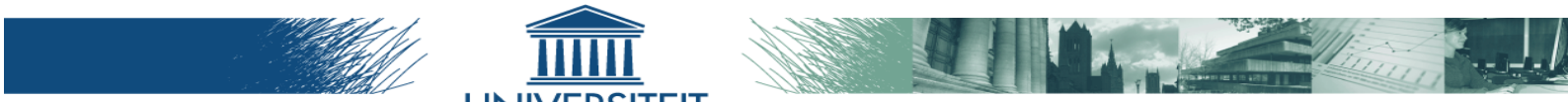

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Determinants of firm growth: evidence from Belgian companies

Masterproef voorgedragen tot het bekomen van de graad van

Master of Science in de Toegepaste Economische Wetenschappen

Teng Hou LOI

Arslan Aslam KHAN

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PERMISSION

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Teng Hou Loi

Arslan Aslam Khan

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Teng Hou Loi & Arslan Aslam Khan

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1. Introduction

Company success can be measured in various ways. Internal growth can be qualified as a key measure of company success. Firm growth is considered such an important measure of company success that some authors consider a distinction between firm growth and firm success obsolete (Roper, 1999; Bergström, 2000).

Growth has been studied in different models by several authors. The well-known growth model of Churchill & Lewis (1983) argues that a young company is usually in the survival phase. Despite the fact that there will not be growth immediately, the investing factor will show its impact in the near future. Hence, the investing factor is necessary for young companies to survive. According to the model, younger companies are less experienced and organizationally inefficient. Larger companies on the other hand have sufficient experience and are more efficient. According to Phillips & Kirchhoff (1989), young companies without growth or negative growth are more likely to fail. Growth enables the company to add value and is a factor which strengthens the organization. Furthermore, on a macro level, growing companies boost the world economy by stabilizing or increasing the work force.

The purpose of this thesis is not to explain existing growth models, but to identify financial ratios which might lead to firm growth. Numerous factors which may create growth are categorized into quantitative and qualitative determinants. Firm specific and those elements which are in relation to the external environment are quantitative determinants. Elements which have to do with the personality and the characteristics of the entrepreneur are qualitative determinants. Managers have a duty to respond in a good manner to these determinants in order to realize firm growth (Kochhar, 1996; Cassar, 2004).

This study will focus mainly on firm specific determinants which include profitability, leverage, innovation, liquidity and solvency. Besides these financial ratios, we will also control for firm age, size, sector, legal form and region. The control variables will mainly be used for benchmarking purposes.

To date, company growth has been widely investigated in the literature. Still, very few studies have examined the Belgian context. Limère, Laveren & Van Hoof (2004) examined a

sample of Belgian companies by basing their research on Ahlström's model (1998). Their qualitative and quantitative design made use of decision tree induction, which is a data mining technique. Similarly, Abraham & De Becker (1999) examined a wide range of potential growth factors, but their study was on a local scale, limiting their sample to the province of Limburg. More recently, Verbakel's study (2005) focused on the growth determinants of Belgian firms and chose the growth in total fund and added value as growth measures.

As mentioned before, the scope of this study will be limited to financial ratios as growth determinants. This study will take into account all Belgian firms which meet specific requirements (see section 3). Furthermore, this study examines the whole Belgian context and is not limited to a particular province in Belgium. In this respect, our study will differ from the other authors who have studied the Belgian companies.

This thesis is structured as follows. In the following section we will review the existing literature around this subject and build our hypotheses. In section 3, we will discuss about the data collection process and the variables we are going to use. In section 4, we will illustrate the empirical results. Subsequently, the strength of our regression models will be assessed through some robustness checks. And finally, we will end with a discussion about the limitations and conclusions of this study.

2. Literature review and hypotheses

Ahlström's model of growth (1998) emphasizes the mayor roles of growth competence and resources, growth potential and growth ambitions. According to Andersson, Andersson, Gran & Mossberg (2007), companies that make an effort to build or develop their competences are more likely to grow.

In contradiction to Ahlström's model, the Gibrat's law (1931) states that the growth of a company is a random process. According to the author, the size of a company is independent from firm growth. However, the paper of Evans (1987), based on a sample of 100 firms in the manufacturing industry, concluded the opposite finding. Research by Oliveira & Fortunato (2006) found evidence for the dependency of age. Firm size and firm age as growth determinants are a prerequisite for distinguishing strong growing companies from weaker

ones (Mateev & Anastasov, 2010). However, Churchill & Lewis' model (1983) indicated firm size as a growth standard, which is a measure for firm growth.

The scope of this thesis is not to determine which growth standard is the best indicator for company growth. The purpose of this study is to find evidence for the financial determinants of firm growth in the Belgian context. In the next paragraphs, we will review the existing literature and make our hypothesis statements.

2.1. Profitability

Making profit is one of the ultimate goals of any economic activity. Profit can be measured by return on equity (ROE), which is calculated by dividing net profit by shareholders' equity. Shareholders' equity represents share capital and proportions of profit retained in the company fund which is called 'retained earnings'. Although there are other profit measures available, we prefer to use return on equity (ROE) as this is the most common measure of profitability in finance.

Profitability and return on equity (ROE) determine the long-term growth prospects of a company. A high return on equity (ROE) creates a scope to invest and good investments lead to accelerated growth. Although it is not necessary for a firm to reinvest all of its profits, we assume that all firms will at least reinvest a minimum proportion of their profits. Some firms may choose to retain a proportion in the company funds and allocate some of the profit to the shareholders in the form of dividends. We take it for granted that an increase in investment budget will be conform with the profitability. In what follows, different previous works are quoted to see whether the concept of conformity in investment budgets is working for the relationship between profitability and firm growth.

Surprisingly, the theoretical relationship between firm growth and profitability is unclear and has not been the subject of uniformity in empirical research (Coad & Hölzl, 2010). According to Friedman (1953), the relationship between profitability and growth is explained by theoretical models which approve the above mentioned concept of conformity in investment budgets. Profitable firms will be more motivated to grow, because they will not only have the financial means to expand, but their ongoing profit creation will also make it possible to sustain growth (Nelson & Winter, 1982).

Goddard, Molyneux & Wilson (2004) are of the opinion that the theoretical belief of firm performance and growth is not observed in reality. According to their findings, firm profitability and growth are not necessarily linked to each other. Additionally, some recent studies confirm the concerns of Goddard and his co-writers (Coad, 2007). The main concerns are as follows:

- The impact and direction of the relationship between growth and profitability are ambiguous.
- It is difficult to control the endogenous effect of a lag term on growth in a simple autoregressive model (Goddard et al., 2004).
- The most commonly used panel unit-root test in previous studies cannot directly examine the inter-relationship between firm growth and profitability (Davidsson, Steffens & Fitzsimmons, 2009).

Jang & Park (2011) had the goal to solve the problem of the shortcomings of the panel unit-root test. By using an improved testing, they were able to improve the empirical section of previous studies. The authors used a combination of panel unit-root test and a dynamic GMM estimator on a sample of restaurant firms. Their research showed that the previous profit rate has a positive impact on the current growth rate. This finding is consistent with Alchian's theory of the firm, which also beliefs that fitter firms will survive and grow, while the less fitter will disappear (Alchian, 1950). Here, the degree of fitness is synonymous to profitability and the rate of success or survivability stands for growth. Additionally, the financing constraint theory and the pecking order theory confirm the findings of Jang & Park.

The financing constraint theory (Goldratt, 1990) argues that firms which do not make profit and thus does not have a buffer to invest, will not be able to finance their growth or at least their sustainability, and will finally disappear. Here, the buffer is the retained earnings, which will be small if the company does not make profit or decides to allocate all of its profit to the shareholders. This buffer equals to the internal capital, which is preferred to external capital according to the pecking order theory.

The theory of Penrose (1959) adds the concept of managerial impact to the relationship between profitability and growth. The capability and the interest in maximizing the

profitability will determine the devotion to grow. Glancey (1998) was interested in the practical value of Penrose's arguments and found a positive correlation between the profitability and growth. The research by Glancey undertook a sample of small owner-managed firms.

Furthermore, we can mention several authors who claimed a positive relationship between firm profit and growth. Mostly, the inter-relationship between profitability and growth is examined. In some cases, the reverse impact of growth on profitability is also tested. Additionally, we find it interesting to mention the conclusions of the opposite growth-profit relationship.

Chandler & Jansen (1992) found a significant positive correlation between sales growth and profit. Mendelson (2000) and Cowling (2004) reported the same conclusion. Capon, Farley & Hoenig (1990) showed that firm growth is related to high financial performance, but it was only significant in some of the industries.

Their conclusions are all consistent with Kaldor and Verdoorn's Law in economics (Kaldor, 1966; Verdoorn, 1949). According to this law, the growth is the engine of the productivity and the productivity is the motor of profitability. Gupta (1981) agrees with this thinking as he shows in his concept of scale economies that growth helps to increase the size of the firm, which in turn helps to make more profit. The argument that larger firms will make more profit is consistent with the advantages of economies of scale. However, this thinking opposes the notorious Gibrat's law, which states that firm size and growth are independent from each other.

A minority group of authors claimed an inverse relationship between profitability and growth. Reid (1995) claimed that growth had a negative impact on profitability. Dobson & Gerrard (1989) used an alternative OLS method to research the same. They found a significant negative relationship between growth and profitability.

The findings of Reid and the colleagues Dobson & Gerrard are consistent with a number of theories:

- Classical Ricardian Theory

- Neoclassical Theory
- The managerial growth maximization theory

The first Ricardian Theory (1817) takes growth into account as a discouraging factor for profitability. The more profit a company makes, the more it wants to grow with plausible less profitable projects. The greed to grow more will lead to less money generating and more money wasting projects. This logic leads to more growth, but less profit, which is not sustainable for the company.

The Neoclassical Theory tells the same story, but uses another storyline. Here, the profitability will first go up and down according to the growth opportunities, but will eventually converge to a thinner base than the pre-growth period.

The last theory of growth maximization has been argued by Marris and Mueller (Marris, 1964; Mueller, 1972). These two authors placed growth in a competitive relationship with profitability. The objection of the managers is to maximize growth rather than profit and this may lead to a pessimistic scenario for the profitability.

In the literature, there is even evidence of impartial findings. As such, Markman & Gartner (2002) reported none significant relationship between growth and profitability.

We however believe in the majority of the academic proof and we are thus examining the validity of the boosting effect of profitability on sales growth. We therefore formulate the following hypothesis:

Hypothesis 1a: profitability has a positive impact on firm growth

Audretsch & Elston (2002) attached importance to the effect of firm size on the profitability-growth relationship. They considered firm size as a dynamometer, which measures the power of the profitability-growth relationship. According to them, a decrease in firm size weakens the impact of profitability on growth. This theoretical line of thinking is linked to the famous theory of constraints (Goldratt, 1990).

According to the theory of constraints, large companies have less financial constraints, whereas small firms face constraining elements. Furthermore, Beck, Demirgüç-Kunt &

Maksimovic (2005) considered non-financial constraints which may weaken the boosting effect of profitability on firm growth.

When applied to the Belgian context, legal constraints also have to be considered on top of the firm constraints. As such, all firms included in our sample are restricted by law. A proportion of minimum five percent of the yearly profit cannot be allocated to shareholders nor to the retained earnings by law. This constraint applies until 10 percent of the total assets have been safeguarded into a special legal reserve account (other than 'retained earnings').

According to Wagenvoort (2003), small firms will face more financial distress, hampering the growth of these companies. Bechetti & Trovato (2002) and Carpenter & Petersen (2002) believed that the constraints mostly affect the growth of small firms. Oppositely, larger firms will face less financial constraints and are more likely being exempted to safeguard profitability. Consequently, larger firms will exploit profitability more accurately and profoundly, leading to more investments and a quicker growth process.

Summarizing, it is to be expected that larger firms will experience a stronger effect of profitability on their firm growth.

> ***Hypothesis 1b: profitability has a positive impact on firm growth and this effect is stronger for large firms***

2.2. Leverage

The pecking order theory states that companies prioritize their sources of financing according to the principle of least effort. This means that companies first use internal financing at startup. When this is depleted, they use debt financing, and when they cannot get any capital anymore through debt financing, they raise capital by looking for external equity. This theory was first suggested by Donaldson (1961) and later on modified by Myers & Majluf (1984).

This phenomenon can be explained by the fact that internal financing is the cheapest way to raise additional capital. The access to external financing is often limited for young companies. And even though they are able to attract external financing, they would pay a very expensive price for it. Young companies namely have a higher failure risk (Huyghebaert

& Van de Gucht, 2007). Therefore, the possibility for young companies to grow are often limited.

Another explanation for this hierarchy of financing decisions could be that the entrepreneur of a company wants to fully control the company by himself. Thus he or she is not likely to raise capital from external investors. Raising capital through debt financing is also difficult for a startup company since the banks do not have any previous financial track records of the company.

An important concept in this theory is the information asymmetry. Myers & Majluf (1984) states that the managers of a company have information that investors do not have, and that both parties are aware of this. Therefore, investors will ask a higher cost of equity in the form of a risk premium for the capital they provided to the company. We can also find this information asymmetry between the company and its debt holders. However, the costs of debt will be lower than the costs of equity, because debt holders are privileged in receiving money when the company fails and gets liquidated. The investors then receive the residual part of the money. Therefore, it is acceptable that investors require a higher cost of equity. Another reason for this difference in costs is the fact that a bank can obligate the company to stick to some clauses indicated in the contract between both parties. This will reduce the risk the bank has to bear. As companies mature, this information asymmetry will diminish (Fazzari, Hubbard, Petersen, 1988).

Durinck, Laveren & Lybaert (1997) have done a research on 370 SMEs from Belgium and they have found that the faster the firm growth, the less companies used retained earnings and the more they used external financing. However, the increase in external equity financing was limited, while the increase in external debt financing was significant. The results of this study were thus in line with the pecking order theory. Other studies have also identified a positive impact of leverage on firm growth (Heshmati, 2001; Honjo & Harada, 2006).

We think that it is logic that a young company with little growth and reputation will have less access to external financing. But when a company gets older, becomes more experienced and indicates higher growth, it will get more trust from the banks. The company will then raise capital through external debt financing to support its growth. This will ultimately result in a higher leverage for the company.

Based on the theories and the previous findings, we come to the following hypothesis:

Hypothesis 2: leverage has a positive impact on firm growth

2.3. Innovation

It is widely known that innovation is one of the most important drivers of firm growth. Companies can create a competitive advantage through investing in innovative products and better operating methods. In the literature, we can find a lot of papers around the relationship between innovation and economic growth since the development of the Solow growth model, which was introduced by Robert Solow in 1956. This model is used to measure the economic growth of countries over a specific period of time. According to Robert Solow, there are three factors which can influence this economic growth: capital, labor and technology. We can see this relationship in the following equation:

$$Y = K^{a}(AL)^{1-a}$$

where Y is output, K is capital, A is a labor-augmenting technology factor and L is labor. All three variables have a positive impact on the output. As the technology factor increases over time, labor becomes more productive and this ultimately leads to a higher output. Thus, this model predicts that technological change has a positive impact on economic growth.

We see in the literature that there exist different methods for measuring innovation. Coad & Rao (2006) for example use the number of patents and the amount of R&D as measures for innovation. In our study, we will use the amount of intangible assets as a measure for innovation. Intangible assets are those assets on the balance sheet, which cannot be seen or touched. These consist of patents, trademarks, know-how, R&D, goodwill, ...

Cainelli, Evangelista & Savona (2006) have studied the relationship between innovation and economic performance of Italian companies which are active in the services sector. One of their research questions was to look if there is an impact of innovation on the economic performance of firms in terms of productivity and growth. The results showed that innovation has a positive impact on both growth and productivity. Thus innovating firms perform better than non-innovating firms in terms of growth.

More recently, Le Bas, Haned & Colombelli (2011) have performed an empirical study on the relationship between innovation and firm growth. They used data from French companies over the period 1992 to 2004. For the data analysis, the authors used different models and a new econometric method, namely a quantile regression. Their main findings are again that firms that innovate, produce more growth than the firms that do not. Other authors have found the same results (Corsino, 2008; Geroski & Machin, 1992; Roper, 1997).

However, Bottazzi et al. (2001) did not find any significant relationship between innovation and firm growth. The authors used data from large pharmaceutical companies over a period of eleven years. They measure innovation by the introduction of new chemical entities or by the proportion of the patented products in a firm's product portfolio. The result of their study is that neither has an impact on the firms' growth performance. Geroski & Mazzucato (2002) have examined the relationship between innovation and growth of US car manufacturers over the period 1910 to 1998. The result of their study indicates as well that there is no significant impact of innovation on firm growth.

Following the Solow growth model and the arguments from the different authors, we expect a positive impact of innovation on firm growth.

Hypothesis 3a: innovation has a positive impact on firm growth

Kolaskar, Anand & Goswami (2007) have studied the relationship between innovation intensity and growth with data from both SMEs and large firms in India for the periods from 2001 to 2002 and from 2005 to 2006. The authors made a distinction between the two sectors manufacturing and services. The results of their study showed that the innovation intensity was clearly higher in the case of manufacturing firms than for services firms (for both SMEs and large firms).

Segarra & Teruel (2011) have examined the impact of internal R&D and external R&D on the probability of being a high-growth firm with data from Spanish firms for the period 2004 to 2008. Their findings showed that the impact of both internal and external R&D is higher in the services sector than in the manufacturing sector, when the dependent variable is measured in terms of sales. If the dependent variable is measured by the number of

employees, then the impact of internal R&D is still higher in the services sector, but the impact of external R&D is higher in the manufacturing sector.

Despite these contradictions in the literature, we think that innovation has a bigger impact on firm growth in the manufacturing sector. Firms which are active in the services sector are less dependent on innovation to grow. Firms active in the manufacturing sector on the contrary are more dependent on for example their patents and R&D to create new products and to satisfy the changing needs of their customers. They usually experience more competition in terms of introducing new technologies to remain competitive in the market. As regards the distribution sector, we are of the opinion that this sector is also less dependent on innovation to grow. Therefore we come to the following hypothesis:

Hypothesis 3b: innovation has a positive impact on firm growth and this effect is stronger for firms which are active in the manufacturing sector

Aldemir (2011) has analysed the relationship between intangible assets and firm growth with a sample of Spanish renewable energy producers. The author has made a distinction between small and large companies. The results show a positive significant impact of the intangible assets on firm growth for small companies, while there is no significant relationship for large companies. Furthermore, Geroski (1999) has found that the growth rates of large and/or old firms are often erratic and unpredictable. Therefore, we assume that there is no clearly defined relationship between innovation and firm growth for large companies.

In contrast to the previous findings, Schimke & Brenner (2011) have found different results. The authors have studied the effect of R&D on firm growth and used data of 1000 European companies from 2003 to 2006. Surprisingly, the results show a positive relationship between R&D expenditures and firm growth for large firms. No significant relationship was found for the other firm sizes (small firms, medium firms, SMEs and very large firms).

Despite the fact that the results of the different studies are not consistent, we predict that there is a positive impact of innovation on firm growth, but this effect will be stronger for small firms. The reason why we adopt the results of Aldemir (2011) is because we use the same measure for innovation, namely the intangible assets.

Hypothesis 3c: innovation has a positive impact on firm growth and this effect is stronger for small firms

2.4. Liquidity

The next determinant concerns the idea that companies will grow faster if they hold a sustained level of current assets to pay off their short term liabilities.

Mateev & Anastasov (2010) measured the level of short term liquidity by the current ratio. This ratio was part of the firm specific characteristics, which may affect the company growth. The current ratio is calculated by dividing the current assets by the current liabilities. An increase in the current ratio will reinforce a firm's liquidity position. Companies with a lower level of liquidity will have more cash constraints and will have more difficulties in repaying suppliers. A good cash cycle begins with healthy working capital and good relationships with suppliers (Beekman & Robinson, 2004). A company that is not able to hold a certain level of liquidity will struggle to keep its head above water.

Cash is an important part of current assets and determines the level of short term liquidity. A company with a sustained level of cash will trade the surplus cash and will make interest on it. If this activity holds year by year, a certain amount serves as a cash buffer. This cash buffer can be used as investment capital or as cash guarantees (e.g. in order to take a bank loan).

The usage of the first opportunity (investment capital) makes it possible for a firm to invest, which is always better than having a shortage of money. The bigger the cash buffer, the more growth opportunities to consider.

Furthermore, Gill & Mathur (2011) expect that firms that are able to maintain higher liquidity levels, will face less severe financing constraints. Surplus cash will shrink financing constraints, enabling the company to finance growth opportunities at lower cost. Logically, a company that is able to invest at a reduced cost, will be more motivated to invest, aiming for growth. As such, a datamining technique namely decision tree induction used by Limère, Laveren & Van Hoof (2004) proved that increased growth ambitions will finally strengthen the growth.

Moreover, Anderson (2002) expressed in his working paper, published by the National Bank of Belgium, similar beliefs about holding liquid assets. Therefore, we expect that liquidity has a positive impact on firm growth.

Hypothesis 4: liquidity has a positive impact on firm growth

2.5. Solvency

The solvency of a company indicates its health. The solvency ratio is calculated through dividing shareholders' equity by the total assets. The bigger this ratio, the healthier a company is. A company with a small solvency ratio has little shareholders' equity compared to its liabilities. A company facing this situation has a higher risk of bankruptcy than a company which has a healthy ratio.

When discussing the solvency and growth hypothesis, much attention will be paid to the theory of Myers & Majluf (1984), better known as the pecking order theory. Myers & Majluf suggest a hierarchy in the way of financing firm growth. According to them, a company manager will first use retained earnings as input for investments and will borrow at the next stage.

Assuming that the company is in its first stage, the manager will choose to invest using the retained earnings in order to grow. This means that the internal financing will continue until the retained earnings reach the amount of zero. As such, the nominator of the solvency ratio will decline. Consequently, the solvency will decrease, explaining the negative relationship between solvency and growth.

This thinking however is oversimplified, because a change in the numerator will affect the denominator and the same applies vice versa. Still, a bigger concern is restricting the logical thinking to the first growth stage, as according to the famous growth model, there are many more stages in growth (Churchill & Lewis, 1983). Nevertheless, 98% of Belgian companies are SMEs[1] (Verbakel, 2005). Most of SMEs are still in their early growth phase, whereby the latter concern is rectified.

[1] An SME is defined as a firm limited by a certain size of total assets.

Furthermore, as mentioned earlier, Durinck et al. (1997) have found that the faster the growth, the more external financing firms will use. However, this increase in external financing is mainly through an increase in the liabilities, as the increase in external equity financing was not found significant. As a company grows, the solvency ratio will thus become smaller. Therefore, a negative relationship between solvency and firm growth is to be expected.

Hypothesis 5: solvency has a negative impact on firm growth

3. Data

3.1. Data collection

For our study, we will focus on financial ratios and their impact on firm growth in the Belgian context. To calculate these ratios, data was used from the Bel-first database, which contains detailed financial information on companies in Belgium and Luxembourg. We collected data from Belgian companies for the period 2001 to 2006, which are NV (company limited by shares) or BVBA (private limited liability company) as legal form. Our study only covers the period from 2002 to 2006. However, to measure the firm growth for 2002, the data from 2001 was also needed. Therefore, we also included the year 2001. Furthermore, only companies which were active during the examined period were considered. In addition, companies in our dataset are required to have reported a full annual account. Belgian companies which do not report a full annual account, are namely not required to report data about their turnover. This resulted in a sample of 13,552 companies.

Next, four categories of sectors were created: 'manufacturing', 'distribution', 'services' and 'others' (which contains the remaining sectors). The companies were allocated to the appropriate sector based on the NACE-BEL code related to each company (we will discuss this in more detail later on). Since this study only treats the first three sectors, we deleted the companies which are linked to the group 'others'. In addition, financial institutions and insurance companies were also removed from our sample, because they are subject to some specific legal requirements. Consequently, we come to a final sample of 10,323 companies.

3.2. Variables

3.2.1. Dependent variable

The dependent variable in our study is the firm growth. We measured this through the average turnover growth over the period 2002 to 2006, expressed as a percentage. More concretely, to calculate the turnover growth of a particular year, we measured the growth rate from the previous year to the current year, expressed as a percentage. We did this for the five years from 2002 to 2006. Thereafter, the average of the growth rates of the five years was calculated. The result is the average turnover growth rate from 2002 to 2006.

The reason why we took the average growth rate over five years instead of just taking the growth rate of a particular year, is the fact that growth rates can fluctuate strongly from one year to another. This would have introduced a large bias into our study.

In the event that the growth rate for a particular year could not be calculated because of some missing data, we just took the average of the growth rates of the other years. This means that if only the growth rate for one year could be calculated, we took this growth rate as the average turnover growth rate for the years 2002 to 2006. And in the event that we did not have data at all for the five years and consequently, we could not calculate the average growth rate, we just left the field blank.

The same method was followed for the calculation of the other variables.

3.2.2. Independent variables

Our first independent variable is profitability. We measured this by the average return on equity (ROE) from 2002 to 2006. To calculate the ROE, we divided the net profit by shareholders' equity.

The second independent variable is leverage. This is measured by the average liabilities-to-equity ratio during the period 2002 to 2006. As the name suggests, this is calculated through dividing all liabilities (current and non-current) by shareholders' equity.

The third independent variable is innovation. We measured this through the average intangible assets ratio over the period 2002 to 2006. The intangible assets ratio is calculated through dividing the intangible assets by total assets.

The fourth independent variable is liquidity. Liquidity is in our study defined as the average current ratio from 2002 to 2006. Current ratio is calculated through dividing the current assets by the current liabilities.

The fifth and last independent variable is solvency. We measured this variable through the average solvency ratio over the period 2002 to 2006. This ratio is calculated through dividing shareholders' equity by total assets.

3.2.3. Control variables

The first control variable is company size. We measured this variable by taking the average natural logarithm (ln) of total assets from 2002 to 2006. The reason why we took the natural logarithm is to reduce the probability that extreme observations would bias our findings.

The second control variable is company age. We calculated the company age at the end of 2004 based on the date of incorporation.

The third control variable is region. We classified the Belgian companies into three regions: Brussels, Flanders and Wallonia. Thus, we introduced the two dummy variables 'Dummy Flanders' and 'Dummy Wallonia'. We allocated each company to the correct region on the basis of their zip code.

The fourth control variable is legal form. Companies in our database can only take the forms NV (company limited by shares) or BVBA (private limited liability company). We introduced here the dummy variable 'Dummy BVBA'.

Our fifth and last control variable is sector. As discussed earlier, we classified the companies into the three sectors 'manufacturing', 'distribution' and 'services'. Thus, we introduced two dummy variables: 'Dummy distribution' and 'Dummy services'. The allocation of the companies to each sector was based on the NACE-BEL code[2] which is linked to the companies. A list of the economic activities and their classification into the different sectors is included in Appendix 1.

A summary of the definition of the various variables can be found in Table 1.

[2] The NACE is a classification of all the economic activities. We use the NACE-BEL codes from version 2003.

Table 1. *Definition of the variables*

Variables	Definition
Dependent variable	
Firm growth	Turnover growth (t_1) = $\frac{\text{turnover } (t_1) - \text{turnover } (t_0)}{\text{turnover } (t_0)}$
Independent variables	
Profitability	ROE = $\frac{\text{net profit}}{\text{shareholders}'\text{equity}}$
Leverage	Liabilities-to-equity ratio = $\frac{\text{total liabilities}}{\text{shareholders}'\text{equity}}$
Innovation	Intangible assets ratio = $\frac{\text{intangible assets}}{\text{total assets}}$
Liquidity	Current ratio = $\frac{\text{current assets}}{\text{current liabilities}}$
Solvency	Solvency ratio = $\frac{\text{shareholders}'\text{equity}}{\text{total assets}}$
Control variables	
Size	Ln of total assets
Age	Age on December 31, 2004
Region	Brussels, Flanders, Wallonia
Legal form	NV, BVBA
Sector	Manufacturing, distribution, services

Source: authors

3.3. Data analysis

The purpose of this thesis is to examine which financial determinants could explain firm growth in the Belgian context. Therefore, we performed an Ordinary Least Squares (OLS) regression for the full sample. The regression equation can be defined as follows:

Turnover growth = β_0 + β_1 ROE + β_2 Liabilities-to-equity ratio + β_3 Intangible assets ratio + β_4 Current ratio + β_5 Solvency ratio + β_6 Ln total assets + β_7 Age + β_8 Flanders + β_9 Wallonia + β_{10} BVBA + β_{11} Distribution + β_{12} Services

In addition to this regression model, we also performed two other regression models whereby we split up the full sample to make a distinction between small and large firms, and between the three sectors manufacturing, distribution and services.

In our boxplots, some extreme values were remarkable for a couple of variables. This could for example be the case if we divide a large numerator by a very small denominator to calculate a certain ratio. We dealt with this outlier problem by winsorizing our data at the one percent level on both sides.

It is known from the literature that, in most cases, firm growth follows a Laplace distribution (Fagiolo, Napoletano, Roventini, 2006). However, we assume in our study that firm growth follows a normal distribution. The histogram of turnover growth is included in Appendix 2. As can be seen, the data are approximately normally distributed. Hence, we used an OLS regression for this study. A similar approach was followed by Schimke & Brenner (2011).

In the following section, we will discuss the empirical results.

4. Empirical results

4.1. Descriptive statistics

Table 2. *Descriptive statistics*

	Variables	N	Mean	SD	Minimum	Maximum
1.	Turnover growth	9,593	0.249	1.089	-0.579	8.989
2.	ROE	10,303	0.163	0.720	-2.966	4.198
3.	Liabilities-to-equity ratio	10,310	5.233	15.946	-32.080	113.390
4.	Intangible assets ratio	4,976	0.028	0.061	0.000	0.375
5.	Current ratio	10,306	6.895	27.645	0.040	229.480
6.	Solvency ratio	10,320	0.236	0.862	-6.375	0.992
7.	Ln total assets	10,320	8.713	1.727	4.130	13.680
8.	Age	10,323	21.990	17.165	2	82
9.	Dummy Flanders	10,323	0.640	0.480	0	1
10.	Dummy Wallonia	10,323	0.160	0.364	0	1
11.	Dummy BVBA	10,323	0.090	0.282	0	1
12.	Dummy distribution	10,323	0.320	0.466	0	1
13.	Dummy services	10,323	0.400	0.490	0	1

Note. Total sample = 10,323 observations
Source: authors

Table 2 illustrates the descriptive statistics of the full sample. The total sample consists of 10,323 companies. Some values are missing for some of the variables, especially for the

intangible assets ratio. For the OLS regression, these cases will be excluded pairwise. The table also shows that the average turnover growth is 24.9%. Furthermore, the companies had an average return on equity of 16.3%. The average liabilities-to-equity ratio is 5.233, which means that on average, a company had approximately five times more liabilities than its shareholders' equity. The average intangible assets ratio is 2.8%, which means that a company on average had intangible assets that amount to 2.8% of the total assets. Next, we see an average current ratio of 6.895, which means that an average company had current assets which can pay off the current liabilities almost seven times. The average age of the companies is twenty-two years.

The mean of the dummy variables can be used to calculate the proportion of the observations belonging to a specific group. As such, it can be deduced that 64% of the companies are located in Flanders, 16% are situated in Wallonia and the remaining 20% of the companies are in Brussels. Additionally, 9% of the companies have the legal form BVBA, while the other 91% have the legal form NV. And finally, 32% of the companies are in the distribution sector, 40% are in the services sector, and consequently, 28% are in the manufacturing sector.

Table 3 shows the correlation matrix. The correlations between the different variables are very low. Only the dummy variables Flanders and Wallonia and the dummy variables distribution and services show a high correlation. These are, however, not substantial problems, since a high correlation between the different regions and the different sectors is to be expected. Since the variance inflation factor (VIF) of the different variables are well below 10, there are no multicollinearity problems.

Table 3. *Correlation matrix*

		1	2	3	4	5	6	7	8	9	10	11	12
1.	Turnover growth	1.00											
2.	ROE	**.02**	1.00										
3.	Liabilities-to-equity ratio	**.02**	**-.10**	1.00									
4.	Intangible assets ratio	**.08**	.00	-.01	1.00								
5.	Current ratio	.01	**-.02**	**-.05**	-.01	1.00							
6.	Solvency ratio	**-.04**	**-.04**	**-.03**	**-.12**	**.12**	1.00						
7.	Ln total assets	**-.02**	-.01	**.11**	**-.12**	-.01	**.25**	1.00					
8.	Age	**-.08**	**-.04**	**-.06**	**-.10**	-.01	**.10**	**.18**	1.00				
9.	Dummy Flanders	**-.02**	.00	.01	**-.06**	**-.05**	**.04**	.01	.01	1.00			
10.	Dummy Wallonia	-.01	**-.03**	**-.04**	**-.03**	-.01	**.02**	.01	**.02**	**-.58**	1.00		
11.	Dummy BVBA	.00	**.04**	**.10**	**.03**	**-.02**	**-.05**	**-.06**	**-.07**	**.05**	**-.04**	1.00	
12.	Dummy distribution	**-.04**	**.02**	**.04**	**.05**	**-.07**	**-.02**	**-.08**	**.06**	**.04**	.00	**.10**	1.00
13.	Dummy services	**.10**	.01	.02	.02	**.11**	-.01	**-.08**	**-.19**	**-.10**	**-.10**	**-.05**	**-.56**

Note. **Bold** = correlations significant at the 5% level
Source: authors

4.2. Regression models of firm growth

This section presents the empirical results of the various regression models. Table 4 illustrates the regression model for the full sample. Concerning the financial ratios (the predictors), two significant relationships can be observed. First, there is a strong significant positive impact of the intangible assets ratio on the turnover growth (1.224 ; $p < 0.01$). This means for instance that for a company which has intangible assets that amount to 10% of the total assets, these intangible assets are responsible for 12.2% of the total firm growth.

Table 4. *Regression model of firm growth in terms of financial ratios*

	Turnover growth Full sample	
Predictors		
ROE	0.028	
Liabilities-to-equity ratio	0.001	
Intangible assets ratio	1.224	***
Current ratio	0.000	
Solvency ratio	-0.039	**
Controls		
Ln total assets	0.007	
Age	-0.003	***
Dummy Flanders	-0.014	
Dummy Wallonia	0.010	
Dummy BVBA	-0.034	
Dummy distribution	0.028	
Dummy services	0.208	***
Constant	0.143	
F-value	8.597	***
R^2	0.021	
Number of observations	10323	

Note. Unstandardized coefficients
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$
Source: authors

Furthermore, the solvency ratio shows a significant negative relationship with turnover growth (-0.039 ; $p < 0.05$). This means that the more solvent a company is (i.e. more equity), the less growth it will have. However, we do not see any significant impact of the other predictors on firm growth. There is a small positive insignificant impact of ROE and the liabilities-to-equity ratio on firm growth (0.028 and 0.001). Unexpectedly, the current ratio has no effect on turnover growth (0.000).

The above confirms hypothesis 3a and hypothesis 5. As there is no significant impact for the predictors ROE, liabilities-to-equity ratio and current ratio, hypotheses 1a, 2 and 4 are rejected.

Regarding the control variables, a significant negative impact of age on turnover growth (-0.003 ; $p < 0.01$) is observed. Additionally, firms in the services sector have a significant positive impact on firm growth (0.208 ; $p < 0.01$). This means that firms which are active in the services sector are more likely to grow than firms in the manufacturing sector or the distribution sector. More concretely, the turnover growth will increase with 20.8% if a firm is active in the services sector. Furthermore, a positive insignificant relationship for the controls ln total assets, Dummy Wallonia and Dummy distribution and a negative insignificant relationship for the controls Dummy Flanders and Dummy BVBA can be observed.

Table 5 illustrates the regression models where a distinction is made between small and large firms. We defined a small firm as a firm which has assets less than or equal to the average ln total assets (8.71). A large firm is then defined as a firm which has more assets than the average ln total assets. The intangible assets ratio has a strong positive significant impact for small firms (2.065 ; $p < 0.01$), while this ratio shows no significant impact for large firms. By making the distinction between small and large firms, we clearly see that the innovation-growth relationship is only valid for small firms. Remarkably, we do not see any significant relationship anymore for the solvency ratio. This might be due to the smaller samples.

Again, we see a significant negative impact of age for both small (-0.004 ; $p < 0.05$) and large firms (-0.003 ; $p < 0.01$). However, this impact is more significant for large firms. As before,

Table 5. *Regression models of firm growth: small vs. large companies*

	Turnover growth			
	Small companies sample		Large companies sample	
Predictors				
ROE	0.051		-0.005	
Liabilities-to-equity ratio	0.000		0.001	
Intangible assets ratio	2.065	***	0.207	
Current ratio	0.002		-0.001	
Solvency ratio	-0.031		-0.046	
Controls				
Age	-0.004	**	-0.003	***
Dummy Flanders	0.031		-0.060	
Dummy Wallonia	0.089		-0.069	
Dummy BVBA	-0.052		0.004	
Dummy distribution	-0.037		0.058	
Dummy services	0.118	*	0.272	***
Constant	0.195	**	0.243	***
F-value	5.316	***	6.186	***
R^2	0.029		0.023	
Number of observations	5176		5144	

Note. Unstandardized coefficients
*** p < 0.01, ** p < 0.05, * p < 0.10
Source: authors

there is a positive impact of the Dummy services on turnover growth for both small (0.118 ; p < 0.10) and large firms (0.272 ; p < 0.01). However, this relationship is stronger and more significant for large firms. A large firm in the services sector is thus more likely to have increased growth than a small firm in the same sector.

Furthermore, return on equity (ROE) has a positive insignificant impact on small firms (0.051), while its impact on large firms is insignificantly negative (-0.005). Although not statistically significant, the solvency ratio seems to have more negative impact for large firms (-0.046) than for small firms (-0.031).

Based on the results of table 5, hypothesis 3c can be confirmed. And since the coefficients of ROE for small and large firms are not significant and show the opposite of what was hypothesized, hypothesis 1b is rejected.

Table 6. *Regression models of firm growth: differences between sectors*

	Turnover growth		
	Manufacturing sample	Distribution sample	Services sample
Predictors			
ROE	0.032	0.009	0.035
Liabilities-to-equity ratio	0.000	0.001	0.001
Intangible assets ratio	1.606 ***	0.989 ***	1.207 **
Current ratio	0.001	0.002	0.000
Solvency ratio	-0.135 ***	-0.035	-0.003
Controls			
Ln total assets	-0.016	0.014	0.016
Age	-0.003 ***	-0.004 ***	-0.003
Dummy Flanders	-0.021	0.072	-0.068
Dummy Wallonia	0.000	0.140 *	-0.105
Dummy BVBA	0.076	-0.023	-0.121
Constant	0.364 ***	0.050	0.327 *
F-value	7.261 ***	2.335 ***	1.181
R^2	0.042	0.015	0.007
Number of observations	2907	3277	4139

Note. Unstandardized coefficients
*** p < 0.01, ** p < 0.05, * p < 0.10
Source: authors

Table 6 illustrates the regression models which distinguish between the manufacturing sector, the distribution sector and the services sector. The intangible assets ratio is positive and significant for all three samples. When we compare the three coefficients, we clearly see that the manufacturing sample has the highest coefficient (1.606 ; p < 0.01). The solvency ratio is negative for all three samples, but is significant for the manufacturing sample (-0.135 ; p < 0.01) only.

The control variable age is negative for all three samples, but is significant for the manufacturing (-0.003 ; p < 0.01) and distribution samples (-0.004 ; p < 0.01) only. There is also a positive significant relationship between the Dummy Wallonia and firm growth in the distribution sample (0.140 ; p < 0.10). This means that Walloon companies in the distribution

sector are more likely to have a higher growth rate than those companies in the manufacturing or services sector in Wallonia.

Although not statistically significant, the predictor ROE has the strongest impact on growth in the services sample (0.035), followed by the manufacturing sample (0.032). It should also be noted that firm size (ln total assets) has a negative insignificant impact for the manufacturing sample (-0,016), while it has a positive insignificant impact for the other two samples. Moreover, Flemish companies active in the distribution sector seem to grow insignificantly more (0.072) compared to those companies operating in other sectors in Flanders. Furthermore, companies with the legal form BVBA seem to have a higher insignificant growth effect (0.076) in the manufacturing sector than those companies in other sectors.

Summarizing, the results show a stronger positive impact of the intangible assets ratio on firm growth for the manufacturing sample when compared to the other samples. Therefore, hypothesis 3b is considered confirmed.

5. Robustness tests

In order to test the robustness of our findings, we used alternative standards in the full regression model to measure

- Profitability
- Liquidity
- Firm size

In doing so, we made minor changes up to three times in the main model as described in section 3. The adapted models can be found in Appendix 3 to 5.

5.1. Replacement ROE by ROA

First, we replaced return on equity (ROE) by return on assets (ROA) as an alternative measure for profitability. The new regression model can be found in Appendix 3. Return on assets (ROA) is a more stringent definition of profitability and is calculated through dividing

net profits by total assets. Analyzing the regression results of the modified model and comparing it with the main model (see table 4), we found two remarkable changes.

First, return on assets (ROA) has a negative significant impact on turnover growth (-0.445 ; $p < 0.01$). Although, the negative relationship between return on assets (ROA) and growth is contrary to what was hypothesized, Dobson & Gerrard (1989) also found a negative relationship between profitability and growth. Using ROA instead of ROE in the regression model will thus also lead to the rejection of hypothesis 1a, which states that profitability has a positive impact on firm growth.

Second, there is no negative and significant impact anymore of the solvency ratio on turnover growth. Instead, there is a low positive insignificant impact of the solvency ratio on growth (0.007). Using this robustness test, we can thus no longer support hypothesis 5, which states that solvency has a negative impact on firm growth.

While ROA is also a performance indicator, ROE is more sustainable. In order to explain this, we have constructed a situation whereby two comparable companies (same total assets, equity and net profit) are liquidating their debt through selling their assets. Both companies are making the same net profits, but they differ in their choice of profitability standard. While company X chooses for ROA, company Y prefers ROE. Liquidating debt[3] means for company X a smaller total assets base, which is on its turn increasing the ROA ratio. Meanwhile, because of its choice for ROE, there are no changes in company Y's computation of profitability. Therefore, ROE and ROA are not substitutes of each other, although they are both measures for profitability.

As already mentioned and in consistency with hypothesis 1b, there is an importance attached to the effect of firm size on the profitability-growth relationship (Audretsch & Elston, 2002). They considered firm size as a dynamometer, which determines the power of the profitability-growth relationship. According to them, a decrease in firm size weakens the impact of profitability on growth. As such, company X is theoretically decreasing its firm size (decreased total assets base) and is in fact weakening the profitability-growth relationship.

[3] Made assumptions: liquidating debt without changes in equity and without new debt.

Since shareholders' equity and total assets are respectively the numerator and the denominator of the variable solvency, an analog explanation for the impact of solvency applies.[4] As such, a negative impact of firm size on the solvency-growth relationship is assumed. The now more explanatory power of profitability, measured by the ROA, leads to a weaker impact of the solvency ratio.

We think that this reasoning may be a declaration for the changes in the regression model caused by the return on assets.

Another explanation for the negative relationship between ROA and firm growth can be found in the work of Mateev & Anastasov (2010). The authors found that firm size, as measured by its total assets, tends to increase sales revenues, which is a measure for firm growth. This means that as the firm size, which is also measured by the total assets in our study, increases, the ROA will become smaller. Based on this negative relationship between firm size and ROA and the positive relationship between firm size and firm growth, we can derive that there is a negative relationship between ROA and firm growth.

We thus think that the choice for a profitability standard is crucial for our growth model. Apart from our thinking and explanation, an empirical study to explain the usage of the various profitability standards within certain growth models is more than ever required. We can conclude that the results of the robustness test were not consistent with our earlier findings. The replacement of ROE by ROA leads to the rejection of hypothesis 5.

5.2. Replacement current ratio by quick ratio

Second, we replaced the current ratio by the quick ratio as a measure for liquidity. The results of the new regression model can be found in Appendix 4. The quick ratio is defined as: (current assets – inventories) / current liabilities.

The results of the robustness test are in line with the findings in our main model in Table 4, aside from one variable. As shown in Appendix 4, we see that liquidity, measured by the quick ratio, has a positive and significant impact on turnover growth (0.025 ; $p < 0.10$), while there is no impact of the current ratio on turnover growth (0.000). This finding is in line with the results presented by Mateev & Anastasov (2010). The difference between the two ratios

[4] Same remark as in footnote 3.

lies in the inventories. This factor thus determines the significance of the quick ratio. Following the findings from the robustness test, we should not reject hypothesis 4, which states that liquidity has a positive impact on firm growth, but instead we find support for this when we use the quick ratio as a measure for liquidity.

5.3. Replacement ln total assets by the number of employees

Third, we replaced the natural logarithm of total assets by the number of employees (workforce) in order to measure firm size. The adjustment to our main model and the results of the new regression model can be found in Appendix 5. The results of this robustness test are consistent with our earlier findings.

6. Conclusion

In this study, we have examined the determinants of firm growth in the Belgian context. We put the focus on financial ratios which measure profitability, leverage, innovation, liquidity and solvency, and examined their impact on firm growth. In the literature, different measures for firm growth are used. In our study, firm growth is defined as the growth in sales. We collected the data from Bel-first, which contains financial information on Belgian and Luxembourg companies. For the regression models, an OLS regression is used. We also performed two additional regression models to make a distinction between small and large firms, and between three sectors.

The results showed that innovation, which is measured by the intangible assets ratio, has a positive impact on firm growth. This can be explained by the fact that companies which put a lot of effort in R&D and innovative activities, will translate these into a higher growth rate.

A second finding of our study is that solvency, which is defined as shareholders' equity divided by total assets, has a negative impact on firm growth. This means that the more solvent a company becomes, thus the bigger the proportion of equity compared to the liabilities, the less firm growth it will have. Companies are thus required to also use some degree of liabilities to finance their activities if they want a higher growth rate.

Furthermore, the results indicated that profitability, leverage and liquidity do not have a significant impact on firm growth.

Aside from the main regression, two additional regressions were performed. First, the full sample was split up into small and large companies. And second, a distinction was made between the manufacturing sector, the distribution sector and the services sector. The results showed that innovation apparently only has a positive impact on firm growth for small companies. The growth of large companies is thus not affected by innovation.

Furthermore, the results showed that the positive relationship between innovation and firm growth exists in all three sectors, but the impact is clearly the largest for companies which are active in the manufacturing sector and the least in the distribution sector. And lastly, we noticed that the negative impact of solvency on firm growth is only significant for companies in the manufacturing sector.

Summarizing, startup companies are advised to invest in innovation and gradually use external debt financing to generate more growth.

7. Limitations and future research

Like any other study, our thesis also suffers from several limitations. First, we used data which are limited to the time period 2002 to 2006. Using data over a longer time period would have led to more accurate results of the study.

Second, the findings of our study are not generalisable to all the firms in Belgium, since we only took into account the manufacturing, distribution and services sector. The findings thus only apply to the three mentioned sectors.

Third, since our data showed outliers in several variables, we winsorized the data at the one percent level on both sides. After this operation, there were still extreme values observable. However, we could not winsorize the data at a higher level, because we also had to take into account the variables which did not have outliers at all. Consequently, the results of our study could be somewhat biased.

Fourth, we assumed that firm growth follows approximately a normal distribution in our study, while in reality it follows a Laplace distribution. This problem could be tackled by taking the natural logarithm of turnover growth to make this variable more normally distributed.

Taking these limitations into account, there is certainly room for improvement. As mentioned before, future researchers can extend the research period to get more accurate results. It is also advisable for future research to not only use turnover growth, but also use other measures to test the robustness of the different growth measures. And lastly, a longitudinal analysis instead of taking the average value over a couple of years could be more interesting for future research.

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9. Appendices

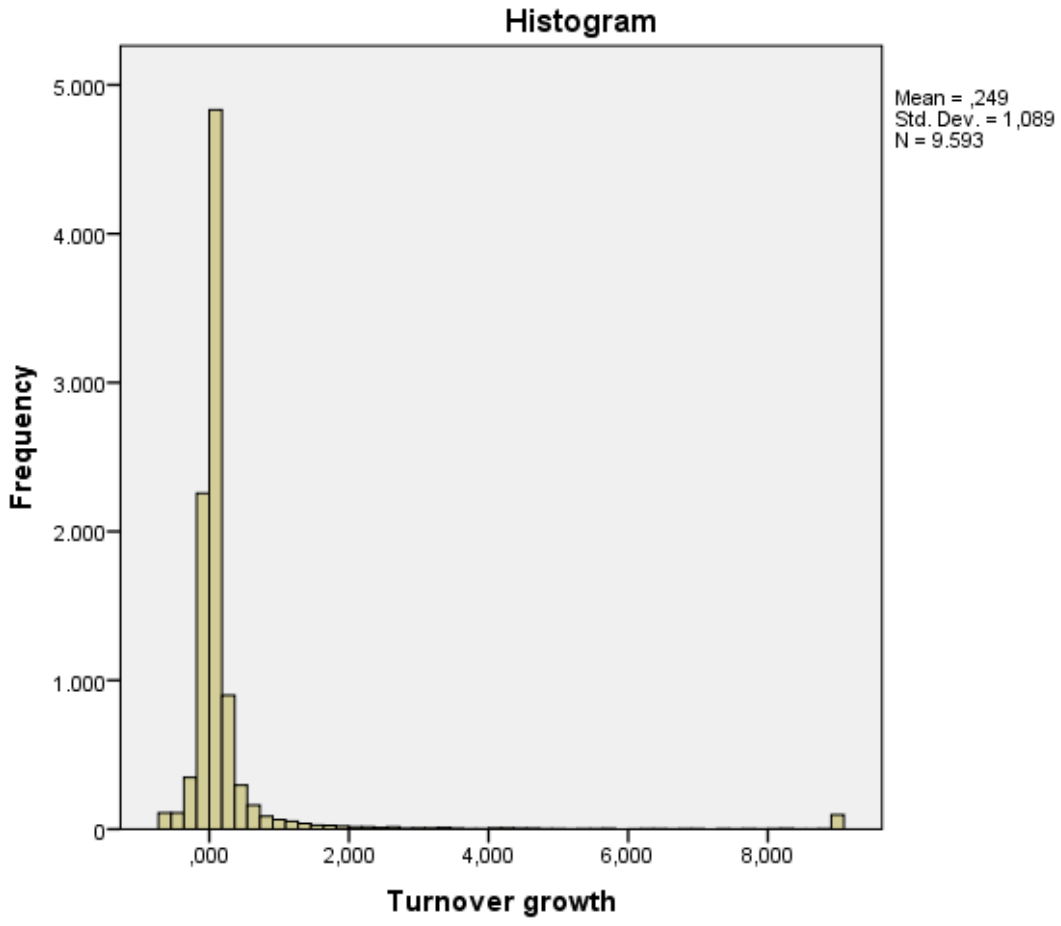
Appendix 1. *Overview of the economic activities and their sector classification*

NACE	Definition
Manufacturing	
15	Manufacture of food products and beverages
16	Manufacture of tobacco products
17	Manufacture of textiles
18	Manufacture of dressing and fur
19	Manufacture of leather and footwear
20	Manufacture of wood and of products of wood and cork, except furniture; manufacture of products of straw and plaiting materials
21	Manufacture of pulp, paper and paper products
22	Publishing, printing and reproduction of recorded media
23	Manufacture of cokes, refined petroleum products and fissile and fertile materials
24	Manufacture of chemical products
25	Manufacture of rubber and plastics products
26	Manufacture of other non-metallic mineral products
27	Manufacture of basic metals
28	Manufacture of metal products
29	Manufacture of machinery, devices and tools
30	Manufacture of office machinery and computers
31	Manufacture of electrical machinery and devices
32	Manufacture of audio, video and telecommunications equipment
33	Manufacture of medical, precision and optical instruments; watches and clocks
34	Manufacture of motor vehicles, trailers and semi-trailers
35	Manufacture of other transport equipment
36	Manufacture of furniture; other manufacturing
37	Recycling
Distribution	
50	Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel
51	Wholesale trade and commission trade, except of motor vehicles and motorcycles
52	Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods
Services	
55	Hotels and restaurants
60	Land transport; transport via pipelines
61	Water transport
62	Air transport
63	Supporting and auxiliary transport activities; travel agencies
64	Post and telecommunications
70	Real estate
71	Renting of machinery and equipment without operator and of personal and household goods

72	Computer-related activities
73	Research and development
74	Other business activities
75	Public administration and defense; compulsory social security
80	Education
85	Health and social work
90	Collection and treatment of sewage and waste
91	Various associations
92	Recreational, cultural and sporting activities
93	Other service activities
95	Activities of private households as employers of domestic staff
96	Undifferentiated goods-producing activities of private households for own use
97	Undifferentiated service-producing activities of private households for own use
99	Extraterritorial organizations and bodies

Source: http://statbel.fgov.be

Appendix 2. *Histogram of turnover growth*



Source: authors

Appendix 3. *Robustness test: ROA instead of ROE as predictor*

	Turnover growth Full sample	
Predictors		
ROA	-0.445	***
Liabilities-to-equity ratio	0.001	
Intangible assets ratio	1.115	***
Current ratio	0.000	
Solvency ratio	0.007	
Controls		
Ln total assets	0.009	
Age	-0.003	***
Dummy Flanders	-0.010	
Dummy Wallonia	0.007	
Dummy BVBA	-0.028	
Dummy distribution	0.037	
Dummy services	0.208	***
Constant	0.123	
F-value	9.554	***
R^2	0.023	
Number of observations	10323	

Note. Unstandardized coefficients
*** p < 0.01, ** p < 0.05, * p < 0.10
Source: authors

Appendix 4. *Robustness test: quick ratio instead of current ratio as predictor*

	Turnover growth Full sample	
Predictors		
ROE	0.029	
Liabilities-to-equity ratio	0.001	
Intangible assets ratio	1.241	***
Quick ratio	0.025	*
Solvency ratio	-0.050	**
Controls		
Ln total assets	0.010	
Age	-0.004	***
Dummy Flanders	-0.015	
Dummy Wallonia	0.013	
Dummy BVBA	-0.034	
Dummy distribution	0.032	
Dummy services	0.208	***
Constant	0.094	
F-value	6.917	***
R^2	0.022	
Number of observations	10323	

Note. Unstandardized coefficients
*** p < 0.01, ** p < 0.05, * p < 0.10
Source: authors

Appendix 5. *Robustness test: workforce instead of ln total assets as control variable*

	Turnover growth Full sample	
Predictors		
ROE	0.029	
Liabilities-to-equity ratio	0.001	
Intangible assets ratio	1.225	***
Current ratio	0.000	
Solvency ratio	-0.035	*
Controls		
Workforce	0.000	
Age	-0.003	***
Dummy Flanders	-0.018	
Dummy Wallonia	0.007	
Dummy BVBA	-0.037	
Dummy distribution	0.013	
Dummy services	0.198	***
Constant	0.220	***
F-value	8.403	***
R^2	0.021	
Number of observations	10323	

Note. Unstandardized coefficients
*** p < 0.01, ** p < 0.05, * p < 0.10
Source: authors