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Are family firms more inclined to be zero-levered than non-family firms? Evidence of the Belgian economy

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[1] This thesis contains paragraphs of earlier submitted documents from the same author, as a consequence of the sequence of submissions for this master's degree.

Abstract

This study investigates the relation between the zero-leverage phenomenon and family firms. The sample is based on the Belgian economy and counts 62 631 year observations between 2008 and 2016, collected from the database Belfirst. Family firms represent 77% of all companies with employees in the Belgian economy and 45% of the labour market is associated with Belgian family firms. Logit and tobit panel analyses show that family firms are less inclined to adopt a zero-leverage policy as they do not want to dilute their ownership. Furthermore, old family firms are less motivated to be zero-levered as they do not need additional funding to expand their business. Overall, Belgian family firms are less inclined to be zero-levered than non-family firms.

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Ben Van Overloop

1 Introduction

This study investigates whether family firms are more or less inclined to adopt a zero-leverage policy than non-family firms. The zero-leverage phenomenon is a rare occurrence where companies do not have any outstanding financial debt, including short- and long-term debt, in their capital structure (Strebulaev and Yang, 2013). This is unusual as borrowing debt creates interest tax shields resulting in lower taxation. By not borrowing, enterprises miss opportunities to reduce their tax expenditures. Family firms could possibly be very sensitive to levering up their firm due to two main reasons. Firstly, the increasing risk of bankruptcy with a rising debt and secondly with a higher level of debt, there is a bigger chance of losing control over the family firm. Similarly, Strebulaev and Yang (2013) mentioned that family-controlled firms can be expected to follow a conservative debt policy as family firms tend to protect their firms better than non-family firms because they want to safeguard the future of their descendants. Moreover, Anderson et al. (2003) stated that bond investors view founding family ownership as an organizational structure that better protects their interests which makes them more careful in making decisions and issuing external financing. However, Colot (2015) states in his study that Belgian family firms have more debt than non-family firms. Additionally, no consensus has been found by prior researches. Strebulaev and Yang (2013) and Ampenberger et al. (2013) demonstrated in their research that family firms in, respectively the American and German economy, are less levered than non-family firms. Nevertheless, Anderson and Reeb (2003) confirmed that the difference in leverage between family firms and non-family firms in the United States of America is quasi-ignorable. Moreover, King and Santor (2008) showed that family firms in Canada have a significantly higher level of leverage compared to non-family firms. Also, Acedo-Ramírez et al. (2017) revealed that Spanish family firms are more levered than non-family firms, partly due to control considerations of the family. Further, this study will highlight the zero-leverage behaviour of family firms at different stages in their lifecycle. Devos et al. (2012) mentioned that young firms are more likely to be zero-levered because they are not able to attract investors due to the lack of a good reputation, also known as the financing constraints hypothesis. On the other hand, Acedo-Ramírez et al. (2017) perceived a decrease in debt during the life cycle of family firms as younger family firms need more debt to grow. This study has found its interest in family firms due to the substantial importance of family firms in numerous economies. The economy of Spain, France, Germany, Belgium and Italy consist of more than 70% of family firms. This research is based on a sample that focuses on the Belgian economy from 2008 to 2016. Belgian family firms represent a third of the total gross domestic product in Belgium (BDO, 2017). Moreover, family firms make up 77% of all the companies with employees and 45% of the Belgian labour market is associated with family firms. Nevertheless, prior research involving Belgian family firms is very limited. To summarize, this paper will scrutinize if family firms are more inclined to be zero-levered than non-family firms and if age has an influence on the zero-leverage policy behaviour of family firms.

The remainder of the paper is structured as follows: section two gives a summary of prior research regarding capital structure frameworks, zero-leverage phenomenon and the family firm. Section three provides more information concerning the first and second hypothesis. Section four describes the data and variables, Section five explains the research methodology of the paper, followed by the empirical results of the research in section six. As a final point, the conclusion of the research will be developed in section seven.

2 Literature study

In the literature study an explanation will be provided regarding the most often used and well-known capital structure theories. Afterwards an introduction to the zero-leverage phenomenon and why companies are unlevered will be shaped. The literature study will be concluded with a description of family firms and their relevance to this study.

2.1 Capital structure theories

There are two main theories regarding to capital structure; a static trade-off framework and a pecking order framework. The agency cost theory is added to the chapter as it can influence the capital structure of a company. By exploring the meaning and effectiveness of these frameworks it will be possible to establish a better comprehension of capital structure and how the zero-leverage phenomenon differs from the traditional capital structure frameworks. The trade-off and pecking order theories are the backbones of capital structure as they are mentioned in the articles of Antoniou et al. (2008).; Myers (1984); Denis and McKeon (2012); and Acedo-Ramírez et al. (2017).

2.1.1 Trade-off framework

The static trade-off framework aims at an optimal debt ratio. This debt ratio is the trade-off between the costs and the benefits of borrowing. Thus, regarding the static trade-off framework, firms will substitute debt for equity or vice versa until the value of a firm is maximised (Myers, 1984). There are three main fields which have a direct impact on the optimal debt ratio. Namely costs of adjustment; debt and taxes, and costs of financial distress. First the costs of adjustment, if firms could switch easily between equity and debt without any costs, almost every firm would reach its optimum debt ratio instantly. However, there are costs which create lags in arriving at this optimum. Due to adjustment costs, there is a wide dispersion in actual debt ratios between firms. Second, debt and taxes have a notable influence on the trade-off framework. If firms borrow, interest tax shields will occur and companies will save money. If firms do not borrow enough, they miss opportunities to reduce their tax expenditures. On the other hand, borrowing too much will increase the risk of bankruptcy and financial embarrassment, which leads to the third pillar, costs of financial distress. This refers to the administrative costs of bankruptcy as well as to image loss where future or alternative lenders will be more suspicious (Myers, 1984). Firms with a zero-leverage policy do not achieve the optimal debt ratio that the trade-off framework suggests. The dispersion between debt and equity is not in balance, as no debt is present.

2.1.2 Pecking order framework

The pecking order framework is based on completely different assumptions compared to the trade-off framework. This framework is based on an order of preference and not on an ideal debt-equity ratio. There is an order of preference because there are two types of equity, internal and external, one at the top of the order and one at the bottom of the order (Myers, 1984).

Firms prefer internal finance over external finance (Myers, 1984). If the need for capital is too high, firms will have to use external financing. According to the pecking order framework, the first type of external finance that will be issued is debt as loans. The next feasible option are hybrid securities such as convertible bonds. The final solution would be issuing equity. One of the reasons why firms apply this framework, is to minimise the control of third parties over the firm and separation of ownership (Myers 1984). This is in line with the results of Acedo-Ramirez et al. (2017) who investigated the capital structure

differences between family firms and non-family firms. Because family firms tend to desire maintaining control over the firm for future generations, the firm is restricted to a limited amount of possibilities to finance its needs. Issuing too much external equity leads to a scattered ownership which family firms try to avoid. This conclusion was also provided by Antoniou et al. (2008). In the mindset of a zero-leverage policy, only internal capital will be used to fund investments as this policy does not want to issue any debt.

2.1.3 Agency cost theory

A third theory that can be related to capital structure of companies is the agency cost theory. Herewith there is a friction between the goals of the shareholders and the goals of the management of a firm. Shareholders tend to aim for a high return on investment of their share in combination with a long-term view of the company. The agency cost theory shows the difficulty to transfer these goals to the management of a company. Managers will have their own idealistic goals for personal development and benefits. They will strive for personal achievements, a bigger wage and fame (Anderson et al., 2003).

Agency cost is the sum of three elements: the monitoring expenditures by the principal, the bonding expenditures by the agent and the residual loss (Jensen et al., 1976). Often shareholders will use debt to decrease the agency cost. By adding more debt to the capital structure of a company, managers will have to be more disciplined, more cautious and they will have to make the right investment decisions to prevent bankruptcy (Antoniou et al. 2008). Ampenberger et al. (2013) confirm that family firm's characteristics have been regarded as a mechanism to reduce agency costs as well. Often family relatives work in the management, or the CEO is one of the main shareholders. It appears that in family firms leverage is not necessarily used as a tool to decrease agency costs. Anderson et al. (2003) confirmed this explanation as they found evidence from the American economy that family ownership is associated with a lower agency cost.

2.2 Zero-leverage phenomenon

2.2.1 General description

The zero-leverage phenomenon is an extreme form of capital structure where classic capital structure frameworks as Trade-off and Pecking order theory are neglected. Hereby management chooses or is forced to govern the firm without any debt. Strebulaev and Yang (2013) find evidence that between 1962 and 2009 there were on average 10,2% of large public US firms which adopted a zero-leverage policy. Moreover, Bessler et al. (2013, p196) stated:

"roughly one out of every four listed firms in the developed markets abstain from using debt".

Furthermore, if a zero-leverage policy is found within a company, it tends to be persistent over the long term (Strebulaev and Yang, 2013). Also, firms that adopt a zero-leverage policy tend to be smaller, younger, riskier, less profitable and hoard the largest cash holdings of all sample firms (Bessler et al., 2013; Byoun and Xu, 2013). On the other hand, firms that apply a zero-leverage policy potentially lose quite a significant amount of money. Graham (2000) found that with issuing debt the capitalised tax reducing benefit of interest deductions could reach up to ten percent of firm value. In addition to the results of Graham, Korteweg (2010, p2138) finds that:

"the net benefits to leverage amount to as much as 5,5% of firm value. This means that the median firm at its value-maximizing leverage ratio is worth 5,5% more than the same firm with no debt in its capital structure.".

Although leverage offers advantages, there is still a substantial number of firms that are not interested in these advantages and opt for a zero-leverage policy. But what are possible reasons for preferring a zero-leverage policy over, for example, an optimal debt ratio as the trade-off framework suggests?

2.2.2 Why are companies unlevered?

One of the reasons why firms are unlevered is strongly correlated with the agency theory. Devos et al. (2012) found that unlevered firms are caused by entrenched managers who eschew debt. As a consequence of not having debt, managers do not have strict disciplines and obligatory interest payments and redemptions to fulfil. A second possibility for the application of a zero-leverage policy are financing constraints (Devos et al. 2012). Financing constraints refer to companies that experience difficulties to issue external financing. Financing constraints occur when information asymmetry is present. More specific:

"In imperfect capital markets, the difference between the costs of external financing and internal financing is financial constraints." (Huang et al., 2017, p2738).

As a consequence of information asymmetry, creditors cannot evaluate the quality of a firm or investment. A second factor that influences financial constraints is based on moral hazard. If a firm that requests external finance has a bad reputation in capital markets, it might be hard to find an investor who is willing to invest (Huang et al., 2017). In line with this point of view, the riskiness of a company contributes to the difficulty of entering capital markets. If the core business of the firm is too risky, this firm will be forced to use internal financing as there is no access to external capital (Dang, 2013). Precedent research reveals that financially constrained firms are likely to be small, young firms without a strong reputation on the debt markets (Devos et al., 2012).

Apart from the financing constraints hypothesis, Dang (2013) examined other hypotheses relating to the zero-leverage policy, particularly the underinvestment and financial flexibility hypotheses. The underinvestment hypothesis is a side-effect of the agency cost theory. It can occur when a company has a severe debt overhang. The underinvestment problem relates to investments in high-risk instead of low-risk opportunities. Hence the pay-off of the investment accrue debt holders for a major part and equity holders for a minor part. Equity holders invest in a firm with its long-term survival in mind. They distrust high-risk investments as it might lead to financial problems. The underinvestment hypothesis suggests that the zero-leverage policy is applied to reduce the underinvestment problem, as companies that do not have a debt overhang will not be faced with this situation.

The financial flexibility hypothesis on the other hand, aims to build or maintain financial flexibility. By saving their debt capacity, companies strengthen themselves to anticipate on investment opportunities or unexpected costs in the future. There is one significant difference between these two hypotheses and the financing constraints hypothesis. The underinvestment and financial flexibility hypotheses are specific strategies which inspire to adopt a zero-leverage policy. The financing constraints hypothesis is not a strategy, this is an event that happens because of a lack of external financing (Dang 2013).

A certain stage in the life cycle of a family firm or age of a firm has a noteworthy importance too. For example, due to passing ownership over to next generations, a strongly focused ownership can transform to a scattered ownership. With a dispersed ownership the pecking order of financial sources can change (Acedo-Ramírez et al., 2017). Furthermore, firm size is mentioned in previous studies. This can relate to the financing constraints theory, as small firms do not have a well-funded reputation in financial markets (Devos et al., 2012).

Another determinant of a zero-leverage policy is profitability, where researchers investigate if different levels of leverage have an impact on firm's profitability. Margaritis and Psillaki (2010) noted that family

firms are likely to be more profitable than non-family firms. Firms with more profit are more likely to fund their investments with internal resources and as a consequence need less external financing.

The cost of debt is another determinant. According to the pecking order framework managers prefer to issue debt when interest rates are low or when they are expected to increase (Acedo-Ramírez et al., 2017). Not only the cost of debt could determine if companies apply a zero-leverage policy but also the level of debt that companies apply. It is clear that if firms apply a zero-leverage policy, no debt is present in the firm.

Also, the sector of firms could be a potential source for applying a zero-leverage policy. Byoun and Xu (2013) included an overview of all sectors in their data. Remarkably heavy industries are not likely to be zero levered while industries active in social services do tend to be more zero-levered.

2.3 The family firm

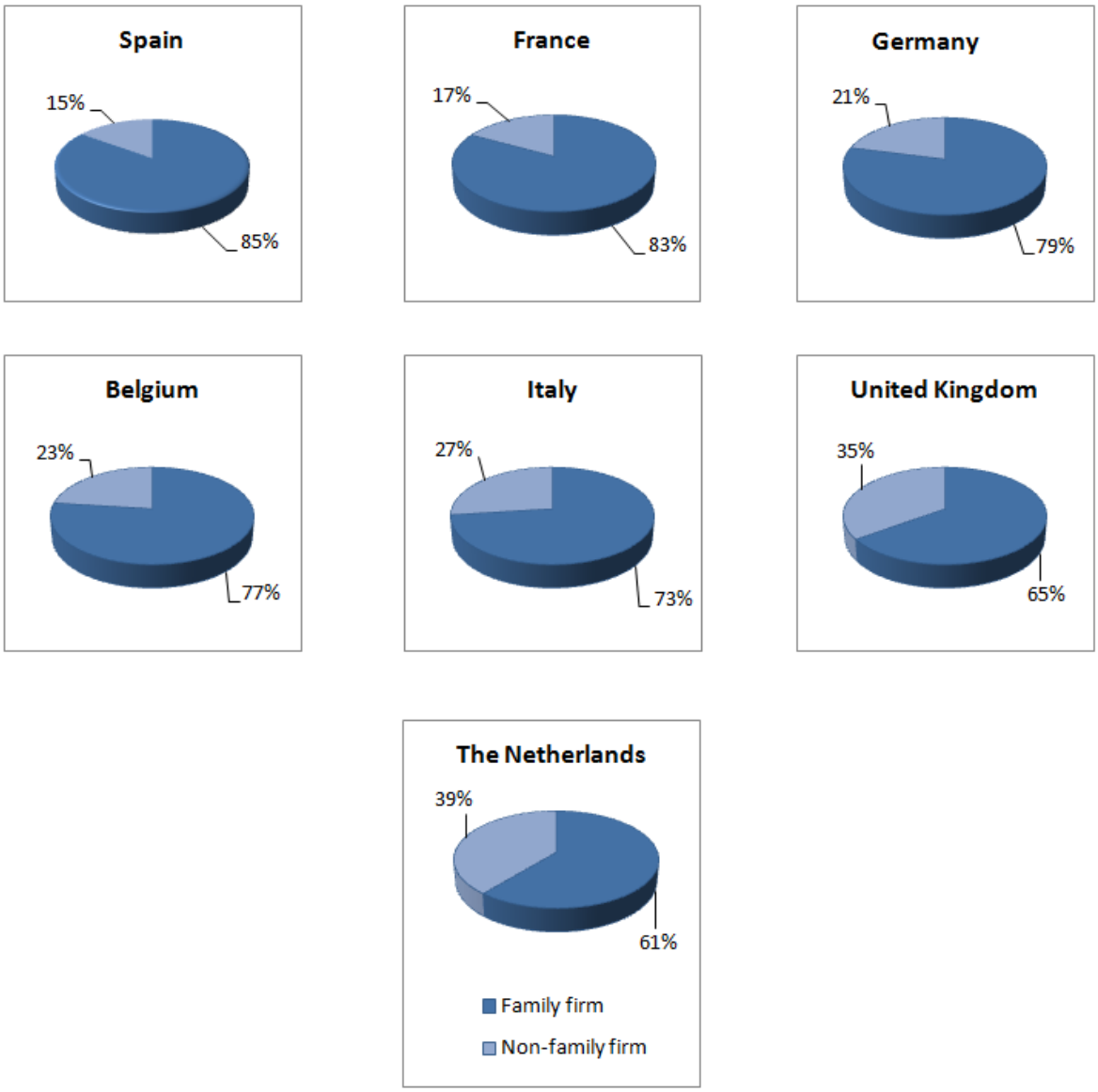
Next, the family firm's concepts and understandings will be explained. The importance of family firms in economies is well known in literature.

Ampenberger et al. (2013, p247) stated: *"family firms are the predominant organizational structure around the world"*.

Bennedsen et al. (2007, p647) affirmed: *"Family firms have gained increasing attention in the economics and finance literature because of recent research showing that the majority of firms around the world are controlled by their founders or their founders descendants'."*

It is crucial to recognise the importance of Belgian family firms as they represent a third of the total gross domestic product in Belgium (BDO, 2017). Moreover, family firms make up 77% of all companies with employees. Family firms offer a vast amount of employment opportunities to the economy. 45% of the Belgian labour market is associated with family firms. In comparison to non-family firms, family firms are generally older, smaller, more active in the construction industry, less present in the international business environment and less active in the service industry (Buysse et al., 2011). The importance of family firms has also been noted in other EU countries as illustrated in figure 1. This figure also demonstrates how Belgium generally sits in the middle as there are both EU countries with a higher or a lower share of family firms in comparison to Belgium.

Figure 1: Distribution of family firms vs non-family firms in the EU



Source: Based on Buysse et al. (2011)

The percentages indicate the distribution of companies that are a family firm or a non-family firm in each national economy.

2.3.1 Defining family firms

Because of the growing interest in family firms, an important question has risen. What are family firms and what differs them from non-family firms? This is a challenging question as there is no evident definition of a family firm. Mazzi (2011) encountered the same conclusion. She made an overview of different definitions. Most of the definitions concerning family firms work with a set of conditions. For example, Ampenberger et al. (2013) used the following conditions to categorise a family firm. At least one of the three conditions need to be satisfied to classify a firm as a family firm, (1) family ownership: the founding family has (ultimate) voting rights of at least 25%. (2) supervisory board participation: at least one member of the founding family is represented in the supervisory board. (3) Management board participation: at least one member of the founding family is appointed as a member of the management

board. Bauweraerts and Vandernoot (2013), who wrote an article that included Belgian family firms, applied the same concept of three conditions to formulate a definition of the family firm. (1) a family owns at least 50% of the firm's shares. (2) a family has a decisive influence on corporate strategies. This criterion is fulfilled if management is mainly exercised by family. (3) the majority of the board is composed of family members. The similarities between the conditions of Bauweraerts and Vandernoot and Ampenberger et al. are manifest. In both condition series, there is an inclusion of ownership and power for the family to govern the company and make decisions. It is remarkable that the conditions of the Belgian study are stricter than the previously mentioned conditions. The similarities between the two series of conditions find support at the study of Litz (1995) who mentioned that the definition of a family firm exists of two core elements, namely (1) significant equity ownership of the business by the family and (2) involvement of family members in the management of the firm. There is research of Cassar et al. (2000) that concludes that family involvement in management is a significant component for family firms. Nevertheless, a commonly acknowledged definition for a family firm has yet to be found (Mazzi, 2011)

An interesting point of view in relation to the structure of family firms is given by Tagiuri and Davis (1996). They introduced the concept of the bivalent attributes. This concept is based on two or more individuals being simultaneously members of both "owning family" and "management team" within the company, making it family controlled. Family firms have specific characteristics creating both advantages and disadvantages for the firm. The overlap of three membership groups (Owners; Managers & Employees; Family members) categorize a family firm. Due to this overlap the unique features of a family firm arise with both negative and positive outcomes. An overview of the attributes and their advantages and disadvantages are exhibited in appendix 1.

2.3.2 Belgian evidence

Belgian documentation discussing family firms is very limited. Bauweraerts and Colot (2016) did write an article concerning the corporate governance and socio-emotional wealth in Belgian family firms. Colot (2015) investigated the performance of family firms in Belgium. He claims that Belgian family firms are more profitable than Belgian non-family firms, nevertheless his results are statistically insignificant. Moreover, this study states that Belgian family firms have more debt than non-family firms. A third noticeable article of Van Gils et al. (2004) sheds light on environmental uncertainty and strategic behaviour in Belgian family firms. Bauweraerts and Vandernoot (2013) concluded in their study about tax aggressiveness that Belgian family firms are more tax aggressive than non-family firms in Belgium. To summarize, no previous research concerning zero-leverage policy in Belgian family firms has been executed yet. Hence why this study contributes to the research environment.

2.3.3 Zero-leverage in family firms

There are several indications in prior articles that family firms tend to be more cautious regarding debt than non-family firms. Anderson et al. (2003) stated that bond investors view founding family ownership as an organizational structure that better protects their interests. Strebulaev and Yang (2013) mentioned that family-controlled firms can be expected to follow a conservative debt policy. Family firms tend to protect their firms better than non-family firms because they want to safeguard the future of their descendants. Ampenberger et al. (2013) expect lower debt ratios in family firms as there are two negative effects of debt for family firms. First the increasing risk of bankruptcy with a rising debt. Second with a higher level of debt, the likelihood of losing control over the family firm is higher.

In academic literature there is a big contradiction whether family firms are more or less levered than non-family firms. Strebulaev and Yang (2013) demonstrated in their research that family firms are 6% more likely to be zero-levered than non-family firms. Ampenberger et al. (2013) make the same conclusion for the German economy; family firms are more likely to be less levered than non-family

firms. Additionally, Margaritis and Psillaki (2010) discovered that French family firms that are active in the industrial sector are less levered than non-family firms in the same sector.

In contradiction to all these conclusions, some authors do not have similar outcomes. Anderson and Reeb (2003) confirmed that the difference in leverage between family firms and non-family firms in the United States of America is quasi-ignorable. As a matter of fact, family firms in Canada have a significantly higher level of leverage compared to non-family firms. On average, Canadian family firms are 2.2% more levered than Canadian non-family firms (King and Santor, 2008). Acedo-Ramírez et al. (2017), who investigated the Spanish economy found that family firms are more levered than non-family firms.

As previously stated, there is no definite consensus in prior literature whether family firms are more or less levered than non-family firms.

3 Hypotheses

In most family firms there is hope that the firm will remain in the ownership of the family and will be transferred along to the next generations to come (Antoniou et al., 2008). Furthermore, family firms are afraid to lose control over their firm (Ampenberger et al., 2013). Moreover, Anderson et al. (2003) mentioned that bond investors view founding family ownership as an organizational structure that better protects their interests. Therefore, the use of equity financing of third parties will be minimised. This is in accordance with the pecking order theory. Issuing external equity is after issuing external debt the last possibility when a company is looking for funding (Myers, 1984). As mentioned by King and Santor (2008), family firms may issue more debt to grow assets without diluting ownership. For family firms the option of issuing financial debt seems the best option as they maintain the control over the firm. Through this policy it will not be possible for third parties to get involved in the decision making and governance of the firm. Additionally, Belgium is a bank based economy, only 202 firms are publicly owned (Euronext, 2017). This makes it a rational choice for Belgian family firms to issue debt at financial institutions. Furthermore, Belgian family firms are more tax aggressive than non-family firms (Bauweraerts and Vandernoot, 2013). By issuing debt, a firm will have to pay interests. These interests can be deducted from the tax basis which results in lower taxes. Consequently, tax aggressive firms would like a reasonable amount of debt as it gives them the opportunity to lower their taxes through interest expenditures. Previously, family firms have been recognised as more levered than non-family firms. As for example Canada where family firms are on average 2,2% more levered than non-family firms (King and Santor, 2008) and Spain (Acedo-Ramirez et al. 2017). Although the opposite has been proven as well for example by Strebulaev and Yang (2013) and Ampenberger et al. (2013).

Hence why hypothesis one has been developed to test whether family firms are less inclined to be zero-levered than non-family firms.

Hypothesis 1: Family firms are less inclined to be zero-levered than non-family firms.

As a second hypothesis the difference within family firms will be examined focusing on the age of family firms. Devos et al. (2012) investigated why firms are unlevered. One of the aspects of zero-levered firms they found, was that young firms are more likely to be zero-levered because they are not able to attract investors due to the lack of a good reputation. On the other hand, Acedo-Ramírez et al. (2017) perceived a decrease in debt during the life cycle of family firms. According to Acedo-Ramírez et al. (2017), younger family firms tend to be more levered than older family firms, as younger family firms need more debt to grow. The contradiction between Devos et al. (2012) and Acedo-Ramírez et al. (2017) makes it even more interesting to investigate how the difference in age of Belgian family firms affects the level of debt.

The boundary between a young and an old company is based on the findings of the research of Buysse et al. (2011) They reported that 52% of Belgian family firms are younger than 20 years old meaning 48% of the Belgium family firms are 20 years and older. Hence why young companies are classed as companies under the age of 20 and old companies are classed above the age of 20. The expectation for this second hypothesis follows the logic of Acedo-Ramírez et al. (2017) as young firms need capital to establish their business and core business. If young firms want to grow with only internal financing, they must be really successful in the beginning of the enterprise and have high profits on a recurring basis.

Hypothesis 2: Older family firms are more inclined to be zero-levered than younger family firms.

4 Data and variables

4.1 Data

All data are collected from Belfirst, a database that consists of financial and economic information about Belgian and Luxembourgian commercial companies but only the information concerning Belgian firms were used.

General conditions were introduced to create narrower data. The research focuses on privately owned companies as the number of publicly owned companies is very limited; only 202 Belgian firms are listed on the Euronext Brussels (Euronext, 2017). A thorough sample could not be made as the number of companies listed is not vast enough. The data do not include financial institutions due to their complicated financial structure and different regulations. This is a general consensus in the research environment of capital structure (Dang, 2013; Byoun and Xu, 2013; Devos et al., 2012; Huang et al., 2017; Strebulaev and Yang, 2013; Acedo-Ramírez et al., 2017). The next sectors are therefore removed from the sample, NACEbel code 64 financial service activities, except insurance and pension funding; NACEbel code 65 insurance, reinsurance and pension funding, except compulsory social security; NACEbel code 66 activities auxiliary to financial services and insurance activities.

A total of nine years was investigated using data from 2008 up to 2016. 2008 has been selected as the starting point of the time period as it measures the companies at the beginning of the most recent financial crisis. In addition, 2016 is the latest and most comprehensive data available. Furthermore, criteria recommended by the European Commission (2003/361/EC) have been used to exclude micro-firms. Only companies that have a minimum turnover of €2.000.000 and a number of employees that is equal or greater than ten, were selected. Micro-firms are not included in this study as they are often composed of one individual and do not have a fixed organisational structure developed yet (Acedo-Ramírez et al., 2017). Another restriction of the data is that companies must provide information concerning their level of debt for the nine investigated years. Without this restriction it would obviously not be possible to execute a study concerning the zero-leverage phenomenon. The final sample consists of 62.631 year observations.

4.2 Variables

4.2.1 Dependent variables

The first dependent variable is a dummy variable which indicates if the firm has a zero-leverage (ZL) policy or not. Previous studies have had different definitions of this dependent variable. Strebulaev and Yang (2013) used book leverage ((long term debt + short term debt)/total assets). Byoun and Xu (2013), Huang et al. (2016) and Devos et al. (2012) defined the dependent ZL dummy as long-term debt + short term debt. However, regarding the collected data it is not possible to apply the two above mentioned methods. There are none or too few companies that fulfil these conditions as illustrated in figure four. Hence why in this paper the dependent ZL variable is based on long term debt only, this method is also used by Strebulaev and Yang (2013) as an additional regression. If long term debt equals zero, the value of the dependent dummy variable equals one and vice versa.

The aim of the second and third dependent variable is to elaborate the research and provide interesting information regarding the zero-leverage phenomenon and verify the robustness of the main regression. As in the first regression the dependent variable is a dummy variable but based on the financial debt

ratio of firms (financial debt/total assets). Financial debt is an adequate measure to investigate zero-leverage in this study as the Belgian economy acts in a bank-based economy (Ampenberger et al. 2013). This dummy variable will be used in two different percentages 0 and 5 percent. The 5% financial debt ratio refers to almost zero-leverage (AZL) firms. Firms can be almost zero-levered due to practical reasons. The criterion of five percent is also applied by Strebulaev and Yang (2013). If the financial debt ratio does not exceed 0% resp. 5%, the dependent dummy variable equals 1.

The fourth dependent variable is a continuous variable instead of a dummy variable. The financial debt ratio will be the continuous dependent variable. With this different approach it might be possible to understand which variables cause a higher level of financial debt and compare these results with the categorical dependent variables. Huang et al. (2016) introduced the idea of adding a robustness check with a continuous dependent variable as leverage-ratio decision might not be discrete but continuous. There are some important differences between the binary dependent variables and the continuous dependent variable. The continuous dependent variable financial debt ratio does not measure specifically for zero-leverage. Furthermore, the continuous variable has been winsorized on a 0,22% level. This may seem as an odd level to execute a winsorization but this specific level eliminates all outliers above one and below zero. Financial debt ratio values are limited between zero and one, hence a tobit regression model is preferred as the observations are situated between zero and one (Mcbee, 2010).

4.2.2 Explanatory variables

The aim of the explanatory variable of the first regression is to identify family firms. Based on the literature study it can be affirmed that there are two main aspects to define a family firm. Family firms are characterised by significant equity ownership of the business by the family and involvement of the family members in management or board of the firm (Litz, 1995). To transform the idea of a family firm to a sample, more strict conditions must be fulfilled. The first condition involves the degree of ownership. One or more shareholders together must own at least 50% or more of the company's shares which gives the family ultimate ownership of the firm. This condition is in accordance with the studies of Acedo-Ramírez et al. (2017); Bauweraerts and Vandernoot (2013); and Westhead and Howorth (2007). To touch the second aspect of a family firm, only firms where manager(s) or board member(s) are shareholder(s), will fulfil the second condition. However, the collected data from Belfirst was inaccurate and incomplete. It was not possible to identify family firms using this methodology. A different approach had to be adopted. Excessive research showed that various studies concerning Belgian family firms faced the same problem. Multiple dissertations referred to the studies of Professor doctor Voordeckers and professor doctor Van Gils. They came up with alternative conditions for identifying family firms. They used four conditions; if one of the conditions was fulfilled, the firm was expected to be a family firm. (1) The name of the company is the same name as the last name of one of its directors. (2) The company consists of more than one director where at least two of them have the same last name. (3) The legal address of the company is the same as the address of one of its directors. (4) At least two directors do not have the same last name but do live at the same address (Voordeckers and Van Gils, 2003). The application of these conditions results in a better outcome of family firms. Nonetheless, after investigating the sample of family firms it appears that a combination of condition one, two and four provide the best and most accurate sample of family firms. As a result, 286 firms are identified as family firms. The dummy family firm is written down as *FF dummy*. A value of one indicates a family firm.

The second hypothesis has two explanatory variables. Namely, *old family firm* and *young family firm*. The aim of these two variables is to investigate if there is a substantial difference between young family firms and old family firms and how they apply a zero-leverage policy. The variable *old family firm* is a dummy variable that turns in to one if two conditions are fulfilled; the firm is a family firm and 20 years or older. The variable *young family firm* is a dummy variable that turns in to one if two conditions are fulfilled; the firm is a family firm and younger than 20 years old.

4.2.3 Control variables

To verify if there are other factors that influence the dependent variable, control variables are added to the regression. The control variables are derived from the studies of Dang (2013); Acedo-Ramírez et al. (2017); Strebulaev and Yang (2013); Devos et al. (2012) and Ampenberger et al. (2013). The natural logarithm has been taken to reduce the number of outliers of the following control variables: *average nr of employees, tangible assets, total assets* and *turnover.*

Table 1: Control variables

Variable	Description
AGE	Measured as the time elapsed between the date of incorporation and 2018.
CASHFLOW	The net amount of cash and cash-equivalents being transferred into and out of a business.
CURRENT PROFIT OR LOSS AFTER TAXES	Controls for possible influence of profitability.
INVESTMENT	Measures the number of euros the company has invested in each specific year.
LOG AVERAGE NR EMPLOYEES	Natural logarithm based on average number of employees of a business.
LOG TANGIBLE ASSETS	Natural logarithm based on the tangible assets present in an enterprise.
LOG TOTAL ASSETS	Natural logarithm of the total assets as representation of the size of the balance sheet.
LOG TURNOVER	Natural logarithm of the turnover represents the sales or revenue of a business.
TAXATION	Represent the amount of taxes that a company has paid in each specific year.

5 Research methodology

This study involves multiple multivariate analyses regressions with various dependent variables. For each hypothesis a general regression is executed, followed by robustness checks. In this study the data consist of different companies that will be assessed multiple times through the given time period of nine years also known as panel data. On the other hand, all dependent variables are limited between zero and one. Three out of four dependent variables are binary variables with outcome one or zero. The fourth variable is a continuous variable with values between zero and one, which results in a logit panel data model for the binary variables as one will need a non-linear function which ensures that predicted response probabilities are between zero and one (Andreß et al., 2013). Strebulaev and Yang (2013), who investigated the mystery of zero-leverage firms, also executed multivariate logit regressions. A tobit panel data model is perfectly suited for the continuous dependent variable, as many observations are situated at the borders of the variable (Mcbee, 2010).

There are three possibilities to deal with panel data; pooled estimations, fixed effects estimations and random effects estimations. The pooled model will not be used in this study as it assumes that no heterogeneity is present between the individual firms or throughout the nine years. As a consequence, pooled estimates are often biased and inefficient. Hence from a statistical point of view it is better to use an estimation technique that accounts for the panel character of the data as fixed effects or random effects. Fortunately, Hausman's specification test helps to decide between random effect or fixed effect estimation. The Hausman test indicated that a fixed effects regression was suited for the model. However, after running a fixed effects regression, no estimates were found for the explanatory variables, while the explanatory variables of a random effects regression were significant. Hence why the random effects have been applied to the regressions even though the estimates are less efficient and minorly biased (Andreß et al., 2013).

Next, multicollinearity between independent variables is verified through a Pearson correlation matrix. Correlation values higher than 0,5 are examined and if necessary, variables are removed from the model to decrease multicollinearity. Heteroskedasticity will be tested with the equality of variance test, more specifically the Levene's test. This test showed that heteroskedasticity is present in the model. Consequently, all models are estimated with robust standard errors. The Wald statistic will be used to determine the significance of individual variables, a significance of $< 0,05$ is required. A pseudo R^2 will be used to measure the fit of the model as for example the pseudo R^2 of McFadden (Gujarati and Porter, 2009) or Akaike's information criterion (Andreß et al., 2013).

Every computation is completed with either the statistical program Stata or EViews.

6 Results

In this part of the study, results will be displayed and described. Firstly, a section concerning the descriptive statistics is provided. Secondly, results concerning the first and second hypothesis will be discussed.

6.1 Descriptive statistics

The aim of the descriptive statistics is to familiarize with the data and understand the data. The data has in total 62.631 year observations, which correspond to 6959 firms.

Table 2: Minimum and maximum

	family firm	non-family firm	family firm	non-family firm
	Minimum	Minimum	Maximum	Maximum
Fin debt	0,00	0,00	0,72	1,00
Fin debt zl 0%	0,00	0,00	1,00	1,00
Fin debt azl 5%	0,00	0,00	1,00	1,00
LT debt 0	0,00	0,00	1,00	1,00
Age	10,00	9,00	111,00	118,00
Cashflow th €	-35 302,93	-1 201 574,00	459 117,54	5 150 109,00
Current P/L after taxes th €	-55 786,49	-540 815,00	454 686,95	5 045 538,00
Investments th €	-	-	822 978,01	49 182 765,00
Log average nr employees	1,00	1,00	3,79	4,47
Log tangible assets	0,42	-1,96	5,57	6,51
Log total assets	3,32	1,70	6,30	7,75
Log turnover	3,67	3,30	6,10	7,52
Old family firm	0,00	0,00	1,00	0,00
Young family firm	0,00	0,00	1,00	0,00

Table 3: Mean and Median

	family firm	non-family firm	family firm	non-family firm
	Mean	Mean	Median	Median
Fin debt	0,09	0,10	0,06	0,01
Fin debt zl 0%	0,23	0,44	0,00	0,00
Fin debt azl 5%	0,48	0,62	0,00	1,00
LT debt 0	0,06	0,13	0,00	0,00
Age	38,16	37,12	33,00	33,00
Cash flow th €	3 023,60	5 254,81	986,36	837,84
Current P/L after taxes th €	1 535,08	2 734,62	355,14	330,08
Investments th €	5 261,74	34 797,14	-	-
Log average nr employees	1,76	1,82	1,68	1,73
Log tangible assets	3,33	3,28	3,36	3,21
Log total assets	4,20	4,19	4,60	4,08
Log turnover	4,48	4,29	4,40	4,21
Old family firm	0,86	0,00	1,00	0,00
Young family firm	0,14	0,00	0,00	0,00

Table 4: Standard deviation and number of observations

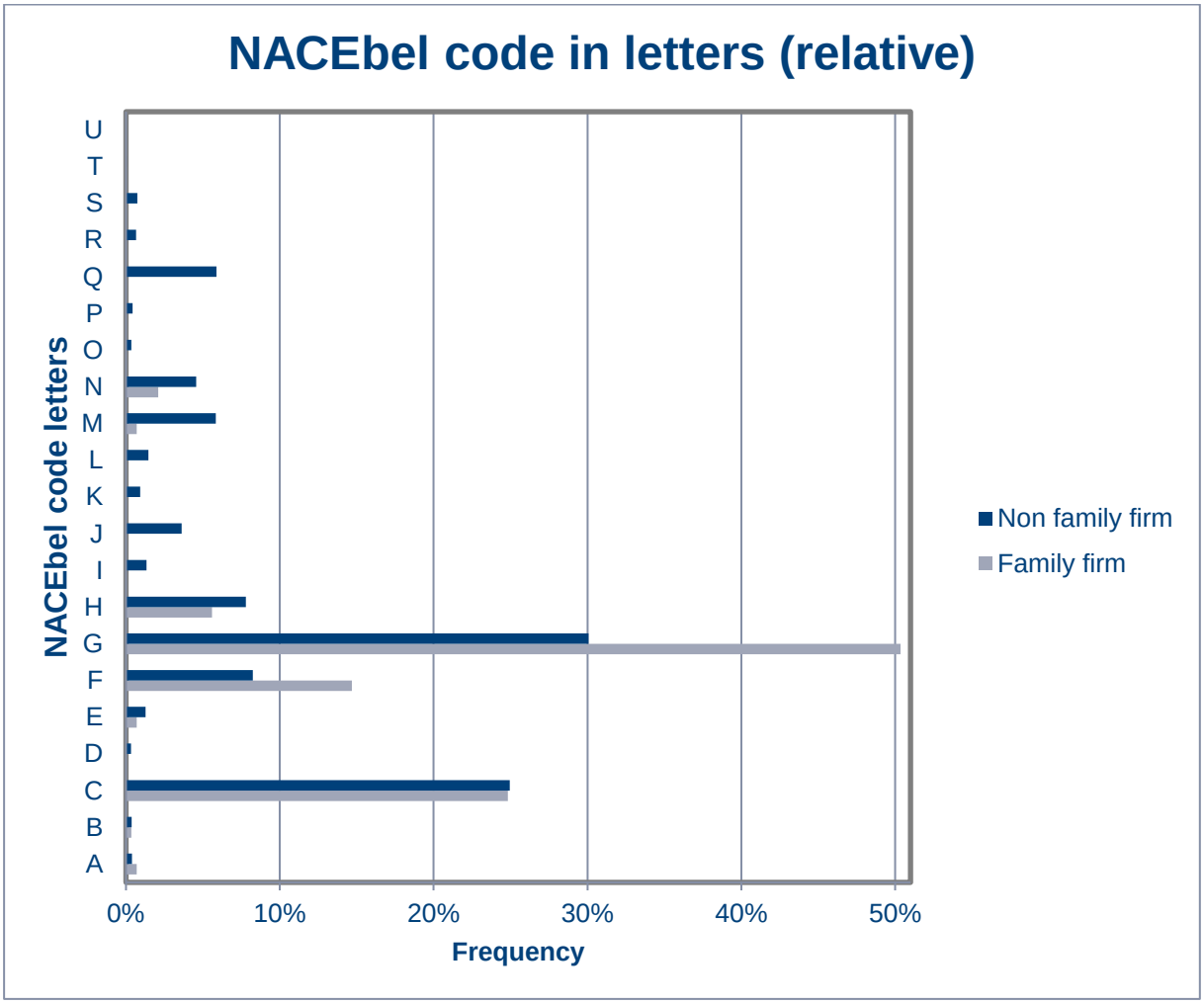
	family firm	non-family firm	family firm	non-family firm
	Std. Deviation	Std. Deviation	Observations	Observations
Fin debt	0,11	0,17	2 574,00	60 056,00
Fin debt zl 0%	0,42	0,50	2 574,00	60 056,00
Fin debt azl 5%	0,50	0,49	2 574,00	60 056,00
LT debt 0	0,24	0,33	2 574,00	60 057,00
Age	19,15	18,86	2 574,00	59 940,00
Cash flow th €	14 825,31	64 476,40	2 572,00	59 648,00
Current P/L after taxes th €	12 489,15	45 488,56	2 574,00	60 036,00
Investments th €	52 277,97	726 006,50	2 567,00	57 419,00
Log average nr employees	0,41	0,48	2 574,00	60 057,00
Log tangible assets	0,56	0,88	2 573,00	59 415,00
Log total assets	0,42	0,63	2 574,00	60 057,00
Log turnover	0,36	0,54	2 574,00	60 057,00
Old family firm	0,35	0,00	2 574,00	0,00
Young family firm	0,35	0,00	2 574,00	0,00

The tables above display the mean, median, maximum, minimum, standard deviation and the amount of observations of each variable. As one can see, the columns are based on two categories within the data sample, family firms and non-family firms. Only 286 firms out of the 6959 firms are family firms.

Complementary, family firms and non-family firms are compared on different aspects to understand how the two categories relate to each other. First a relative dispersion of the industry sectors in each category is displayed in figure two. The industries are presented with the NACEbel code letters. The definition of each category and the composition of each category can be found in appendix two. A closer look at figure two shows that both categories are almost equally distributed. There are a couple of elements

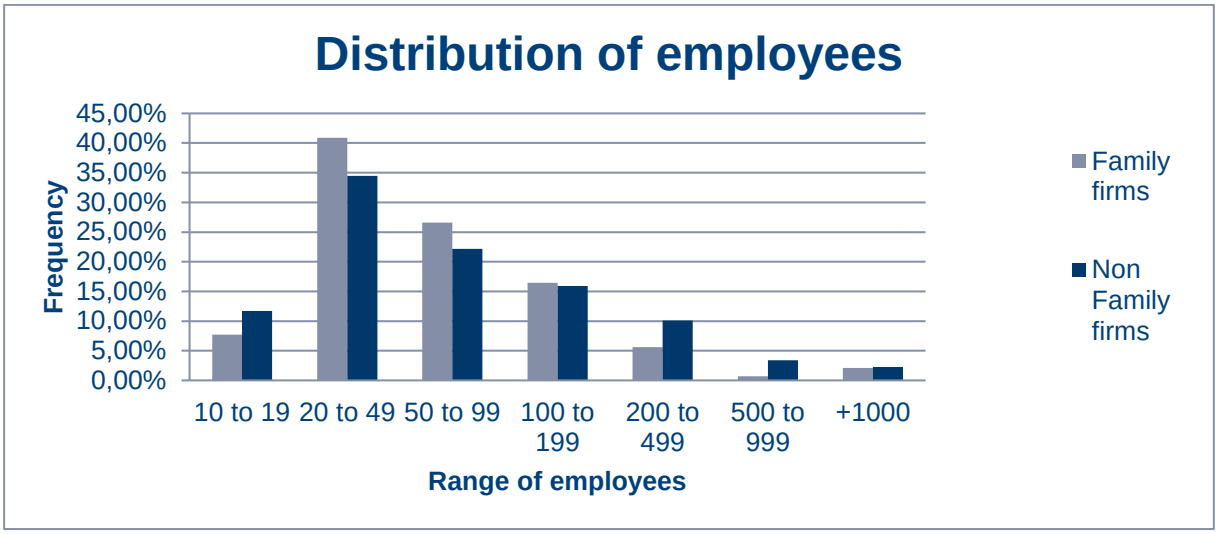
that should be pointed out. Both categories are represented in the most frequent industry groups. Although they are not completely equally distributed. The category of family firms is relatively more represented in industry group G and F. Since family firms are a minority in our sample, family firms are not represented in each different industry group. As a matter of fact, family firms are absent in industry groups T, S, R, Q, P, O, L, K, J and I. However, the presence of the non-family firms is also very limited in these industry groups.

Figure 2: Comparison of sectors



Next the size of family firms and non-family firms is compared. Three measures of size are considered to make the comparison, namely average amount of employees, total assets and turnover. These three variables of size are also mentioned in the recommendation of the European Commission (2003/361/EC). All graphs are based on year observations. To compare the average amount of employees between the two categories, ranges of the average numbers of employees have been created. As a result, the graph is clearly visible and easier to interpret. In both categories most firms employ on average 20 to 49 employees. There is a declining trend as the graph moves to enterprises employing more than one thousand employees on average. Both categories are almost equally distributed. The graphs that provide visual information regarding the total assets and turnover can be found in appendix three. Whereas the distribution of the number of employees is quite equally distributed, the distribution of total assets and turnover is absolutely not equally distributed. On the left-hand side of the graph is a high frequency of either total assets or turnover, followed by many values counting few observations, which leads to very right-skewed variable distributions.

Figure 3: Distribution of employees



Subsequently a more detailed overview of the dependent and feasible dependent variables is given. Previously book leverage 0% and 5%, long term debt + short term debt, long term debt, financial debt ratio 0% and financial debt ratio 5% have been mentioned as possible dependent variables based on prior literature. However, as figure 4 shows, not every dependent variable is suitable. The most used dependent variable in preceding literature in regards to the zero-leverage phenomenon is long term debt + short term debt. However, there is no single year observation that has a value of zero. Consequently, it is not possible to run a maximum likelihood regression. The same findings are present at dependent variable book leverage 0%. The other dependent variables do have observations that fulfil the conditions. Nevertheless, an important side note has to be made. The number of observations that meet the conditions at book leverage 5% is very limited. By executing a maximum likelihood regression with this dependent variable, the problem of rare events will occur. One speaks of a rare event if the frequency of the event ranges from 0,1% to less than 10% (Qiu et al., 2013), resulting in biased estimates. The remaining dependent variables have sufficient observations, so there is no danger of rare events bias. Hence why financial debt 0%, financial debt 5% and long-term debt are chosen as efficient dependent variables in this study. The fourth continuous dependent variable financial debt is not included in this figure as it has a value for each observation. Figure four represents the differences between family firms and non-family firms.

Figure 4: Categorical dependent variables (relative)

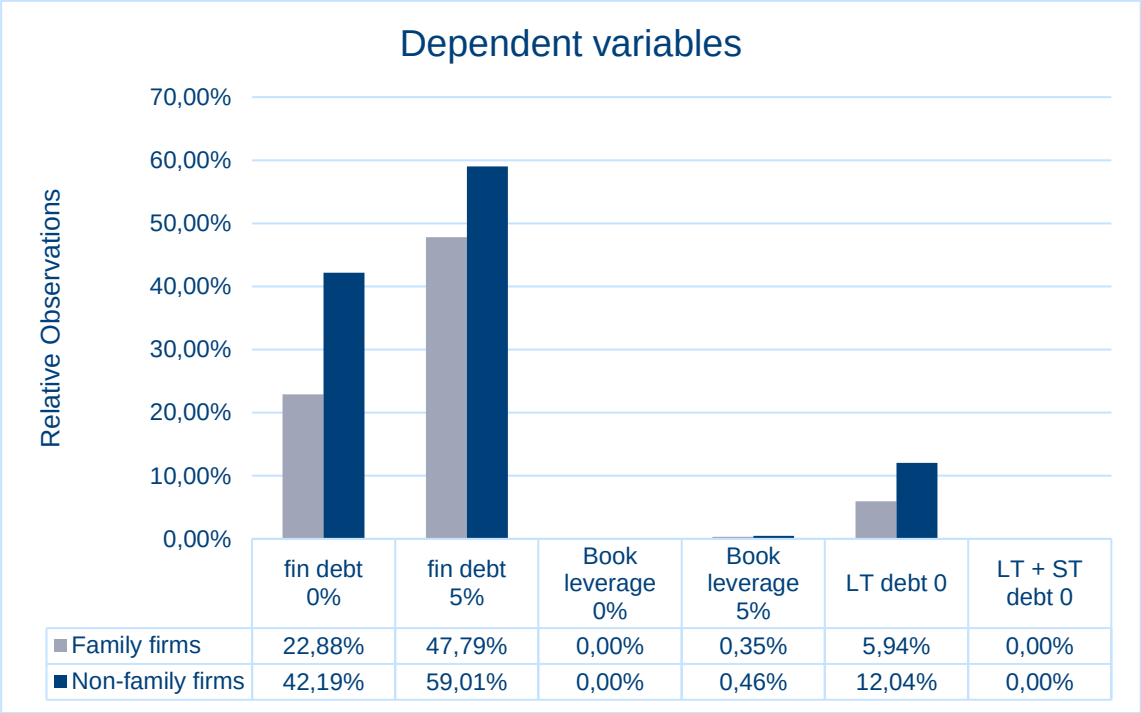


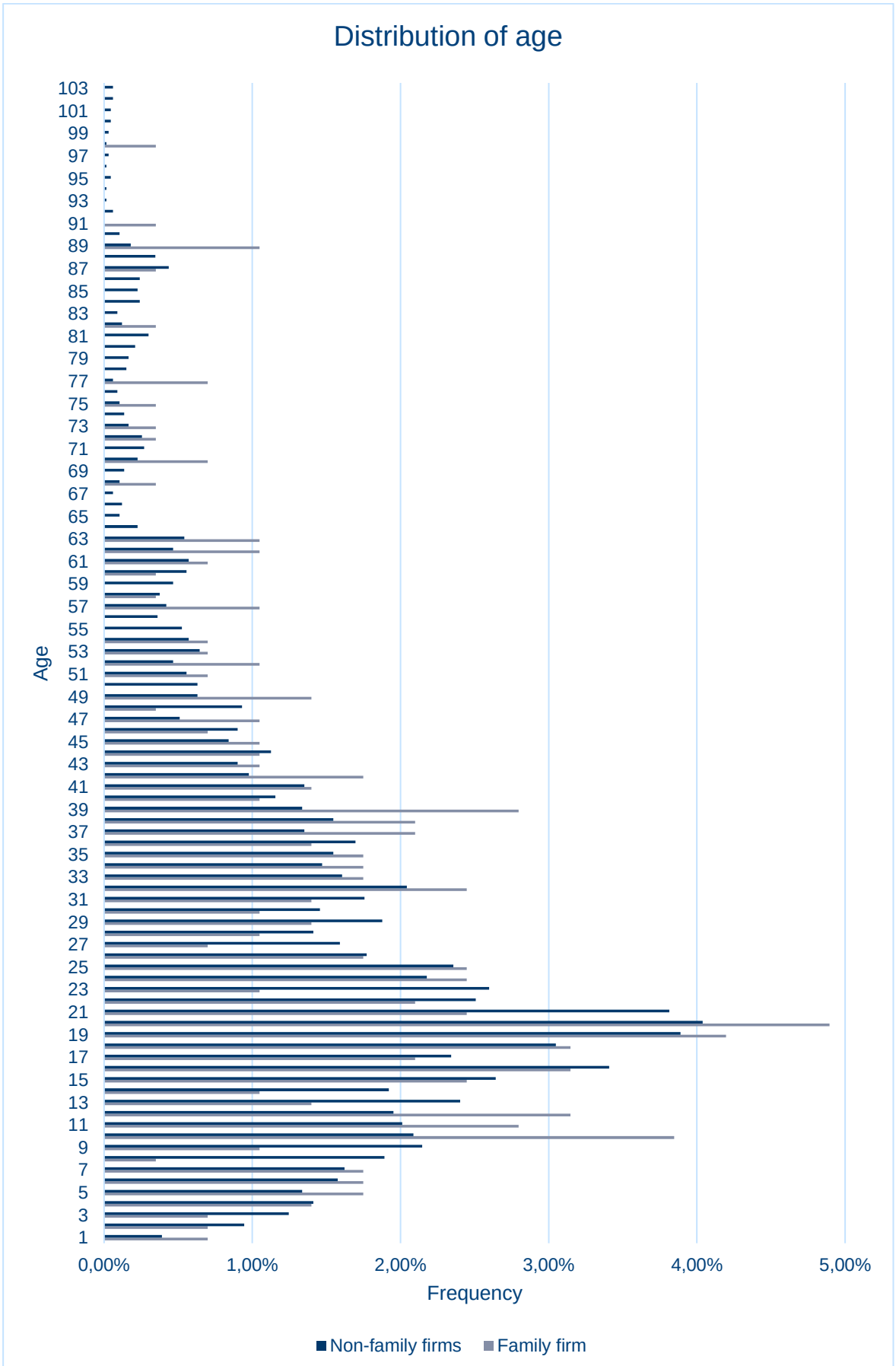
Table 5 represents the numbers of zero-levered or almost zero-levered firm's year observations for family and non-family firms. The chance of an event happening or not is expressed as odd, well known from gambling practices. Where the numerator holds the number of successful events and the denominator the number of unsuccessful events. Odds can obtain values between zero and plus infinity. When the odds are lower than one, the probability of a successful event is below 50%. On the other hand, odds greater than 1 represent a probability greater than 50%. One can conclude that for family firms the probability of applying a zero-leverage or an almost zero leverage policy is less than 50%. Whereas for the non-family firms the probability of an almost zero-leverage policy is greater than 50% yet for a zero-leverage policy less than 50% (Andreß et al., 2013).

Table 5: Categorical dependent variables (absolute)

	fin debt zl 0%	fin debt azl 5%	LT debt 0
Family firms	589	1 230	153
Non family firms	26 424	36 958	7 540
Odds family firm	0,30	0,92	0,06
Odds non family firm	0,79	1,60	0,14

The second hypothesis is heavily based on the age of family firms. Hence why more information regarding the variable age is provided. Figure 5 represents the relative frequency of age of both family firms and non-family firms. It is possible to observe an increasing trend up to the age of 20 followed by a decline. Family firms and non-family firms follow a similar trend. 50,3% of the family firms are 33 years old or younger which is very similar to non-family firms. 51,2% of non-family firms are 32 years old or younger.

Figure 5: Distribution of age



The table below displays the correlation matrix between independent variables. Correlations with an absolute value of more than 0,5 are marked in red. An absolute value of 1 means perfect collinearity. The highest correlation value between the independent variables log total assets and log turnover amounts 0,756. The very high correlation between the explanatory variables family firm and old family firm can be ignored as these two variables are not simultaneously used in a regression.

Table 6: Correlation matrix

	1	2	3	4	5	6	7	8	9	10	11	12
1 Family firm dummy	1											
2 Old family firm	0,925	1										
3 young family firm	0,367	-0,015	1									
4 Age	0,011	0,048	-0,088	1								
5 Cashflow th	0,017	0,015	0,008	0,006	1							
6 Current P/L after taxes	0,025	0,023	0,011	0,002	0,268	1						
7 Investments	-0,026	-0,025	-0,007	0,001	-0,019	-0,004	1					
8 Log averAge nr employees	-0,022	-0,025	0,003	0,004	-0,028	-0,036	0,064	1				
9 Log turnover	0,071	0,061	0,036	-0,003	-0,024	0,039	0,068	0,585	1			
10 Log total assets	0,006	0,002	0,010	0,004	-0,026	0,015	0,119	0,580	0,756	1		
11 Log tangible assets	0,036	0,031	0,018	0,017	0,016	-0,033	0,054	0,485	0,423	0,597	1	
12 Taxation	-0,020	-0,020	-0,005	-0,003	-0,014	0,035	-0,019	0,084	-0,039	0,008	0,004	1

Due to the fact that the independent variable *log total assets* has elevated correlation values with two other independent variables, *log total assets* has been removed from the model. After running the regression multiple times, the independent variables *log turnover, age* and *cashflow* have been removed from the model. These independent variables have not been removed all at once but individually. After each elimination, an assessment of the model had been made. After the exclusions, all correlation values dropped in the correlation matrix and all variables became more significant. Another problem occurs with the independent variable *taxation*. Due to missing values in the sample, the variable *taxation* consists of only 50.894 year observations. However, the variable *taxation* is significant with a p-value of 0,0363 which means that *taxation* has an explanatory effect on the choice between a zero leverage policy or a non-zero leverage policy. On the other hand, the coefficient of the variable *taxation* is very low which results in an insubstantial effect on the dependent variable. Hence for this reason, the control variable *taxation* is excluded from the regression model.

6.2 Results of hypothesis 1

6.2.1 Regression

The first hypothesis investigates if family firms are less inclined to be zero-levered than non-family firms. First a regression with dependent variable *long term debt 0* is executed. Afterwards the robustness checks with dependent variables *financial debt 0%*, *financial debt 5%* and *financial debt ratio* are executed. All regressions are run based on the whole sample.

Another aspect has to be considered before it is possible to discuss the results of the regressions, namely the interpretation of the coefficient outcomes. Whereas the interpretation of OLS coefficient outcomes is straightforward, the coefficient outcomes of a maximum likelihood estimation are less clear-cut. To make statements on how the odds change given a unit change of a particular explanatory variable, one has to compute the odds ratio. This can be achieved by taking the antilogarithms (exp) of the logistic regression. This is displayed in the outcome tables as "exp(β)". Another possibility to interpret the coefficient outcomes is by computing the change of the odds, (exp(β)−1)*100. In the outcome tables the change of the odds is displayed as "%" (Andreß et al., 2013).

Table 7: Hypothesis 1 with dependent variable LT debt 0

Variable	ß	Robust standard errors	exp(ß)	%	Prob.
FF dummy	-1,280	0,355	0,278	-72,210	0,000
Log average nr employees	-1,509	0,169	0,221	-77,892	0,000
Log tangible assets	-1,746	0,085	0,174	-82,555	0,000
Investments	0,000	0,000	1,000	-0,009	0,000
Current P/L after taxes	0,000	0,000	1,000	0,000	0,016
C	2,626	0,337	13,813	1 281,301	0,000

In table seven the logit regression with dependent variable long term debt 0 can be consulted. The explanatory variable *FF dummy* is significant and has a noticeably negative effect on the dependent variable. The odds of being a firm that has no long-term debt decreases by a factor of 0,278 if the firm is a family firm. Yet another way of interpreting the finding is with the percentage change in odds. Compared to the firms that are not zero levered, the odds of having a zero-leverage policy are 72,210% lower for family firms. All variables are significant with a p-value<0,05. The variables *current profit/loss after taxes* and *investments* are significant but their coefficient value is very low, so they do not have a meaningful influence on the dependent variable *long term debt 0*. The variables *log average number of employees* and *log tangible assets* have a substantially negative influence on the dependent variable.

6.2.2 Robustness check

The dummy variable *financial debt 0%* is used as dependent variable. As a supplementary test an almost zero leverage regression is executed with the dependent dummy variable *financial debt 5%* (Strebulaev and Yang, 2013). However, both regressions concerning the robustness check are based on binary dependent variables. Hence why the third robustness check will be executed based on a continuous dependent variable (Huang et al. 2016).

Table 8: Hypothesis 1 with dependent variable financial debt 0%

Variable	ß	Robust standard errors	exp(ß)	%	Prob.
FF dummy	-3,089	0,244	0,046	-95,447	0,000
Log average nr employees	1,644	0,170	5,178	417,805	0,000
Log tangible assets	-2,935	0,108	0,053	-94,688	0,000
Investments	0,000	0,000	1,000	-0,010	0,000
Current P/L after taxes	0,000	0,000	1,000	0,000	0,000
C	5,396	0,343	220,570	21 957,020	0,000

In the table above, the logit regression with dependent variable *financial debt 0%* can be consulted. As in the previous regression, the explanatory variable *FF dummy* is significant. It also has a negative effect on the odds of applying a zero-leverage policy. The size of the negative effect does differ from the first regression. With a value of 0,046 the odds ratio is smaller than the odds ratio of the first regression. The change of the odds is equally almost 20% lower than in the first regression. It is possible to conclude that the coefficient of the explanatory variable is robust. All variables are further significant with a p-value<0,05. There are differences regarding the direction of the control variables' coefficients in comparison to the prior regression. The coefficient of the variable *log average number of employees* has turned positive which translates as, more employees increase the odds of applying a zero-leverage policy. However, a remark has to be made concerning the change of odds of the control variable *log average nr employees*, it is very high and might be biased.

Next the second part of the robustness check will be executed by adding an almost zero-leverage regression. More specifically, the condition of the dependent dummy variable is enlarged. Instead of selecting firms with no financial debt at all, firms with up to 5% financial debt ratio are selected. Now it is possible to see if the independent variables react in the same way if a limited amount of debt is added to the capital structure.

Table 9: Hypothesis 1 with dependent variable financial debt 5%

Variable	ß	Robust standard errors	exp(ß)	%	Prob.
FF dummy	-1,328	0,261	0,265	-73,511	0,000
Log average nr employees	2,488	0,155	12,038	1 103,845	0,000
Log tangible assets	-3,676	0,122	0,025	-97,468	0,000
Investments	0,000	0,000	1,000	-0,009	0,000
Current P/L after taxes	0,000	0,000	1,000	0,001	0,000
C	8,905	0,342	7 367,274	736 627,371	0,000

In table nine the explanatory variable *FF dummy* has had a consistently negative effect on each dependent variable. The odds ratio of the explanatory variable *FF dummy* amounts 0,265. The change of odds is equal to -73,511%, which means that family firms have the same effect on almost zero-leverage policy as it has on a pure zero-leverage policy. The direction of the influence that the independent variables have on the dependent variable, either a positive or a negative effect, are

perfectly similar to the previous regression. However, one should note that the variable *log average nr employees* has increased even more as well as the constant.

The third robustness check uses a continuous dependent variable *financial debt ratio*.

Table 10: Hypothesis 1 with dependent variable financial debt ratio

Variable	ß	Robust standard errors	Prob.
FF dummy	0,021	0,014	0,115
Log average nr employees	-0,093	0,005	0,000
Log tangible assets	0,152	0,002	0,000
Investments	0,000	0,000	0,000
Current P/L after taxes	0,000	0,000	0,000
C	-0,311	0,010	0,000

Table ten represents the outcome of the continuous dependent robustness regression. All variables are significant except from the explanatory variable *FF dummy,* which is a bothersome occurrence as this makes it impossible to draw conclusions for this variable. Nevertheless, the explanatory variable family firm has a positive coefficient which is in accordance with the previous regressions. It means that if a firm is a family firm, its financial debt ratio will increase by 0,021. One could be confused as the sign of the coefficient is opposite to the one in previous regressions, but this is because in the previous regressions the binary result “one”, that was being optimised by the maximum likelihood estimation, stood for a zero-leverage policy. A negative coefficient of the variable family firm meant a decrease in the odds that a firm was zero-levered. Thus, it is possible to agree with hypothesis one, family firms are less likely to adopt a zero-leverage policy.

6.3 Results of hypothesis 2

6.3.1 Regression

The second hypothesis is as following: *Older family firms are more inclined to be zero-levered than younger family firms.* The same structure is applied as with the discussion of the first hypothesis. First a regression is completed with dependent dummy variable *long term debt 0*. Afterwards, robustness checks are executed to control for possible changes of the explanatory variables. The dependent variables that are used for the robustness checks are the same as in hypothesis one. The regressions are based on the whole sample.

Table 11: Hypothesis 2 with dependent variable LT debt 0

Variable	ß	Robust standard errors	exp(ß)	%	Prob.
Young Family firm	-1,091	0,823	0,336	-66,406	0,185
Old Family firm	-1,315	0,390	0,268	-73,159	0,001
Log average nr employees	-1,518	0,169	0,219	-78,075	0,000
Log tangible assets	-1,743	0,085	0,175	-82,502	0,000
Investments	0,000	0,000	1,000	-0,009	0,000
Current P/L after taxes	0,000	0,000	1,000	0,000	0,017
C	2,629	0,337	13,863	1 286,270	0,000

Table 11 represents the logit regression with dependent variable *long term debt 0*. Only one of the two explanatory variables is significant, namely *old family firm*. Nevertheless, it is interesting to have a look at both results. These results show that old family firms are more in favour of applying a zero-leverage policy. The difference between the variables *young family firms* and *old family firms* amounts 0,068 odds ratios or 6,753% change of the odds. All variables except the explanatory variable *young family firm* are significant. The direction of the influences of the control variables is the same as in hypothesis one.

6.3.2 Robustness check

The dummy variable *financial debt 0%* is used as dependent variable. As a supplementary test an almost zero leverage regression is executed with dependent dummy variable *financial debt 5%* (Strebulaev and Yang, 2013). However, both regressions concerning the robustness check are based on limited dependent variables. Hence why the third robustness check will be executed based on a continuous dependent variable (Huang et al. 2016).

Table 12: Hypothesis 2 with dependent variable financial debt 0%

Variable	ß	Robust standard errors	exp(ß)	%	Prob.
Young Family firm	-4,481	0,573	0,011	-98,868	0,000
Old Family firm	-2,864	0,264	0,057	-94,295	0,000
Log average nr employees	1,642	0,170	5,167	416,684	0,000
Log tangible assets	-2,938	0,108	0,053	-94,701	0,000
Investments	0,000	0,000	1,000	-0,010	0,000
Current P/L after taxes	0,000	0,000	1,000	0,000	0,000
C	5,403	0,344	222,154	22 115,404	0,000

The first robustness check with dependent variable *financial debt 0%* can be found in table 12. In comparison to the regression with the dependent variable *long term debt 0* all variables are significant, including the explanatory variable *young family firm*. However, in the regression the explanatory variables relate differently to each other. Here young family firms are less inclined to adopt a zero-leverage policy than older family firms. A possible explanation could lie in the small difference of the dependent variables. *Long term debt 0* consists partly of financial debt complemented with other

commercial debts whereas *financial debt 0%* only considers financially related debts. This is related to the findings of Acedo-Ramírez et al. (2017) that young family firms issue more debt to invest in their company and expand their activities. Moreover, as the Belgian economy is a bank based economy, one could state that the information asymmetry between financial institutions and the firm is not as big as in public capital markets. One could argue that the financing constraints hypothesis is less valid in this case, because financial institutions will demand every detail about a firm before they will grant a loan. Furthermore, the change of sign and substantial increase of the variable *log average nr employees,* is remarkable.

Table 13: Hypothesis 2 with dependent variable financial debt 5%

Variable	ß	Robust standard errors	exp(ß)	%	Prob.
Young Family firm	-2,207	0,641	0,110	-88,994	0,001
Old Family firm	-1,184	0,282	0,306	-69,401	0,000
Log average nr employees	2,476	0,156	11,895	1 089,518	0,000
Log tangible assets	-3,682	0,122	0,025	-97,483	0,000
Investments	0,000	0,000	1,000	-0,009	0,000
Current P/L after taxes	0,000	0,000	1,000	0,001	0,000
C	8,941	0,343	7 637,228	763 622,808	0,000

The second robustness check with dependent variable *financial debt 5%* can be found in table 13. The dependent variable *financial debt 5%* represents the almost zero-leverage phenomenon. All variables are significant with a p-value<0,05. Again, the explanatory variable *young family firm* is less inclined to be almost zero-levered than the variable *old family firm*. The same reasoning could be applied as in the previous robustness check of hypothesis two. Younger firms need more funding to expand their business. Concerning the other independent variables, note the big increase of *log average nr employees*.

Table 14: Hypothesis 2 with dependent variable financial debt ratio

Variable	ß	Robust standard errors	Prob.
Young Family firm	0,038	0,035	0,280
Old Family firm	0,018	0,015	0,206
Log average nr employees	-0,092	0,005	0,000
Log tangible assets	0,152	0,002	0,000
Investments	0,000	0,000	0,000
Current P/L after taxes	0,000	0,000	0,000
C	-0,313	0,010	0,000

The fourth and last robustness check is based on the continuous dependent variable *financial debt ratio*. According to the coefficients of the explanatory variables, young family firms have more debt than old family firms. However, both explanatory variables are statistically insignificant which means their

outcome can not be interpreted. All the other variables are significant. Only variable *log average nr employees* has a negative effect on the dependent variable *financial debt ratio*.

Figure 6: Interpretation of dependent variables hypothesis 2

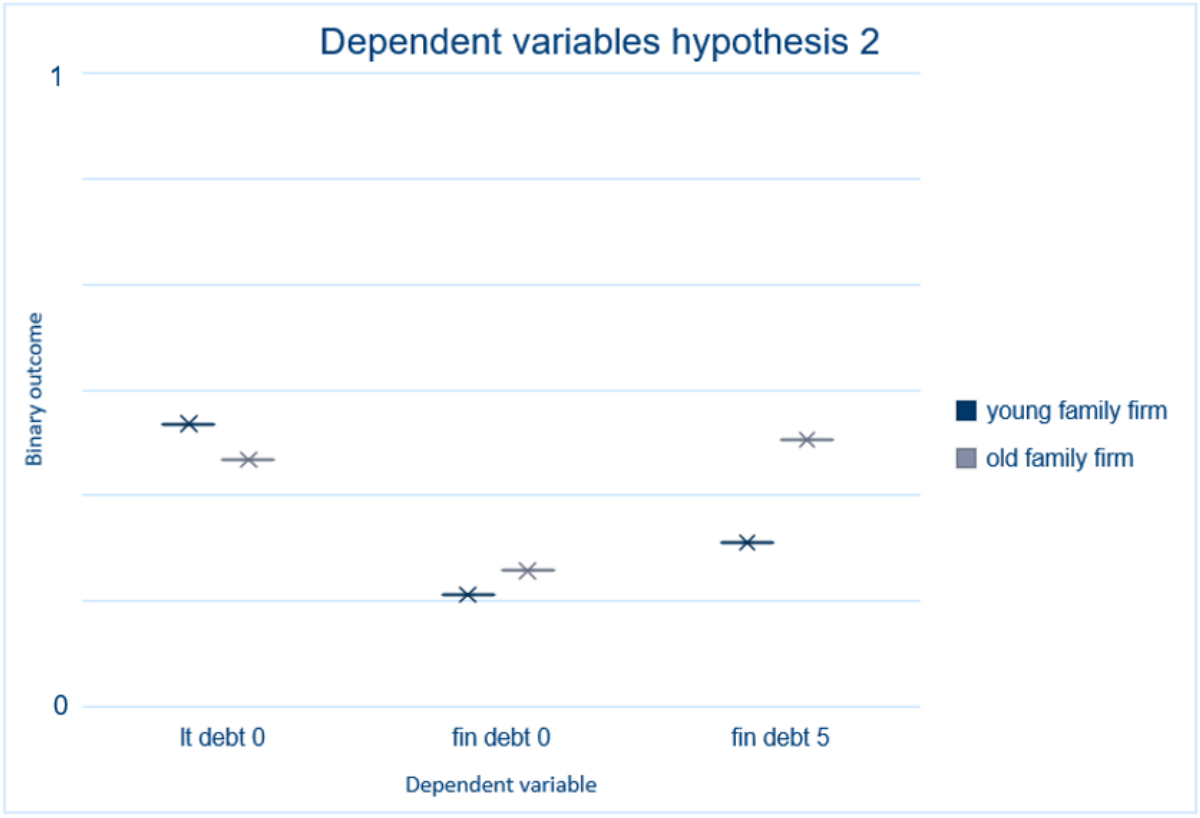


Figure six displays a visualisation of the effects of the explanatory variables *young family firms* and *old family firms* on the relevant dependent variables. On the y-axis, the binary outcome can be found. A value of one represents a zero-leverage or almost zero-leverage policy. A value of zero represents a levered enterprise. The fourth dependent variable has not been included in this figure as the explanatory variables of the regression are not significant. One can conclude that older family firms are more inclined to be zero-levered. Consequently, young family firms are less inclined to adopt a zero-leverage policy. A possible reason for this event is given by Acedo-Ramírez et al. (2017), younger family firms need more debt to expand their company. The financing constraint hypothesis of Devos et al. (2012) is less feasible with this hypothesis as the study focuses on the Belgian market which is a bank based economy.

7 Conclusion

This research has focused on a specific topic within the research flow of capital structure, the zero-leverage phenomenon. Many articles have been written regarding the capital structure of companies whilst other studies have been completed focusing on the definitions and characteristics of family firms. However, only a few researchers have combined the subject of family firms and their capital structure in one investigation. Prior studies focused on countries and economies other than the Belgian economy. No prior research focusing specifically on Belgian family firms and their capital structure has been found, let alone Belgian family firms that apply a zero-leverage policy. Two hypotheses have been designed relating to the research topic. The first hypothesis investigated if family firms were less inclined to adopt a zero-leverage policy. In most family firms there is hope that the firm always will remain in family ownership and will be transferred to the next generations (Antoniou et al., 2008). Furthermore, family firms are afraid to lose control over their firm (Ampenberger et al., 2013). Hence, one could conclude that family firms do not want a dilution of their ownership, and would prefer external debt financing over external equity financing. The results confirm the first hypothesis. Family firms are less inclined to be zero-levered.

The second hypothesis is based on the age of family firms and states that old family firms are more inclined to be zero-levered than young family firms. An old family firm is a firm aged 20 or older. The reasoning why older family firms would be more likely to be zero-levered is due to the fact that these firms are already established and do not need additional funding to expand their business (Acedo-Ramírez et al., 2017). The financing constraint theory of Devos et al. (2012) that mentions that younger firms are more likely to be zero-levered due to the information asymmetry is not valid in this case. The Belgian economy is a bank based economy where financial institutions demand all available evidence of the firm before they grant a loan. The results of the statistical regressions where in accordance with the second hypothesis. Old family firms are more likely to adopt a zero-leverage policy than young family firms.

A few imperfections of the research have to be mentioned. Difficulties regarding data have been encountered, more specifically the identification process of family firms. Data of Belfirst were not adequate concerning ownership and shareholder information. Hence why a slightly different approach has been executed to identify family firms. A second limitation of the research has to be mentioned concerning the methodology. The statistical Hausman test indicated that the preferable technique to perform the regressions was the fixed effects technique. However, by performing the regressions with the fixed effects technique, none of the explanatory variables were significant. Hence why the random effects technique has been performed, resulting in significant values for the explanatory variables. Recommendations for further research involve a broader sample of family firms based on a questionnaire. The use of a questionnaire would increase the accuracy of the identification of family firms. Additionally, in depth interviews could be a possibility to examine the incentives of a family firms' capital structure. Further, qualitative interviews give the opportunity to scrutinize the incentives of CEO's of family firms.

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9 Appendices

9.1 Appendix 1

Table A 1: Bivalent attributes of the family firm

Disadvantages (-)	Attribute	Advantages (+)
Norm confusion and anxiety. Family business and ownership issues can get mixed up. Lack of business objectivity	**Simultaneous Roles**	Heightened family and company loyalty. Quick and effective decision-making.
A stifling sense of being overwatched. Resentment toward family and business.	**Shared Identity**	Heightened family and company loyalty. A strong sense of mission. More objective business decisions.
Family members can point out weaknesses. Early disappointments can reduce trust in work interactions.	**Lifelong Common History**	Relatives can draw out relatives' strengths and complement their weaknesses. Strong foundation can encourage a family to weather adversity.
Lack of objectivity in communication. Resentment and guilt can complicate work interactions. Covert hostility can appear.	**Emotional Involvement and Ambivalence**	Expression of positive feelings creates loyalty and promotes trust.
Can trigger sensitive reactions that can distort communication and encourage conditions for conflict.	**Private Language**	Allows for more efficient communication with greater privacy.
Can lead relatives to feel overwatched and trapped.	**Mutual Awareness and Privacy**	Improved communication and business decisions that support the business, owners, and family.
Fierce rivalries can develop between relatives.	**Meaning of the Family Company**	Company symbolism can develop a strong sense of mission for employees.

Source: Based on Tagiuri and Davis (1996)

9.2 Appendix 2

Table A 2: NACEbel 2008 Manufacturing Industry

Manufacturing Industry		
Parent code	Code	**Division**
A	01	Crop and animal production, hunting and related service activities
A	02	Forestry and logging
A	03	Fishing and aquaculture
B	05	Mining of coal and lignite
B	06	Extraction of crude petroleum and natural gas
B	07	Mining of metal ores
B	08	Other mining and quarrying
B	09	Mining support service activities
C	10	Manufacture of food products
C	11	Manufacture of beverages
C	12	Manufacture of tobacco products
C	13	Manufacture of textiles
C	14	Manufacture of wearing apparel
C	15	Manufacture of leather and related products
C	16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
C	17	Manufacture of paper and paper products
C	18	Printing and reproduction of recorded media
C	19	Manufacture of coke and refined petroleum products
C	20	Manufacture of chemicals and chemical products
C	21	Manufacture of basic pharmaceutical products and pharmaceutical preparations
C	22	Manufacture of rubber and plastic products
C	23	Manufacture of other non-metallic mineral products
C	24	Manufacture of basic metals
C	25	Manufacture of fabricated metal products, except machinery and equipment
C	26	Manufacture of computer, electronic and optical products
C	27	Manufacture of electrical equipment
C	28	Manufacture of machinery and equipment n.e.c.
C	29	Manufacture of motor vehicles, trailers and semi-trailers
C	30	Manufacture of other transport equipment
C	31	Manufacture of furniture
C	32	Other manufacturing
F	41	Construction of buildings
F	42	Civil engineering
F	43	Specialised construction activities

Source: Based on statistics Belgium: http://statbel.fgov.be/

Table A 3: NACEbel 2008 Service Industry

Service Industry		
Parental code	Code	**Division**
C	33	Repair and installation of machinery and equipment
D	35	Electricity, gas, steam and air conditioning supply
E	36	Water collection, treatment and supply
E	37	Sewerage
E	38	Waste collection, treatment and disposal activities; materials recovery
E	39	Remediation activities and other waste management services
G	45	Wholesale and retail trade and repair of motor vehicles and motorcycles
G	46	Wholesale trade, except of motor vehicles and motorcycles
G	47	Retail trade, except of motor vehicles and motorcycles
H	49	Land transport and transport via pipelines
H	50	Water transport
H	51	Air transport
H	52	Warehousing and support activities for transportation
H	53	Postal and courier activities
I	55	Accommodation
I	56	Food and beverage service activities
J	58	Publishing activities
J	59	Motion picture, video and television programme production, sound recording and music publishing activities
J	60	Programming and broadcasting activities
J	61	Telecommunications
J	62	Computer programming, consultancy and related activities
J	63	Information service activities
L	68	Real estate activities
M	69	Legal and accounting activities
M	70	Activities of head offices; management consultancy activities
M	71	Architectural and engineering activities; technical testing and analysis
M	72	Scientific research and development
M	73	Advertising and market research
M	74	Other professional, scientific and technical activities
M	75	Veterinary activities
N	77	Rental and leasing activities
N	78	Employment activities
N	79	Travel agency, tour operator reservation service and related activities
N	80	Security and investigation activities
N	81	Services to buildings and landscape activities
N	82	Office administrative, office support and other business support activities
O	84	Public administration and defence; compulsory social security
P	85	Education
Q	86	Human health activities
Q	87	Residential care activities

Q	88	Social work activities without accommodation
R	90	Creative, arts and entertainment activities
R	91	Libraries, archives, museums and other cultural activities
R	92	Gambling and betting activities
R	93	Sports activities and amusement and recreation activities
S	94	Activities of membership organisations
S	95	Repair of computers and personal and household goods
S	96	Other personal service activities
T	97	Activities of households as employers of domestic personnel
T	99	Activities of extraterritorial organisations and bodies

Source: Based on statistics Belgium: http://statbel.fgov.be/

Table A 4: NACEbel 2008 code letters

Code	Sections
A	Agriculture, forestry and fishing
B	Mining and quarrying
C	Manufacturing
D	Electricity, gas, steam and air conditioning supply
E	Water supply; sewerage; waste management and remediation activities
F	Construction
G	Wholesale and retail trade; repair of motor vehicles and motorcycles
H	Transportation and storage
I	Accommodation and food service activities
J	Information and communication
K	Financial and insurance activities
L	Real estate activities
M	Professional, scientific and technical activities
N	Administrative and support service activities
O	Public administration and defence; compulsory social security
P	Education
Q	Human health and social work activities
R	Arts, entertainment and recreation
S	Other service activities
T	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use
U	Activities of extraterritorial organisations and bodies

Source: Based on statistics Belgium: http://statbel.fgov.be/

9.3 Appendix 3

Figure A 1: Total assets family firms

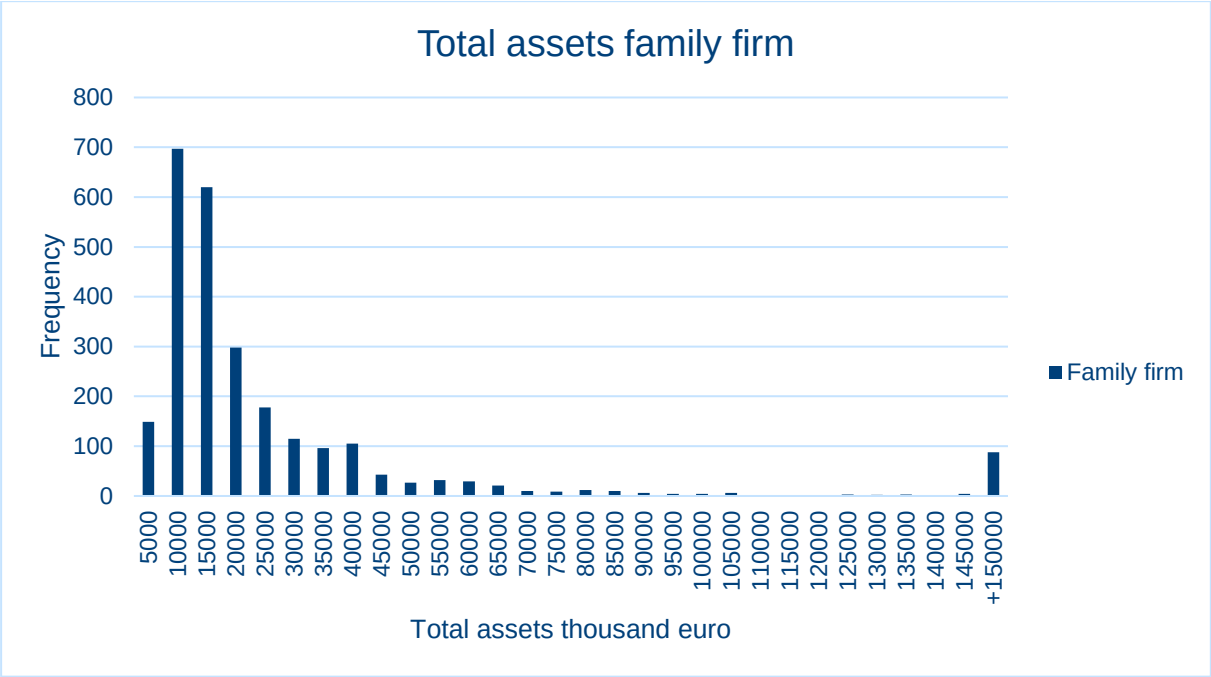


Figure A 2: Total assets non family firm

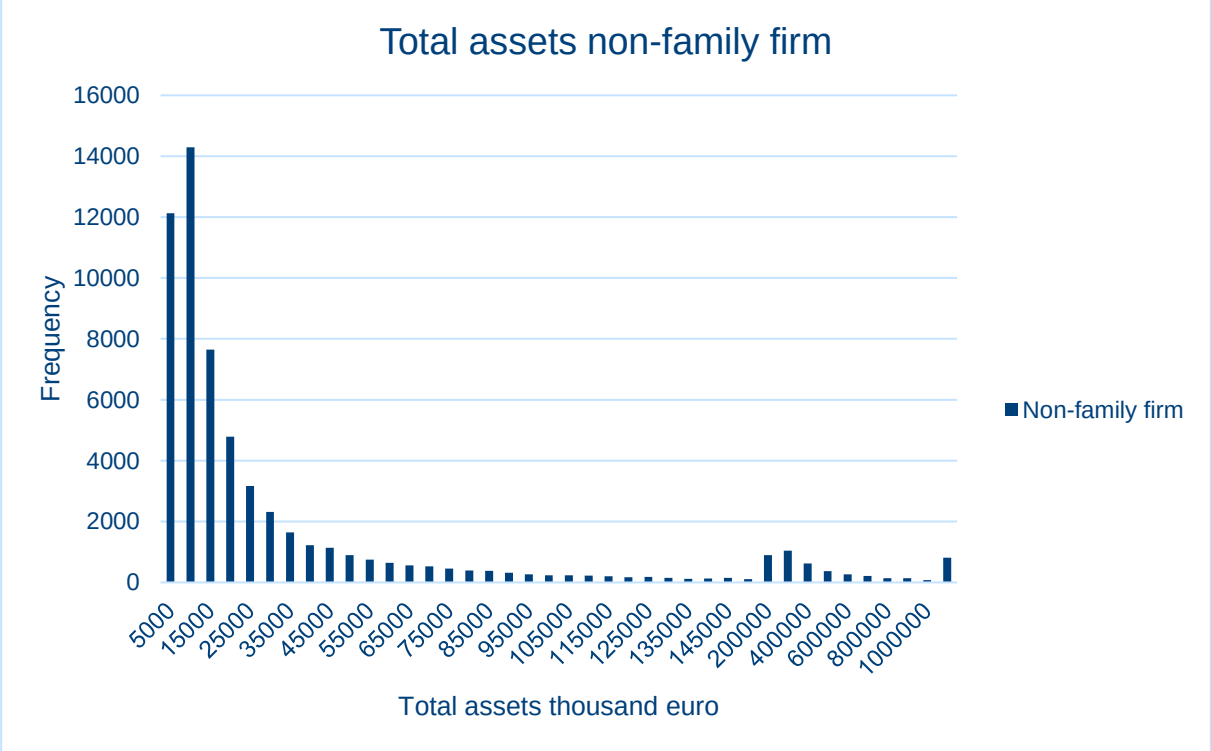


Figure A 3: Turnover family firms

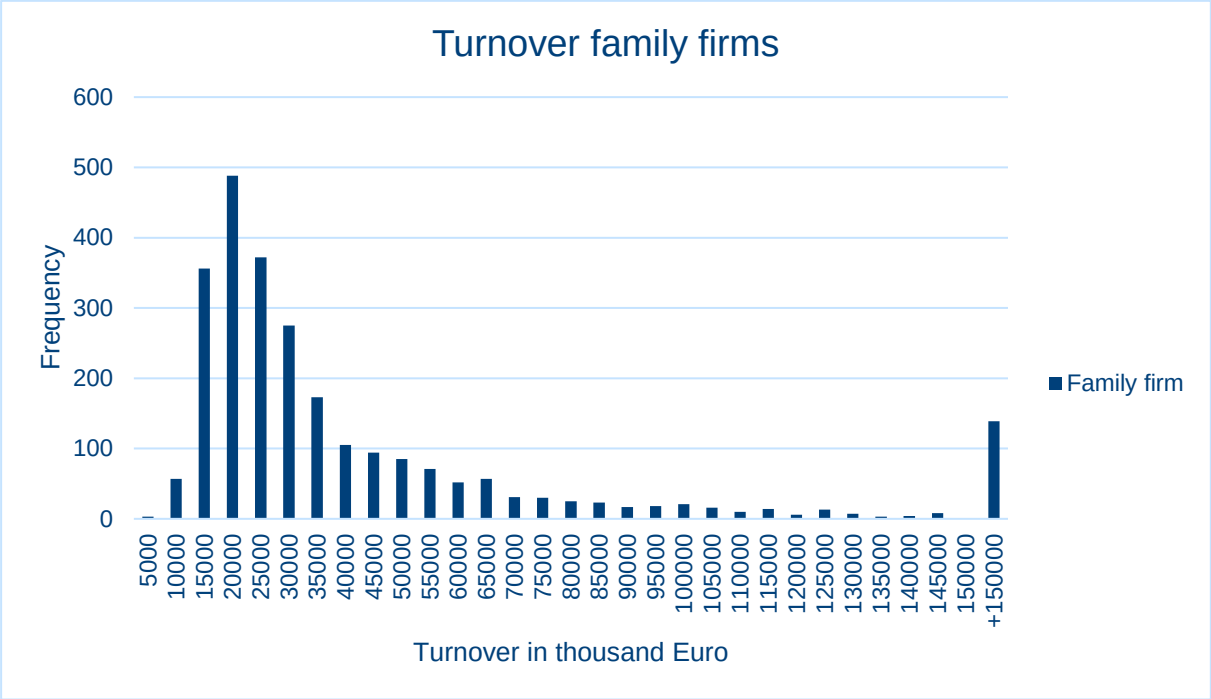
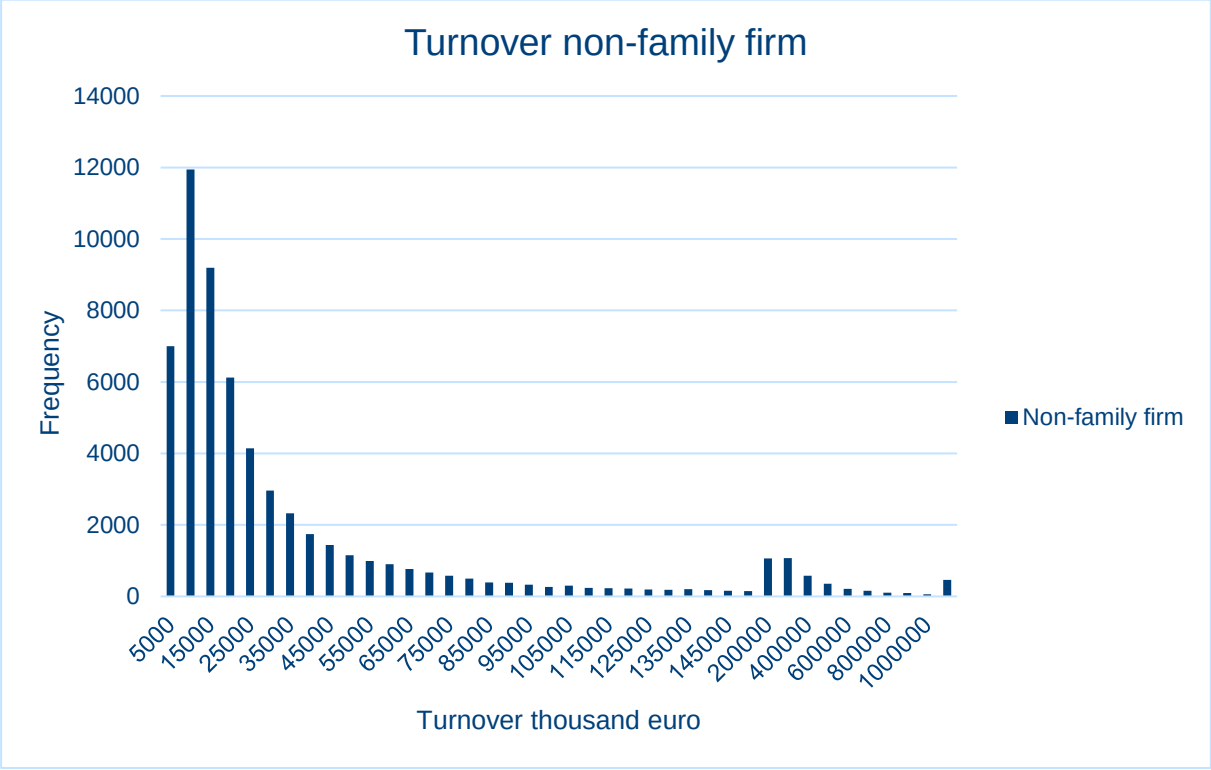


Figure A 4: Turnover non family firms



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Family firms are more likely to have debt than non-family firms.

Family firms are more likely to have debt than non-family firms due to the anxiety of losing control over their firm and consequently not being able to pass the firm over to the next generation. By issuing debt instead of equity, the family will maintain its ownership. Another result of this research shows that a young family firm is more inclined to have financial debt as a young family firm needs the external funding to expand their business. This research is based on a sample of the Belgian economy including 6 959 firms, observed over 9 years from 2008-2016.

The zero-leverage phenomenon

The research topic is the zero-leverage phenomenon, an extreme form of a company's capital structure. This is a phenomenon where firms have no outstanding debt. This is a consequence of a managerial decision or an external constraint as no individual or institution wants to invest money in the firm. By not borrowing debt, enterprises miss opportunities to reduce their tax expenditures.

Importance of family firms

Family firms represent 77% of all companies with employees (Buysse et al., 2011) and represent a third of the total gross domestic product in Belgium (BDO, 2017). Furthermore, previous research concerning zero-levered family firms in various economies gave different results. Spanish and Canadian family firms are more levered than non-family firms (King and Santor, 2008; Acedo-Ramírez et al., 2017) whereas German and American family firms are less levered than non-family firms (Strebulaev and Yang, 2013; Ampenberger et al., 2013). Generally, Belgian family firms are not inclined to adopt a zero-leverage strategy. Which is in accordance with the results of Colot (2015) who stated that Belgian family firms have more debt than non-family firms.

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