SEK) in restricted equity. Partnerships and sole proprietorships, on the other hand, hold no shares, thereby making all measures involving equity difficult to compare between legal forms. Secondly, the economic liability of owners in limited liability firms are restricted to their own equity, whereas owners of partnerships and sole proprietorships are fully liable for their firms' economic undertakings. This means that owners of firms within different legal forms face

[27] Government firms are also excluded as government and private organizations differ in a number of ways; for instance, in terms of the owners' objectives and in that the government has "unlimited" access to funds through the right to taxation and right to print money. Governments do, moreover, set "the rules of the game" by legislation.

different economic incentives. Thirdly, owners of limited liability firms are allowed to collect labor income from their own firms, whereas Swedish law prohibits sole proprietors[28] and partners to be employed in and collect labor income from theirs. Instead, owners of sole proprietorships and partnerships receive only business income – making measures involving labor costs less comparable between legal forms. Summarizing the above discussion, we conclude that firms of different legal forms face different economic circumstances and therefore behave differently. We also conclude that any analysis across all family firms would struggle with interference by these differences, meaning that we should delimit our analysis to one single legal form. Choosing from the three above legal forms, we infer that the continued analysis should be confined to the most economically interesting group; limited liability firms. This is motivated from that limited liability firms are of the most economic significance in terms of employment, growth and GDP.

Table 7 illustrates the growth pattern across legal forms by showing the total number of firms that grow in size with one employee or more between 2009 and 2010. Recall that there are more than 200,000 sole proprietorships; out of these, about 161,000 existed in both 2009 and 2010 and employed at least one individual. Out of these, about 10,000 grew with at least one employee (6 percent) in 2010, whereas almost 151,000 did not grow or decreased in size (94 percent).

Partnerships are also of less economic significance, for instance, they employ less than 80,000 people (3 percent of total employment). As noted above, we therefore choose to exclude sole proprietorships and partnerships from the analysis, which, hence, concerns only domestic limited liability firms controlled by Swedish residents. These firms are divided into family controlled and non-family controlled limited liability firms, respectively.

Table 7: The number of non-growing and growing firms by legal form. Family firms and non-family firms, 2009-2010

Growth Legal form	0	1	2	3	4	> 5
Sole proprietorships	150,846	7,650	1,704	508	210	191
Partnerships	3,723	15,112	2,771	698	269	197
Limited liability firms	37,300	76,454	24,042	10,032	4,943	4,670

Notes: Number of firms within each growth category and legal form. Growth is measured in employees.

Table 8 shows that family firms are, on average, smaller than non-family firms, both in terms of employment and sales – a result which is comparable to that of Backman and Palmberg

[28] Income and employment restrictions also apply to the nuclear family of sole proprietors; including spouse and children.

(2015) and Dow and McGuire (2016); this, even though the average family and non-family firm are of the same age. Family firms are moreover shown to be less likely to be part of enterprise groups and foreign trade and to employ less skilled personnel and less physical capital compared to non-family firms. In terms of performance, the average family firm is shown to have slightly lower solidity, lower unit labor costs, higher return on assets, lower labor productivity and to produce less value added than the average non-family firm. Finally, family firms are shown to be less involved in multinational enterprises.

Statistics Sweden does not have access to balance sheet and income statement data concerning financial firms (NACE 1.1 65-67) and they are therefore omitted from the parts of the analysis that requires such data.[29] The characteristics of sole-proprietorships, partnerships and limited liability firms owned both by residents, foreigners and the government are presented in Appendix B.

[29] Financial firm statistics are produced outside Statistics Sweden by several organizations, the most important being the Swedish Financial Supervisory Agency and the Swedish Riksbank. Financial firms make out approximately three percent of Swedish GDP, where the bulk of economic activity within the industry are concentrated within a handful of firms. These firms are well-known and easily identified in public information, and they are not family owned.

Table 8: Limited liability family and non-family firm characteristics and economic performance (means and medians), 2010

Ownership category	Family		Non-family		Difference	
Characteristic	Mean	Median	Mean	Median	Mean	Median
Age	12	10	11	8	1	2
Being an exporter (1,0) (%)	24	0	42	0	-18	0
Being part of a an enterprise group (1,0) (%)	22	0	56	100	-34	-100
Being part of an MNE (1,0) (%)	3	0	16	0	-13	0
Employment	8	3	36	7	-28	-4
Exports	1,638	0	29,700	0	-28,062	0
Labor productivity	545	443	601	511	-55	-68
Physical capital intensity	515	34	790	19	-275	15
Return on assets, EBIT (%)	3	7	0	5	2	2
Return on assets, EBITDA (%)	7	12	4	9	3	3
Sales	11	3	43	10	-32	-7
Skill intensity (%)	30	8	44	40	-15	-32
Solidity (%)	96	100	97	100	-1	0
Unit labor cost	284	263	369	326	-86	-63
Value added	3,526	1,254	12,400	3,944	-8,874	-2,690

Notes: Sales are reported in millions of Swedish Krona (SEK), all other monetary values are reported in thousands of SEK. Skill intensity is defined as the share of employees who have completed at least two years of tertiary education.

The above exposition does not, however, observe the characteristics of family firms while holding constant other factors, such as their industry and size. Therefore, in Table 9 and 10 we control for industry, year and, when applicable, firm size in OLS, quantile and probit regression models to briefly illustrate the general characteristics and performance of limited liability family firms.

6.1 Dependent variables

The dependent variables constitute 16 performance and firm characteristics: Whether or not a firm is an exporter (Being an exporter), a member of an enterprise group (Being member of an enterprise group) or a part of a multinational enterprise (Being part of an MNE); the performance of a given firm in terms of its return on assets (EBIT, EBITDA) and labor productivity (Labor productivity); the financial composition of each firm in terms of its financial solidity (Solidity) and average cost of labor (Unit labor cost); the size of each firm in terms of employment (Employment) and sales (Sales) and, finally, the intensity of inputs of each firm in terms of physical and human capital intensity (Physical capital intensity, Skill

intensity). For a detailed description of the included variables, see Appendix A. To isolate the characteristics of family firms we also include a number of independent variables.

6.2 Independent variables

The first thing we wish to control for is our variable of interest; whether a firm is family controlled or not (Family). This is represented by a dummy variable which assumes the value 1 if a firm is a family firm and 0 otherwise. Moreover, the firm characteristics are likely to differ across firm size – therefore we also control for the number of employees per firm (Firm size). Due to collinearity, this variable is excluded when we analyze size-related characteristics (Employment and Sales). The characteristics of firms are also likely to differ across industries as the nature of goods and the inputs required for production are inherently different across different industries. Therefore, we also control for which industry each firm belongs to (Industry). Industry is controlled for at the 2- and 3-digit level according to the Statistical Classification of Economic Activities in the European Community (NACE rev 1.1). Finally, we may expect the timing of each observation to influence the characteristics of firms. Therefore, we control for the year which each firm is observed (Year).

6.3 Econometric model

The included variables differ in terms of their distribution and we therefore, divide them into categories; continuous non-financial variables (Employment and Skill intensity), binary non-financial variables (Being an exporter, Being member of an enterprise group and Being part of an MNE) and financial variables (EBIT, EBITDA, Solidity, Labor productivity, Physical capital intensity, Unit labor cost and Sales).

The continuous, non-financial variables are analyzed using a standard OLS specification:

$$\ln(Firm\ characteristic_{it}) = \alpha + \beta_1 Family_{it} + \beta_2(Firm\ size_{it}) + D_1 Industry_{it} + D_2 Year + \varepsilon_{it} \quad (1)$$

where all continuous non-financial firm characteristics of firm *i* are related to its ownership, size and industry during a given year *t* as described in the previous section. Industry is controlled for at the 3-digit level (NACE rev. 1.1). For all binary non-financial variables, an equivalent logit specification is used with the only exception being that the dependent variables in the logistic regression model are expressed in their natural form rather than in logarithms.

For simpler interpretation we have expressed all logistic coefficients as odds-ratios, i.e. relative probabilities. In our case, this means that they are to be interpreted as the relative probability of a characteristic assuming the value 1 *given* that a firm is family controlled compared to that of a non-family controlled firm. This means that all coefficient values below 1 indicate that family firms are less likely to display a certain characteristic compared to non-family firms whereas values of 1 and above indicates that family firms are equally or more likely to display a certain characteristic.

Finally, the included financial variables are found to be skewed and having non-normally distributed standard errors, meaning that they do not fulfill the conditions of an OLS estimator. This means that we need to use a robust estimator in order to yield consistent and unbiased results for these variables. We therefore estimate all effects on financial variables using the specification of (1) in a quantile regression model which is estimated at the median. In this specification, industry is controlled for at the 2-digit level (NACE rev 1.1).

For brevity, only the coefficients and standard errors have been included in Table 9 and 10.

Table 9. A comparison of characteristics and economic performance of limited liability family and non-family firms (pooled OLS/median/logistic estimates), 2004-2010.

Dependent variable	*Explanatory variable Family firm dummy*	*Adjusted R^2*	*Observations*
Employment (log)	-1.080***	0.21	1,166,579
	(0.004)		
Sales (log)	-1.278***	0.22	1,068,807
	(0.006)		
Return on assets, EBITDA (%)	3.753***	0.02	1,079,832
	(0.061)		
Return on assets, EBIT (%)	2.731***	0.01	1,079,832
	(0.056)		
Solidity (%)	2.805***	0.07	1,079,832
	(0.117)		
Labor productivity (log)	-0.134***	0.07	1,043,472
	(0.002)		
Physical capital intensity (log)	0.189***	0.12	990,284
	(0.008)		
Skill intensity	-4.928***	0.29	1,166,579
	(0.092)		
Unit labor cost (log)	-0.156***	0.08	1,072,826
	(0.002)		
Being part of an MNE (1,0) *odds ratio*	0.280***	0.08	1,166,579
	(0.013)		
Being part of an enterprise group (1,0) *odds ratio*	0.405***	0.16	1,166,579
	(0.008)		
Being an exporter (1,0) *odds ratio*	0.674***	0.19	1,166,579
	(0.008)		

Notes: Coefficients for all limited liability firms from two pooled robust OLS, seven quantile and two logit regressions of the dependent variable on the family firm dummy (1,0) and firm size (except in the first and second regression), 2- and 3-digit industry dummies (1,0) and year dummies (1,0). All continuous variables are in logs except for skill intensity. The last two variables MNE and Exporter are expressed in odds ratios. Robust and clustered standard errors in parenthesis. For brevity, other coefficient estimates are omitted. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The results of Table 9 are similar to those of Table 8 in that family firms are on average found to be smaller than non-family firms in terms of employment and sales. Family firms are, again, shown to employ less human capital and to be less likely to participate in multinational enterprises, enterprise groups and exports. Moreover, as in Table 8, family firms are again found to be more profitable than non-family firms, both in terms of EBIT and EBITDA. These results imply that there is a positive payoff of family control on firm profitability. Regarding solidity, family firms are shown to have higher solidity than non-family, as oppose to the results of Table 8. This does likely indicate a greater preference towards control as well as risk-aversion among family firms. Finally, family firms are shown to have lower labor productivity

and lower unit labor costs while they are found to have higher capital intensity than non-family firms. The first two of these last three results do likely mirror each other. Theory tells us that there is a close relationship between productivity and labor compensation. Furthermore, theory argues that there is a tradeoff between concentration of ownership and productivity (e.g. Anderson and Reeb, 2003; Burkart et al., 1997). We should, therefore, expect family firms to be less productive based both on their ownership structure and their lower average labor costs.

In terms of capital intensity our results do, however, contradict previous literature in that family firms have been thought to have a lower capital intensity compared to other firms (Harris et al., 1994; Ward, 1997; Hamelin, 2013), whereas we find the opposite relationship. This result is somewhat puzzling and might be worthwhile to analyze in future research.[30]

We now turn to analyzing the characteristics and performance of family firms and non-family firms across size, as presented in Table 10.

[30] One issue to consider might be the influence on the result of specific capital legislation and accounting principles.

Table 10: A comparison of characteristics and economic performance of limited liability family and non-family firms (pooled OLS/median-/probit estimates) across size class (number of employed individuals), 2004-2010

Firm size	*Micro (0-9)*	*Small (10-49)*	Medium (50-249)	Large (≥ 250)
Dependent variable	Explanatory variable, family firm dummy			
Employment (log)	-0.491***	-0.123***	-0.090***	-0.182***
	(0.003)	(0.003)	(0.006)	(0.028)
Sales (log)	-0.707***	-0.331***	-0.267***	-0.215***
	(0.006)	(0.006)	(0.013)	(0.035)
Return on assets, EBIT (%)	4.894***	1.966***	1.848***	1.910***
	(0.080)	(0.099)	(0.206)	(0.571)
Return on assets, EBITDA (%)	3.623***	1.217***	1.297***	1.653***
	(0.073)	(0.091)	(0.189)	(0.573)
Solidity (%)	4.342***	-0.601***	0.731**	1.633*
	(0.157)	(0.176)	(0.345)	(0.972)
Labor productivity (log)	-0.129***	-0.158***	-0.129***	-0.104***
	(0.003)	(0.003)	(0.006)	(0.015)
Physical capital intensity (log)	0.200***	0.133***	-0.094***	0.077*
	(0.010)	(0.012)	(0.022)	(0.047)
Skill intensity	-5.092***	-4.974***	-3.778***	-2.138***
	(0.136)	(0.110)	(0.197)	(0.451)
Unit labor cost (log)	-0.172***	-0.149***	-0.105***	-0.079***
	(0.002)	(0.002)	(0.003)	(0.009)
Being part of an MNE (1,0) *odds ratio*	0.243***	0.401***	0.517***	0.475***
	(0.000)	(0.000)	(0.034)	(0.099)
Being part of a corporation (1,0) *odds ratio*	0.325***	0.567***	0.599***	0.811
	(0.010)	(0.014)	(0.039)	(0.170)
Being an exporter (1,0) *odds ratio*	0.683***	0.643***	0.606***	0.606***
	(0.011)	(0.015)	(0.039)	(0.116)

Notes: Coefficients for all limited liability firms from two pooled robust OLS, seven quantile and two logit regressions of the dependent variable on the family firm dummy (1,0) and firm size (except in the first and second regression), 2 and 3-digit industry dummies (1,0) and year dummies (1,0). All continuous variables are in logs except for skill intensity. The last two variables MNE and Exporter are expressed in odds ratios.. Robust and clustered standard errors in parenthesis. For brevity, other coefficient estimates and statistics are omitted. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 10 shows that the differences between family firms and non-family firms among small (10-49 employees) and micro-sized firms (0-9 employees) are similar to that of the whole population. Family firms are, again, shown to be smaller than non-family firms in terms of employment and sales; although the discrepancy is seemingly lesser for small firms than for micro-sized firms. Family firms are furthermore shown to yield lower labor productivity, higher physical capital intensity, lower skill intensity and lower unit labor cost. Among small

firms, family firms are also shown to have lower solidity, whereas micro-, medium- and large-sized family firms display the opposite relationship. Lastly, family firms are, again, shown to be more profitable and less involved in multinational enterprises, enterprise groups and exports.

The relative characteristics of medium-sized family firms (50-249 employees) are similar to that of small and micro-sized family firms, although most discrepancies are seemingly lesser among medium-sized firms. Medium-sized family firms are, for example, shown to be more similar to non-family firms in terms of size, productivity, physical capital intensity and solidity.

Finally, large family firms ($\geq$ 250 employees) follow the same tendency as medium and small-sized family firms in that they are even less differentiated from non-family firms – suggesting that family control has a larger impact among smaller firms. Prominent, however, is the continued tendency for family firms to be smaller and more profitable than non-family firms.

Summarizing the results of Table 8 to 10, it seems that a prominent trait of family firms is that they are, on average, smaller than non-family firms. The differences are shown to be most significant among micro- and small-sized firms, where most firm characteristics seemingly converge across firm size, a result which is consistent with Habbershon (2006). Family firms are also shown to have both higher and lower solidity (micro-, medium- and large-sized firms versus small firms) while we, in opposite to previous literature, find them to be more profitable. They are furthermore shown to be less involved in exports, a result which is consistent with Westhead and Howorth (2006) and Fernandez and Nieto (2005; 2006). Finally, family firms are shown to rely less on formal education, perhaps suggesting that informal knowledge plays a greater role in family firms than in non-family firms, as discussed by Fiegener et al. (1996), Cabrera-Suárez et al. (2001), Sirmon and Hitt (2003) and Habbershon (2003).

We interpret our econometric results as qualified correlations rather than causal relations and as a first description of the population of domestic family firms which may guide later research. The results do, for example, suggest that family firms refrain from hiring as many employees as their non-family equivalents – a result which may be misleading from a policy perspective as the sheer number of employees does not necessarily reflect the full dynamics of employment. Our results do, for example, take no consideration as to the duration of each employment; where research such as Bjuggren (2015) finds that employment within family firms is less sensitive to short-term shocks – suggesting that family firms have a longer planning horizon in their employment decisions.

7. Concluding discussion

This paper suggests that family firms are the prevalent form of business: they employ one-third of the Swedish working population and generate an equivalent share of Swedish GDP. Our results thereby demonstrate the need for both knowledge and consideration of family dynamics among researchers and policy makers when designing measures aimed towards employment and economic growth. Although the economic significance of family firms has long been hypothesized, research has been limited by an inability to identify an entire population of family firms. Much of the previous family business research has, for example, been based on commercial data and has therefore been confined to public and/or listed limited liability firms. An exception, which is also most closely related to our study, is Bjuggren et al. (2011), who used total population data to identify family firms in Sweden. Our results are consistent with theirs, although higher in terms of the share of family firms' contribution to employment and GDP. This is likely because these authors were unable to study kinship for the entire population and therefore included a smaller range of family firms.

We contribute to the current literature by solving several methodological issues associated with identifying family firms and by establishing the first description of domiciled family firms across an entire economy. Our method has considerably greater range and precision than previous ones, as we use information on kinship, firm ownership and firm governance to identify family firms across the entire Swedish firm population using administrative data. Our approach is able to capture the dynamics between family and firm across all domiciled limited liability firms, partnerships and sole proprietorships, i.e., all legal forms that contain family firms, by definition. The method presented is general and can be applied to any administrative dataset containing similar information; we therefore hope that our results may guide future family business research both in Sweden and internationally. Moreover, our method grants compatibility across periods, indicating that the same method can be used to identify family firms for later years. This will render it possible to use register data to conduct long-term longitudinal studies across all domiciled family firms in the future.

By applying our method, we find that family firms yield lower wage costs per employee than private, domestically held non-family firms, the cause of which requires further research. Part of the explanation for this finding is likely because family firms are also found to have less formally educated personnel and to be less productive, thereby suggesting that family firms should have a lower general wage level. Due to the complexity of family firms, the explanation for their lower wage costs may also be due to more elusive mechanisms, such as to workers

accepting lower wages in return for implicit work protection or due to larger stocks of goodwill among family firms. The fact that family firms are less reliant on formal education also requires further attention; this could be due to spatial factors, in which family firms are more likely to survive and/or grow in sparse economic environments with low general levels of education, or to a higher dependence on tacit knowledge among family firms in order to develop and maintain their businesses. The characteristics of family and private non-family firms are generally found to converge with firm size. Consistent with previous literature, we find that family firms are, on average, smaller than private non-family firms in terms of employment and sales, even within size groups. We also find them to have higher solidity and to be more profitable. Moreover, the term 'family firm' is shown to contain a wide variety of entities, spanning from the smallest firms to the largest traded companies, and family firms are active in all industries, except when crowded out by government actors. Due to Sweden's large public sector, it is likely that family firms contribute even more in other countries. Finally, our results show that limited liability firms are the most economically interesting group among family firms because the bulk of economic activity occurs within them. Sole proprietorships and partnerships are still of significant interest, however, as they are likely to have unique family firm characteristics that set them apart from family controlled limited liability firms. We also find that sole proprietorships constitute a majority of all family firms and that they employ a noteworthy share of the working population.

In conclusion, our results emphasize the need for nuance in the discussion of family firms, an area in which the traditional rhetoric has been characterized by considering family firms as a homogenous group of small firms with no growth ambitions and low profitability. By contrast, our results suggest that family firms have similar growth potential to that of non-family firms. This is relevant for economic policy targeting growth as family firms are likely to require different types of growth policies than non-family firms. We therefore propose that policy makers and economists consider the specificities of family ownership, as this could significantly improve the efficiency and accuracy of economic policy. Moreover, we find that there are also significant differences among family firms. This suggests that researchers and policy makers must not only consider whether a firm is family controlled but also consider its size, industry and legal form. This may also explain why previous researchers have reached seemingly contradictory conclusions regarding the characteristics and performance of family firms.

For future research, we suggest two ways that our method can be improved: First, it would be desirable to develop a method to identify kinship structures across countries that

would, by extension, make it possible to identify foreign-controlled family firms. As our study considers only domiciled family firms, its results can be considered a lower bound in terms of the economic contribution of family firms because we exclude those owned by foreigners and Swedish family firms that are owned from abroad. Second, it would be important to further differentiate among family firms to identify entrepreneurial family firms, i.e., those that are innovative, have growth ambitions and are driven by profit motive. This approach has the potential to increase our understanding of family firm growth and consequently the driving forces of the overall economy.

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Appendix A

Table A.1: Included variables

Variable	Definition
Employment	Number of employees by November 30th
Sales *	Sales by December 31, Swedish Krona (SEK)
Return on assets (EBIT) *	Earnings before interest and taxes in share of total assets
Return on assets (EBITDA) *	Earnings before interest, taxes, deductions and amortizations in share of total assets[31]
Financial solidity *	Total equity in share of total assets
Labor productivity	Value added by December 31 per employee by November 30th
Physical capital intensity *	Physical capital by December 31 per employee by November 30th
Skill intensity	Share of employees by November 30th who have completed at least two years of tertiary education
Unit labor cost *	Total wage bill by December 31 per employee by November 30th
Being part of enterprise group	Binary variable indicating 1 if a firm is part of an enterprise group, 0 otherwise
Being part of an MNE	Binary variable indicating 1 if a firm is part of a multinational enterprise, 0 otherwise
Being an exporter	Binary variable indicating 1 if a firm has participated in exports during the year, 0 otherwise.
Firm age	Firm age according to registers (current year – birth year)**
Industry	Three digit industry dummy (NACE rev. 1.1)
Year	Year dummy

Notes: * Limited liability firms only. ** All firms founded before 1900 are denoted as being founded 1900-01-01; all other firms are denoted according to their actual age.

[31] As used by Anderson and Reeb (2003), Sraer and Thesmar (2007) and Andres (2008). EBIT and EBITDA are chosen over measures such as Tobin's q as firm market value is not presented for non-listed firms.

Appendix B

Table B.1: Family firm characteristics mean, median, min, max, standard deviation), limited liability firms, partnerships and sole proprietorships in 2010

Characteristic	Limited liability firms					Partnerships				
	Mean	Median	Min	Max	SD	Mean	Median	Min	Max	SD
Age	12	10	0	38	10	11	9	0	110	9
Being an exporter (1,0) (%)	24	0	0	100	43	16	0	0	100	37
Being part of a corporation (1,0) (%)	22	0	0	100	41	2	0	0	100	12
Being part of an MNE (1,0) (%)	3	0	0	100	16	0	0	0	100	3
Employment	8	3	0	8119	52	2	1	0	2,195	18
Exports	1,638	0	-2,208	7,210,000	46,400	62	0	-22	275,000	2,047
Labor productivity	545	443	-36,100	148,000	796	273	220	-5,690	32,400	435
Physical capital intensity	515	34	-126	1,680,000	5,674	-	-	-	-	-
Return on assets, EBIT (%)	3	7	-352,338	8,572	921	-	-	-	-	-
Return on assets, EBITDA (%)	7	12	-340,955	9,706	892	-	-	-	-	-
Sales	11	3	0	7,710	57	2	1	0	799	9
Skill intensity (%)	30	8	0	100	38	29	0	0	100	42
Solidity (%)	96	100	0	100	20	-	-	-	-	-
Unit labor cost	284	263	-1,331	18,700	198	-	-	-	-	-
Value added	3,526	1,254	-144,000	1,120,000	12,800	718	369	-11,700	493,000	4,385

Notes: Sales are reported in millions of Swedish Krona (SEK), all other monetary values are reported in thousands of SEK. Human capital per employee is defined as the share of employees who have completed at least two years of tertiary education. Returns on assets are not reported for sole proprietorships and partnerships as these firms have little or no capital.

Table B.1 continued: Family firm characteristics mean, median, min, max, standard deviation), limited liability firms, partnerships and sole proprietorships in 2010

Characteristic	Sole proprietorships					Total				
	Mean	Median	Min	Max	SD	Mean	Median	Min	Max	SD
Age	9	7	0	38	9	10	8	0	110	9
Being an exporter (1,0) (%)	13	0	0	100	34	18	0	0	100	38
Being part of a corporation (1,0) (%)	0	0	0	0	0	9	0	0	100	29
Being part of an MNE (1,0) (%)	0	0	0	0	0	1	0	0	100	10
Employment	1	1	0	100	1	4	1	0	8,119	34
Exports	14	0	-284	49,500	259	689	0	-2,208	7,210,000	29,800
Labor productivity	313	234	-8,824	92,400	551	412	327	-36,100	148,000	674
Physical capital intensity	-	-	-	-	-	790	19	0	326,000	7,602
Return on assets, EBIT (%)	-	-	-	-	-	0	5	-6,031	3,207	92
Return on assets, EBITDA (%)	-	-	-	-	-	4	9	-5,537	3,753	95
Sales	1	1	0	170	2	6	1	0	7,710	38
Skill intensity (%)	28	0	0	100	44	29	0	0	100	42
Solidity (%)	-	-	-	-	-	97	100	0	100	17
Unit labor cost	-	-	-	-	-	369	326	-212	10,300	318
Value added	404	258	-8,824	92,400	744	1,791	491	-144,000	1,120,000	8,663

Notes: Sales are reported in millions of Swedish Krona (SEK), all other monetary values are reported in thousands of SEK. Human capital per employee is defined as the share of employees who have completed at least two years of tertiary education. Returns on assets are not reported for sole proprietorships and partnerships as these firms have little or no capital.

Table B.2: Private domestic, non-family firm characteristics and performance (means, medians, min, max, standard deviations), limited liability firms and partnerships in 2010

Characteristic	Limited liability firms					Partnerships				
	Mean	Median	Min	Max	SD	Mean	Median	Min	Max	SD
Age	11	8	0	38	10	8	5	0	38	8
Being an exporter (1,0) (%)	42	0	0	100	49	20	0	0	100	40
Being part of a corporation (1,0) (%)	56	100	0	100	50	5	0	0	100	21
Being part of an MNE (1,0) (%)	16	0	0	100	36	1	0	0	100	10
Employment	36	7	0	17,682	280	6	2	0	1,643	51
Exports	29,700	0	-10,300	104,000,000	940,000	902	0	-32	778,000	18,700
Labor productivity	601	511	-75,000	139,000	2,074	768	338	-7,788	99,600	3,925
Physical capital intensity	790	19	0	326,000	7,602	1,693	18	-	-	-
Return on assets, EBIT (%)	0	5	-6,031	3,207	92	-8,133	34	-	-	-
Return on assets, EBITDA (%)	4	9	-5,537	3,753	95	-8,126	40	-	-	-
Sales	43	10	0	5,610	153	10	2	0	1,000	45
Skill intensity (%)	44	40	0	100	36	31	0	0	100	39
Solidity (%)	97	100	0	100	17	-	-	-	-	-
Unit labor cost	369	326	-212	10,300	318	-	-	-	-	-
Value added	12,400	3,944	-841,000	808,000	36,200	4,412	891	-148,000	479,000	22,000

Notes: Sales are reported in millions of Swedish Krona (SEK), all other monetary values are reported in thousands of SEK. Human capital per employee is defined as the share of employees who have completed at least two years of tertiary education. Returns on assets are not reported for sole proprietorships and partnerships as these firms have little or no capital.

Table B.2 continued: Private domestic, non-family firm characteristics and performance (means, medians, min, max, standard deviations), limited liability firms and partnerships in 2010

Characteristic	Total				
	Mean	Median	Min	Max	SD
Age	11	8	0	38	10
Being an exporter (1,0) (%)	40	0	0	100	49
Being part of a corporation (1,0) (%)	50	0	0	100	50
Being part of an MNE (1,0) (%)	14	0	0	100	35
Employment	32	6	0	17,682	263
Exports	26,400	0	-10,300	104,000,000	884,000
Labor productivity	619	496	-75,000	139,000	2,348
Physical capital intensity	790	19	0	326,000	7,602
Return on assets, EBIT (%)	0	5	-6,031	3,207	92
Return on assets, EBITDA (%)	4	9	-5,537	3,753	95
Sales	39	8	0	5,610	146
Skill intensity (%)	43	35	0	100	37
Solidity (%)	97	100	0	100	17
Unit labor cost	369	326	-212	10,300	318
Value added	11,600	3,407	-841,000	808,000	35,100

Notes: Sales are reported in millions of Swedish Krona (SEK), all other monetary values are reported in thousands of SEK. Human capital per employee is defined as the share of employees who have completed at least two years of tertiary education. Returns on assets are not reported for sole proprietorships and partnerships as these firms have little or no capital.

Table B.3: Foreign, non-family firm characteristics (means, medians, min, max, standard deviations), limited liability firms, partnerships and sole proprietorships in 2010

Characteristic	Limited liability firms					Partnerships				
	Mean	Median	Min	Max	SD	Mean	Median	Min	Max	SD
Age	15	12	0	38	11	12	9	0	34	8
Being an exporter (1,0) (%)	74	100	0	100	44	41	0	0	100	50
Being part of a corporation (1,0) (%)	97	100	0	100	16	85	100	0	100	36
Being part of an MNE (1,0) (%)	98	100	0	100	14	80	100	0	100	40
Employment	89	15	0	14,053	403	65	8	1	1,456	233
Exports	116,000	2,391	-28,600	67,900,000	1,420,000	5,094	0	0	80,400	15,000
Labor productivity	970	694	-29,200	91,400	2,640	2,005	646	-688	18,600	3,916
Physical capital intensity	1,613	31	0	793,000	18,700	-	-	-	-	-
Return on assets, EBIT (%)	-3	5	-8,834	871	147	-	-	-	-	-
Return on assets, EBITDA (%)	1	8	-8,834	871	145	-	-	-	-	-
Sales	152	37	0	14,000	460	90	17	0	847	188
Skill intensity (%)	43	38	0	100	31	32	20	0	100	34
Solidity (%)	97	100	0	100	17	-	-	-	-	-
Unit labor cost	487	403	-223	9,433	433	-	-	-	-	-
Value added	34,600	10,100	-146,000	1,060,000	72,600	21,900	5,712	-825	223,000	42,700

Notes: Sales are reported in millions of Swedish Krona (SEK), all other monetary values are reported in thousands of SEK. Human capital per employee is defined as the share of employees who have completed at least two years of tertiary education. Returns on assets are not reported for sole proprietorships and partnerships as these firms have little or no capital.

Table B.3 continued: Foreign, non-family firm characteristics (means, medians, min, max, standard deviations), limited liability firms, partnerships and sole proprietorships in 2010

Characteristic	Sole proprietorships					Total				
	Mean	Median	Min	Max	SD	Mean	Median	Min	Max	SD
Age	-	-	-	-	-	14	12	0	38	11
Being an exporter (1,0) (%)	63	100	0	100	50	74	100	0	100	44
Being part of a corporation (1,0) (%)	0	0	0	0	0	97	100	0	100	17
Being part of an MNE (1,0) (%)	0	0	0	0	0	98	100	0	100	15
Employment	0	0	0	0	0	88	15	0	14,053	402
Exports	0	0	0	0	0	115,000	2,300	-28,600	67,900,000	1,420,000
Labor productivity	-	-	-	-	-	975	694	-29,200	91,400	2,649
Physical capital intensity	-	-	-	-	-	1,613	31	0	793,000	18,700
Return on assets, EBIT (%)	-	-	-	-	-	-3	5	-8,834	871	147
Return on assets, EBITDA (%)	-	-	-	-	-	1	8	-8,834	871	145
Sales	-	-	-	-	-	152	37	0	14,000	459
Skill intensity (%)	42	34	0	100	30	43	38	0	100	31
Solidity (%)	-	-	-	-	-	97	100	0	100	17
Unit labor cost	-	-	-	-	-	487	403	-223	9,433	433
Value added	-	-	-	-	-	34,600	10,100	-146,000	1,060,000	72,400

Notes: Sales are reported in millions of Swedish Krona (SEK), all other monetary values are reported in thousands of SEK. Human capital per employee is defined as the share of employees who have completed at least two years of tertiary education. Returns on assets are not reported for sole proprietorships and partnerships as these firms have little or no capital.

Table B.4: Government owned firm characteristics (means, medians, min, max, standard deviations), limited liability firms and partnerships in 2010

Characteristic	Limited liability firms					Partnerships				
	Mean	Median	Min	Max	SD	Mean	Median	Min	Max	SD
Age	18	15	0	38	11	12	12	4	19	5
Being an exporter (1,0) (%)	23	0	0	100	42	17	0	0	100	41
Being part of a corporation (1,0) (%)	91	100	0	100	29	67	100	0	100	52
Being part of an MNE (1,0) (%)	16	0	0	100	36	0	0	0	0	0
Employment	138	21	1	20,272	846	136	33	1	640	250
Exports	26,500	0	-32	19,900,000	551,000	97	0	0	581	237
Labor productivity	1,416	895	-11,700	77,200	3,151	580	623	40	1,160	405
Physical capital intensity	12,100	2,448	0	415,000	27,900	-	-	-	-	-
Return on assets, EBIT (%)	-3	3	-762	112	43	-	-	-	-	-
Return on assets, EBITDA (%)	1	6	-744	112	41	-	-	-	-	-
Sales	165	55	0	6,650	363	33	13	4	111	45
Skill intensity (%)	42	34	0	100	30	30	33	0	46	16
Solidity (%)	99	100	0	100	8	-	-	-	-	-
Unit labor cost	377	353	-2	4,791	222	-	-	-	-	-
Value added	51,200	20,800	-150,000	1,580,000	95,000	21,100	12,200	121	69,200	28,400

Notes: Sales are reported in millions of Swedish Krona (SEK), all other monetary values are reported in thousands of SEK. Human capital per employee is defined as the share of employees who have completed at least two years of tertiary education. Returns on assets are not reported for partnerships as these firms have little or no capital.

Table B.4 continued: Government owned firm characteristics (means, medians, min, max, standard deviations), limited liability firms and partnerships in 2010

Characteristic	Total				
	Mean	Median	Min	Max	SD
Age	18	15	0	38	11
Being an exporter (1,0) (%)	23	0	0	100	42
Being part of a corporation (1,0) (%)	91	100	0	100	29
Being part of an MNE (1,0) (%)	16	0	0	100	36
Employment	138	21	1	20,272	844
Exports	26,400	0	-32	19,900,000	550,000
Labor productivity	1,413	893	-11,700	77,200	3,145
Physical capital intensity	12,100	2,448	0	415,000	27,900
Return on assets, EBIT (%)	-3	3	-762	112	43
Return on assets, EBITDA (%)	1	6	-744	112	41
Sales	165	55	0	6,650	362
Skill intensity (%)	42	34	0	100	30
Solidity (%)	99	100	0	100	8
Unit labor cost	377	353	-2	4,791	222
Value added	51,100	20,800	-150,000	1,580,000	94,800

Notes: Sales are reported in millions of Swedish Krona (SEK), all other monetary values are reported in thousands of SEK. Human capital per employee is defined as the share of employees who have completed at least two years of tertiary education. Returns on assets are not reported for partnerships as these firms have little or no capital.

Appendix C

Table C.1: A comparison of characteristics and economic performance across all family and non-family firms (pooled OLS/median/logistic estimates) across size class (number of employed individuals), 2004-2010

Firm size	*All*	*0-9*	*10-49*	50-249	≥ 250
Dependent variable	Explanatory variable, family firm dummy				
Employment (log)	-0.182***	-0.426***	-0.151***	-0.135***	-0.203***
	(0.004)	(0.002)	(0.002)	(0.005)	(0.022)
Sales (log)	-1.562***	-0.866***	-0.457***	-0.376***	-0.205***
	(0.005)	(0.005)	(0.005)	(0.010)	(0.027)
Return on assets, EBIT (%)	2.731***	3.623***	1.217***	1.297***	1.653***
	(0.056)	(0.073)	(0.09)	(0.189)	(0.573)
Return on assets, EBITDA (%)	3.753***	4.894***	1.966***	1.848***	1.910***
	(0.061)	(0.080)	(0.099)	(0.206)	(0.571)
Solidity (%)	2.805***	4.342***	-0.601***	0.731**	1.633*
	(0.117)	(0.157)	(0.176)	(0.345)	(0.972)
Labor productivity (log)	-0.235***	-0.251***	-0.213***	-0.163***	-0.088***
	(0.002)	(0.003)	(0.003)	(0.005)	(0.013)
Physical capital intensity (log)	0.040***	0.052***	0.036***	-0.193***	-0.073*
	(0.007)	(0.009)	(0.010)	(0.017)	(0.042)
Skill intensity	-4.750***	-4.530***	-5.587***	-4.072***	-1.012***
	(0.074)	(0.108)	(0.092)	(0.148)	(0.331)
Unit labor cost (log)	-0.156***	-0.172***	-0.149***	-0.105***	-0.079***
	(0.002)	(0.002)	(0.002)	(0.003)	(0.009)
Being part of an MNE (1,0) *odds ratio*	0.077***	0.042***	0.129***	0.192***	0.322***
	(0.002)	(0.001)	(0.004)	(0.011)	(0.048)
Being part of a corporation (1,0) *odds ratio*	0.233***	0.186***	0.357***	0.362***	0.620**
	(0.003)	(0.003)	(0.008)	(0.022)	(0.140)
Being an exporter (1,0) *odds ratio*	0.633***	0.657***	0.601***	0.652***	0.718**
	(0.007)	(0.009)	(0.014)	(0.034)	(0.103)

Notes: Coefficients for all limited liability firms from two pooled OLS, seven quantile and two probit regressions of the dependent variable on the family firm dummy (1,0) and firm size (except in the first and second regression), 2 and 3-digit industry dummies (1,0) and year dummies (1,0). All continuous variables are in logs except for skill intensity. The last two variables MNE and Exporter are expressed in odds ratios.. Robust and clustered standard errors in parenthesis. For brevity, other coefficient estimates and statistics are omitted. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Appendix D

When estimating the economic contribution of family firms to gross domestic product (GDP), we use a multiple-stage approach. Official GDP estimates are produced by Statistics Sweden and based on assumptions and weighting and do therefore not equal the sum of value added at the micro-level. Therefore, in order to yield comparability, we have used data from official GDP estimates by Statistics Sweden (2014). The problem of estimating family firm contribution towards GDP consists of two fundamental problems:

1. Government organizations do not report value added

2. Statistics Sweden does not have access to financial variables for financial firms and we can therefore not calculate value added for financial firms

Statistics Sweden do, however, produce official estimates of government and financial sector GDP, which have been used. As we do not have firm level information of the required variables to calculate value added for financial firms, we have chosen to treat all financial sector output as non-family generated. Our estimate hence contains non-financial family firm GDP only. We have then estimated the GDP generated by private-nonfinancial firms by subtracting all GDP stemming from the government and financial sector. Formally:

$$GDP_{2010} - (GDP_{public\ sector} + GDP_{financial\ sector}) = GDP_{private,non-financial}$$

Our calculations yield that the private, non-financial sector produces approximately 68 percent of Swedish GDP in 2010.

We then assume that all GDP generated in the private and non-financial sector is distributed in the same way as value added across firms at the micro-level. Thereby, we calculate the share of family firm contribution towards private, non-financial sector GDP using their share of micro-level value added, formally:

$$GDP_{family} = \left(\frac{Value\ added_{family}}{Value\ added_{non-family} + Value\ added_{family}}\right) * GDP_{private,non-financial}$$

Our calculations yield that family firms produce approximately 56.9 percent of all value added in the private, non-financial sector; corresponding to approximately 38.7 percent of Swedish GDP in 2010.