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Family Firms, Do They Grow Slower Than Non-Family Firms?

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Summary

This study seeks to answer whether family firms grow slower than non-family firms in Norway, and if family firm's inherent characteristics explains differing growth. Our research analyses four different measurements of growth: Sales, Operating income, Total assets and Wage. Out of 12 industries, we find that family firms grow slower in 6 industries, but quicker in 2 industries. Our tests show that none of the following explains the differing growth: risk aversion, lack of business planning or family ties over professionalism. Lastly, we also discuss possible reasons for different growth scenarios across industries.

1. Introduction

Family firms (FF) accounts for a large fraction of firms all over the world (Burkart et. al. 2003). Many famous international companies are family controlled, such as Audi, Walmart, Fort motors amongst others. The culture of family firms is especially strong in Western-Europe, where the majority of firms are family controlled (Faccio et. al. 2002). Knowing that FFs are a large bulk of firms in Norway, and that FFs and non-family firms (NFFs) are believed to be different, makes it interesting to study. Previous research and findings address the growth and possible reasons to why they think FFs grow slower. However, actual testing of the matter and comparing the growth rate between FFs and NFF has not been done. Hence, this study aims to investigate the growth rate of both FFs and NFFs in Norway, more specifically, the growth rate between the two types of companies will be compared.

We know that FFs and NFFs are inherently different, with characteristics such as: FFs want to keep control over the company and keep the company within the family for many generations. These characteristics have ripple effects to factors that might lead to slower growth.

Firstly, studies have suggested that FFs grow slower due to the assumption of higher risk aversion for such companies (Nordqvist et al. 2007). Since family owners tend to have a large proportion of their personal wealth invested in the company, it renders them more affected by the company's idiosyncratic risk. Managers in NFFs however, are more diversified with their personal wealth, thus the NFF can afford to take more risk than FFs.

If FFs have higher risk aversion, it should show through their capital structure, by having less leverage as suggested by previous literature (Villalonga et. al. 2017; Mishra and McConaughy 1999).

Secondly, the desire to keep control in the family might also include the control of information and the future plans of the business. FFs tend to plan less for the future than NFFs and it might affect growth negatively (Andersen.1997); (Upton, Teal, & Felan, 2001); Rue & Ibrahim 1998)

Thirdly, wanting the company to remain in the family for generations to come, FFs may choose managers that are within the family. The fact that family ties often are

preferred over professional expertise is a promising argument for slower growth in FFs (Sirmon & Hitt, 2003; Burkart, panunzi & schleifer, 2003)
Lastly, we introduce agency theory, where disputes among principal and agents as well as disputes among family members within the company might hinder growth (Jensen & Meckling, 1976; Nordqvist et al., 2008).

As implied by previous research, FFs should grow slower than NFFs. It will be very interesting to see whether this is indeed true. In addition, we are also interested in analysing and finding out what possible reasons might cause the different growth rate between the two types of companies, such as risk aversion, capital structure, governance and business planning. In total, we have 25 653 companies in across 12 industries, where 8 254 are NFFs and 17 399 are FFs. We found FFs and NFFs are different in leverage, total investments and R&D in most of the industries. Further, we found FFs grow slower than NFFs in 6 industries, quicker in 2 industries, and not significantly different from NFFs in the remaining 4 industries. However, differences in leverage, total investments and R&D are not found to fully explain the differences in growth between FFs and NFFs. These results infer that other factors such as agency theory might be the reason. In addition, since the results vary from industries to industries, we discuss some possible reasons that cause the differences across industries. Lastly, we address some of limitations and possible endogeneity problem in our study.

2. Theory

There are various aspects that affect firm growth. Known variables such as size, age of company and industry will be discussed further in the methodology section. In addition, it is presumed that capital structure, will have an impact on growth, discussion of this presumption will follow in theory and literature section. FFs and NFFs might have differences due to their respective inherent characteristics, which might cause them grow differently.
Thus, in this section, we want to discuss the differences between FFs and NFFs, in order to see what can be tested in our empirical research.

2.1 Different characteristics

FFs do have certain characteristics which define them and distinguish them from NFFs, such as 1) FF want to keep control of the company; 2) FF want to keep the business in the family for many generations.

These inherent characteristics mentioned above, lead to the belief that FF are more risk averse than NFF. Risk aversion might be shown by FFs choice in capital structure. Although studies are not unanimous whether FFs has different capital structure than NFFs, there are evidence of it.

1) Debt: Some researchers state that FFs use less leverage (Villalonga et. al. 2017), which has also been found empirically (Mishra & McConaughy, 1999). Increasing debt would heighten the risk of bankruptcy and therefore impose the risk of losing the company. This risk aversion might cause FF to be more reluctant to debt, which potentially could be the reason for slower growth. Leverage creates risk which yields a higher ROE. It is then reasonable to presume that firms with leverage would have higher return than those without leverage. Higher return over time would suggest higher growth.

2) Equity: The unwillingness to dilute family ownership (Sirmon & Hitt 2003) by turning to outside investors may result in inefficient resource management when often outside investors have more knowledge in certain growth opportunities. Most FFs have a socioeconomic point of view, e.g. legacy, which could translate into somewhat of a pride in accomplishing growth and prosperity without external help. This has been confirmed by Croce & Marti (2016), that FF rarely use private equity (PE).
   In addition, when owners outside the family are involved, firm's strategy would be more objectively analysed, thereby increasing the likelihood of successful growth. However, family firms often rely solely on manager's/owner's own gut-feeling, creating one-sided perspective towards growth opportunities. Thus, it can be stated that external investors function as information producers, and are likely to guide the growth of the company.

Debt holds the risk of financial distress and possible bankruptcy, whilst equity poses the greatest risk as it immediately disperses control. Therefore, FF might choose a capital structure with less debt and equity than NFF, possibly leading to slower growth for FFs.

Because these family characteristics create differences in leverage and external capital, most research seem to infer that it indicates slower growth for family firms. However, empirical research on this topic is scarce. If it is true that FF possess aversion towards losing control and rely solely on retained earnings to grow, this would function as a capital constraint. Thus, it is highly likely that FF grow slower than NFF. Our study will therefore try to unveil the growth of FFs, and if it is the fact that FFs grow slower than NFFs.

2.2 Agency theory

There are three types of agency problems we believe will affect growth in FFs and NFFs: owner and management; shareholders and creditors; majority and minority owner (Jensen & Meckling, 1976). We will discuss each, and assess which affect

NFFs or FFs growth. We also introduce another possible conflict between active and non-active family members (Nordqvist et al. 2008).

Agency theory 1

The first possible agent-principal conflict is between owner and manager. It does not apply to FFs since the owner most often also is the manager, no possible conflict could emerge. However, for NFFs the conflict is often present. One common problem is the incentive for the manager in NFF to invest in negative NPV projects, growing beyond what is profitable to extend his power. (Jensen, 1986) suggests issuing debt to overcome this problem, which is known as the Free cash flow (FCF) theory. By issuing debt, a commitment to the debt holders forces the manager to invest in profitable projects, rather than negative NPV projects. Previously, part of FCF were used to give out dividends, however the commitment is not equally strong to issuing debt, as dividends can be altered.

Debt can be seen as a proxy for investment opportunities for NFF, high debt indicates low FCF and profitable investment opportunities. Low debt indicates high FCF and higher agency cost, suggesting poor investment opportunities.

Reasonably, we can then expect NFFs to have higher debt and thus grow quicker than FFs.

Agency theory 2

The possible conflict between shareholders and creditors are mainly due to lack of transparency from FFs. As covered by our discussion on risk aversion, FF wish to keep information and control within the family. Creditors want information on investment prospects, otherwise they are reluctant to invest. Hence this problem rarely arises in FFs, since they are believed to shy away from outside shareholders.

Agency theory 3

The third known conflict that might hinder growth, is between majority owner (owner-manager) and minority owners. The conflict is that majority owner draws out perquisites at the expense of minority owners. When majority owner draws out private benefits, minority owners must impose monitoring costs so that afflicting interests becomes aligned. Furthermore, Jensen & Meckling (1976) claims that “as the manager’s ownership claim falls, his incentive to devote significant effort to creative activities such as searching out new profitable ventures falls.”. Both points

suggest that the conflict between majority and minorities, as well as the proportion of ownership will have an impact on growth. However, Thomsen and Pedersen (2000) found in an empirical study that ownership share is not correlated with growth (sales). ROA is significantly negatively correlated with ownership share. Further controlling for ownership status, such as family, nonfinancial company, banks and institutions, they found that family firms and nonfinancial company owners have higher sales growth than institutional, banks and government owners. This seems to be in line with the interpretation that NFF tend to have more emphasis on shareholder value, as for FFs, they tend to be more concerned about the growth and survival of the firm. Their findings then suggest that family firms will actually grow faster than nonfamily firms. The idea is further strengthened by the agency problem theory, where managers have incentive to grow beyond what is profitable (Jensen, 1986) since this gives them more resources under their control. With family firms, the manager is also the owner and there is therefore no conflict of interest on the matter. One might deduce that this desire to grow is not hindered by owners wanting to maximize profits.

Agency theory 4

A reason that FF might grow slower could be the conflict between active family members and non-active family members. Active family members care about the future growth of the firms, whereas non-active family members focus more on their personal interests, such as dividends that might sacrifice the benefits of the company growth (Nordqvist et al., 2008).

As we can see through the theory, FFs characteristics and their risk aversion might induce them to choose less debt and external equity. If it is true, less debt and external equity would be a capital constraint hindering growth. On the other hand, agency theory does not give a clear answer regarding growth. FFs might grow slower or faster than NFFs depending on the type of agent problem. To further assess growth between FF and NFF, previous studies on the topic will be discussed.

3. Literature review

FFs and NFFs has long been an interesting part of corporate finance. There are a lot of research comparing performance between the two types of firms, but one issue that is yet to be raised and studied is to compare the growth between them. Even though few researchers test empirically the growth rate of FFs and NFFs, some studies present factors that would affect FFs' and NFFs' growth rates differently. In this section, we list five main reasons that are mostly discussed in previous literature.

3.1 Financing, Leverage

Different debt level for FF and NFF

Previous research paper has found that FFs have less debt than NFFs, based on two different reasons.

Firstly, debt increases the risk of bankruptcy and therefore increases the risk of losing the company (Mishra & McConaughy, 1999). FF owners normally invest a big proportion of their personal wealth in the company, which explains their risk aversion towards debt. Further evidence for FFs' avoidance from the usage of LD (long term debt) has empirically been found by Agrawal & Nagarajan (1990). Their argument suggests that increasing debt increases the risk of their personal wealth, i.e. the company, which FFs wants to retain throughout generations.

Secondly, the FCF theory (Jensen, 1986) is one factor pro higher leverage in NFF, it states that debt is taken to mitigate the agency problem of managers' overinvestment and unprofitable growth. FF does not encounter the agency problem since they work as agent and principal, thus the theory does not apply.
This explains why NFFs might have higher leverage than FFs.

We then need to assess if leverage is empirically found to affect growth, in order to see whether different capital structure can cause different growth in FF and NFF.

Relation between leverage and growth

In an empirical analysis of financial factors affecting growth, Huynh & Petrunia (2010) found a significant positive correlation between leverage and sales growth. Interestingly, they also found that the proportion of debt decreases as the firm ages, but leverage does not affect the negative relationship between age and growth. The findings then tell us that leverage has a positive impact on growth in young firms, but as the company ages, the effect leverage has on growth declines.

However, debt has also been empirically found to be negatively related to growth in net investment, employees and capital expenditure (Lang, Ofek, & Stulz, 1996). In addition, others have empirically found that leverage is negatively related to investment (Aivazian, Ge, & Qiu, 2005) and in order to grow, firms need to invest. To make sure the results are not biased, i.e. that the companies are affected by bad investment opportunities, they also tested companies with good investment opportunities. The same relation, though not as strong, holds for companies with good investment opportunities.

These perspectives on leverage constructs a dissonance in results. On one side leverage is well known to create more risk, and found empirically to positively affect growth. On the other side, debt has also been empirically found to hinder growth on certain areas. Given that the growth rate of FFs and NFFs are not certain according to abovementioned factors, we will test to see whether leverage affects firm growth and if leverage differs between FFs and NFFs.

3.2 External financing

Another way to raise capital where FF and NFF are of contrast, is their attitude towards external finance. In an article by Croce and Marti (2016), they address FFs' reluctance towards private equity(PE). The reason is that Socioeconomic wealth (SEW) is of major importance for FFs and is only put aside when the company needs help to survive. SEW is a name for typical FF attributes, such as the wish to keep control in the family, social ties over professionalism and otherwise legacy. Thus, to protect their interest of staying in control, FFs are reluctant towards PE.

However, they believe that when FFs are in financial distress, they are more willing to turn to PE. In their paper, they found that when growth in sales are significantly slower than the growth of investment, and when cash flow and profits are low (they are financially constrained), FFs tend to turn to PE for help. It is also uncovered in the article that young FFs who turn to PE would increase their growth, and to the point that they have higher growth than comparable FFs who do not.
From the paper, we can infer that it might be beneficial to use PE or otherwise external finance to aid growth, however FFs' are unenthusiastic as they wish to stay in control.

3.3 Family ties over professionalism

Burkart et. al. (2003) discuss the problems arising from the family founders' succession. They assume that a professional manager is better than an heir at managing the firm, and give evidence of declining ROA of 16% if heir is the successor, 25% if compared with companies where the successor is a professional manager. Only about 1/3 of family firms are run by their founders, the remaining 2/3 are either run by descendants or bought through acquisition.

The fact is that family ties are often chosen over expertise, which will discourage superior employees from ever seeking employment (Sirmon & Hitt, 2003), reasonably this could hinder growth by having less qualified human capital. Additionally, they argue that the founders rational are often originated by the legislation, which provide safety for shareholders. If the law provides low safety, the professional successor could potentially draw private benefits out of the company. In this case the family founder would choose family ties rather than professional managers, to keep control and the benefits to him- or herself. They further state that this low protection from law occurs in OECD countries i.e. Norway. If this fact is indeed true, it reveals two important prospects of Norwegian FFs: 1. Family ties are often chosen over expertise; 2. equity for investors is not preferable since lower investor protection from legislation decreases valuation of shares. That hinders growth on two important areas, expertise and the capital raised to invest in positive NPV projects.
Whether a FF has a family CEO or a professional CEO is therefore an explanatory variable we want to test empirically.

3.4 Business planning

Known from previous research FFs generally lack planning and the inclusion of board members in business plans (Andersen. 1997). An explanation for this lack of planning, is the FFs' preference towards privacy and keeping information within the family, which is also consistent to what we discussed above.

However, a qualitative research underwent by Upton, Teal & Felan (2001) on high growth FFs, might infer that FFs' lack of planning and reluctance to share information with board members would hinder growth. Those FFs in their sample grow faster than 80% of firms in United states, and their average growth rate is as high as 92%. There are 65 high growth FFs in total, of which 70% planned for growth, almost 40% included board members in said planning, 50% shared information regarding the growth plans with their employees monthly. This is further supported by Rue & Ibrahim (1998), that FFs who have high-level business planning, the majority of them (54%) perform better than the industry average. Thus, we want to test empirically whether planning affects growth.

3.5 Competitive advantage - Agency theory

FFs may grow quicker than NFFs, due to possible competitive advantages.

Agency theory and its effect on growth has been discussed in our theory section. Here we will mention the potential competitive advantage, that arise from fewer agency problems, since owner and manager often are the same person in FFs. One competitive advantage of FFs is that they are flexible and quick in decision making. The flexibility and quickness stems from the possibility to keep information excluded from external shareholders, and thus owners of FFs can act more freely on their own intuition.

Human and social capital are two other factors that might help FF grow (Sirmon & Hitt, 2003). Human capital is the value that are created by a high-quality workforce. Employees working in FFs may have higher commitment to the company, than those working in NFFs. It could be especially beneficial in low-cost industries, where family ties are more concerned of the overall family wealth and the firms' success, than their individual wealth.

The relationship with business partners are possibly very valuable, if the firm can rely more heavily on business partners than comparable firms, this is a competitive advantage. If the relationship is considered of economic value, it is called social capital. For NFFs, outside owners are more concerned of profit maximisation than building strong relationships, versus FFs that might prefer the one that yields higher social capital. FFs benefits from less transparency, as they may choose more freely business accomplices and build networks based on personal relations. Such relationships are mutual beneficial and may be a factor that makes FFs more stable and grow consistently.

The abovementioned FF traits may be an important factor for growth.

However, there seem to be a dissonance, whether or not FF poses competitive advantages (Carney, 2005). The FFs structure allows them to allocate resources swiftly to any investment they see fit. This might be a positive attribute towards first-mover advantage and the possibility to cease growth-opportunities in the bud. However, by not discussing projects with board members or external shareholders, the perception of risk in a project becomes one-sided and possibly biased.

The majority of papers have economically reasonable arguments as to why FFs grow slower. The reluctance to debt and outside capital, reluctance to plan and the interesting fact that professionalism is not sought after are all promising arguments for a slower growth. However, considering that FFs might have traits that yields a competitive advantage over NFFs, the findings are not homogenous towards slower growth for FFs. Hence, this is our motivation for our thesis, testing the growth empirically, to resolve and understand which effect dominates.

4. Hypothesis

As discussed in theory, we believe there are several differences between FFs and NFFs. Unfortunately, some of the variables cannot be measured and accessed in our data, such as agency problems, human capital and social capital. However, for the other factors, such as risk aversion, planning and family ties over professionalism, we can find variables in our dataset functioning as proxies.

4.1 Hypothesis group 1

Firstly, we want to test for three variables and see if they are different in FFs and NFFs, therefore, our first group of hypotheses are:

1.1. FF has less debt than NFF.
1.2. FF has lower investment than NFF.
1.3. FF has less business planning than NFF.

4.2 Hypothesis 2

From theory, we believe and expect that FFs grow slower than NFFs. In addition, the main goal of our research is to test empirically if it is the case. Thus, our second hypothesis is:

2. FFs grow slower than NFFs.

4.3 Hypothesis group 3

If hypothesis 2 is true, we would further test the variables in hypothesis group 1, which are believed to be different in FFs and NFFs. We want to see if the variables can explain the slower growth for FFs. In addition, family ties over professionalism can also be a reason as we discussed above.
Thus, our third hypotheses group are the following:

3.1. Debt explains why FFs grow slower than NFF.
3.2. Investments explains why FFs grow slower than NFF.
3.3. Business planning explains why FFs grow slower than NFF.
3.4. Family ties over professionalism explains why FFs grow slower than NFF.

5. Data

We use firms' data from CCGR database (Center for Corporate Government Research), which includes all the Norwegian firms within all industries. We choose to analyse firms within consecutive six years, from 2010 to 2015. The reason behind is that the data in CCGR is annual and only available until 2015, and we also want to exclude the impact of financial crisis (year 2008 and 2009), which might cause biases on firms' growth.

We choose several variables and calculate their growth rate as the measurements for firms' growth rate. Those variables are operating income, total assets, wages and revenue. Moreover, based on our definition on family firms (will be discussed more deeply in the methodology section), the variable "largest family sum ultimate ownership" is included. We created a dummy variable called *familydummy*, with largest family sum ultimate ownership greater than 50% meaning family firms (value 1) and less than 50% meaning non-family firms (value 0). Further, control variables such as size, industry code and company age are also included. Finally, based on the previous discussion on the possible reasons of differences in growth rate of family firms and non-family firms, we include liabilities for leverage, total investments, R&D and Largest family has CEO.

Before we run any regression, we need to trim the data consisting of 173 110 firms. We exclude some companies which have assets and revenues that are less than 1 million. The reason is that those companies are likely to be holding firms which do not produce goods or services themselves, with the purpose of owning shares of other companies' stocks. That might cause biases to firms' growth. To further control for holding firms we exclude all companies which are not AS or ASA (private and public limited companies). In addition, firms in financial services and industries that are believed to be governmentally owned are excluded. Also, we exclude the companies that exist in more than one industry, in order to see if one specific industry affects growth differently than other industries. The firms must exist throughout the 6-year period. Moreover, we exclude those firms that have transformed from FF to NFF or NFF to FF in the six years.

At the end, we have balanced panel data of 25 653 firms in total, with 17 399 FFs and 8 254 NFFs within 13 industries. Due to large sample size, we cannot combine all industries and analyse firms together. We have to separate firms according to their industries and investigate them one by one.

More details of firms within each industry is showed in the table 5.0 below.

Table 5.0: Industries description

Industry	NFFs	FFs	FF% of total
(1) Retail	2948	5888	67%
(2) Business service	66	220	77%
(3) Professional scientific and technical service	1112	1828	62%
(4) Accommodation and food services	230	657	74%
(5) Construction	1492	4053	73%
(6) Turnover and operation of real estate	416	913	69%
(7) Electricity, gas, steam and hot water supply	97	25	20%
(8) Water supply, sewerage and rehabilitation activities	28	79	74%
(9) Transport and storage	337	1222	78%
(10) Cultural business and entertainment	108	187	63%
(11) Information and communication	670	461	41%
(12) Manufacturing	750	1866	71%
Total	8254	17399	68%

6. Methodology

Firstly, we need to define family firm. Up to date, there has not been a widely accepted definition for family firm. But there are various beliefs of family business discussed in previous research, most of which suggest three ways to consider the definition: content (Handler, 1989; Heck & Trent, 1999), family ownership (Barry, 1975; Lansberg, Perrow, & Rogolsky, 1988), family business culture (Dreux IV & Brown, 1994). For content and family business culture, it is difficult to differentiate family firms from all the other firms without quantitative data. Hence, we prefer to choose ownership to define family firms, which is also suggested by Litz (1995). A business firm can be considered as a family business to the extent that its ownership is concentrated within one family unit.

Further, as it is defined by Villalonga and Amit (2006), FFs must have "a minimum control threshold of 20% of the votes, being the largest shareholder or vote holder". We therefore adopt this definition to distinguish family firms from all the other firms. However, the ownership concentration in our data is quite high, therefore, we define a stricter definition: it must be more than 50% ownership throughout the period we investigate. Also, with more than 50% ownership, we are sure that the family owns and controls the company in its entirety.

Secondly, we need to calculate firms' growth rate. We want to use different measurements to calculate growth rate of a firm in order to have an overview of the firm's growth. Previous studies used a variety of growth measurements, among which Delmar et al (2003) used 19 different growth measurements in their study. In addition, Ardishvili et al (1998) and Delmar (1997) came up with an identical list of growth indicators, which includes assets, employment, profits, market share, sales and physical output. Out of the six variables, four variables were selected in our study to measure the growth rates of FFs and NFFs. These four variables are 1) total assets, 2) wage as a proxy for employment, 3) operating income as for profits and 4) revenues. The reason why we do not include market share and physical output is that they are only comparable in a similar product range within industries, which we cannot control in our data.

Sales and employment are the most widely used in recent empirical research on firms' growth. Further, according to Davidsson and Wiklund (2006), sales are a

highly suitable indicator across different types of firms. And employment is a direct indicator of organization complexity and might be preferred on the managerial implications of growth (Churchill & Lewis, 1983; Greiner, 1972). Moreover, in addition to sales and employment, profits and assets are of great interests of firms today (Delmar et al, 2003).

When we decide these four growth measurements, we used the following formula to calculate firms' growth rates.

$$Growth_{i,t} = {(X_{i,t} - X_{i,t-1})}\Big/{X_{i,t-1}}$$

Where $Growth_{i,t}$ is the growth rate of a firm i at time t. X is one of the four measurements (sales, wages, operating income and total assets).

Furthermore, as mentioned above, our definition for FFs is the firms with largest family sum ultimate ownership greater than 50% throughout the 6 years. While, firms with largest family sum ultimate ownership less than 50% for 6 years are considered to be NFFs. Thus, we created a dummy variable called *familydummy*, with value 1 for family firms that meet the definition of FFs and 0 for NFFs.

Tests

Testing hypotheses group 1, we will use T-test to see whether FFs and NFFs have differences in debt, investments and business planning.

Here debt and investment function as proxies for risk aversion, we must also find a proxy for business planning. For business planning we could ask each CEO whether they plan, however, we want to test empirical data, not possible biased opinions. Although level of planning is not possible to get an exact measure of, we believe R&D could function as a proxy. It is reasonable to expect companies who funds R&D, have devised a plan to create a new product. In order to plan well, the plan must be integrated throughout the company (R. Stutely, 2007, p.63-64). Stutely divides the company core activities into R&D, Marketing, Production and sales. If one fails, the business plan will likely fail as well. Thus, R&D function as an important part of planning, and can therefore be used as a proxy to test for planning.

For hypothesis 2, we will first use T-test to get a general overview if FFs and NFFs have significantly different growth rates in different industries. When some significant results are found, it is necessary to analyse further, more precisely by

running regression. With regression, we can also try to find out what possible reasons that drive FFs and NFFs to grow differently.

For regression, it is necessary to control several variables that would affect a firm's growth rate. According to previous research, size greatly affects firms' growth rate (Hymer & Pashigian,1962; Evans, 1987; Beck, 2005; Hall,1986). Smaller firms usually grow quicker than bigger firms. In addition, firms age affects firms' growth rate. The growth rate of younger firms is found to be significantly faster than that of older firms in a given age period (Evans,1987; Dunne,1989; Huynh & Petrunia, 2010). As for industries, the growth rates of industries can be very different from each other, which greatly affect the firms in each respective industry. Firms in a fast-growing industry can grow much quicker than firms in other industries, which is not because those firms outperform the other firms, but only because they are in a fast-growing industry. In all, our results would be biased when comparing the growth rate of FFs and NFFs, if those three variables above are not controlled.
We run the following regression (1):

$$Growth\ rate_{i,t} = \beta_0 + \beta_1 familydummy_i + \beta_2 subindustry_i + \beta_3 size_{i,t-1} + \beta_4 age_{i,t-1} + u_{i,t}$$

It is worth mentioning that we need to lag one year for size and age, in order to reduce the possible correlation between growth rate and size (or age) of firms in the same year. Moreover, for the variable $subindustry_i$, since we are analysing firms within each industry and there are different sub-industries in each industry, we need to control for sub-industry.

Given the regression above, we want to see the sign of β_1 and if it is significant or not. According to our hypothesis 2, β_1 is expected to be significantly negative.
If β_1 is significantly negative, we move on to hypothesis group 3 where we will include four possible variables which might explain the reason for slower growth in family firms.
Thus, the new regression will be the following (2):

$$Growth\ rate_{i,t} = \beta_0 + \beta_1 familydummy_i + \beta_2 subindustry_i + \beta_3 size_{i,t-1} + \beta_4 age_{i,t-1} + \beta_5 Z_{i,t-1} + u_{i,t}$$

Where $Z_{i,t-1}$ is the three possible variables that explain the different growth rate between FFs and NFFs. These four variables are leverage, investments, R&D.

When we include one of the variables in the regression, this variable Z is held constant functioning like a control variable. The effect of including the variable concerns the interpretation of coefficient on *familydummy* (β_1). We then will observe how the coefficient and its significance would change when we include one more variable. If β_5 is significant but β_1 becomes insignificant, then that variable Z explains the different growth between FFs and NFFs. If β_1 is still significant, but the significance is weakened (absolute t-stats value become lower), the variable explains the reason partially. If the significance of β_1 does not change too much, it means than FF ownership has an effect on growth beyond or above the effect of this variable Z. So we test those possible variables one by one to see which ones drive FFs grow slower than NFFs.

In order to measure family ties over professionalism, we will create a new variable called *FamCEO.* The variable is created by multiplying "*largest family has CEO"* with *familydummy.* Here, "*largest family has CEO"* is an available variable in our data set, with value 1 meaning that the CEO of the firm is from the largest family, and value 0 meaning that the CEO might be a professional outside of the family. Further, the reason why we multiple the two variables is that when the firms is a FF (*familydummy* =1), we then see if it has CEO from that family, ergo *FamCEO* equals 1 if it is, 0 otherwise. While, when the firm is a NFF (*familydummy* =0), it does not matter if the CEO is from the largest family or not, so the value of *FamCEO* is 0. Thus, *FamCEO* is a variable to show whether FFs have family CEO or a professional CEO from outside of the family.
Furthermore, in order to reduce possible multicollinearity problems, we replace *familydummy* with this newly created dummy *FamCEO.*

The regression (3) will be:

$$Growth\ rate_{i,t} = \beta_0 + \beta_{1,1} FamCEO_i + \beta_2 subindustry_i + \beta_3 size_{i,t-1} + \beta_4 age_{i,t-1} + \beta_5 Z_{i,t-1} + u_{i,t}$$

If the significance of *FamCEO's* coefficient ($\beta_{1,1}$) becomes even stronger and the absolute value of the it becomes larger, it means that FFs with CEO from the family will grow even slower.

7. Results

Industries are given numbers showed in the table:7.0

Table 7.0: Industry numbers

(1) Retail	**(2) Business service**	**(3) Professional, scientific and technical service**
(4) Accommodation and food services	**(5) Construction**	**(6) Turnover and operation of real estate**
(7) Electricity, gas, steam and hot water supply	**(8) Water supply, sewerage and rehabilitation activities**	**(9) Transport and storage**
(10) Cultural business and entertainment	**(11) Information and communication**	**(12) Manufacturing**

In all, we have 12 industries, together with 3 possible variables and 4 different growth measurements per industry. This leads to 84 t-tests and over 48 different regression results. In the following section, we will try our best to display all the results in an orderly sequence.

7.1 Hypothesis group 1

For testing hypothesis group 1, we used T-test to see if FFs and NFFs have differences in leverage, investments and R&D expenditures. The results are showed in the Table 7.1 in appendix, where the significant results are marked.

7.1.1 Leverage

We found that FFs and NFFs have significantly different leverage in 10 industries, in 9 of which FFs have less leverage than NFFs as we expected. This is consistent to what previous research has found (Villalonga et al, 2017; Mishra & McConaughy, 1999). However, in industry *(7)*, FFs have more leverage than NFFs. Based on the results, we expect that FFs might grow slower in the 9 industries, but this might not be the case for industry *(7)*.

7.1.2 Total investments

FFs and NFFs are found to have significantly differences in total investments within 7 industries. To our surprise, only in one industry *(7)*, we found that FFs have less investments, while, FFs have more investments in the rest 6 industries. More investments might suggest FFs grow quicker, but it also depends if they are investing in good projects or not. That makes the results for hypothesis 2 more unpredictable.

7.1.3 R&D

The results show that FFs have significant less expenditure in R&D than NFFs in 8 out of 12 industries. This result is consistent to what we expected, and also suggested by Andersen (1997) that FFs lack business planning, compared with NFFs. These results would suggest FFs grow slower than NFFs.

In addition, it is worth mentioning that in 4 industries, FFs are significantly different in all the three variables from NFFs. In these 4 industries, the differences are the same: FFs have less leverage; FFs have more investments; FFs have less R&D expenditure. These 4 industries are *(3)*; *(10)*; *(11)* and *(12)*. In another 6 industries, FFs and NFFs are different in two variables, but the differences are not the same across industries. These 6 industries are *(1); (2); (4); (5); (7); (9)*. It is reasonable to infer that FFs and NFFs are more likely to grow differently in these 10 industries altogether. Lastly, only in industry *(8)*, FFs are not significantly different from NFFs in all three variables. This makes it likely that FFs and NFFs do not grow differently in this industry.

7.2 Hypothesis 2

As expected, we found significant results (at 10% level) for different growth between FFs and NFFs in the 4 industries that have differences in leverage, investments and R&D expenditure. These 4 industries are *(3)*; *(10)*; *(11)* and *(12),* as discussed above. Additionally, 4 out of 6 industries that FFs and NFFs have differences in two variables are found to have significant results for different growth, which are *(1); (2); (4); (5); (7)*. Furthermore, as we anticipated and

discussed, FFs do not grow significantly differently from NFFs in industry *(8)*, since FFs and NFFs in that industry do not have significant differences in leverage, investments and R&D expenditure.

Lastly, among 8 of the industries that have significant different growth, there are 6 industries where FFs grow slower than NFFs as predicted. However, surprisingly, FFs grow quicker than NFFs in *(4)* and *(10)*. We will discuss the results more deeply later in this section.

7.2.1 T-tests results

As mentioned in methodology, we firstly use t-test to see if the growth rate of FF and NFF are different. All the t-test results including mean and standard deviation of 12 industries are showed in Table 7.2 A in appendix.

We have four growth measurements in total as stated, different growth measurements are found significant across industries.

Industry (5) shows significant slower growth for FFs in Operating income; Assets and Revenue.

For industry (1), (3) and (11), t-tests reveal slower growth for FFs in Assets and Revenue.

In industry (10) growth of Assets are slower for FFs, but faster growth in Operating income.

For industry (2), (4), (7) and (12) only one growth measurement is found to be significant for slower growth. In both industries *(2); (4)*, FFs and NFFs have differences in wage growth, with FFs having slower growth in industry *(2)*, but faster growth in industry *(4)*. In industry *(7)*, operating income growth is significantly slower for FFs. While, asset growth is slower for FFs in industry *(12)*.

In addition, assessing all the significant results, there is a tendency for FFs showing lower standard deviation. This could infer that FFs grow more steadily than NFFs. Also, we observe that the standard deviation of operating income growth measurement is generally very high in all the industries, which indicates operating income fluctuates a lot during this period.

7.2.2 Regression results

The results of *familydummy* coefficient are consistent with what we found in t-test for 8 industries, except industry *(2),* as presented in Table 7.2 B in appendix. The results within each industry are described thoroughly in the following:

Only in industry *(5)*, we found the coefficient of *familydummy* is significant negative in three growth measurements, which is also consistent to t-tests results. The value of *familydummy* coefficient is -0,425 in operating *income*, -0,027 in assets and -0,038 in revenue growth. In terms of significance, the p-value is 0,068 for operating income, 0,000 for assets growth, and 0,000 for revenue growth. Given that all the values of coefficient are significant negative in three measurements, FFs grow slower than NFFs in industry *(5).*

There are 4 industries that have significant results in two growth measurements, with industry *(1), (3), (11)* having very significant and negative results in assets and revenue growth, but industry *(10)* having negative results in assets but positive in operating income growth.

In industry *(1)*: the coefficient of *familydummy* is negative significant at 1% level, with coefficient of -0, 016 (p-value: 0,000) for asset growth and -0,029 (p-value: 0,000) for Revenue growth. And no significant results are found in the two other growth measurements.

In industry *(3)*: the *familydummy* coefficient is significant at 1% level in total assets growth with coefficient of -0,028 (p-value: 0,000). Revenue growth is significant here as well, with coefficient value of -0,048 (p-value: 0.000).

In industry *(11)*: the results are very similar to what we found in both industries *(1)* and *(3)*. Significant results at 1% level are found for *familydummy* coefficient in assets with coefficient of -0,040 (p-value: 0,000) and Revenue growth with coefficient of -0.045 (p-value: 0,000). But nothing significant is founded for the rest two growth measurements.

In industry *(10),* we also found significantly negative for *familydummy* coefficient with value of -0,070, as the three industries above, but the significance magnitude is lower (p-value: 0,070). However, *familydummy* coefficient is significant positive in operating income growth with coefficient of 2,549 (p-value: 0,021), meaning that FFs' operating income grow quicker than FFs'. Further, given that the value of the coefficient is 2,549, FFs actually grow much quicker than NFFs.

There are 3 industries that have significant results in one growth measurement, but the growth measurement as well as the sign of *familydummy* coefficient are not the same across the three industries.

In industry *(4)*, *familydummy* coefficient in wage growth is found to be significant positive, with coefficient value of 0,027 (p-value: 0,014). It means that wage growth rate is quicker for FFs than NFFs in this industry.

In industry *(7)*, we found *familydummy* coefficient in operating income growth is significant negative with coefficient of -0,850 (p-value: 0,067).

In industry *(12)*, assets growth is found to be slower for FFs. The value of *familydummy* coefficient is -0,015, (p-value of 0,011).

However, we did not find significant results in any of the growth measurement in industry (2), which is not consistent to what we found in t-tests.

In addition, we found significant negative results for the coefficients of both size and age in most of the regressions with significant family dummies, which indicates that firms with larger size grow slower than those with smaller size, and older firms grow slower than younger firms. The findings are consistent to what the previous research found that are mentioned above (article).

However, no significant results are found in the remaining 4 industries that are (2); (6); (8); (9). This implies that FFs do not grow slower than NFFs in those industries.

7.3 Hypothesis group 3

As mentioned in methodology, we include three possible explanatory variables (leverage, investments and R&D) in the regression of the 8 industries, where significant different growth for FFs and NFFs are found. The results are shown in Table 7.2 B in appendix. Unfortunately, we did not find any of the three variables that make *familydummy* coefficient become insignificant, after the variables are added in the regression. The significance magnitude becomes even stronger in some cases, and lower, but to a minor degree in other cases. Moreover, the value of the coefficient changes only slightly, with the largest 1% change in one industry *(11)*. It implies that none of the three variables fully explains the reason why FFs grow differently than NFFs. More details of each variable and their impact will be discussed now.

7.3.1 Leverage

Revenue growth

In terms of revenue growth, we found a significant positive relation between leverage and revenue growth in three industries, which proves what Huynh & Petrunia (2010) found. Furthermore, this suggests that FFs should grow slower, due to lower leverage than NFFs. However, the *familydummy* does not change the significance after including leverage in the regression. Thus, leverage is not the reason for FFs to grow slower in revenue.

Asset growth

Oppositely, we found leverage has a negative impact on assets growth, suggesting that FFs would grow quicker than NFFs due to lower leverage. This might explain why the inclusion of leverage magnifies the significance of *familydummy* coefficient.

Operating income and wage growth

Further, leverage does not have significant effect on operating income and wage growth.

Based on our results, the effect of leverage on overall growth is ambiguous, making it not a reason for FFs slower growth.

7.3.2 Investments

When we include investments in the regressions, we only found 2 industries where the coefficient of investments is significant. It means that investments is not a strong factor that would affect firm growth in general, which further explains the reason why it does not have much effect on *familydummy* coefficient.

Together with leverage and investments, we cannot find clear relation between FFs slower growth and their risk aversion. Even though FFs do choose less leverage possibly due to risk aversion, it does not affect the growth, compared with NFFs.

7.3.3 R&D

In most cases, we found there is a significant positive relation between firm growth and R&D expenditure. Given that FFs have less R&D in most industries as we stated above, R&D should be one of the reasons that makes FFs grow slower than

NFFs. Consistently, when we compare the *familydummy* coefficient before and after the inclusion of R&D, the significant degree drops in all the 8 industries except industry *(10)*. However, the degree is very minor, meaning that the effect of R&D on FFs slower grow is very small. Thus, it means that the differences in business planning between FFs and NFFs have very little impact on their growth, which partially proves what Upton, Teal and Felan (2001) in their research.

Overall, even though we found in a few cases that the significance magnitude of *familydummy* coefficient becomes lower when adding one of the variables, the degree of which is very limited (less than 1% change in p-value). These results keep us from making a conclusion that one of the three variables explain the reason for different growth of FFs and NFFs.

7.3.4 FamCEO

For *FamCEO,* we replace it with *familydummy* in order to test family ties over professionalism in FFs and how it affects growth. The results are showed in Table 7.3 in appendix.

Comparing the results of the two regression (one with *familydummy*, the other with *FamCEO*), we can see that the results vary from industries to industries. Replacing *familydummy* with *FamCEO*, we found in industry *(5); (7); (12)*, the absolute value of coefficient became higher, and the significance increased. It means that FFs grow even slower than NFFs when FFs have family CEO. The result further proves the argument suggested by Sirmon & Hitt (2003), that the growth of a FF where the CEO is from the family is slower than a FF with professional CEO. But we did not find similar results in the other industries, which means that family CEO do not necessarily hinder FFs growth in those industries.

8. Robustness analysis

In this section, we investigate the robustness of our results, in order to test and check if the original results still hold. We only test for the 8 industries that have significant results. We implement disaggregation analysis suggested in the previous research (Coad, 2010; Coad & Rao, 2010) to study robustness, which is temporal disaggregation.

8.1 Temporal disaggregation

We investigated the growth rates of firms within 5 continuous years, from 2010 to 2015. Now, we repeat the analysis and do a sub-sample test with three years, from 2013 to 2015. The results showed in the Table 8.0 in appendix. The coefficient of *familydummy* from sub-sample still remain significant in most of the industries. However, in industry (7) that previously had only one growth measurement in which *familydummy* were significant, in our subsample test this *familydummy* coefficient becomes insignificant. Also, in industry (3) and (10), asset growth become insignificant, but both industries still have another growth measurement that is significant. Thus, the results of sub-sample test suggest that the conclusion we drew earlier still holds in most of industries.

8.2 Different growth rate measurement

We have already taken this into account previously that we use four measurements of growth rate, in order to investigate robustness. By including multiple growth measurements, we make sure that we get the full picture of growth between NFFs and FFs. If we were only assessing one growth measurements, we would possibly not find any significant results, and thus be biased towards no differing growth. Additionally, with four different growth measurements we can find specific information on where FFs and NFFs grow differently, which yields greater contributions on the topic of growth.

8.3 Family firm definition

To further test robustness, we made a stricter definition of FFs by replacing *familydummy* with *FamCEO*. The new dummy required FFs to both have family CEO and over 50% ownership during the sample period. Our results still hold when we replaced the previous dummy, with the exception of Operating income growth measurement in industry (5) and (10).

9. Discussion

9.1 Specific discussion across industries

According to our results as discussed above, it is interesting to see different growth results of FFs and NFFs across the 12 industries. FFs and NFFs grow differently at least in one of the measurements in 8 industries, with FFs growing slower in 6 industries, but quicker in 2 industries. In the remaining 4 industries, FFs and NFFs do not grow significant differently. Even though we cannot give clear explanations for each industry, we still can find some patterns which help us to understand the differences in growth across industries.

In terms of differences between FFs and NFFs, we tested three variables that are leverage, investments and R&D expenditure. Although those three variables were not found to be the reason explaining different growth, it may still imply some other information on FFs and NFFs. Specifically, if all the three variables are different in FFs and NFFs, we could assume that FFs might be different from NFFs in other unknown factors as well. If this is true, we can then assume that those factors may make them grow differently.

The assumption above could imply: in the 4 industries *(3); (10); (11); (12)* where FFs and NFFs have significant differences in all three variables, FFs grow slower than NFFs. Also, the differences are the same across these industries (FFs lower leverage, higher investments and lower R&D). FFs in this industry might have a particularly strong family-culture: if they differ in all three variables, they are more likely to be different in other unknown variables as well. That would further affect their growth.

On the other hand, in industry *(8),* none of the three variables were different for FFs and NFFs. We know FFs have some inherent characteristics that should be showed by differences in our variables: leverage, total investment and R&D. Since they do not, we believe that this industry inhabits market forces which drive FFs to behave more like NFFs, thus growing at a similar rate. In highly competitive markets, we believe that FFs have no other choice than to overcome family norms, converging towards how NFFs are. Even though in industry *(6)* there is only one variable differing, there might be the same forces as with industry (8). Therefore, FFs and NFFs do not grow differently in these two industries.

Another interesting part to discuss is why FFs grow quicker than NFFs in wage for industry (4), and in operating income for industry (10). To understand why FFs operating income grow quicker than NFFs in industry (10), we assessed the sub-industries that are believed to be the most profitable, shown in table 9.1.

Table 9.1

The table 9.0 below shows number total number of firms, and amount of FFs and NFFs within the most profitable sub-industries in cultural business and entertainment (10). Total number of firms within these sub-industries out of the entire industry amounts to 64%. Total number of FFs in these sub-industries out of total number of FFs in the entire industry amounts to 75,4%. Total number of NFFs in these sub-industries out of total number of NFFs in the entire industry amounts to 45,4%.

Table 9.0: Sub-industry description in industry (10).

Sub-industry	***Total***	***FF***	***NFF***
Independent artistic business	19	17	2
Creative activities and performance art	26	19	7
Lottery and betting	28	14	14
Fitness center	65	43	22
Recreational activities	25	21	4
Management of sports facilities & sport teams and clubs	27	27	0
Number of firms in profitable sub-industry	190	141	49
Percentage of total	64 %	75,4 %	45,4 %

Out of the total number of FFs in the industry, 187 (from table 5.0), 141 or approximately 75% are in believed highly profitable sub-industries. Whereas, NFF has in total 108 firms in the industry, only 45% of which are in those highly profitable sub-industries. The other non-profitable sub-industries are believed to consist of libraries and museums. This might explain why FFs' operating income grow faster than NFFs in this particular industry. However, when FFs have family CEO, they do not grow faster.

It is worth mentioning that FFs grow slower in terms of assets, which may be because FFs do not require assets as much as NFFs. As we said earlier, NFFs are mostly libraries and museums which need lots of assets.

While, in industry (4), FFs wage grow faster than NFFs in industry (4). This might imply that FFs focus more heavily on quality personnel, whereas NFFs might focus more on profitability and effectivity. By increasing wages, we believe that FFs in Industry (4), accommodation and food services, want to improve the service provided by the employees and thereby increasing the quality to their customers. As found by previous study (Upton, Teal, & Felan, 2001) FFs often choose a high-quality strategy in business, which are arguments in favour of our reasoning.

9.2 General reasons for FFs' slower growth

Based on possible reasons for FFs slower growth suggested by theory and previous research, we managed to test for three variables. These three variables are leverage, investments and R&D as mentioned, since they can be measured by numbers and available in our dataset. Risk aversion is shown by the level of leverage and investments, and business planning is shown by R&D expenditure. However, we did not find any one of these three variable that fully explains the slower growth of FFs. It further means that FFs' risk aversion may not be the reason for slower growth, nor is business planning. The results would therefore infer that other factors which cannot be measured by numbers, may explain the reason.

One of the more prominent arguments for FFs slower growth is agency theory 1. Managers in NFFs have the incentive to grow beyond what is profitable in order to maximize their private benefits (power, wages and bonuses). From our results, we know that Norwegian NFFs grow faster in general. Furthermore, there are findings that FFs have higher performance than NFFs (Saito, T. 2008). These two results combined infer that agency theory 1 might be true, i.e. NFFs have lower performance but higher growth. Jensen (1986) states that the problem could be mitigated by issuing debt. Furthermore, our results show that NFFs have higher debt, it would be very interesting to further test our dataset for performance, to see if debt remedies the effect of unprofitable growth in NFFs.
I.e. does NFFs in Norway have higher unprofitable growth or higher profitable growth. We therefore encourage readers of this paper to further examining Norwegian firms in this period.

When it comes to agency theory 2, 3 and 4, that are about the conflicts between different groups, we cannot find any proxy variables characterising those conflicts. Therefore, we cannot test empirically if those are the reasons for FFs slower growth. We believe that agency theory 2 (conflicts between shareholders and outside equity holders) might be the main factor, since family owner wants to control the firm and thus is unwilling to share the information. The implications might be that FFs get less capital and less professional aid from outside equity holder such as private equity companies, which hinder FFs growth.

10. Endogeneity and limitation

10.1 Endogeneity

It is worth mentioning that there might be endogeneity problem in our regression, which is known and pervasive in empirical corporate finance. Endogeneity can be loosely defined as the correlation between explanatory variables and error term (Roberts & Whited, 2012). According to many previous articles, it is very difficult to sufficiently mitigate endogeneity, and there is no guarantee that endogeneity problem can be eliminated. However, it is still crucial for us to address the issue, showing that we understand and try to mitigate the problem as much as we can, based on our compelling analysis. In addition, there is a possibility of endogeneity problem in our regression that would affect our final conclusion. In our case, omitted variables might cause endogeneity in our regression. Omitted variables problem refers to the variables that should be included in the regression, which is particularly severe in corporate finance. Those variables are difficult to quantify and might even be unobservable.

In our regression, *family dummy* might be the endogenous variable. That means there might exist some omitted variables Xi that are characterized by family firms (those variables are correlated with *family dummy*), but are not included by us as explanatory variables. Thus, omitted variables Xi will be in the error term u, which causes the error term to correlate with *family dummy*. As a result, the OLS estimation will be inconsistent, that is to say, there will be a bias towards the coefficient of *family dummy* (β1) as the sample size increases. That further affects our conclusion.

One standard remedy for endogeneity here is to find instrumental variable(s) Zi that meets two conditions, one of which is that Zi are partially correlated with *family dummy.* The other condition is that correlation between Zi and error term is zero, which implies that Zi influences growth rate only through its effect on *family dummy.* According to Roberts &Whited (2012), good instrumental variables can come from biological or physical events or features. For example, in our case, Zi can be a dummy variable describing whether the owner of a firm has children or not. The owner has children or not is a biological event that would not likely affect firm growth. However, it might be the case that if the owner has children, it is more likely that his or her firm becomes a family firm, since the owner may want to keep his wealth for his children and think more of the firm in the long term. That would further affect the firm's growth. Unfortunately, we could not find any variable in our dataset describing if the owner has children, to mitigate the potential problem.

10.2 Limitation

Firstly, in order to measure business planning, we use R&D as a proxy. However, it might be the case that a firm's business planning is not fully shown by its R&D expenditure. Business planning might actually hinder growth for FFs, but if our proxy for business planning (R&D) is not good, it would render our results for this variable insignificant.

Secondly, our definition of FFs might not be strong enough based on previous research where they define FFs on content and culture (Handler, 1989; Heck & Trent, 1999; Dreux IV & Brown, 1994). We define FFs by its ownership and later with ownership and family CEO, which might capture some NFFs in our group of FFs. However, we have no possibility to conduct a survey to check whether each company considers itself a family firm

Thirdly, we were not able to test all the industries combined due to very large sample size, thus we could not check the growth of FFs and NFFs in general, but only each industry separately.

Lastly, we did not have variables in our dataset to see the level of external equity (private equity). In other words, we do not know whether NFFs were able to raise more capital in general which helps growth, or if private equity works as a mentor, aiding NFFs to higher growth than FFs.

11. Conclusion

In this paper, we aim to study whether FFs grow slower than NFFs and what are the possible reasons behind. Based on our results, we did find that FFs grow significantly slower than NFFs in 6 out of 12 industries. However, FFs grow quicker in 2 industries, and not significantly different from NFFs in the remaining 4 industries. Further, even though leverage, total investments and R&D are found to be significantly different in FFs and NFFs, they do not fully explain the different growth between FFs and NFFs according to our tests. The results infer that there might be other reasons beyond those three variables affecting different growth of FFs and NFFs. Those reasons might be industry specifics, as well as general reasons such as agency theory and market forces.

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Appendix

Table 7.1: T-test results for hypothesis group 1.

The table presents t-test results showing leverage, total investment and R&D in FFs and NFFs. Mean and standard deviation of the three variables are presented for each industry. Lastly, the p-value are presented, signifying whether those variables are significantly different between NFF and FF.

		Leverage		*Total investment*		*R&D*	
		NFF	**FF**	**NFF**	**FF**	**NFF**	**FF**
(1) Retail	Mean	0,685	0,661	72 525,58	91 344,70	276 691,40	18 081,86
	ST.deviation	0,252	0,269	1 198 538,00	1 071 350,00	6 159 099,00	302 440,00
	P-value	**0,000*** **		0,107		**0,000*** **	
(2) Business service	Mean	0,691	0,695	5 384,85	150 089,10	147 527,30	35 930,00
	ST.deviation	0,37	0,277	44 138,09	1 566 767,00	788 756,90	288 946,40
	P-value	0,854		**0,002*** **		**0,012** **	
(3) Professional, scientific and technical service	Mean	0,688	0,565	73 651,80	460 331,80	191 738,70	34 197,70
	ST.deviation	0,248	0,285	733 945,90	5 525 347,00	1 717 101,00	316 601,70
	P-value	**0,000*** **		**0,000*** **		**0,000*** **	
(4) Accommodation and food services	Mean	0,803	0,781	14 570,43	33 665,45	48 108,70	54 677,02
	ST.deviation	0,278	0,447	154 867,60	331 395,30	446 791,60	416 482,70
	P-value	**0,053***		**0,010*** **		0,663	
(5) Construction	Mean	0,686	0,638	129 271,80	143 510,40	45 471,31	10 641,01
	ST.deviation	0,206	0,25	3 840 196,00	4 238 838,00	934 758,50	229 188,80
	P-value	**0,000*** **		0,790		**0,001*** **	
(6) Turnover and operation of real estate	Mean	0,718	0,656	1 690 159,00	1 227 572,00	25 201,44	56 824,53
	ST.deviation	0,269	0,331	18 900 000,00	9 328 236,00	540 110,80	1 785 169,00
	P-value	**0,000*** **		0,289		0,275	
(7) Electricity, gas, steam and hot water supply	Mean	0,788	0,89	21 000 000,00	788 992,00	143 814,40	115 048,00
	ST.deviation	0,194	0,16	204 000 000,0	5 123 627,00	939 074,90	476 301,50
	P-value	**0,000*** **		**0,031** **		0,633	
(8) Water supply, sewerage and rehabilitation activities	Mean	0,51	0,546	183 607,10	63 250,63	418 571,40	14 764,56
	ST.deviation	0,25	0,267	1 534 956,00	562 178,30	3 435 844,00	107 947,10
	P-value	0,152		0,366		0,167	
(9) Transport and storage	Mean	0,709	0,662	516 185,80	138 137,30	517 150,10	12 516,86
	ST.deviation	0,272	0,261	10 600 000,00	2 591 729,00	8 647 131,00	222 646,30
	P-value	**0,000*** **		0,147		**0,017** **	
(10) Cultural business and entertainment	Mean	0,828	0,687	19 203,70	202 792,50	102 050,00	27 961,50
	ST.deviation	0,69	0,358	140 368,90	3 167 114,00	489 361,10	259 436,10
	P-value	**0,000*** **		**0,077***		**0,001*** **	
(11) Information and communication	Mean	0,651	0,605	96 330,45	289 288,50	626 650,70	143 095,40
	ST.deviation	0,293	0,308	887 822,80	1 542 134,00	3 601 613,00	1 201 720,00
	P-value	**0,000*** **		**0,000*** **		**0,000*** **	
(12) Manufacturing	Mean	0,638	0,617	91 513,57	136 437,60	952 490,10	67 674,49
	ST.deviation	0,266	0,266	953 252,90	1 509 058,00	14 800 000,00	619 054,60
	P-value	**0,000*** **		**0,044** **		**0,000*** **	

*Where the significance at 10%, 5% and 1% level are shown by *, ** and *** respectively*

Table 7.2 A: T-test results for growth

This table reports the t-test results for the four different growth measurements in FFs and NFFs. The test reveals whether FFs and NFFs do have significantly differing growth in Revenue, Wages, Assets or Operating income. Mean and standard deviation of each growth measurement are shown, underneath them the p-value shows whether the growth is significantly different from each other.

		Revenue		***Wages***		***Assets***		***Operating income***	
		NFF	**FF**	**NFF**	**FF**	**NFF**	**FF**	**NFF**	**FF**
(1) Retail	Mean	0,080	0,043	0,275	0,205	0,075	0,057	-0,018	-0,262
	ST.deviation	0,486	0,291	11,891	8,774	0,312	0,261	30,501	17,452
	P-value	**0,000*** **		0,529		**0,000*** **		0,368	
(2) Business service	Mean	0,063	0,070	0,611	0,018	0,100	0,107	0,226	-0,275
	ST.deviation	0,256	0,311	10,317	1,912	0,415	0,47	12,995	5,047
	P-value	0,704		**0,084***		0,8		0,298	
(3) Professional, scientific and technical service	Mean	0,126	0,069	0,151	0,214	0,111	0,094	0,690	-0,083
	ST.deviation	1,103	0,393	2,852	9,265	0,515	0,351	32,142	23,842
	P-value	**0,000*** **		0,548		**0,032** **		0,743	
(4) Accommodation and food services	Mean	0,070	0,067	0,058	0,076	0,072	0,069	0,885	-0,108
	ST.deviation	0,378	0,315	0,312	0,350	0,399	0,334	19,600	23,041
	P-value	0,77		**0,098***		0,853		0,159	
(5) Construction	Mean	0,170	0,116	0,240	0,189	0,130	0,108	0,336	-0,179
	ST.deviation	0,962	0,543	6,018	5,06	0,404	0,355	14,889	21,775
	P-value	**0,000*** **		0,524		**0,000*** **		**0,026** **	
(6) Turnover and operation of real estate	Mean	0,120	0,102	1,083	0,890	0,078	0,063	0,794	0,544
	ST.deviation	1,100	0,744	31,56	17,815	0,701	0,367	21,803	39,253
	P-value	0,483		0,841		0,38		0,74	
(7) Electricity, gas, steam and hot water supply	Mean	0,094	0,125	0,466	0,509	0,004	0,123	0,535	-0,267
	ST.deviation	1,035	0,553	7,882	4,163	0,251	1,108	7,794	2,47
	P-value	0,652		0,944		0,237		**0,055***	
(8) Water supply, sewerage and rehabilitation activities	Mean	0,091	0,070	0,203	0,085	0,067	0,083	0,694	-0,646
	ST.deviation	0,378	0,300	1,022	0,395	0,240	0,295	9,396	13,100
	P-value	0,552		0,193		0,549		0,195	
(9) Transport and storage	Mean	0,114	0,097	0,187	0,147	0,091	0,102	-1,184	0,531
	ST.deviation	0,631	0,423	1,827	1,592	0,433	0,424	50,03	37,249
	P-value	0,318		0,427		0,339		0,19	
(10) Cultural business and entertainment	Mean	0,081	0,066	0,116	0,327	0,111	0,056	-2,11	0,295
	ST.deviation	0,387	0,336	0,670	6,393	0,704	0,332	22,645	13,178
	P-value	0,46		0,319		**0,086***		**0,024** **	
(11) Information and communication	Mean	0,110	0,066	0,253	0,249	0,118	0,095	-0,017	0,33
	ST.deviation	0,356	0,300	6,619	4,912	0,355	0,333	21,805	14,500
	P-value	**0,000*** **		0,979		**0,013** **		0,503	
(12) Manufacturing	Mean	0,149	0,081	0,169	0,088	0,079	0,068	-0,117	0,685
	ST.deviation	3,876	0,818	4,250	2,015	0,291	0,314	25,826	56,202
	P-value	0,298		0,276		**0,062***		0,268	

*Where the significance at 10%, 5% and 1% level are shown by *, ** and *** respectively*

Table 7.2 B: Regression 1 and 2 results

The following tables show the regression results from all the industries from (1) to (12). Four growth measurements are included. The columns show the variables that are included in the regression, rows show the value of coefficient, t-value and p-value for each variable. When the *familydummy* is significant in regression 1, the variable leverage, total investment or R&D are included respectively. Reg. 2 represents including leverage, Reg 3 represents including total investments and reg. 4 represents including R&D. These inclusions are to see how they effects the coefficient value and significance of the *familydummy*.

(1) Retail

	Family dummy	Size	Companyage	Industrycontrol	Constant	Leverage	totalinvestment	R&D
Op.income growth								
Coefficient	-.1740224	.1309418	-.0154828	-.08705	3.367725	-	-	-
T-value	-0.65	0.67	-1.17	-0.73	0.55	-	-	-
P-value	0.517	0.501	0.241	0.467	0.583	-	-	-
Wage growth								
Coefficient	-.0479451	-.212881	-.0072775	-.1767439	10.02442	-	-	-
T-value	-0.37	-2.10	-2.03	-2.01	2.35	-	-	-
P-value	0.710	0.036	0.042	0.044	0.019	-	-	-
Asset growth								
Coefficient	-.0157839	-.0369871	-.0013562	-.0189282	1.224878	-	-	-
T-value	-5.20	-10.98	-14.35	-10.01	12.69	-	-	-
P-value	**0.000*** **	0.000	0.000	0.000	0.000	-	-	-
Asset growth reg. 2								
Coefficient	-.0174786	-.0391051	-.0015713	-.0173477	1.214094	-.0647394	-	-
T-value	-5.77	-11.63	-16.16	-9.21	12.62	-10.48	-	-
P-value	**0.000*** **	0.000	0.000	0.000	0.000	**0.000*** **	-	-
Asset growth reg. 3								
Coefficient	-.0159542	-.0380852	-.0013767	-.0189694	1.23435	-	3.66e-09	-
T-value	-5.26	-11.23	-14.51	-10.03	12.77	-	3.95	-
P-value	**0.000*** **	0.000	0.000	0.000	0.000	-	**0.000*** **	-
Asset growth reg. 4								
Coefficient	-.0157234	-.0373848	-.0013538	-.0190056	1.231019	-	-	4.11e-1
T-value	-5.18	-10.99	-14.31	-10.04	12.71	-	-	2.23
P-value	**0.000*** **	0.000	0.000	0.000	0.000	-	-	**0.026***
Revenue growth								
Coefficient	-.0289743	.004258	-.0019696	-.0126785	.6695474	-	-	-
T-value	-6.60	1.06	-14.46	-5.32	5.54	-	-	-
P-value	**0.000*** **	0.290	0.000	0.000	0.000	-	-	-
Revenue growth reg.2								
Coefficient	-.0279376	.0055538	-.001838	-.0136453	.6761447	.0396059	-	-
T-value	-6.42	1.40	-13.99	-5.68	5.59	5.35	-	-
P-value	**0.000*** **	0.162	0.000	0.000	0.000	**0.000*** **	-	-
Revenue growth reg.3								
Coefficient	-.0288979	.0047509	-.0019604	-.01266	.6652952	-	-1.64e-09	-
T-value	-6.58	1.17	-14.35	-5.31	5.49	-	-1.95	-
P-value	**0.000*** **	0.243	0.000	0.000	0.000	-	**0.051***	-
Revenue growth reg.4								
Coefficient	-.0289513	.0041071	-.0019687	-.0127078	.671877	-	-	1.56e-1
T-value	-6.59	1.01	-14.45	-5.32	5.53	-	-	1.13
P-value	**0.000*** **	0.312	0.000	0.000	0.000	-	-	0.256

Where the significance at 10%, 5% and 1% level are shown by *, ** and *** respectively

(2) Business services

	Family dummy	Size	Companyage	Industrycontrol	Constant	Leverage	Totalinvestment	R&
Op.income growth								
Coefficient	-.5445365	.263154	.0161782	-.0866744	5.161631	-	-	-
T-value	-0.74	0.82	1.39	-0.95	0.65	-	-	-
P-value	0.462	0.412	0.164	0.342	0.514	-	-	-
Wage growth								
Coefficient	-.6371715	-.3495432	.0013253	-.0321468	5.547786	-	-	-
T-value	-0.98	-0.88	0.62	-0.42	0.61	-	-	-
P-value	0.329	0.380	0.537	0.672	0.544	-	-	-
Asset growth								
Coefficient	.0059607	-.0956774	-.0025046	.0055556	.3397629	-	-	-
T-value	0.19	-2.75	-2.41	0.57	0.35	-	-	-
P-value	0.850	0.006	0.016	0.568	0.728	-	-	-
Revenue growth								
Coefficient	.0093367	-.0523728	-.0024188	.0018413	.3020383	-	-	-
T-value	0.55	-2.89	-4.05	0.44	0.77	-	-	-
P-value	0.586	0.004	0.000	0.659	0.443	-	-	-

Where the significance at 10%, 5% and 1% level are shown by *, ** and *** respectively

(3) Professional, scientific and technical services

	Family dummy	Size	Companyage	Industrycontrol	Constant	Leverage	Totalinvestment	R&D
Op.income growth								
Coefficient	-.2819965	-.7603963	-.0093705	.0055556	4.932122	-	-	-
T-value	-0.51	-1.69	-0.34	0.05	0.71	-	-	-
P-value	0.610	0.091	0.735	0.962	0.475	-	-	-
Wage growth								
Coefficient	.0415615	-.167025	-.0186431	-.0221561	3.092061	-	-	-
T-value	0.47	-1.09	-1.81	-1.20	1.26	-	-	-
P-value	0.638	0.276	0.070	0.231	0.207	-	-	-
Asset growth								
Coefficient	-.0276085	-.0735287	-.0043102	.0016864	.5444901	-	-	-
T-value	-3.62	-7.55	-10.21	1.05	4.34	-	-	-
P-value	**0.000*** **	0.000	0.000	0.295	0.000	-	-	-
Asset growth 2.reg.								
Coefficient	-.0369313	-.0766614	-.0043145	.0016594	.6168959	-.071684	-	-
T-value	-4.24	-7.90	-10.22	1.03	4.83	-3.12	-	-
P-value	**0.000*** **	0.000	0.000	0.302	0.000	**0.002*** **	-	-
Asset growth 3.reg.								
Coefficient	-.0278617	-.0741951	-.0043078	.0016961	.5482506	-	3.46e-10	-
T-value	-3.65	-7.49	-10.20	1.05	4.35	-	0.33	-
P-value	**0.000*** **	0.000	0.000	0.292	0.000	-	0.744	-
Asset growth 4.reg.								
Coefficient	-.0268237	-.0771916	-.0042363	.001749	.5620255	-	-	9.34e-0
T-value	-3.50	-7.82	-9.96	1.09	4.48	-	-	1.88
P-value	**0.000*** **	0.000	0.000	0.278	0.000	-	-	**0.060***
Revenue growth								
Coefficient	-.0482165	.036226	-.0048139	.0014563	-.1583741	-	-	-
T-value	-3.60	1.39	-5.32	0.67	-0.77	-	-	-
P-value	**0.000*** **	0.164	**0.000**	0.503	0.442	-	-	-
Revenue growth 2.reg.								
Coefficient	-.0446545	.0374229	-.0048122	.0014667	-.1860384	.0273885	-	-
T-value	-2.97	1.46	-5.31	0.67	-0.91	1.05	-	-
P-value	**0.003*** **	0.144	**0.000**	0.500	0.361	0.292	-	-
Revenue growth 3.reg.								
Coefficient	-.047055	.0392831	-.0048249	.0014122	-.1756233	-	-1.59e-09	-
T-value	-3.53	1.47	-5.32	0.65	-0.84	-	-1.56	-
P-value	**0.000*** **	0.142	0.000	0.516	0.400	-	0.119	-
Revenue growth 4.reg.								
Coefficient	-.0463736	.0276254	-.0046404	.0016034	-.1172004	-	-	2.19e-0
T-value	-3.44	1.24	-5.28	0.74	-0.62	-	-	1.26
P-value	**0.001*** **	0.215	0.000	0.461	0.538	-	-	0.209

Where the significance at 10%, 5% and 1% level are shown by *, ** and *** respectively

(4) Accommodation and food services

	Family dummy	Size	Companyage	Industrycontrol	Constant	Leverage	Totalinvestment	R&D
Op.income growth								
Coefficient	-1.076594	.587514	-.0139605	.8603448	-50.6829	-	-	-
T-value	-1.35	0.66	-0.52	1.09	-1.17	-	-	-
P-value	0.177	0.512	0.603	0.275	0.244	-	-	-
Wage growth								
Coefficient	.0269574	.0151311	-.0010834	.0021646	.0412384	-	-	-
T-value	2.47	-1.09	-2.83	0.18	0.06	-	-	-
P-value	**0.014****	0.277	0.005	0.859	0.955	-	-	-
Wage growth 2.reg.								
Coefficient	.0264613	.0163449	-.0010892	.0013268	.106593	.0131978	-	-
T-value	2.43	-1.18	-2.84	0.11	0.15	-1.39	-	-
P-value	**0.015****	0.239	0.005	0.913	0.882	0.166	-	-
Wage growth 3.reg.								
Coefficient	.0256156	.0184227	-.0011088	.00096	.1301511	-	4.58e-08	-
T-value	2.37	-1.20	-2.93	0.07	0.17	-	1.19	-
P-value	**0.018****	0.232	0.003	0.940	0.866	-	0.233	-
Wage growth 4.reg.								
Coefficient	.0251752	.0209288	-.0009467	-.0009035	.248545	-	-	3.12e-08
T-value	2.32	-1.51	-2.49	-0.07	0.34	-	-	2.20
P-value	**0.020****	0.130	0.013	0.941	0.731	-	-	**0.028****
Asset growth								
Coefficient	-.006417	.1390122	-.0010153	-.0194715	2.103934	-	-	-
T-value	-0.41	-7.00	-2.03	-1.42	2.47	-	-	-
P-value	0.679	0.000	0.042	0.156	0.014	-	-	-
Revenue growth								
Coefficient	.0045189	.02805	-.0015187	-.0051299	.1769541	-	-	-
T-value	0.35	1.61	-3.37	-0.52	0.31	-	-	-
P-value	0.724	0.109	**0.001**	0.605	0.757	-	-	-

Where the significance at 10%, 5% and 1% level are shown by *, ** and *** respectively

(5) Construction

	Family dummy	Size	Companyage	Industrycontrol	Constant	Leverage	Totalinvestment	R&D
Op.income growth								
Coefficient	-.4253846	.3640025	-.0054794	-.1718998	5.156703	-	-	-
T-value	-1.82	1.64	-0.51	-1.33	0.89	-	-	-
P-value	**0.068***	0.101	0.609	0.184	0.373	-	-	-
Op.income growth 2.reg								
Coefficient	-.433945	.3625131	-.0058394	-.1754451	5.455328	-.1950335	-	-
T-value	-1.84	1.63	-0.55	-1.33	0.90	-0.35	-	-
P-value	**0.065***	0.103	0.580	0.183	0.366	0.725	-	-
Op.income growth 3.reg								
Coefficient	-.4243602	.3698127	-.0055089	-.1722391	5.132183	-	-6.66e-09	-
T-value	-1.82	1.66	-0.51	-1.33	0.89	-	-1.38	-
P-value	**0.069***	0.097	0.607	0.183	0.375	-	0.169	-
Op.income growth 4.reg								
Coefficient	-.4262342	.3694017	-.0054998	-.1713073	5.096702	-	-	-4.44e-0
T-value	-1.83	1.65	-0.51	-1.32	0.88	-	-	-1.32
P-value	**0.068***	0.099	0.607	0.185	0.379	-	-	0.187
Wage growth								
Coefficient	-.0220732	.0056833	-.0098585	-.1097016	4.971383	-	-	-
T-value	-0.27	0.10	-3.00	-2.24	2.31	-	-	-
P-value	0.784	0.920	0.003	0.025	0.021	-	-	-
Asset growth								
Coefficient	-.0268688	-.0921261	-.0028232	-.0211802	1.697497	-	-	-
T-value	-5.02	-16.75	-12.40	-7.46	12.26	-	-	-
P-value	**0.000*****	0.000	0.000	0.000	0.000	-	-	-
Asset growth 2.reg.								
Coefficient	-.0290529	-.0925002	-.0029154	-.0220821	1.773595	-.0498433	-	-
T-value	-5.41	-16.82	-12.67	-7.78	12.78	-4.77	-	-
P-value	**0.000*****	0.000	0.000	0.000	0.000	**0.000*****	-	-
Asset growth 3.reg.								
Coefficient	-.0269389	-.0925248	-.0028212	-.0211568	1.699178	-	4.57e-10	-
T-value	-5.03	-16.77	-12.39	-7.45	12.27	-	1.07	-
P-value	**0.000*****	0.000	0.000	0.000	0.000	-	0.285	-
Asset growth 4.reg.								
Coefficient	-.0266294	-.0936462	-.0028175	-.0213469	1.714386	-	-	1.25e-0
T-value	-4.98	-17.08	-12.39	-7.51	12.36	-	-	2.57
P-value	**0.000*****	0.000	0.000	0.000	0.000	-	-	**0.010****
Revenue growth								
Coefficient	-.0379085	.032681	-.0040778	-.0365056	1.540816	-	-	-
T-value	-3.57	2.42	-11.16	-7.07	8.18	-	-	-
P-value	**0.000*****	0.016	0.000	0.000	0.000	-	-	-
Revenue growth 2.reg.								
Coefficient	-.0322087	.0336571	-.0038372	-.0341517	1.342223	.1300771	-	-
T-value	-3.00	2.48	-10.80	-6.85	7.67	6.34	-	-
P-value	**0.003*****	0.013	0.000	0.000	0.000	**0.000*****	-	-
Revenue growth 3.reg.								
Coefficient	-.0377241	.0337293	-.0040831	-.0365669	1.536397	-	-1.20e-09	-
T-value	-3.56	2.47	-11.17	-7.07	8.16	-	-3.08	-
P-value	**0.000*****	0.014	0.000	0.000	0.000	-	**0.002*****	-
Revenue growth 4.reg.								
Coefficient	-.0379617	.0330188	-.0040791	-.0364685	1.537063	-	-	-2.78e-0
T-value	-3.58	2.41	-11.16	-7.08	8.18	-	-	-0.75
P-value	**0.000*****	0.016	0.000	0.000	0.000	-	-	0.451

Where the significance at 10%, 5% and 1% level are shown by *, ** and *** respectively

(6) Turnover and operation of real estate

	Family dummy	Size	Companyage	Industrycontrol	Constant	Leverage	Totalinvestment	R&D
Op.income growth								
Coefficient	-.2366934	.0333285	-.0035618	-	.6039829	-	-	-
T-value	-0.31	0.03	-0.23	-	0.08	-	-	-
P-value	0.753	0.972	0.817	-	0.934	-	-	-
Wage growth								
Coefficient	-.1274776	.2799276	-.0302013	-	.4009005	-	-	-
T-value	-0.14	0.87	-2.22	-	-0.16	-	-	-
P-value	0.892	0.386	0.026	-	0.876	-	-	-
Asset growth								
Coefficient	-.0159897	.0773583	-.0004014	-	.6450972	-	-	-
T-value	-0.96	-5.27	-1.95	-	5.49	-	-	-
P-value	0.338	0.000	0.051	-	0.000	-	-	-
Revenue growth								
Coefficient	-.0136367	.0375589	-.0010639	-	.1368023	-	-	-
T-value	-0.54	1.34	-2.18	-	-0.73	-	-	-
P-value	0.590	0.180	0.029	-	0.467	-	-	-

Where the significance at 10%, 5% and 1% level are shown by *, ** and *** respectively

(7) Electricity, gas, steam and hot-water supply

	Family dummy	Size	Companyage	Industrycontrol	Constant	Leverage	Totalinvestment	R&D
Op.income growth								
Coefficient	-.8469504	.3102328	-.0089137	-	2.908917	-	-	-
T-value	-1.84	-0.64	-1.88	-	0.75	-	-	-
P-value	**0.067***	0.524	0.061	-	0.451	-	-	-
Op.income growth 2. reg.								
Coefficient	-.8272681	.3064265	-.0096624	-	.1946827	3.043558	-	-
T-value	-1.82	-0.63	-1.84	-	-0.44	0.78	-	-
P-value	**0.069***	0.529	0.066	-	0.663	0.438	-	-
Op.income growth 3. reg.								
Coefficient	-.8462808	-.410787	-.0128843	-	3.674708	-	7.96e-10	-
T-value	-1.83	-0.71	-1.87	-	0.81	-	1.07	-
P-value	**0.067***	0.475	0.062	-	0.418	-	0.286	-
Op.income growth 4. reg.								
Coefficient	-.8418312	.2535177	-.008268	-	2.497875	-	-	-7.72e-08
T-value	-1.82	-0.46	-1.80	-	0.58	-	-	-0.52
P-value	**0.069***	0.646	0.072	-	0.564	-		0.600
Wage growth								
Coefficient	.0382159	.263554	-.0149802	-	1.274235	-	-	-
T-value	0.06	0.75	-1.04	-	-0.62	-	-	-
P-value	0.949	0.456	0.301	-	0.538	-		
Asset growth								
Coefficient	.1131956	.0403402	-.0006488	-	.3067856	-	-	-
T-value	1.18	-0.80	-0.98	-	0.82	-	-	-
P-value	0.237	0.426	0.329	-	0.411	-	-	-
Revenue growth								
Coefficient	.0772694	.4380881	-.0071289	-	3.020414	-	-	-
T-value	1.37	1.13	-1.55	-	-1.10	-	-	-
P-value	0.172	0.259	0.123	-	0.270	-	-	-

Where the significance at 10%, 5% and 1% level are shown by *, ** and *** respectively

(8) Water supply, sewerage and rehabilitation activities

	Family dummy	Size	Companyage	Industrycontrol	Constant	Leverage	Totalinvestment	R&D
Op.income growth								
Coefficient	-1.506909	.5716143	-.0402442	-.5181132	24.95448	-	-	-
T-value	-1.40	-1.07	-1.16	-0.65	0.88	-	-	-
P-value	0.161	0.287	0.247	0.518	0.378	-	-	-
Wage growth								
Coefficient	-.1340235	.1073826	-.0036975	.0125585	.5468087	-	-	-
T-value	-1.43	-2.10	-2.21	0.43	0.61	-	-	-
P-value	0.152	0.036	0.028	0.669	0.541	-	-	-
Asset growth								
Coefficient	.0104347	.0213509	-.0006278	-.0072296	.5021326	-	-	-
T-value	0.43	-0.95	-0.84	-0.35	0.65	-	-	-
P-value	0.671	0.342	0.403	0.727	0.513	-	-	-
Revenue growth								
Coefficient	-.0183718	.0152616	-.0020138	-.0034138	.141177	-	-	-
T-value	-0.56	0.43	-1.73	-0.18	0.19	-	-	-
P-value	0.577	0.670	0.084	0.861	0.846	-	-	-

Where the significance at 10%, 5% and 1% level are shown by *, ** and *** respectively

(9) Transport and storage

	Family dummy	Size	Companyage	Industrycontrol	Constant	Leverage	Totalinvestment	R&D
Op.income growth								
Coefficient	1.225037	.8652636	.0339378	-.2608975	17.60253	-	-	-
T-value	1.15	-0.92	0.75	-1.32	1.88	-	-	-
P-value	0.250	0.358	0.456	0.186	0.060	-	-	-
Wage growth								
Coefficient	.0003977	.0887926	-.0018184	.0165803	-1.24931	-	-	-
T-value	0.01	1.10	-0.97	1.25	-1.37	-	-	-
P-value	0.994	0.272	0.333	0.212	0.170	-	-	-
Asset growth								
Coefficient	-.0110976	.1019038	-.0007942	.0048563	.5769806	-	-	-
T-value	-0.90	-10.58	-1.53	1.17	2.87	-	-	-
P-value	0.368	0.000	0.126	0.242	0.004	-	-	-
Revenue growth								
Coefficient	-.0168246	.0296438	-.0016124	.0067906	.0035537	-	-	-
T-value	-0.85	-2.39	-2.09	1.16	0.01	-	-	-
P-value	0.395	0.017	0.037	0.245	0.991	-	-	-

Where the significance at 10%, 5% and 1% level are shown by *, ** and *** respectively

(10) Cultural business and entertainment

	Family dummy	Size	Companyage	Industrycontrol	Constant	Leverage	Totalinvestment	R&D
Op.income growth								
Coefficient	2.548529	.4757921	-.042219	.2884711	31.40866	-	-	-
T-value	2.32	0.67	-1.00	0.94	-1.17	-	-	-
P-value	**0.021****	0.501	0.320	0.347	0.241	-	-	-
Op.income growth 2. Reg.								
Coefficient	2.476163	.3953932	-.0427154	.3159584	32.97328	.5124181	-	-
T-value	2.21	0.54	-1.01	0.99	-1.20	-0.85	-	-
P-value	**0.027****	0.586	0.314	0.324	0.230	0.394	-	-
Op.income growth 3. Reg.								
Coefficient	2.546844	.4700394	-.0421981	.2886936	31.39101	-	7.31e-09	-
T-value	2.31	0.66	-0.99	0.94	-1.17	-	0.63	-
P-value	**0.021****	0.510	0.320	0.347	0.241	-	0.529	-
Op.income growth 4. Reg.								
Coefficient	2.590397	.3821621	-.0411646	.2908389	31.07896	-	-	6.60e-07
T-value	2.32	0.54	-0.97	0.95	-1.16	-	-	0.99
P-value	**0.020****	0.592	0.330	0.343	0.246	-	-	0.322
Wage growth								
Coefficient	.1827284	.4168903	-.0035151	-.1289854	14.82538	-	-	-
T-value	1.03	-1.19	-0.87	-0.90	0.96	-	-	-
P-value	0.304	0.233	0.382	0.367	0.337	-	-	-
Asset growth								
Coefficient	.0700187	.1471164	.0025965	-.0096035	1.95257	-	-	-
T-value	-1.81	-4.33	0.48	-1.08	2.53	-	-	-
P-value	**0.070***	0.000	0.634	0.281	0.011	-	-	-
Asset growth 2. Reg.								
Coefficient	.0352671	-.108638	.0028321	-.0228151	2.70615	.2457891	-	-
T-value	-1.00	-3.50	0.53	-2.03	3.01	1.21	-	-
P-value	0.316	0.000	0.598	0.043	0.003	0.227	-	-
Asset growth 3. Reg.								
Coefficient	.0707333	.1495523	.0026054	-.0095087	1.959997	-	3.10e-09	-
T-value	-1.83	-4.36	0.48	-1.07	2.54	-	3.31	-
P-value	**0.068***	0.000	0.633	0.286	0.011	-	**0.001*****	-
Asset growth 4. Reg.								
Coefficient	.0715065	.1437891	.002559	-.0096883	1.940919	-	-	-2.35e-08
T-value	-1.84	-4.25	0.47	-1.09	2.52	-	-	-1.74
P-value	**0.066***	0.000	0.639	0.277	0.012	-	-	**0.082***
Revenue growth								
Coefficient	.0050412	.0088361	-.005253	.0063343	.3847302	-	-	-
T-value	-0.27	-0.25	-3.69	0.76	-0.55	-	-	-
P-value	0.787	0.802	**0.000**	0.449	0.585	-	-	-

Where the significance at 10%, 5% and 1% level are shown by *, ** and *** respectively

(11) Information and communication

	Family dummy	Size	Companyage	Industrycontrol	Constant	Leverage	Totalinvestment	R&D
Op.income growth								
Coefficient	.4070845	.2203277	-.0107446	.1108895	-8.12431	-	-	-
T-value	0.88	0.46	-0.44	0.60	-0.76	-	-	-
P-value	0.378	0.643	0.662	0.548	0.448	-	-	-
Wage growth								
Coefficient	-.0757416	-.2825139	.0048716	-.0342064	4.220402	-	-	-
T-value	-0.42	-1.68	0.67	-0.64	1.05	-	-	-
P-value	0.672	0.092	0.504	0.522	0.295	-	-	-
Asset growth								
Coefficient	-.0395953	-.066045	-.001871	.0059625	.2390442	-	-	-
T-value	-4.16	-7.36	-3.80	2.55	1.52	-	-	-
P-value	**0.000*** **	0.000	0.000	0.011	0.129	-	-	-
Asset growth 2. Reg.								
Coefficient	-.0418958	-.0677443	-.0019222	.005702	.2937391	-.0406187	-	-
T-value	-4.38	-7.53	-3.92	2.44	1.86	-2.32	-	-
P-value	**0.000*** **	0.000	0.000	0.015	0.063	**0.020** **	-	-
Asset growth 3. Reg.								
Coefficient	-.0402101	-.0667993	-.0018758	.0059834	.242858	-	2.22e-09	-
T-value	-4.20	-7.38	-3.80	2.55	1.54	-	1.10	-
P-value	**0.000*** **	0.000	0.000	0.011	0.124	-	0.273	-
Asset growth 4. Reg.								
Coefficient	-.0393407	-.0685777	-.0018403	.0060618	.2490396	-	-	1.80e-09
T-value	-4.13	-7.40	-3.73	2.59	1.58	-	-	2.04
P-value	**0.000*** **	0.000	0.000	0.010	0.115	-	-	**0.041** **
Revenue growth								
Coefficient	-.0450695	-.0013537	-.0033291	.0034725	-.0468091	-	-	-
T-value	-4.94	-0.13	-7.17	1.56	-0.33	-	-	-
P-value	**0.000*** **	0.895	0.000	0.119	0.744	-	-	-
Revenue growth 2.Reg.								
Coefficient	-.0432863	-.0000366	-.0032894	.0036744	-.0892048	.0314848	-	-
T-value	-4.79	-0.00	-7.11	1.66	-0.62	1.98	-	-
P-value	**0.000*** **	0.997	0.000	0.097	0.533	**0.047** **	-	-
Revenue growth 3.Reg.								
Coefficient	-.044855	-.0010906	-.0033274	.0034652	-.0481397	-	-7.75e-10	-
T-value	-4.90	-0.10	-7.16	1.55	-0.34	-	-0.40	-
P-value	**0.000*** **	0.917	0.000	0.121	0.737	-	0.690	-
Revenue growth 4.Reg.								
Coefficient	-.0449106	-.0029344	-.0033099	.0035344	-.0405709	-	-	1.12e-09
T-value	-4.93	-0.27	-7.11	1.58	-0.28	-	-	1.33
P-value	**0.000*** **	0.786	0.000	0.114	0.778	-	-	0.183

Where the significance at 10%, 5% and 1% level are shown by *, ** and *** respectively

(12) Manufacturing

	Family dummy	Size	Companyage	Industrycontrol	Constant	Leverage	Totalinvestment	R&D
Op.income growth								
Coefficient	1.126231	1.284589	-.0361731	-.0368639	-7.809851	-	-	-
T-value	1.15	0.97	-1.18	-0.71	-0.96	-	-	-
P-value	0.252	0.331	0.237	0.477	0.339	-	-	-
Wage growth								
Coefficient	-.0869451	-.0700125	-.0045734	-.0010734	.7685861	-	-	-
T-value	-1.12	-1.49	-2.75	-0.40	1.86	-	-	-
P-value	0.262	0.135	0.006	0.686	0.063	-	-	-
Asset growth								
Coefficient	-.0148068	-.0325365	-.0012952	-.000291	.3378438	-	-	-
T-value	-2.56	-6.58	-5.60	-0.66	8.71	-	-	-
P-value	**0.011****	0.000	0.000	0.512	0.000	-	-	-
Asset growth 2. Reg.								
Coefficient	-.01585	-.0337584	-.0014254	-.0004365	.3849324	-.0518151	-	-
T-value	-2.75	-6.85	-5.90	-0.99	9.62	-3.18	-	-
P-value	**0.006*****	0.000	0.000	0.324	0.000	**0.001*****	-	-
Asset growth 3. Reg.								
Coefficient	-.0151512	-.0336705	-.0013185	-.0002843	.3458093	-	3.67e-09	-
T-value	-2.62	-6.75	-5.67	-0.64	8.86	-	1.54	-
P-value	**0.009*****	0.000	0.000	0.521	0.000	-	0.123	-
Asset growth 4. Reg.								
Coefficient	-.0147725	-.0326684	-.0012936	-.0002928	.338723	-	-	7.08e-11
T-value	-2.55	-6.54	-5.59	-0.66	8.67	-	-	0.43
P-value	**0.011****	0.000	0.000	0.509	0.000	-	-	0.670
Revenue growth								
Coefficient	-.0431224	.1028184	-.0023819	-.0030387	-.4737979	-	-	-
T-value	-0.89	1.24	-5.37	-0.75	-1.08	-	-	-
P-value	0.374	0.214	0.000	0.453	0.280	-	-	-

where the significance at 10%, 5% and 1% level are shown by *, ** and *** respectively

Table 7.3: Regression 3 results

The table presents a comparison between the regression (1) with *familydummy* or (3) with *FamCEO*. When *familydummy* is significant in regression (1), it is then replaced with *FamCEO.* Thus, only industries and growth measurements with significant results are shown here. In order to clearly compare the results of the two variables, only the value of coefficient, t-value and p-value of the two variables are shown. The results of other variables are not presented here.

(1) Retail

		Coefficient	T-value	P-value
Growth Assets	Familydummy	-.0157839	-5.20	**0.000*** **
	FamCEO	-.0125396	-4.42	**0.000*** **
Growth Revenue	Familydummy	-.0289743	-6.60	**0.000*** **
	FamCEO	-.0243912	-6.37	**0.000*** **

(3) Professional, scientific and technical service

		Coefficient	T-value	P-value
Growth Assets	Familydummy	-.0276085	-3.62	**0.000*** **
	FamCEO	-.0254638	-3.68	**0.000*** **
Growth Revenue	Familydummy	-.0482165	-3.60	**0.000*** **
	FamCEO	-.0425142	-3.72	**0.000*** **

(4) Accommodation and food services

		Coefficient	T-value	P-value
Growth Wage	Familydummy	.0269574	2.47	**0.014** **
	FamCEO	.0321233	3.42	**0.001*** **

(5) Construction

		Coefficient	T-value	P-value
Growth Op.income	Familydummy	-.4253846	-1.82	0.068
	FamCEO	-.3319939	-1.43	0.152
Growth Assets	Familydummy	-.0268688	-5.02	**0.000*** **
	FamCEO	-.0295331	-6.00	**0.000*** **
Growth Revenue	Familydummy	-.0379085	-3.57	**0.000*** **
	FamCEO	-.0421449	-4.78	**0.000*** **

(7) Electricity, gas, steam and hot water supply

		Coefficient	T-value	P-value
Growth Op.income	Familydummy	-.8469504	-1.84	**0.067***
	FamCEO	-.9722732	-2.00	**0.046** **

(10) Cultural business and entertainment

		Coefficient	T-value	P-value
Growth Op.income	Familydummy	2.548529	2.32	**0.021** **
	FamCEO	.7091974	0.84	0.401
Growth Assets	Familydummy	-.0700187	-1.81	**0.070***
	FamCEO	-.0497018	-1.73	**0.084***

(11) Information and communication

		Coefficient	T-value	P-value
Growth Assets	Familydummy	-.0395953	-4.16	**0.000*** **
	FamCEO	-.0382189	-3.83	**0.000*** **
Growth Revenue	Familydummy	-.0450695	-4.94	**0.000*** **
	FamCEO	-.0418293	-4.42	**0.000*** **

(12) Manufacturing

		Coefficient	T-value	P-value
Growth Assets	Familydummy	-.0148068	-2.56	**0.011** **
	FamCEO	-.0167817	-3.03	**0.002*** **

Where the significance at 10%, 5% and 1% level are shown by *, ** and *** respectively

Table 8.0: Robustness check – subsample test

This table shows the results of subsample tests for industries and growth measurements that have significant results. The sub-sample consists the same information as the original sample, except only including three years from 2013-2015. Comparing significance of *familydummy* coefficient in subsample and in original sample, to see whether the original results still hold.

Retail

		Familydummy	Size	Companyage	Controlindustry	Constant
Growth Asset	Coefficient	-.0104774	-.0239805	-.0009719	-.0103109	.7175061
	T-value	-2.92	-6.09	-8.46	-4.59	6.39
	P-value	**0.004*** **	0.000	0.000	0.000	0.000
Growth Revenue	Coefficient	-.0096585	.0228326	-.0009684	-.0105305	.394587
	T-value	-2.82	6.03	-8.16	-4.58	3.43
	P-value	**0.005*** **	0.000	0.000	0.000	0.001

Professional, scientific and technical services

		Familydummy	Size	Companyage	Controlindustry	Constant
Growth Asset	Coefficient	-.0080624	-.0565203	-.0032004	.0005671	.4604185
	T-value	-0.90	-5.13	-7.18	0.28	2.86
	P-value	0.370	0.000	0.000	0.782	0.004
Growth Revenue	Coefficient	-.0239146	.0551335	-.0023474	-.0011537	-.1806361
	T-value	-2.33	1.50	-3.44	-0.67	-0.72
	P-value	**0.020** **	0.135	0.001	0.501	0.473

Accommodation and food services

		Familydummy	Size	Companyage	Controlindustry	Constant
Growth Wages	Coefficient	.0265592	.0086377	-.0007913	-.0192846	1.061386
	T-value	2.24	0.49	-1.75	-1.09	0.99
	P-value	**0.025** **	0.624	0.080	0.274	0.321

Construction

		Familydummy	Size	Companyage	Controlindustry	Constant
Growth Operating income	Coefficient	-.51336	.3001593	-.0053699	-.2217672	7.742419
	T-value	-1.84	1.07	-0.43	-1.33	1.04
	P-value	**0.066***	0.284	0.667	0.182	0.299
Growth Assets	Coefficient	-.021646	-.0608488	-.0016361	-.0151663	1.189537
	T-value	-3.26	-9.04	-5.83	-4.36	6.97
	P-value	**0.001*** **	0.000	0.000	0.000	0.000
Growth Revenue	Coefficient	-.0271713	.0228377	-.002235	-.0216763	.9074253
	T-value	-2.71	2.08	-5.57	-3.91	4.00
	P-value	**0.007*** **	0.038	0.000	0.000	0.000

Electricity, gas, steam and hot water supply

		Familydummy	Size	Companyage	Controlindustry	Constant
Growth Operating income	Coefficient	-1.026073	-.6774617	-.0096772	-	5.90297
	T-value	-1.54	-0.94	-1.31	-	1.01
	P-value	0.124	0.346	0.190	-	0.311

Cultural business and entertainment

		Familydummy	Size	Companyage	Controlindustry	Constant
Growth Operating income	Coefficient	3.293272	.7942368	-.0204714	.1575221	-22.74202
	T-value	1.98	1.14	-0.34	0.40	-0.62
	P-value	**0.049****	0.256	0.735	0.690	0.537
Growth Assets	Coefficient	-.0337864	-.0734466	-.0014531	-.0156928	2.025926
	T-value	-1.46	-2.67	-1.14	-1.54	2.10
	P-value	0.146	0.008	0.256	0.124	0.036

Information and communication

		Familydummy	Size	Companyage	Controlindustry	Constant
Growth Assets	Coefficient	-.0305265	-.0380642	-.0016136	.0033208	.1874784
	T-value	-2.45	-3.27	-3.26	1.06	0.88
	P-value	**0.014****	0.001	0.001	0.288	0.377
Growth Revenue	Coefficient	-.0374854	.0328009	-.0025477	.0018091	-.2156044
	T-value	-3.76	2.44	-5.23	0.66	-1.28
	P-value	**0.000*****	0.015	0.000	0.512	0.200

Manufacturing

		Familydummy	Size	Companyage	Controlindustry	Constant
Growth Assets	Coefficient	-.0205952	-.0258224	-.0010851	-.000505	.2816036
	T-value	-2.86	-4.30	-4.38	-1.03	6.32
	P-value	**0.004*****	0.000	0.000	0.303	0.000

Where the significance at 10%, 5% and 1% level are shown by *, ** and *** respectively