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A historical overview of the capital structure in Belgium from 1950 to 2005

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Abstract

The evolution of the capital structure in Belgium from 1950 to 2005 indicates two major changes. In 1960 we see a small dip followed by a period with high leverage during the period 1970 to 1990. The second dip follows in the period 1995 to 2000. The results show some strong influences from micro- and macro-economic determinants. These correlations could not exclude the presence of either the Static Trade off theory or pecking order theory. Although the counter-cyclical trend of leverage confirms the presence of a pecking order, the positive correlation with corporate tax also indicates a Static Trade off.

Special thanks

I would like to use this opportunity to thank everybody that was involved directly and indirectly with my master thesis. It has been a long journey with a lot of road blocks but always with positive energy to accomplish something I am very proud of. Of course it would not have been possible without the very helpful input I got throughout the year.

The research required the gathering of data 50 years back in time. I would like to thank Frans Buelens of the SCOB at the University of Antwerp who helped me with the main part of the data. Apart from the data he helped me on several other questions that crossed my mind throughout the research.
For the more recent data I could count on Eric Vandenbroele and the people at Graydon. They provided me with data at a very short notice and I thank them for that.
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I would also like to thank my promoter, Professor Diane Breesch. She offered me a great and challenging subject where I could put all my energy in. Thank you for guiding me through this subject and refining the paper.

Also my family and friends, not directly involved with the making of, deserve my thanks. They supported me and helped me with relaxing moments when necessary.

1. Introduction

The purpose of my master thesis, called "a historical overview of the capital structure in Belgium from 1950-2005", is to study the determinants influencing the capital structure (CS)[1] for a sample of Belgian firms throughout the years 1950 to 2005. Based on the determinants retained from the literature, some variables are tested that possibly explain the leverage evolution.

The whole master thesis is divided into two main parts; a theoretical and an empirical part. I start with a brief theoretical introduction on CS[2]. First of all, I explain CS by getting back to the basics and discuss among other things the Modigliani and Miller (1958) and Myers (1978) theory. Secondly, I look which studies on determinants exist and what findings already exist on their influence on CS evolution. The goal herewith is to give a clear overview of the determinants studied and to retain the most relevant ones. Those inputs are then used in the empirical part of my work where these factors will be used to look for influences on the CS evolution of a sample of Belgian firms from 1950-2005.

The second main part of my master thesis will consist of evaluating the CS for the selected sample of Belgian firms. I will give an overview of the CS of Belgian firms from 1950 to 2005 with an interval of 5 years. The sample of firms will change every 5 years using the top 20 of largest firms of each of these years. After determining the evolution of the leverage of the largest Belgian firms over the last 50 years and drawing some primary conclusions, I explain the evolution with the determinants retained previously. These determinants will be both micro-economic (e.g. size, profitability) and macro-economic (e.g. economic situation, industry effects). The aim is to look for a link between these determinants and the capital structure and compare this to previous results.

[1] From here on I will refer to capital structure as CS in the text.
[2] CS can be referred to with different terms (leverage, debt-equity ratio…). This doesn't imply different definitions. I refer to chapter 2.1. (Basic concepts) for explanations on the definition.

2. Theory, literature review

2.1 Basic concepts

According to McGuigan (2006) CS can be defined as a mixture of financing sources a firm uses. It is the amount of permanent short-term debt, long-term debt, preferred stock and common equity used by the firm for permanent financing.
The financial structure on the other hand is the amount of total current liabilities, long-term debt, preferred stock and common equity used to finance a firm. Hence, the CS is part of the financial structure.

In this context people also talk about the concept of optimal CS. This is the optimal mix of financing sources for the specific firm. It is the mix of debt (short-term and long-term), equity and preferred stock that minimizes the weighted cost of capital employed by the firm. This is in line with the idea of shareholders wealth maximization.

It is necessary to highlight the fact that no unique and official formula to calculate the CS exists, since the CS is often used in solvency analysis. The terms "debt-to-equity ratio" or "leverage" are used to explain the effects of financing in a firm. Leverage is the amount of debt used to finance its assets (debt/assets ratio).

In previous international literature, Rajan and Zingales (1991) and Bevan and Danbolt (2000), a variety of CS formulas are discussed. Although it is too complex to go into depth in the definitions and accounting principles, it is necessary to give a brief overview of formulas to support my definition of CS.

The broadest definition of leverage is the ratio of total liabilities[3] to total assets. Since liabilities also include accounts payable and pension liabilities, this ratio doesn't provide a good measure of the permanent financing situation of the firm. Rajan and Zingales replace total liabilities with total debt (both short and long term). They continue by defining leverage as the ratio of "total debt" to "net assets", where net assets are total assets less accounts payable and other liabilities. The net assets[4] can be measured at book or market value.
Finally, they claim that the most representative definition to study past financing decisions is the ratio of total debt to capital, where capital is total debt plus equity.

[3] According to the IASB liabilities are present obligations of the entity arising from past events, the settlement of which is expected to result in an outflow from the entity of resources embodying economic benefits. It is debt and other obligations. In a formula this means total passive minus equity. It is not clear however if liabilities for Rajan and Zingales is debt or broader. Debt is what we know as "schulden op meer dan 1 jaar en schulden op minder dan 1 jaar".
[4] Net assets as Rajan and Zingales define them, are equal to equity. According to IASB equity is the residual interest in the assets of the entity after deducting all its liabilities.

An example of a balance sheet as provided by the Balanscentrale can help clear things up (Figure 1):

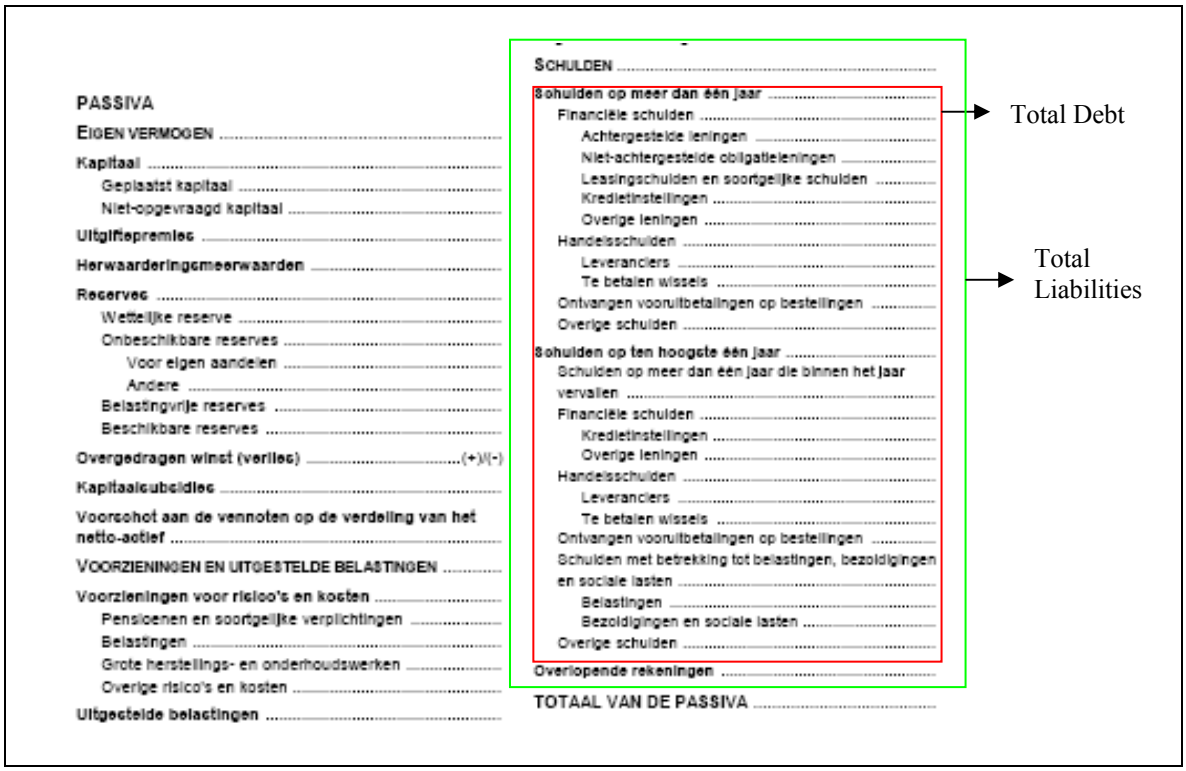


Figure 1: Example of Balance sheet – Passive side (Balanscentrale NNB)

I continue with four ratio definitions mentioned in Bevan and Danbolt (2000).

- *Non-equity Liabilities to Total Assets:* This ratio is calculated as total debt plus trade credit[5] to total assets. In the case of market value we use the market value of equity and not the book value as a component of the total assets.
- *Debt to total assets:* A simple ratio based on book or market value by adjusting equity calculations for total assets.
- *Debt to Capital:* Capital is calculated as the sum of debt, equity and preference shares[6]. Again there is a possibility to adjust for book and market value.
- *Adjusted debt to Adjusted Capital:* Adjusted debt is defined as the book value of total debt less cash and marketable securities. The adjusted capital is the sum of total debt and adjusted value of equity (which is the value of equity plus provisions and deferred taxes, less intangibles).

[5] Trade credit is an essential form of capitalization for an operating firm. The firm provides the goods or the service, but the client only has to pay for the good or service later. The same counts for paying suppliers only some days after delivery of the good or service. Trade credit is another word for accounts receivable or payable.

[6] I refer to Rajan and Zingales and their definition for capital on page 5. Capital is total debt plus equity.

The definitions above mention that "equity" could be calculated at market or book value. Barclay (1995) arguments why not to use market value.

- First of all when we look at the evolution of leverage and we use market value, part of the trend will be influenced by changes in market value. Hence the fluctuations in leverage will be interrupted by the fluctuations of the market value throughout the years.
- The book value also reflects tangibility of assets and these provide collateral for lenders. Given the fact that in the CS decision collateral is used to determine the optimal CS, book value is used to emphasize this importance.
- When looking over a period of time it becomes harder to calculate the market value in an accurate and consistent way throughout the entire period. The use of book value gives the advantage to be consistent throughout the period studied.

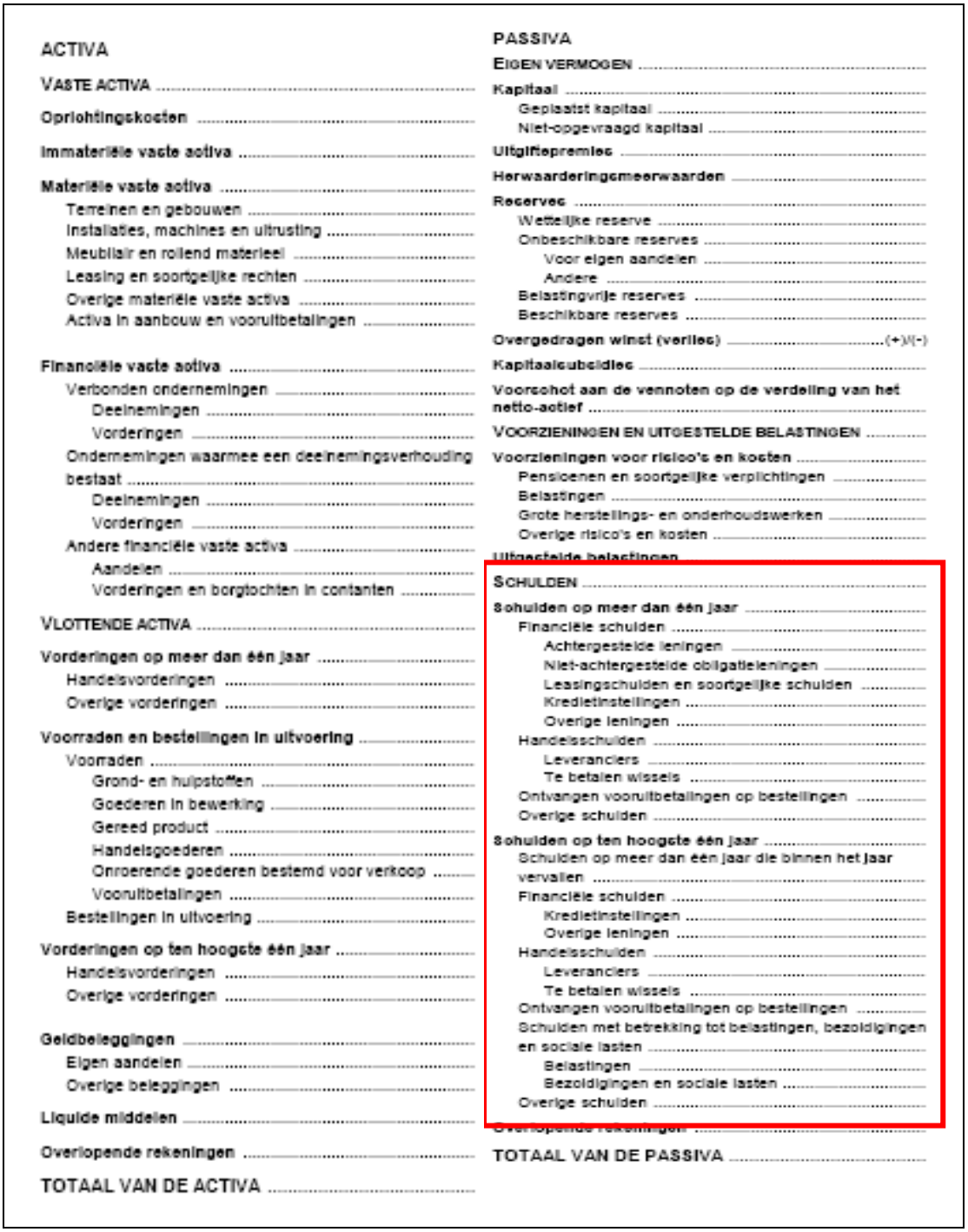
In conclusion, using a very broad definition has the advantage of easy calculation and can be applied easily throughout all the years and across countries. On the other hand it is also more sensitive to accounting differences since more items are included.

Given the data I will use, the more complex the definition, the less coherent the calculations will be. The samples vary over time and there were no general accounting principles in the beginning of the research period. Hence, I will be using a broad leverage definition throughout the paper:

$$Leverage = \frac{DEBT}{Total\_ASSETS}$$

The easiest way to introduce my definition of CS is to look at an example of the balance sheet of companies[7] and point out what is included in the definition.
Debt is everything under the definition of "Schulden" except "Overlopende rekeningen" (red rectangle). Total assets can be found easily and is the total amount on either the passive or active side of the balance sheet.
Some ratios leave out short term debt. This will not be taking into account due to methodological and data reasons.

[7] This general example can be found on the website of the "Balanscentrale" of the National Bank of Belgium.



ACTIVA

VASTE ACTIVA

Oprichtingskosten

Immateriële vaste activa

Materiële vaste activa
- Terreinen en gebouwen
- Installaties, machines en uitrusting
- Meubilair en rollend materieel
- Leasing en soortgelijke rechten
- Overige materiële vaste activa
- Activa in aanbouw en vooruitbetalingen

Financiële vaste activa
- Verbonden ondernemingen
  - Deelnemingen
  - Vorderingen
- Ondernemingen waarmee een deelnemingsverhouding bestaat
  - Deelnemingen
  - Vorderingen
- Andere financiële vaste activa
  - Aandelen
  - Vorderingen en borgtochten in contanten

VLOTTENDE ACTIVA

Vorderingen op meer dan één jaar
- Handelsvorderingen
- Overige vorderingen

Voorraden en bestellingen in uitvoering
- Voorraden
  - Grond- en hulpstoffen
  - Goederen in bewerking
  - Gereed product
  - Handelsgoederen
  - Onroerende goederen bestemd voor verkoop
  - Vooruitbetalingen
- Bestellingen in uitvoering

Vorderingen op ten hoogste één jaar
- Handelsvorderingen
- Overige vorderingen

Geldbeleggingen
- Eigen aandelen
- Overige beleggingen

Liquide middelen

Overlopende rekeningen

TOTAAL VAN DE ACTIVA

PASSIVA

EIGEN VERMOGEN

Kapitaal
- Geplaatst kapitaal
- Niet-opgevraagd kapitaal

Uitgiftepremies

Herwaarderingsmeerwaarden

Reserves
- Wettelijke reserve
- Onbeschikbare reserves
  - Voor eigen aandelen
  - Andere
- Belastingvrije reserves
- Beschikbare reserves

Overgedragen winst (verlies) ....(+)/(-)

Kapitaalsubsidies

Voorschot aan de vennoten op de verdeling van het netto-actief

VOORZIENINGEN EN UITGESTELDE BELASTINGEN

Voorzieningen voor risico's en kosten
- Pensioenen en soortgelijke verplichtingen
- Belastingen
- Grote herstellings- en onderhoudswerken
- Overige risico's en kosten

Uitgestelde belastingen

SCHULDEN

Schulden op meer dan één jaar
- Financiële schulden
  - Achtergestelde leningen
  - Niet-achtergestelde obligatieleningen
  - Leasingschulden en soortgelijke schulden
  - Kredietinstellingen
  - Overige leningen
- Handelsschulden
  - Leveranciers
  - Te betalen wissels
- Ontvangen vooruitbetalingen op bestellingen
- Overige schulden

Schulden op ten hoogste één jaar
- Schulden op meer dan één jaar die binnen het jaar vervallen
- Financiële schulden
  - Kredietinstellingen
  - Overige leningen
- Handelsschulden
  - Leveranciers
  - Te betalen wissels
- Ontvangen vooruitbetalingen op bestellingen
- Schulden met betrekking tot belastingen, bezoldigingen en sociale lasten
  - Belastingen
  - Bezoldigingen en sociale lasten
- Overige schulden

Overlopende rekeningen

TOTAAL VAN DE PASSIVA

Figure 2: Example of Balance sheet (Balanscentrale NNB)

2.2. Capital Structure Theories

2.2.1. Static Trade off model

2.2.1.1. No Tax

The Modigliani – Miller (MM) theory (1958) is considered to be the first breakthrough in corporate finance theory and is still the cornerstone of modern corporate finance. MM were the first to take a closer look at the relationship between CS and the cost of capital. They start their reasoning with providing the conditions under which the financial decisions have no effect on the value of the firm.

In Modigliani (1980) the "irrelevance" Theorem is explained as follows: "*With well-functioning markets (and no taxes) and rational investors, who can "undo" the corporate financial structure by holding positive or negative amounts of debt. The market value of the firm (debt plus equity) depends only on the income stream generated by its assets. It follows, in particular, that the value of the firm should not be affected by the share of debt in its financial structure or by what will be done with the returns, paid out as dividends or reinvested (profitability).*"

The theorem states some propositions. The first proposition is that under certain assumptions[8] the firm's overall cost of capital and therefore also the value of the firm is independent of its CS. The idea is that in a no tax scenario the investors can offset the debt used by a firm by replicating its financial actions. In other words they increase personal leverage to balance with the leverage of the company. Since debt and equity can be seen as part of the same homogenous group (i.e. capital), arbitrage will offset the price difference in a perfect market and the price of both debt and equity will equalize again.
The second proposition relaxes some of the assumptions previously made (taxes included) and says that the amount of debt used has no effect on the weighted average cost of capital. Figure 3 shows the linear function between cost of capital and the debt-to-equity ratio. The cost of capital (k_e) increases since the stockholders will require higher return due to the increased risk imposed by the additional debt. This increase offsets the benefit of the lower cost of debt (k_d). The overall cost of capital (k_a) does not change with changes in the capital structure.

[8] These assumptions are:

- No Taxes
- No transaction costs
- Buyers and sellers are price takers
- Information is readily available and can be obtained easily
- All investors can borrow and lend at the same rate
- All investors are rational and have homogeneous expectations of a firm's earnings
- The homogeneous risk class assumption: firms operating under similar conditions are assumed to face the same degree of business risk

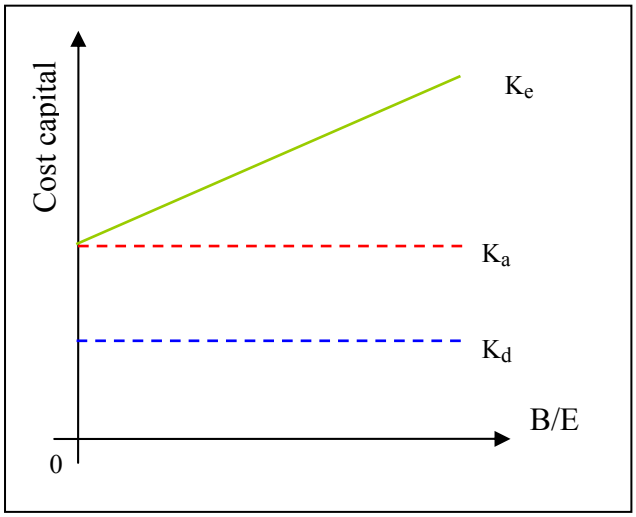


Figure 3: Cost of capital in relation to the capital structure (McGuigan et al. 2006)

The image of a fully debt financed firm is however not realistic. We can not assume that a firm only gains from this tax deductibility. At a certain debt level the company will face some extra costs too. It is necessary to further relax the assumptions and include some other factors than corporate taxes.

2.2.1.2. Tax

Taxes play a crucial role in the MM theory. They introduce the term "tax shield" already in their second proposition. In a lot of countries debt gets a preferential treatment within tax codes relative to equity. The tax deductibility of interest payments for a firm creates a tax shield. This is the amount of tax-gain thanks to debt financing. When a firm wants to maximize this tax shield, the optimal CS will be completely debt financed. Hence, a firm reduces its tax payments and increases its returns by financing its capital with debt. Under these assumptions a firm would be financed only with debt.

Personal taxes might need to be included. Apart from the risk factor, there is a difference in treatment in tax for the investor on income from interest payments and income from equity payments. Investors receiving interest income must directly pay tax on this. On the other hand investors that receive equity income in the form of capital gains can postpone the payment of tax. Hence, investors who receive interest income will require higher return to compensate the higher taxes as compared to capital gains. Consequently this reduces the advantage of debt over equity.

We could also think of other examples of non-debt shields investment tax credits like the notional interest deduction in Belgium. These lower the advantage of the tax shield caused by debt financing. In other words, if these shields are large enough, the tax shield from interest deduction becomes redundant. That is, the contribution to the

value of the firm through debt financing reduces with the presence of other shields. Hence, we will see lower leverage ratios[9].

Tax based theories suggest that a profitable firm with a low tax shield will miss out on substantial value increase when it maintains a lot of unused debt capacity. In other words, for a profitable firm with few tax shields it is irrational to have a low debt-to-equity ratio since that means it will pay more taxes than needed. To maximize its shareholders wealth it should increase debt financing.

Pozdena (1987) calculated that the ratio of debt-to-equity in manufacturing firms in the USA was 0,550 in 1960, while in 1982 the ratio increased till 1,250. He concludes that the increase of corporate debt is due to the personal and corporate tax policies. Corporations in the USA are subject to an income tax since 1908. The income tax is due on revenues minus deductible expenses. One of these expenses for corporations is the interest paid on debt. However corporations base their financing decisions not only on the taxes they directly face, but also on the taxes their investors are subjected to. In the USA personal income has been taxed since 1913. In the USA dividends have a preferential treatment. The firm can choose to retain its earnings and as a consequence the tax on the capital gain is delayed.
Until 1922 equity income and ordinary income were subjected to the same rate as in personal income. In addition to the advantage of retained earnings, the realized capital gains have been taxed at a lower rate than ordinary income.
In 1960 the corporate tax rate reached its ultimate high of 52,8% (whereas 1% in 1908).
The 1986 Tax Act made the shift to more debt financing more interesting. First of all, the corporate tax rate exceeds the personal tax rate, which makes the tax shield for the companies bigger than the advantage of retained earnings for their investors.
A lot of other non-debt shields, such as depletion and depreciation allowances, are eliminated as well. They are however less easy to calculate using a single parameter.

[9] More information on the effect of notional interest deduction can be found in the review of "Accountancy & Bedrijfskunde" by Diane Breesch and Kristof Vanhoebroeck (Jaargang 27, nr.7, p 3-16).

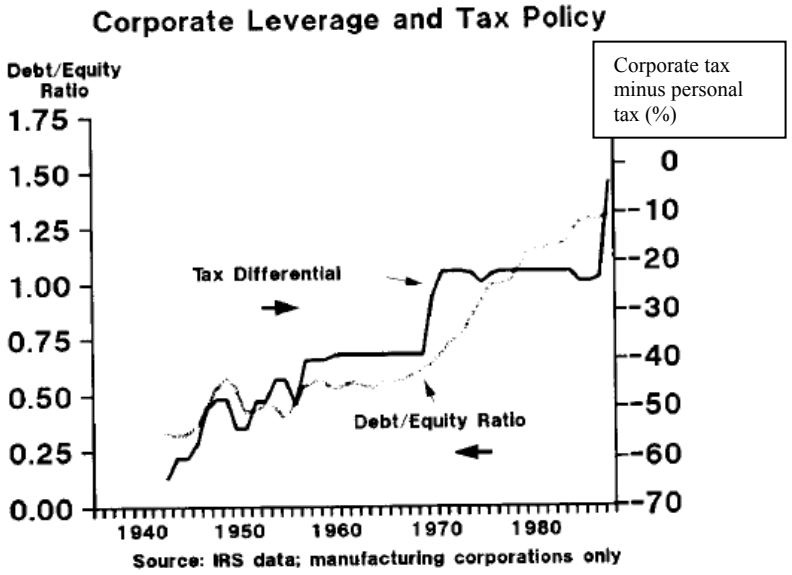


Figure 4: Corporate Leverage and Tax Policy (Pozdena 1987)

Figure 4 shows the link between the tax differential (corporate minus personal tax) and debt-to-equity ratio. Based on the discussion above we should see a positive relation between this differential and the ratio. We see that in 1940 the corporate tax was low whereas the personal taxes where (proportionally) higher. Hence, the tax shield for corporations was not big and the investors preferred to invest through equity and retain the earnings.
As the difference between the two became smaller, we see a positive evolution. On the one hand the tax shield for the companies got bigger, which made the use of debt more attractive. Also the difference in tax treatment became smaller. The advantage for the investors to use equity is weighing less on the decision of the ratio. Hence, there is a positive and linear association between tax and leverage.

2.2.1.3. Agency Cost Theories

Apart from the inclusion of taxes MM also relax other assumptions. They include financial distress costs and agency costs.

Myers et al. (2003) define bankruptcy costs as follows. They are direct or indirect costs related to the failing of the company. Direct costs include the actual administrative costs of going bankrupt (legal costs, lower market value for assets, etc.). They make up a considerable part of the firm value for smaller firms, but in general these costs are fairly small. This makes them less important in the corporate financing decision. Nevertheless, the indirect bankruptcy costs are significant for both large and small firms. An example could be that highly leveraged companies pass up investments with a positive net present value, especially when these firms are faced with the prospect of default.

What happens is that there will be an attempt to balance the tax advantage with the disadvantage of bankruptcy costs. The optimal CS is the one where the next euro of

debt is expected to provide an incremental tax subsidy that offsets the resulting increase in expected bankruptcy costs.

Agency costs are accrued by conflicts of interest between agent and principal. The first possible conflict is between managers and shareholders. Managers have a small claim on the profit but are fully responsible for the costs. This might give them the incentive to maximize personal wealth instead of shareholders wealth. A possible solution to reduce this agency problem is making the managers shareholders. If we link this to the CS decision however, we can see that the more the firm is debt financed, the less these agency costs are important. It reduces the possible conflict, by reducing the amount of cash available to managers since it commits the firm to pay interest.

More relevant in the CS issue, is the relation between the debt holders (principals) and the security holders (agents). The agents have (direct) influence on the investment decisions of the firm. They will try to maximize their shareholder wealth and this through investing in riskier projects with higher returns. The principals on the other hand would want to reduce this risk since they want to ensure the repayment of their money. If agents increase debt, principals will ask a higher interest rate to compensate this risk increase. Alternatively stock holders propose monitoring and covenants to reduce the perceived risk for the principals and hence the interest payments. Of course the firm will only propose this to the point where the extra reduction in interest payments outweighs the cost of monitoring.

This brings us to what is called the static trade-off model. In this model a company determines its optimal CS by making a trade off between the benefits from increasing debt and the costs, while holding the firm's assets and investment plans constant. The important implication this model has is that a firm has an optimal CS that it targets.
Hence, in a same sector we should see few differences in the debt-to-equity ratios between companies since there will be one common optimal CS based on taxes, bankruptcy and agency costs. The reasoning is that firms in a same sector face similar factors and should therefore have one optimal CS.

The major implication this model has, is that there is a possible positive relationship between leverage and profitability (and cash flow). Profitability means less risk to go bankrupt which lowers these costs. Greater profitability also increases the tax rate. When increasing leverage, you increase the tax shield and lower the effect of the higher tax. Also in the agency costs we saw that a primary source of agent-principal conflict is the free-cash flow. Increasing debt reduced this effect.
Another prediction of the model is an inverse relationship between leverage and investment opportunities. This can mainly be explained by agency theories. Firms with high investment rates have less need to constrain the management in taking decisions that harm the shareholders.

Hence the Static Trade-off model can be summarized by the formula:

$$MarketValueFirm(levered) = (MarketValueFirm(unlevered)) + (\Pr esentValueTaxShield) - (\Pr esentValueFinancialDistressCosts) - (\Pr esentValueAgencyCosts)$$

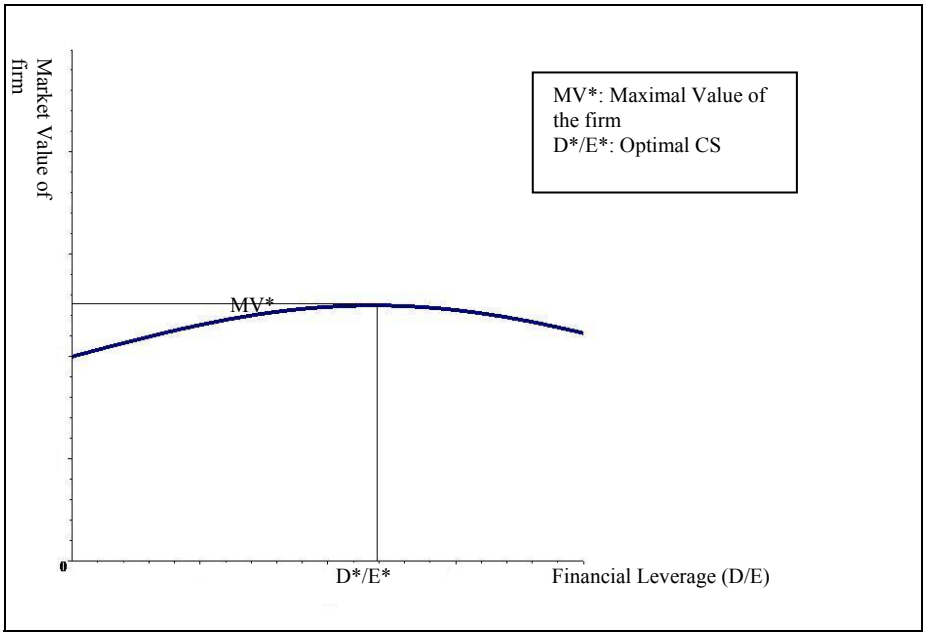


Figure 5: Relationship between market value of the firm and leverage

Figure 5 summarizes the Static Trade off model. The optimal CS (D*/E*) is the CS where the market value of the firm is maximized (MV*). In other words, where the present value of the tax shield is maximized and the present value of financial distress costs and agency costs minimized.

2.2.2. Pecking Order Model

This theory was introduced by Myers (1984). It claims that the company's CS is an accumulation of its past financing decisions and that debt-to-equity ratios change in response to imbalances between internally-generated cash flows and investment opportunities. In other words, companies finance their new investments with the cheapest available funding. These are internally generated funds. Only if this is insufficient it will pass on to external funding. Here, debt financing is cheaper than equity financing.

Implications are that there is no such thing as an optimal CS according to this model. The actual level of debt is more of a historical consequence of past decisions made and is driven by the firm's net cash flow (cash earnings minus investment outlays). Profitability (and cash flow) will cause lower leverage since the company can finance itself with internally generated funds. On the other hand, investment opportunities will increase leverage since more funds will be needed. Remarkable is that this is completely the opposite of the findings in the trade-off model. Intuitively the pecking order has great value, but there is no sound theoretical foundation for it.

2.2.3. Asymmetric Information and Signalling Theories

Insiders and/or firm managers possess private information about the firm and its investments opportunities to which outsiders have no access. The theory of information in economy says that information that is disclosed by a biased source will only be credible if the costs of communicating falsely are large enough to encourage managers to reveal the truth. Hence, the CS choice signals to the outsiders the information the insiders hold.

For example, adding more debt to the leverage can serve as a credible signal of high future cash flows. If we think about the theory of information, the cost of false signalling is high. If the managers want to increase the value of the company using the signal of increased debt financing and if the future cash flows are insufficient to cover the interest payments, the firm can fail and go bankrupt. As a consequence, the CS can be seen as a very valuable signal.

In summary, in case of undervaluation of the company, issuing debt will be the most appropriate signal. On the other hand, issuing equity is more appropriate in case of overvaluation.

Some of the implications for leverage are that debt-to-equity increase with the extent of informational asymmetry. There are also positive correlations between leverage and firm value.

2.3. Empirical Studies

This part aims to discuss the major determinants that influence the CS. This is certainly not a complete overview of all determinants, but an overview of the most important determinants found in several papers discussing this subject. A distinction is made between micro-economic determinants (company related) and macro-economic (non company related) determinants.

To enable the reader to understand the context of the research, a brief description of the main papers used can be found in footnote.

2.3.1. Micro economic determinants

2.3.1.1. Tangibility of assets

Rjana and Zingales[10] (1995) state that the larger the tangibility of the firm's assets, the better they could be used as a collateral. This diminishes the risk of the provider of debt. In other words the agency costs decrease. The proxy used for tangibility is the ratio of fixed to total assets.
The effects of collateral will decrease when the firms have close relationships with their creditors. Thanks to this close relationship and the more informed monitoring they need to provide less collateral. Hence, for firms in bank based countries[11], the tangibility should matter less. On the other hand the costs of financial distress decrease with more tangible assets present, since more value is retained in liquidation.

Bevan and Danbolt[12] (2000) found that tangibility has a negative effect on leverage. They agree however with Rajan and Zingales (1995) when it comes to long term debt components. Only in this case there is a positive relation. When it comes to short term debt components we see a negative relation.
The negative relation between short term debt and tangibility of assets is explained by the maturity matching principle. A firm can face the risk of not having sufficient cash when maturity of the debt is shorter than the maturity of the assets or vice versa. As a

[10] Rajan and Zingales (1995) investigate the influence of micro-economic determinants (tangibility, growth opportunities, company size and profitability) on leverage, by analyzing the financing decisions of public firms in major industrialized countries. They used data collected throughout the years 1987-1991. The first part of the study compares previous research in the USA and Canada on CS with research in some Western European Countries. It is one of the first studies that also look at continental European countries. There was no reason to automatically expect the determinants for US based countries to be the same for European countries. The cross country study of the determinants enables us to interpret the determinants that affect the CS decision even in different institutional environments.

[11] Bank based country: Examples are continental European countries as well as Japan. In these countries financing is less regulated via market (the so called market based countries, e.g. USA and UK) and more via banks.

[12] Bevan and Danbolt (2000) study the dynamics of the determinants that influence CS. Difference with other studies is the link with time. They concentrate on the same four micro-economic determinants as Rajan and Zingales (1995): tangibility, growth opportunities, company size and profitability. Apart from looking at the effect of these four determinants they also study the change of the regression coefficients over time in a period from 1991 to 1997 for UK firms.

consequence it is better to have less short term debt in case the company has a high tangibility to ensure the cash position of the company in the short term. The findings support the existence of the maturity matching principle.
The negative effect of tangibility is however smaller in 1997 than in 1991. The explanation is that due to bad debt problems in the early 90's banks were less willing to debt finance the firms. Hence, the effect of tangibility (and collateral) was less in 1997.

2.3.1.2. Growth opportunities

Rajan and Zingales (1995) state that growth opportunities, and hence higher future growth, stimulate a greater use of equity. This is because firms with higher growth opportunities have higher costs of financial distress. Highly levered firms are also more likely to pass up profitable investment opportunities. Hence, if a firm is facing high future growth, it should be less debt financed to make sure that the necessary investments can be made to sustain this growth. The proxy used is the ratio of the market value of the assets to the book value of the assets.

We can better understand this relation by looking back at the theory of agency costs and asymmetric information. Myers (1977) says that shareholders could undertake actions that are against the interest of the debt holders. For a company whose value is accounted for mainly by high future investment opportunities this is even more relevant. To protect themselves lenders impose restrictions. Hence, growth companies will be reluctant to take on debt since it will constrain their future manoeuvrability.

Bevan and Danbolt (2000) find a positive and highly significant relationship between leverage and growth opportunities. The coefficient is however higher in 1991 than it was in 1997. A possible explanation could be the increase in the level of the market-to-book ratio during the 90's. The shift from debt towards more equity finance for firms with high growth levels can be linked to the growing demand for shares in high technology and internet companies. These companies took advantage of the increase in demand of their shares and reduced there levels of indebtedness.

2.3.1.3. Firm size

The proxy used for size is "logsales". Rajan and Zingales (1995) explain why the theory and most empirical research show a positive relation. Larger firms can be seen as more diversified and less prone to failure (bankruptcy costs are lower). As a consequence leverage and size should be positively correlated. In this case size is seen as a proxy for the (inverse) probability of default. This is also closely linked to the determinant of tangible assets: Larger firms are able to use more collateral.
A small and new firm has a larger probability of default and when it goes bankrupt it will be at a large cost for the creditors and shareholders since it has not a lot of collateral to repay them. More mature and large companies are less prone to bankruptcy and in case of bankruptcy they mostly have a lot of assets to fall back on.

Bevan and Danbolt (2000) agree and confirm the positive and significant relationship between size and leverage. This relationship grew stronger in 1997.

The major aim of Michaelas'[13] (1999) work is to show policy makers in the UK and financiers that borrowing requirements for SMEs are not the same over time and across industries. The results show that small businesses retain a lot of their earnings and only raise debt when additional finance is necessary. Policy makers need to take this into account and provide an environment in which SMEs can retain sufficient earnings to be able to finance their projects. His critique is that the UK tax regime does not provide enough breathing space for SMEs. Only when they provide incentives to retain earnings (through tax allowances for example) the SMEs will be able to contribute the maximum possible to economic performance.

2.3.1.4. Profitability

Rajan and Zingales (1995) say that following the pecking order theory, firms prefer to finance with internally generated funds. So there is a negative correlation between leverage and profitability. The more profitable a firm is, the more earnings it can retain to reinvest in the firm. There is no need to attract funding externally. In other words: In the short run a firms dividends and investments are fixed. If debt financing is the dominant way of external financing, then changes in profitability will have a negative effect on leverage. The proxy used is the ratio of EBITDA to total assets.

Modiglinani and Miller (1958) however suggested that due to tax deductibility of interest payments company might prefer debt to equity. This means that profitable firms would choose to have high levels of debt in order to obtain a higher tax shield. This would suggest a positive relationship between profitability and leverage. DeAngelo and Masulis (1980) state that the effect of the tax shield might be less important with other tax shields present such as depreciation.

We also saw that larger firms tend to issue less equity. The negative influence of profitability on leverage will be stronger as firm size increases. The reason why however is not clear. Probably larger firms have larger profit and hence more to retain. As a consequence the effect of profitability is bigger for them.

Bevan and Danbolt (2000) found that the effects of profitability on leverage are negative and significant. This is consistent with the pecking-order theory and contradicts the tax shield hypothesis and hence Static Trade off model. The level of profitability has however a much smaller effect on leverage in 1997 than in 1991. In the mid 90's banks started to put constraints to their borrowing because of the increasing bad debt in the early 90's. Bank debt became increasingly dependant upon adequate earnings capacity of the firm. This partly explains why the effect of profitability was less important. The banks were less willing to take risks.

[13] Michaelas (1999) studies the time-series patterns in leverage by looking at the evolution of CS of UK small and medium sized companies (SME) from 1988 to 1995. He studies the same company related determinants as the two previous papers and also makes some inferences on the effect of non company related determinants. He uses this paper to consult politics on a better approach for taxation of SME's.

2.3.1.5. Summary

Rajan and Zingales (1995) summarize their model as follows:

$$leverage[firm(i)] = \alpha + \beta_1[Tangibleassets(i)] + \beta_2[Markettobookratio(i)] + \beta_3[\log sales(i)] + \beta_4[returnonassets(i)]$$

All the coefficients found in the study with US firms gave the sign as predicted. It was significant at the 1% level.

The model outcome is shown in table 1 with correlation coefficients (β's) and the quality of the model (R^2):

Variable\Country	USA	Japan	Germany	France	Italy	UK	Canada
Tangibility	0.5	1.41	0.42	0.53	0.36	0.41	0.26
Market-to-book	-0.17	-0.04	-0.2	-0.17	-0.19	-0.13	-0.11
Logsale	0.06	0.11	-0.07	0.02	0.02	0.026	0.08
Profitability	-0.41	-4.26	0.15	-0.02	-0.16	-0.34	-0.46
Pseudo R^2	0.21	0.29	0.12	0.12	0.05	0.18	0.19
# observations	2079	316	175	117	96	822	264

Table 1: Results of Rajan and Zingales (1995) cross country determinants

The R^2 for the USA, which is one measure of the quality of the model, is 0,210. It proves that the model explains 21% of the variance of leverage which is weak in general, but given the field of research, this is still a pretty good model.

Bevan and Danbolt (2000) found following correlation coefficients:

Year	Constant	Market-to-book	Logsale	Profitability	Tangibility	Adj R^2	F
1991	0.3737	0.0671	0.019	-0.7733	-0.1914	0.1527	33.09
1997	0.2385	0.0298	0.0251	-0.3219	-0.1256	0.1141	22.08

Table 2: Correlation coefficients for year 1991 and 1997 - Bevan and Danbolt (2000)

Over the period from 1991-1997 the overall level of indebtedness of the average UK firm has not changed significantly. There have been significant changes however on the importance of the various components of debt. There has been a statistically significant increase in the average level of long term debt. This increase was offset by a general fall in the level of current liabilities. This has led to a very small decline in the overall level of debt.

The research shows that there is definitely a dynamic in the determinants of CS. It fails however to really pinpoint the reasons for the changes over time. We need to take a closer look at determinants that influence leverage over time.

2.3.2. Macro-economic determinants

2.3.2.1. Industry Effects

The Static Trade off theory implicated the presence of an optimal CS for companies. The theory loses part of its value when companies of a same sector have different debt-to-equity ratios. There is however strong evidence that companies in the same industry have similar leverages. This industry effect on leverage is in line with the Static Trade off theory since it confirms the presence of a general optimal CS for companies with the same characteristics.

McGuigan et al. (2006) identified two examples: the paper industry and pharmaceutical industry. The paper industry is known to have a high debt-to-equity ratio (1,360). We can understand this since it uses a lot of tangible assets and these are ideal collateral for debt financing. The pharmaceutical industry on the other hand has a debt-to-equity ratio that is far lower than in other industries (0,079). This industry relies more on intangible assets and has high R&D costs. Based on the theories above we can classify the pharmaceutical industry as an industry with lower leverage.

In Bradley et al. (1984) we can find following table with a classification of different industries and Debt-to-Equity Ratios.

INDUSTRY	Debt-to-Equity RATIO	INDUSTRY	Debt-to-Equity RATIO
Drugs	Low	**Lumber**	Medium
Cosmetics	Low	**Motor Vehicle Parts**	Medium
Instruments	Low	**Paper**	Medium
Metal Mining	Low	**Textile Mill Products**	High
Publishing	Low	**Rubber**	High
Electronics	Low	**Retail Department Stores**	High
Machinery	Low	**Retail Grocery Stores**	High
Food	Low	**Trucking**	High
Petroleum Exploration	Medium	**Steel**	High
Construction	Medium	**Telephone**	High
Petroleum Refining	Medium	**Electric and Gas Utilities**	High
Metal Working	Medium	**Airlines**	High
Chemicals	Medium	**Cement**	High
Apparel	Medium	**Glass**	High

Table 3: Qualitative classification of different industries and their CS (Bradely et al. 1984)

Also Michaelas (1999) empirically confirms that the industry exhibits a significant effect on the CS of the firm.

2.3.2.2. Country and Culture

Rajan and Zingales (1995) study cross country differences by comparing studies done in the USA and Canada with research done in Western European countries. When comparing the G7-countries the results showed firms in the Germany to be less levered than in USA.
An important point to make is the difference between "bank based countries" and "market based countries". The difference in leverage between countries can be partly explained by the difference in power of banks. The two extreme cases can be Germany (strong power of banks) and USA (strong power of markets). In Germany banks are allowed to underwrite corporate securities and to own equity in industrial companies. This is significantly limited in the USA. The effect it has on leverage is less clear however. We could assume the following:
Bank oriented countries will have more equity financing available because of closer monitoring of management by the banks. Hence, firms in bank based countries will have lower leverage. The market oriented countries will need to look for debt on the market since less equity is available due to strong regulation of the involvement of banks in their country.
However, another explanation is that the banks provide both debt and equity finance. This greater availability of financing in general will not show in the leverage ratio. It is important however that this institutional difference can partly explain why some determinants have more effect in some countries than others.

Country	Non equity liabilities to total assets	Debt to total assets	Debt to net assets	Debt to capital
USA	0.52	0.25	0.32	0.33
Japan	0.62	0.21	0.33	0.37
Germany	0.5	0.11	0.17	0.18
France	0.69	0.18	0.32	0.34
Italy	0.68	0.21	0.33	0.39
UK	0.47	0.1	0.16	0.16
Canada	0.48	0.32	0.36	0.37

Table 4: Cross country difference in CS (Rajan and Zingales 1995)

Table 4 shows us the leverage in different definitions after adjustment for accounting rules with equity measured at book value. We clearly see that Germany has a lower leverage in the different definitions than the USA. This could confirm the difference between bank based countries and market based countries.

Chui et al.[14] (2002) say that it is a fact that it helps to predict the financial leverage of a company by knowing the nationality of a company. In previous studies on the effects of the different determinants there has been evidence which suggested that leverage is affected by a country factor that affects the leverage. This is partly because of the fact that, although CS decisions in the developed countries are affected by the

[14] The study of Chui et al. (2002) includes the effect of culture in the studies of corporate finance and helps us explain cross country differences in the CS decision. Based on a tree graph they define two main cultural dimensions that each has a specific effect on the CS decision.

same variables, there are still some persistent differences in the leverage across the countries. Schwartz' (1994) cultural dimensions can help explain the effect.
The first dimension is Conservatism, which focuses on the extent the individual in a society is considered as an autonomous identity.
The second dimension is Mastery and Hierarchy, which focuses on the importance of the individual or the group within society. Based on these two dimensions of culture they developed a table hypothesizing how cultural values might influence CS decisions.

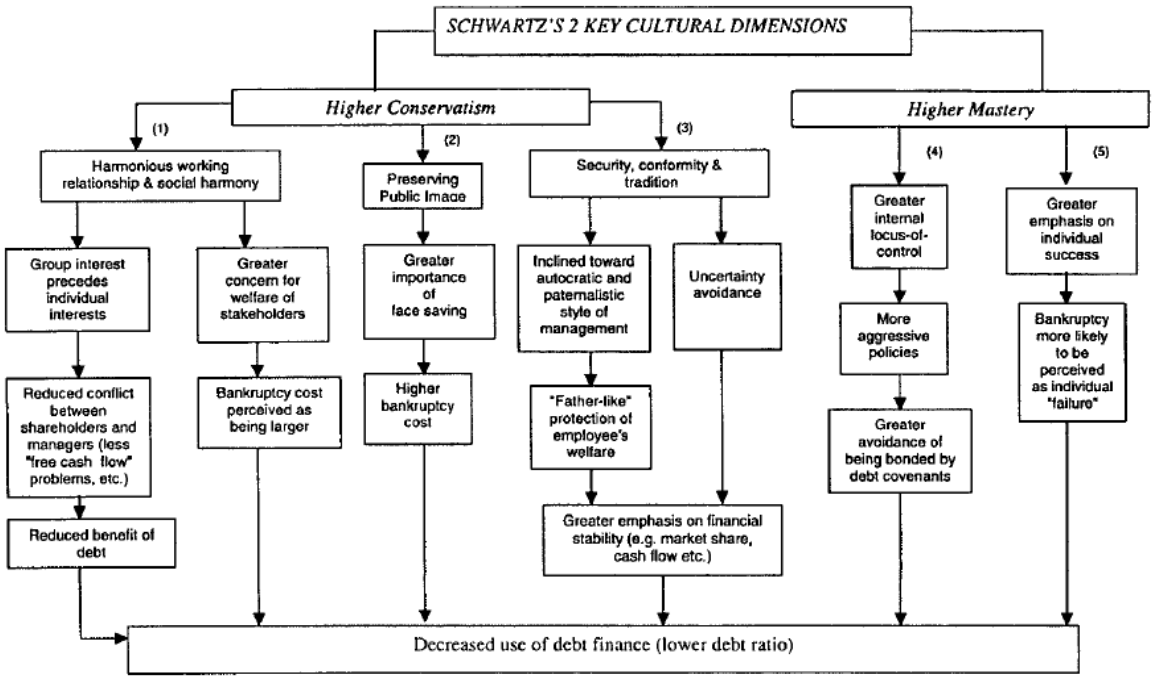


Figure 6: Cultural Dimensions and their influence on use of debt

The hypothesis that we can extract from the diagram in figure 6 is first that the CS is negatively related to the country's level of conservatism. It is also negatively related to the country's level of mastery and hierarchy. The two dimensions are measured through national scores on the seven cultural values of Schwartz (1994).

The results of the study show that both conservatism and mastery correlate negatively with leverage. This correlation is significant at the 1% level. Both determinants explain about 44% (R^2) of the cross country variance in leverage. If we look at the differences within a country, the R^2 is lower but still significant. This is mainly due to the fact that within a country there are more determinants influencing the leverage. But still after controlling for the major determinants (tangibility, growth opportunities, size and profitability), the cultural values play an important role.

Although my paper is a study of the Belgian CS and not a cross country study, this cultural difference is important. The cultural effect is one of the determinants that might explain the unexplained. In other words, Belgium has changed during the period I am studying. The mentality of different generations is certainly not static. Although it is not my goal to study the cultural effect on CS, I am convinced that part of the evolution of Belgian CS decisions will be explained by this effect.

2.3.2.3. Economic situation

Bevan and Danbolt (2000) conclude that the average total debt in the sample of firms appear to be decreasing during economic boom periods and increasing during economic recession. The proxy used is the percentage change of real GDP.

Michaelas (1999) also took a closer look at the effect of the general economic situation. He found a Pearson correlation coefficient (beta) of -0,551. This means that there is a negative relationship between the percentage change of real GDP and leverage. In other words the economic growth has a negative effect on gearing ratios of small firms.
We have to be careful however. If we look at the effect of economic growth on long term and short term debt we see two opposite effects. During economic boom periods we see decreasing use of short term debt for SMEs. Long term debt will however increase during these periods. The Pearson correlation coefficients (beta) respectively are, for short term debt -0,721 and for long term debt 0,805.

The explanation could be that for example during economic recession working capital requirements may be increasing as stock levels will be piling up and payment of clients will be delayed. The firms will have to raise short term debt to be able to finance possible cash flow shortages. During economic recessions firms will have less major investments and hence require less long term debt to finance these projects. As soon as the economy picks up the firm will use retained profits to pay back the short term debt and will start the invest in major projects.

Korajczyk and Levy[15] (2001) confirm that there is no doubt that CS decisions vary over time. In general, equity issues vary pro-cyclically and debt issues vary counter-cyclically. This is for firms that can easily access public financial markets. The effect of economic situation is less for firms that face a higher degree of financial constraint[16]. These firms are more likely to issue equity when there is an increase in their own price of equity. Hence, firms that face financial constraints might make different decisions than unconstrained firms.

The relation Korajczyk and Levy (2001) found between firm specific determinants and leverage is consistent with elements from both pecking order and trade-off theories. However, the relations between the macro-economic determinants and leverage seem to be consistent with the pecking order theory.

[15] Korajczyk and Levy (2001) model the CS choice of the firm as a function of not only micro-economic elements but also macro-economic conditions. In this paper the effect of the economic situation is studied from 1952 to 2000 for US based companies.
[16] Financial constraint does not mean they have no access to the capital market. A firm is financially constrained if it does not have sufficient cash to undertake investment opportunities and if it faces high agency costs when accessing financial markets.

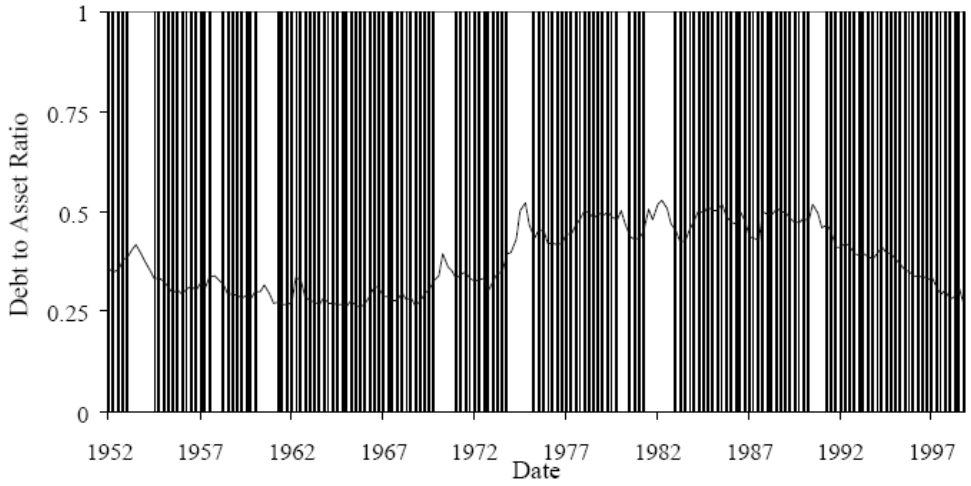


Figure 7: Evolution CS and economic situation (Korajczyk and Levy 2001)

Figure 7 shows that systematic peaks in leverage occur during economic downturns (indicated by the light areas). On the other hand leverage decreases during economic expansions (indicated by the shaded areas). If the trade-off model would hold we would see a pro-cyclical leverage, meaning that during expansions debt should be more attractive and hence leverage should be higher. In other words when the economy is doing well and the equity market is performing well, the bankruptcy costs are low, firms will have a higher tax shield and more free cash. We do not see a pro-cyclical trend but a counter-cyclical trend. This result is consistent with the pecking order model. During economic expansion firms will have more internal funds and hence prefer using internally generated funds to finance investments.

2.3.2.4. Inflation

Most theories demonstrate that inflation leads to higher use of debt by the companies because the real cost of debt declines during an inflationary period. In the study of Kim et al. (1988) the empirical results show a positive correlation between inflation and leverage (at the 10% significance level). On average 1% change in the inflation rate leads to a 0,7% change in leverage. Pozdena (1987) claims that inflation increases the attractiveness of additional debt.

If we consider both the effect on the cost of capital and the yield on corporate bonds we can summarize it as follows. The demand for corporate bonds (=lending) will decrease if the yield on corporate bonds becomes lower during an inflationary period. On the other hand, the supply of corporate bonds (=borrowing) will increase because during inflationary periods debt becomes more attractive. This is if the positive tax affect through interest deductibility is larger than the adverse effect of inflation on tax. The net impact will depend of the balance of both demand and supply effects.

2.3.2.5. Interest rates

There are two opposing arguments that can explain the effect of interest rates on leverage. In a paper by Downing et al. (2005) the key result was that the level of short term interest rate has a significant impact on the optimal CS. For example, if the short term interest rate is 3%, the optimal leverage ratio was 30%. When the short term interest rate rises to 15%, this optimal leverage ratio increases to 60%. The logic behind this is that in a risk-neutral setting, a higher risk-free rate means that all assets are expected to have higher returns. So the unleveraged assets are expected to appreciate at a higher rate and the firm's debt capacity increases.

On the other hand they also expect an inverse relationship. A higher interest rate means a higher weighted average cost of capital and hence a lower value of the firm. When interest is high, firms tend not to raise capital through debt financing. This is due to the fact that they don't want a long term commitment with a high interest level. They also have higher bankruptcy risks if earnings should drop.

Both arguments show that there is an effect on leverage. It is however not clear, based on research or theory, what the direction should be.

2.3.3 Overview of determinants

Overview determinants			
Determinant	Proxy	Effect on CS	Study
Tangibility of Assets	Fixed / Total Assets	Positive	Rajan and Zingales (1995)
Tangibility of Assets	Fixed / Total Assets	Positive (LT), Negative (LT+ST)	Bevan and Danbolt (2000)
Growth Opportunities	MV Assets / BV Assets	Negative	Rajan and Zingales (1995)
Growth Opportunities	MV Assets / BV Assets	Positive	Bevan and Danbolt (2000)
Firm Size	Logsales	Positive	Rajan and Zingales (1995)
Firm Size	Logsales	Positive	Bevan and Danbolt (2000)
Profitability	EBITDA / Total Assets	Negative	Rajan and Zingales (1995)
Profitability	EBITDA / Total Assets	Negative	Bevan and Danbolt (2000)
Economic Situation	% change of GDP	Negative	Michaelas (1999)
Economic Situation	% change of GDP	Negative	Korajczyk and Levi (2001)
Inflation	Inflation rate	Positive	Kim et al. (1988)
Inflation	Inflation rate	Positive	Pozdena (1987)
Interest rate	ST interest rate	Negative	Dowing et al. (2005)
Interest rate	ST interest rate	Positive	Dowing et al. (2005)

Table 5: Summary of the determinants and their influence on leverage

2.3.4. Corporate Finance in Belgium

Tychon [17] (1997) studies the influence of determinants on the CS of Belgian companies from 1984 to 1993.

Tychon (1997) concludes that Belgian firms rely mostly on internal funds. This confirms the "pecking order" model of Myers (1984). The emergence of Coordination Centres in the late 1980's explains a lot of the changing financial structure in Belgian firms during the period studied. The reasons why will become clear in an overview of corporate finance in Belgium later on.

Belgium is generally associated to Germany when discussing corporate finance. This is mainly because of the historical role that large banks play in Germany. Belgian corporate finance is characterised by the presence of large shareholders being mostly holding companies and family groups. In other words, there are a lot of "daughter companies" present in our economy. Figure 8 shows the evolution of debt and equity in the period studied (1985-1993).

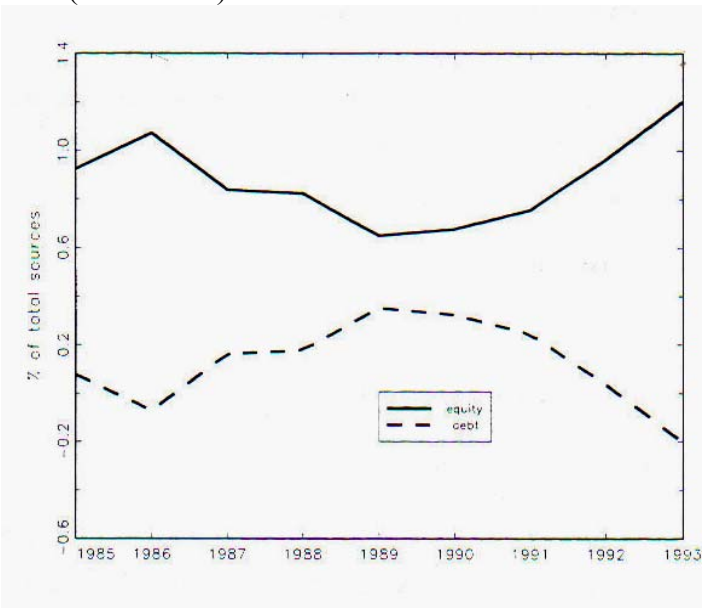


Figure 8: Debt versus Equity (P. Tychon 1997)

Figure 8 shows that small firms have maintained an almost constant leverage in the 10 year period. This is mainly due to the dominance of self-finance in smaller firms. My research will focus on a sample of the biggest firms in Belgium so we should see more evolution and can better study the effects on the determinants.

[17] Pierre Tychon (1997) studies the influence of micro economic determinants on the leverage of Belgian companies since 1984 and gives an overview of the history of corporate finance in Belgium. The sample is split up into small firms and large firms and makes a difference in the evolution for long term and short term debt throughout the period studied.

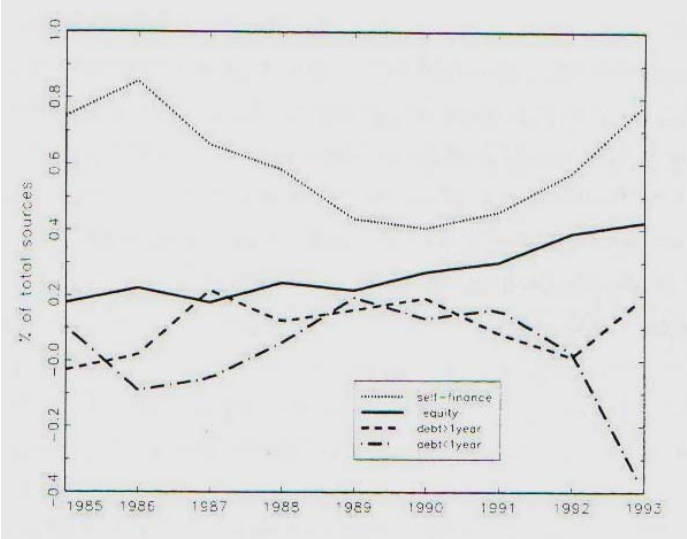


Figure 9: Sources of finance large firms (P. Tychon 1997)

Figure 9 shows that large firms[18] increased their reliance on external sources of funding during the late 80's. This was a period of investment boom in Belgium. We see that through the period from 1985 to 1990 there has been a sharp decrease of self finance from 80% to 40%. In 1993 this was back up to 75%. We can see that the evolution of self finance is balanced by short term debt. This confirms the pecking order model. From 1985 through 1990 the large firms increased their capital from 20% to 40%. This is consistent with the growing importance of Coordination Centres (discussed later) and the fact that large shareholders prefer to retain the earnings instead of paying out dividends for tax reasons.

Belgian finance has long been characterised by a banking system with large dominating banks. Since the mid 80's however the Belgian banking system faced several financial reforms after some "big bangs" on the European financial markets.
First of all the Brussels stock market in 1989 introduced a computerized trading system for all stocks in the forward market[19]. Also in 1991 the Belgian Future and Options exchange began trading, designing a market for small capital issues with the aim of attracting middle-sized firms to the public markets.
Secondly the market for Belgian government treasury certificates started modernizing as from 1991. Before the reform the treasury certificates market was restricted to a group of resident financial intermediaries. As a consequence the rates for treasury certificates were always higher than the interbank rates. The reform was done to lower the public debt burden by increasing the competition between credit institutions and hence lowering the rates for treasury certificates.
The law of 1993 that gave credit institutions the possibility to hold shares in non-financial firms removed the distinction between banks, saving banks and public credit institutions.

[18] Proxy used by Tychon (1997): Large firms exceed at least one of the following conditions:
1. Average number of employees > 50
2. Turnover >145 million Belgian Francs
3. Total Assets > 70 million Belgian Francs

[19] A forward market is an over-the-counter financial market in forward contracts.

As previously stated, a big influence on the evolution of CS in Belgium is the creation of Coordination Centres in 1982[20]. The basic idea was to give incentives to multinationals to relocate their financial operations in Belgium and hence to favour employment.
A Coordination Centre[21] is a company set up by the multinational in Belgium to provide certain services such as finance, treasury management, accounting, consultancy, etc. to the other firms in the multinational group. These Coordination Centres were exempt from the ordinary tax rules. The taxable income of Coordination Centres was determined using the cost-plus method[22]. Apart from this, they had several other exemptions. For example, the interest, dividends and royalties paid by Coordination Centres are not subjected to withholding tax. Also Belgian companies making loans to Coordination Centres benefit from a notional withholding tax attributed to the interest paid by the centre. This is only if they use the funds for investment or research in Belgium. In 2003 however the European Commission[23] decided that the rule was no longer in line with the common market idea and Coordination Centres are no longer allowed.

Coordination Centres allowed multinational groups[24] to carry out a large variety of financial and management services on a roughly tax-free basis. Belgium was not unique with its approach since quiet similar systems exist in e.g. the Netherlands, France and the United Kingdom. In 1997 about 300 international groups set up a Coordination Centre in Belgium.

Thanks to these advantages, the principal activity of the Coordination Centre is to finance investments of the members of the group. According to a survey done by the National Bank of Belgium in 1989, 43% of the investments in total Belgian manufactured industry were financed through these Centres. It is clear that the multinational group could benefit from financing with debt thanks to the tax advantage these Coordination Centres gave.

Important in Belgian Corporate Finance is also the high degree of ownership concentration. By this we mean the importance of holding companies and families and the control exercised through pyramidal and complex ownership structures to avoid hostile acquisitions. To put this into perspective Belgium is compared with the United States. La Porta et al. (1996) report that on average in the ten largest Belgian companies 57% of the equity is owned by the three largest shareholders. In the United States this is only 20%. The concentrated ownership encourages investors to closely monitor and influence the management. As a consequence conflicts of interest are not as important as in the United States. The agency costs are lower and hence managers are able to finance more with debt as they have the trust of the shareholders.

[20] Coordination Centres were created in 1982 by the "Royal Decree 187".
[21] Information based on a press release of the European commission in april 2003. http://europa.eu/rapid/pressReleasesAction.do?reference=IP/03/558&format=HTML&aged=1&language=en&guiLanguage=en
[22] The tax base in a cost-plus method corresponds to a flat rate percentage of the operating costs.
[23] The beneficial tax regime for Coordination Centres had to be phased out by the European Commision by 2003. For Coordination Centres that were approved on the 31st of January 2000 and extension was given till the 31st of December 2010.
[24] Multinational groups have a consolidated capital and reserves in excess of 1 billion former Belgian Francs and an annual turnover of at least 10 billion former Belgian Francs (Tychon, 1997).

Finally we also report a disintermediation since 1988. The degree of intermediation is measured as the ratio of the annual change of financial liabilities of Belgian banks to the change of gross financial liabilities of the private sector. Results show that financing is happening more and more via the private sector and as a consequence the ratio falls. At the same time more financing comes from abroad. A possible explanation is that large firms are raising funds from abroad through Coordination Centres.

We can conclude by summarizing the evolution of Belgian corporate finance. Belgium is a bank-oriented country that has undergone several major changes. The role of bank finance has decreased but the concentrated ownership is still present. Large firms could benefit from the special tax treatment through Coordination Centres. This allowed them to benefit from a tax advantage via debt financing. These Coordination Centres are no longer allowed since 2003.

The results of the study by Tychon (1997) are that large firms are more highly levered than small. This confirms the findings on the determinant size. During the period of research firms show a strong increase in equity. For large firms this increase was very strong (see figure 9). At the same time we see an even stronger increase of debt. On the assets side we see an increase in financial assets, with again a more significant increase for larger firms. The author gives two alternative explanations. The first being that the large firms got more opportunities to finance themselves with debt thanks to the existence of Coordination Centres. The small firms will face less opportunities of this kind. The explanation is that to avoid paying tax, large firms preferred to increase equity capital of their Coordination Centre. This has taken the form of financial assets in their balance sheet. The Coordination Centre transfers these funds in the form of debt to the firm. This results in a higher leverage.
The other explanation is that the amount of control is a decisive determinant of a firm's financial structure. In Belgium, as noted earlier, the influence of large shareholders is big. As a consequence it is possible that due to risk aversion, the dominant shareholders preferred to retain earnings instead of paying out dividends, as capital gains are not taxable.

The rest of the paper looks at the effect of the determinants also considered by Rajan and Zingales (1995). The results were similar and hence we can conclude the same for Belgian firms.

3. Empirical research: Evolution of the capital structure from 1950-2005

3.1. Introduction

The literature showed that in the past there has been a lot of studies on CS and the determinants that influence the CS. Meanwhile a lot of progress is made and some very strong determinants have been found. It is also clear that studies that take a closer look at a longer period of time are rare. Hence, general macro-economic determinants are studied less.
It is clear that gathering information over such a long period is no sinecure. The risk of comparing samples that are too different is real. However the fact that Belgium is a country where a lot of data is conserved well, made it possible to take the study of CS to another level.

The main goal of the empirical research is to give an overview of the evolution of the CS from 1950 to 2005 with a time interval of 5 years. Based on this evolution the correlation with several micro-economic and macro-economic determinants is studied.

3.1.1. Sample

In order to make valid conclusions a consistent sample over the full research period (1950-2000) is needed. Using a fixed sample (i.e. the same companies) was not possible. Mergers and acquisition and bankruptcy would change the sample too much and hence the consistency would be weak.

Therefore a sample of companies with at least one common characteristic, i.e. being part of the 20 largest listed companies, was selected. This sample of companies is assembled by the "StudieCentrum voor Onderneming en Beurs" (SCOB), a research centre at the University of Antwerp and is referred to as the SCOB20. The main goal of the research centre is to broaden the knowledge on the history of the Belgian Stock Exchanges and the companies listed on it.

The SCOB20 is a top 20 of the Brussels Stock Exchange and is calculated since 1832. The methodology and composition is nearly the same as the BEL20.
At the end of each year the market capitalization of the companies is calculated and a ranking of the 20 largest companies is made. This measures the economic size of the company and is calculated as the price of the stock times the number of shares outstanding of the company.

I refer to the appendix for an overview of the sample of companies during 1950-2005.

An important remark is the presence of a lot of banking companies (on average 20% of the sample). The banking sector is subjected to a specific set of rules and hence banks require a different interpretation of their balance sheet. On average the leverage calculated, with inclusion of banking companies tend to be higher (the results show 5% to 10% higher). This is mainly because of the rigid application of one formula on all the balance sheets of the companies. Banking companies need a special treatment to be able to reflect their leverage in a correct way. The balance sheets of banking companies contain elements that are considered as debt items when applying the CS formula. Hence, banking companies are financed extensively with debt based on the definition of CS used. To ensure myself that the presence of these banking companies do not distort the results I included results that make abstraction of the banking companies when these results differ from the results with banking companies.

Banking companies are subjected to a unique set of rules and their balance sheets and CS need to be interpreted different from non banking companies. According to Harding et al. (2006) corporate finance for financial intermediaries is influenced by two major factors: protection by deposit insurance and the rigid capital regulations.

Deposit insurance commits to pay the remaining of the insured deposits at the bank when insolvency occurs. Hence, bankruptcy costs will have less influence on the CS decision of a banking company. This will cause the leverage to be higher since the insurance backs the banks up. Of course higher debt will increase the premium paid by the bank to the insurance company and this will cause the bank to lower its debt to lower the premium paid.
The rigid capital regulations are a disincentive for excessive debt. A bank needs to comply with a whole range of rules to ensure the stability of the financial markets worldwide. The Basle Accords[25] introduced an international regulatory set of rules that are used in almost 100 countries worldwide. Several rules concern the strict minimum capital requirements of banking companies. These rules limit the risk for insolvency due to a high amount of debt. Harding et al. (2006) state that in the absence of minimum capital requirements banks will choose extremely low leverage ratios. If the bank can not meet up with these minimum requirements they may face liquidation for regulatory bodies. In Belgium the CBFA is an organisation that ensures the fulfilment of the minimum requirements by the banking companies.

Taking into consideration these two factors for banks, they follow the same reasoning for an optimal CS as the other companies in my sample.

[25] According to the paper of Jackson P. et al (1999) the introduction of the first Basle Agreements can be linked to an increase in leverage. The causal relation however could not be proven empirically.

3.1.2. Data

The data necessary to calculate the CS and other company related characteristics was gathered from the annual reports of the SCOB20 companies. The obligation of companies to officially issue their annual report to the National Bank of Belgium only started in 1978[26]. In this year also the general accounting principles were introduced in Belgium. Hence, data before 1978 was not centralized and there was no standard layout for the annual report required. Every year the annual reports were however published in the "Bijlage van het Belgisch staatsblad" and the "Receuil Financier".

This "Receuil Financier" was used for the data from 1950-1975. At the research centre SCOB the annual reports were processed electronically and the original data was input in an Oracle database. Each accounting item received a reference code and was then linked by the computer to a current code according to the "MAR[27]". This enabled us to transform the annual reports to the current standard layout.
For the year 1980 individual company annual reports were used from the archive of the Brussels Stock Exchange present at the SCOB. For the period 1985-2005 the data was provided by Graydon[28] and the Belfirst CDrom of Bureau van Dijk[29].

3.1.3. Methodology

To investigate the influence of micro- and macro-economic determinants on the evolution of the CS a single linear regression is used for each determinant.

The definition used for CS was:

$$Leverage = \frac{DEBT}{Total\_ASSETS}$$

The strength of the model and hence of each determinant will be denoted by R^2. The closer R^2 is to 1, the better the predictability of the model. In this field of study a R^2 of 0,5 is already considered to be a strong result.
The sense of the correlation between the determinant and leverage, positive or negative, is denoted by the standardized beta coefficient (referred to as beta). This correlation coefficient also indicates the strength of the correlation. The closer to 1 or -1 the stronger this positive or negative correlation is.
The significance of the R^2 and the coefficient will also be tested and will be referred to as S (significant) or nS (not significant). The significance ensures that the R^2 or

[26] Law 17 July 1975: Accounting Law: Article 80 concerning the deposition of the annual report. Royal Decree 8 October 1976 concerning the annual report of companies.
[27] According to the "Minimum Algemeen Rekeningstelsel (MAR)" introduced by the Law of 17 July 1975: Accounting Law: Article 4 concerning the MAR" and executed by the Royal Decree of 12 September 1983"
[28] Graydon NV Belgium has a leading role in commercial and marketing information as well as credit and debit management in Belgium since 1981. Website <http://www.graydon.be>
[29] Bureau Van Dijk Electronic Publishing has a range of products that contain company information available in software applications. Website <http://www.bvdep.com>

beta is significantly different from 0. The risk taken on the error of the first order (alfa) is 5%. Due to the small number of observations however the significance will be low for the majority of the results.

Based on literature review the determinants that will be studied are:

- Micro-economic (company):
  - Tangibility
  - Growth opportunities
  - Firm Size
  - Profitability
- Macro-economic (non-company):
  - Industry effect
  - Type of ownership
  - Tax system
  - Economic situation
  - Inflation rate
  - Interest rate
  - Stock exchange

The micro-economic data are gathered from the annual reports used for the evolution of the CS. For the macro-economic data several sources are used. The International Monetary Fund (IMF[30]) publishes data on GDP, interest rates and inflation rates for Belgium. The data on the corporate tax in Belgium is provided by Janssens et al. (1990) and the secretary of Finance in Belgium[31]. Stock exchange data of the Brussels Stock Exchange was available at the research centre SCOB.

[30] The International Monetary Fund (IMF) websites contains a financial statistics module where data on several macro-economic determinants can be found for each country.
Website < http://www.imf.org/external/data.htm>
[31] FOD Financiën website < http://minfin.fgov.be/>

3.2. Results

3.2.1. General Evolution Capital Structure

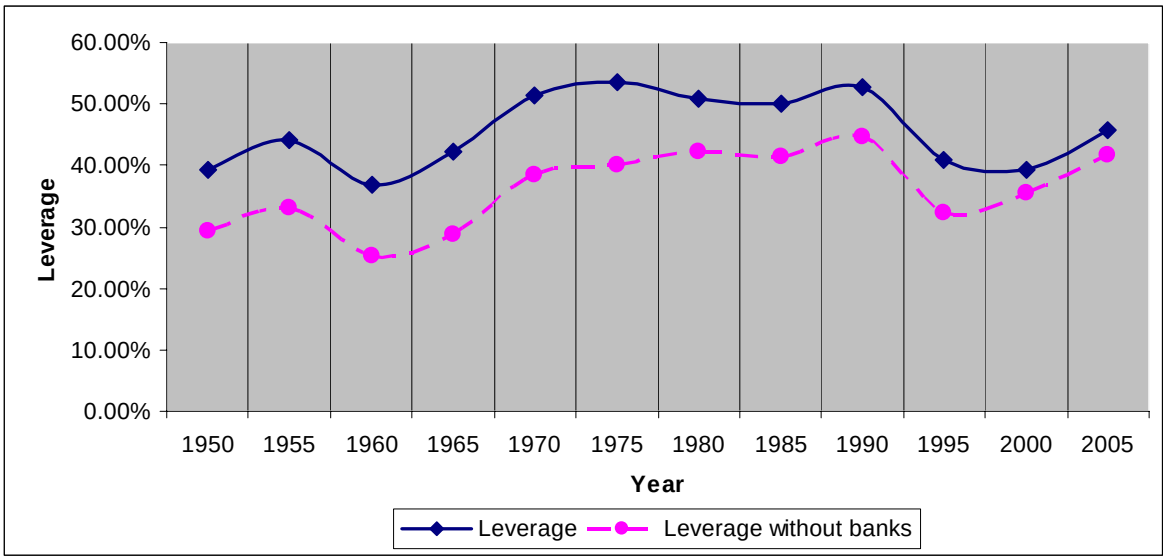


Figure 10: General evolution of the leverage of Belgian companies from 1950 to 2005.

Figure 10 gives a general evolution of the CS throughout the years 1950-2005. During the period 1955-1970 a serious decrease in leverage is noted in 1960. As from this year an increase can be seen. From 1970 to 1990 we see a relatively stable evolution with the average leverage at a constant but high level (+/- 50% for the total sample). In 1985 a small increase is noted until 1990 where we notice a drastic decrease in leverage till 2000. These findings are in line with the results from Tychon (1997). As from 2000 the use of debt increases again.
In figure 10 the difference between banking and non-banking companies discussed earlier is also noted. Although the evolution is similar, the sample without banking companies has a leverage that is on average 10% lower.

Year	Capital Structure	Capital Structure (without banks)
1950	39.37%	29.35%
1955	44.02%	33.23%
1960	36.83%	25.16%
1965	42.15%	28.80%
1970	51.38%	38.60%
1975	53.64%	40.14%
1980	50.90%	42.11%
1985	49.98%	41.50%
1990	52.60%	44.71%
1995	41.01%	32.38%
2000	39.40%	35.58%
2005	45.79%	41.74%

Table 6: Evolution of the CS with and without banks

3.2.2. Micro-economic determinants

These determinants will enable me to explain the evolution of the CS based on determinants directly related to the companies. An important remark however is that my sample is an average of the 20 largest companies. Therefore the strength of the influence of these determinants will not be as strong as in previous research because of the homogeneity of the sample.

3.2.2.1 Tangibility

For the determinant tangibility the ratio of fixed assets to total assets is used as a proxy.

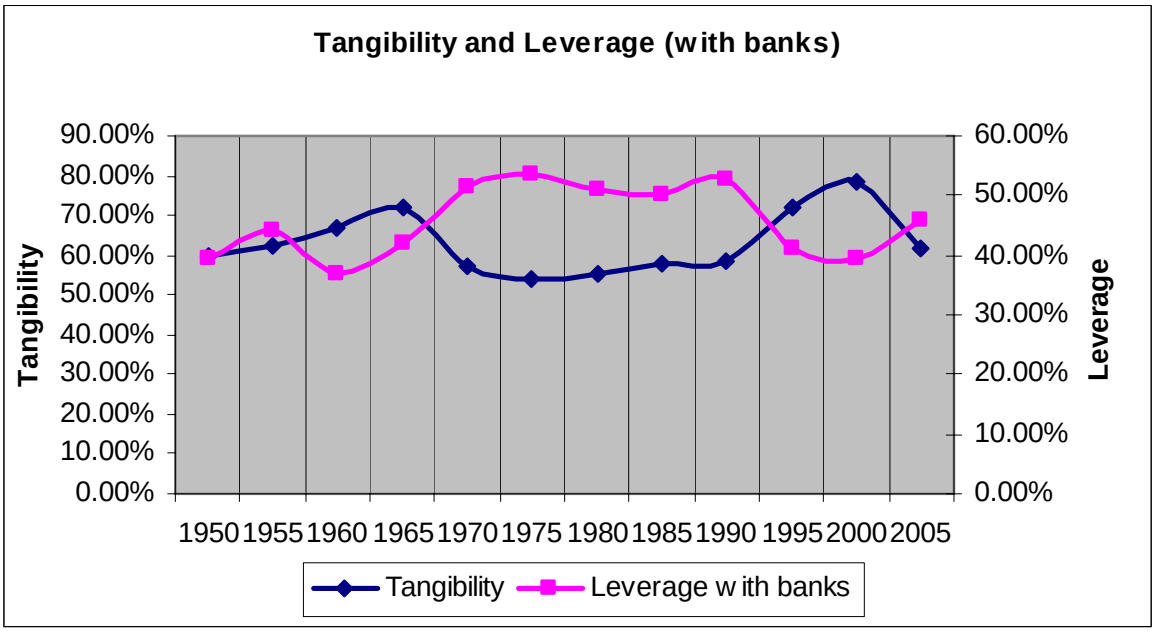


Figure 11: Correlation between tangibility and leverage.

Figure 11 shows an inverse correlation between the tangibility and leverage during the entire period studied. As tangibility increases, the level of debt financing decreases and vice versa.
The coefficient for tangibility in a regression analysis gives us -0,795 (S) and confirms the strong negative influence of this determinant with a good predictability (R^2=0,633 (S)).

Rajan and Zingales (1995) suggested a positive correlation since fixed assets mean more collateral for more debt. My results are more in line with Bevan and Danbolt (2002). They found a negative correlation and explained this with the maturity matching principle. In the short term the company needs to have enough cash. Indeed companies can use the big investments in fixed assets as collateral for the longer term debt but also need to take into account their cash position. To be able to fulfil their cash position in the short run their debt position will be lower. This decreases their interest payments and ensures their future cash position.

3.2.2.2. Growth opportunities

The proxy that should be used here is the ratio of market value of the assets compared to their book value. The data on stock listings of each company is not gathered and not readily available electronically. Hence, this determinant will not be discussed.

Later on however, when discussing the macro-economic determinants, I will discuss the influence of the performance of the stock exchange on leverage.

2.2.2.3. Firm Size

The proxy used in previous research is the logarithm of sales. This information was not available in the annual reports studied. The proxy used for size in this research is the logarithm of total assets.

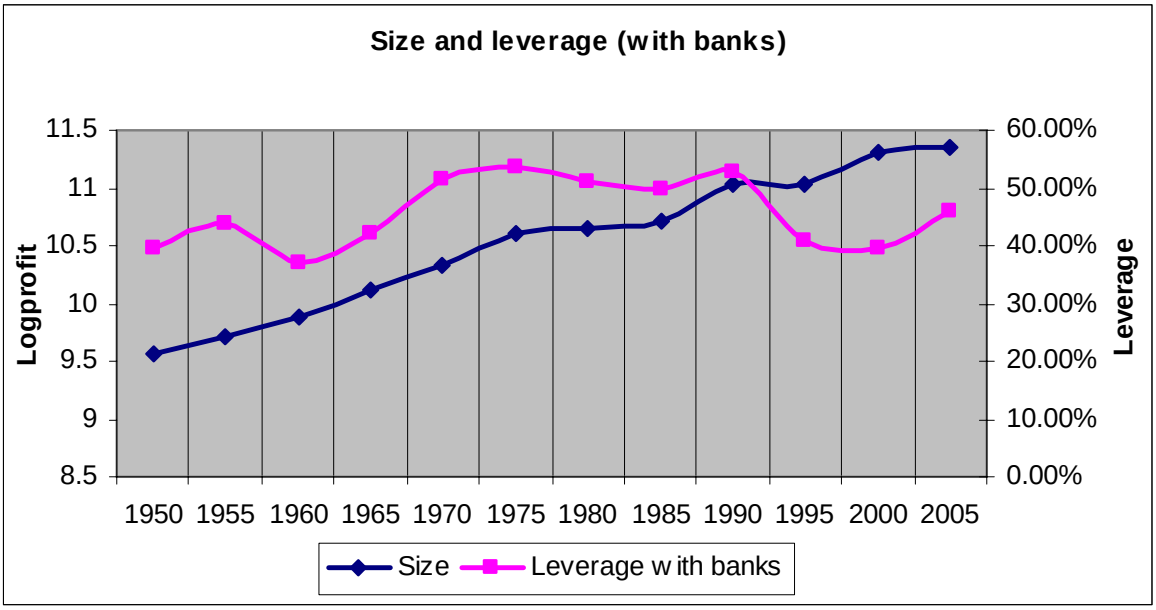


Figure 12: Evolution of size and leverage.

Figure 12 shows a weak positive correlation between the determinant size and leverage (beta of 0,332 (nS)). It is also not predictive (R^2 only 0,110 (nS)). Previous showed a strong positive and predictive relation between the determinant size and leverage. This research however studies a homogeneous sample of the 20 largest companies in Belgium. Linked to this is the fact that we are studying the evolution of a sample of companies and not a single company. When discussing a company related determinant it is better to look at its influence on a specific company.

We can only conclude that due to the general increase/decrease of the size of the sample, the leverage increases and decreases. From the period 1950 to 1975 we see a steady increase in the size of the companies. This partly explains the growth in the leverage. From 1975 to 1985 we see a stable size and this is linked to a light decrease

in leverage. Also the small decrease in size from 1990 to 1995 can be linked to a decrease in leverage.

It is interesting to also investigate the effect of the determinant size on one single company, e.g. Electrabel. This company had enough data throughout the period studied to make some interesting inferences.

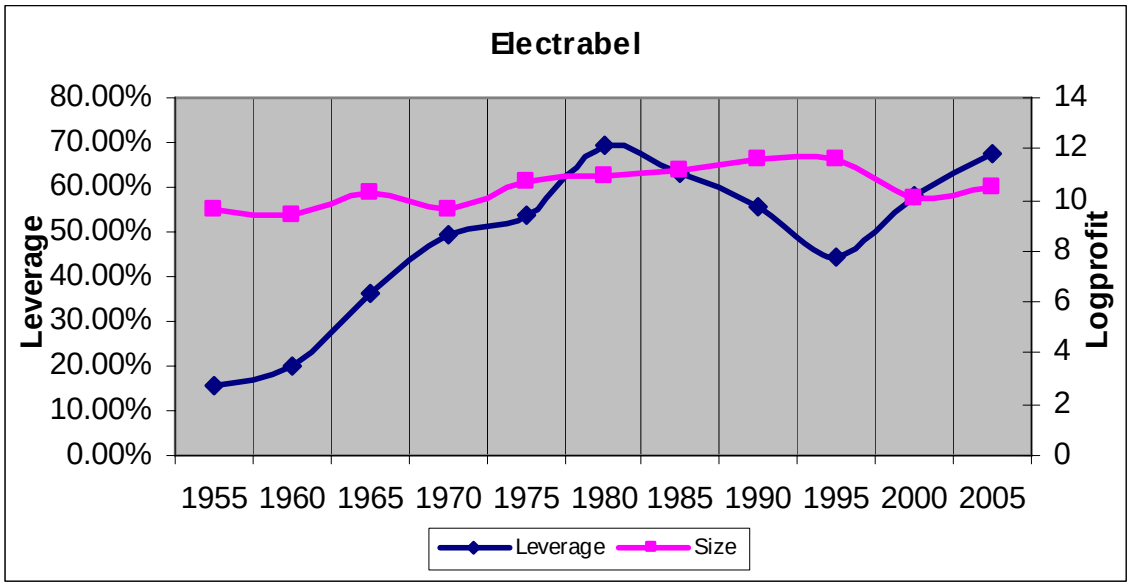


Figure 13: The evolution of size and leverage for Electrabel

Although we see a strong positive influence (beta is 0,595 (nS[32])) of the factor size, this influence is not very predictive (R^2 is only 0,354(nS[33])). The proxy I used for size is not good enough and the results are weaker than with the proxy logsales used in previous studies (R^2 of 0,600).

Hence we can conclude that the determinant has more relevance when studying the effect on the leverage of a single company. The homogeneity of our sample only allows us to conclude that a general increase in the size of our sample can be linked to an increase of leverage throughout the period studied.

[32] Significant when alfa = 10%
[33] Significant when alfa = 10%

2.2.2.4. Profitability

The proxy for profitability is the profit[34] of that year divided by total assets. Both Rajan and Zingales (1995) as Bevan and Danbolt (2000) found a negative correlation. These results confirmed that companies follow the pecking order theory.

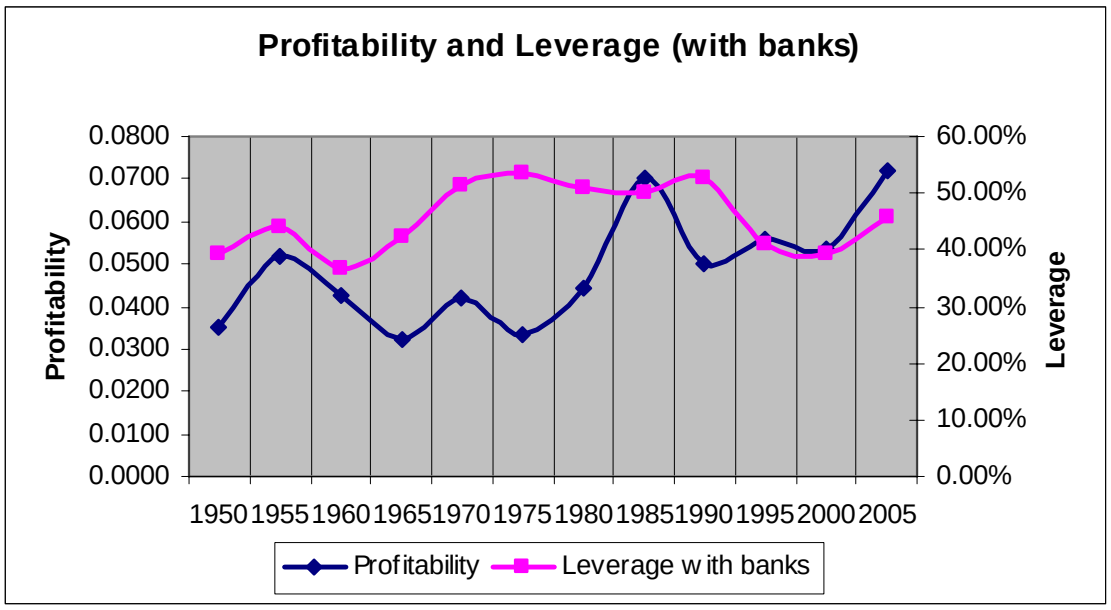


Figure 13: Evolution of CS and profitability

Our sample shows no inverse relationship between profitability and the CS. Only the period 1960 to 1980 could confirm this relationship. This period shows indications of the presence of a pecking order. Here the CS increased while profitability decreased. For the entire period a weak positive beta of 0,147 (nS) and a R^2 of only 0,022 (nS) was found.

There are two important reasons that can explain these results. First the time lag needs to be taken into consideration. Profitability will have an influence on the CS but only after one year. Given the fact that a sample is studied every five years it is difficult to make assumptions based on this variable. Based on these results we can not conclude whether there is a pecking order present or not.

[34] On the annual reports used for the data profit is the item "Winst van het boekjaar"

Secondly, profitability is again a company related factor. When we take one company, e.g. Petrofina, we obtain a negative relation.

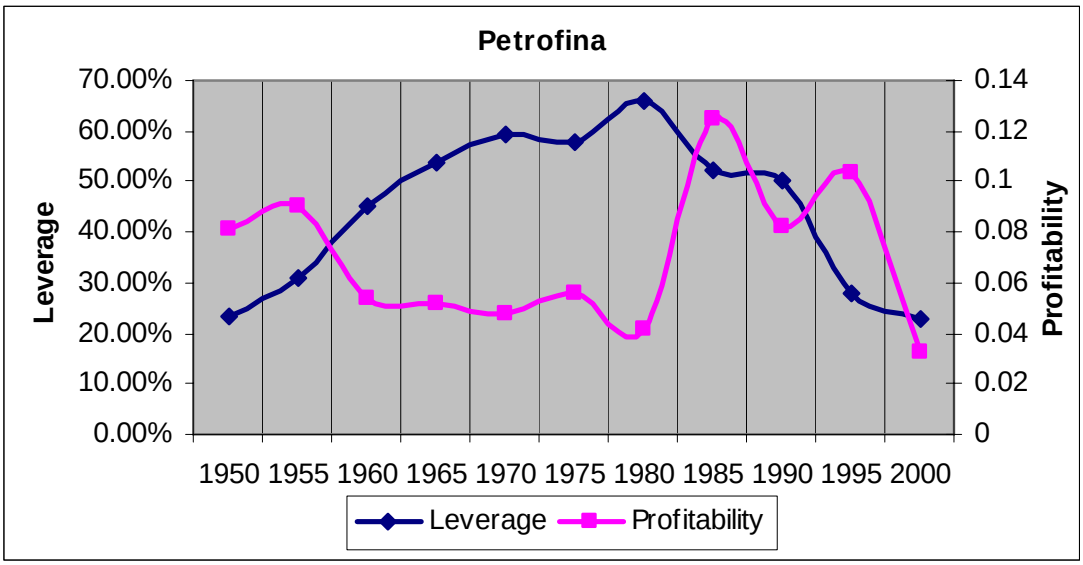


Figure 14: Evolution of the leverage and profitability for Petrofina

Figure 14 shows a negative correlation with a beta is -0,238 (nS). The predictability of this model is however extremely weak (R^2 of only 0.057(nS)). This weakness might again be due to the 5 year time interval.

For the entire sample it is difficult to make a conclusion based on profitability. However when we take a look at one company we see an inverse relation between CS and profitability. Based on this finding we could conclude that there is an indication that Belgian companies tend to follow the pecking order theory. This needs however further investigation with specific companies, other determinants and more data with a time period of 1 year.

3.2.3. Macro-economic determinants

The company related determinants showed already some interesting results concerning the investigated sample. The aim of the sample was however to see especially the influence and the strength of the correlation of macro-economic determinants. This is a quiet unique part of the paper. Most of the papers never give a complete overview of these determinants.

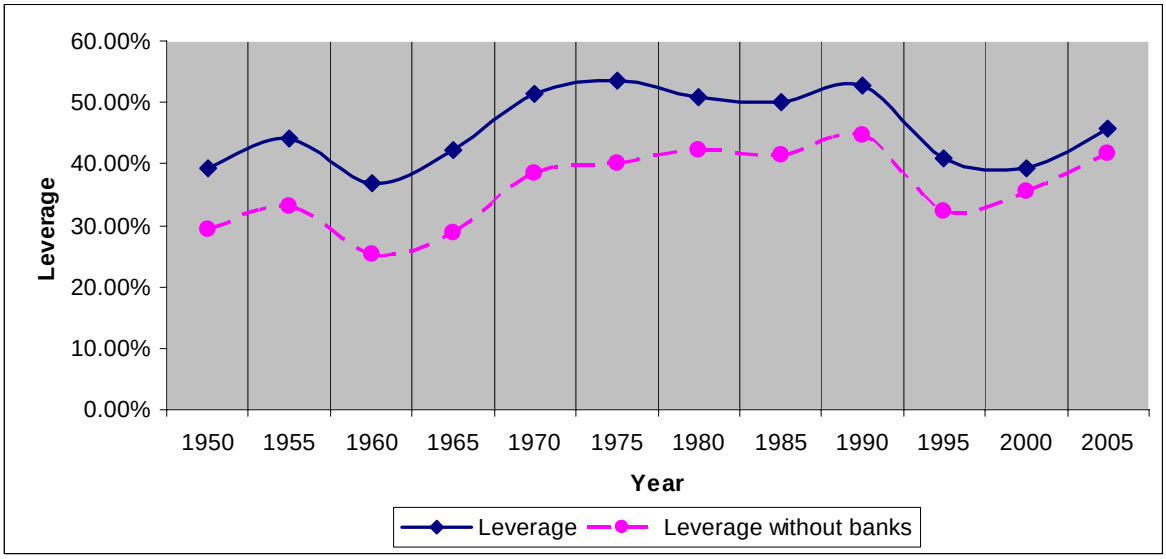


Figure 15: Evolution of CS in Belgium from 1950-2005 (reminder)

3.2.3.1. Industry effect

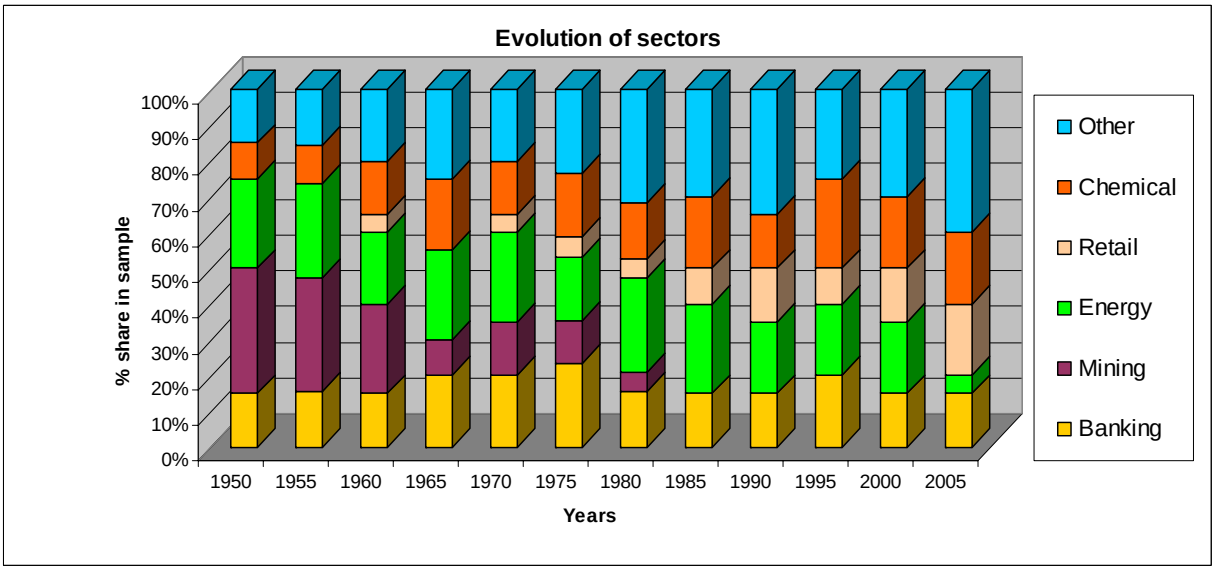


Figure 16: Evolution of the sectors represented in the sample.

The sample of companies changes every 5 years. The first samples contain 25% to 30% heavy mining companies (e.g. Cockerill, Forges de Clabecq and Charbonages de

Beeringen) with lower leverage as compared to the other sectors. Throughout the years these heavy industries disappeared in Belgium. In the year 1960 we still find five mining companies and one glass company in the sample. In 1965 only 2 heavy mining companies are left in the sample.
The more recent samples contain more chemical, energy and retail companies (e.g. UCB, Colruyt, Electrabel, GB Inno and Delhaize). These companies have a leverage of 40% for chemical and energy companies and 60% for retail companies (for mining companies this is around 20%).
The dip in 1995 and 2000 can not be directly linked to the constitution of the sample and industry effect.

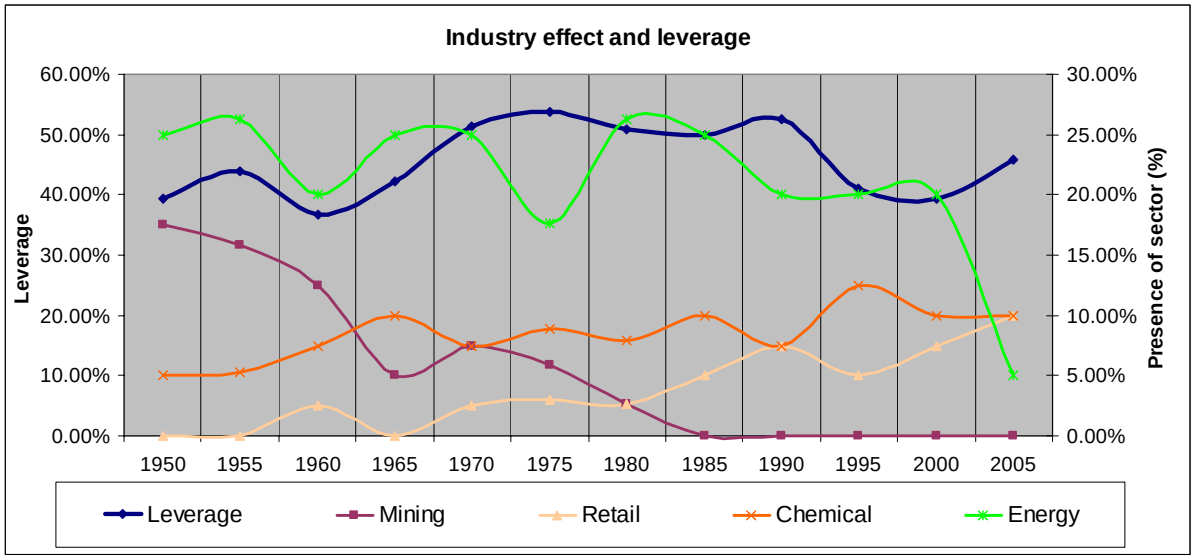


Figure 17: Correlation between leverage and presence of a sector (%).

The industry effect could explain the general increase in CS throughout the years. The sample confirms that indeed mining industries are less leveraged as chemical or retail companies.
The correlation between the presence of mining companies and leverage is negative (beta of -0,369 (nS)), but not very predictive (R^2 of 0,136 (nS)). The correlation is stronger when we only consider the period till 1985 (beta of -0,673 (nS[35]) and R^2 of 0,453 (nS[36])). The effect of the presence of retail (beta 0,511 (nS)), chemical (beta -0,166 nS)) and energy (beta 0,330 (nS)) companies is also not predictive (R^2 of 0,098 (nS)). We see a negative effect for chemical companies although theoretically there should be a positive correlation since chemical companies tend to have higher leverage on average.
An important remark is that using the correlation coefficients is less appropriate when discussing the industry effect. It is necessary to look at the presence of one sector relatively to the other. This explains the effect on the evolution of leverage of a certain industry.

If we look at this in a broader perspective we can say that the Belgian economy has developed throughout these years and indeed consists of companies in industries with higher leverage. Hence, the evolution of leverage can partly be explained by the

[35] Significant for alfa 10%
[36] Significant for alfa 10%

industry effect. Trying to quantify the industry effect is difficult. It is necessary to interpret the results and the graphs relative to each other. The decrease of the mining industry as compared to the increase in retail and the constant presence of the chemical and energy companies caused leverage to increase during most of the period.

The industry effect can however confirm the presence of the Static Trade off theory. The fact that companies in the same sector tend tot fluctuate around the same leverage indicates the presence of this theory. This is however not enough to conclude that the results confirm the Static Trade off theory for Belgian companies.

3.2.3.2 Type of ownership

First of all we have the influence of the government ownership. Rajan and Zingales (1995) state that the leverage of companies, in which the government has a majority of ownership, is higher. The bankruptcy costs are lower since the default risk with the government as shareholder is lower. Dewenter (2001) also report higher leverage for government owned companies in the USA. Two factors induce this. In most cases government owned companies can not issue stock except in case of privatization. Hence, capital that is not internally generated or equity contributed by the government needs to be borrowed. Government firms also enjoy implicit or explicit loan guarantees enabling them to borrow at favourable rates or they can borrow directly from the government at favourable rates. The results of Dewenter (2001) show that government owned companies have higher leverage and that after privatization the leverage of such companies significantly decreases with 8,7%.

Although this paper does not study which companies have the governement as major stockholder, we see that the average leverage is high for our sample of companies. The sample without banks has an average CS of 36%. This average is in line with the average of countries such as France and Italy[37] (27%). These countries are known for having a high government ownership in companies. For a country such as the UK, with less government ownership, the average leverage is only 18%.
Some of the companies in my sample, e.g. Electrabel and Tractebel, suggest government ownership. This could explain why the leverage is on average high for my sample of companies. The change in government ownership is not taken into account however. Hence I can not make inferences for the evolution of leverage of my sample.

Secondly ownership and control by large shareholders can be of importance. In contrast to the previous determinant, government ownership, this factor has a negative influence on the leverage of the company. Large shareholders reduce agency costs between managers and shareholders and they facilitate equity issues.
Tychon (1997) stated that Belgian companies tend to be controlled by some large shareholders and families. La Porta (1996) reports that for the ten largest companies in Belgium, 57% of the equity is owned by the three largest shareholders. In the USA this is only 20%. This would mean that in Belgium we should see lower leverage than in other countries. This factor has a different influence if these shareholders are

[37] These results can be found in the study by Rajan and Zingales (1995)

holding and banking companies. These shareholders stimulate the use of extra debt and reducing the amount of outside sourcing for their clients. Hence it is difficult to predict the influence of this factor although Tychon (1997) stated that it plays an important role in Belgium. This factor was also not studied in this paper and again we can not make accurate inferences.

3.2.3.3. Tax System

Modigliani and Miller (1958) already introduced the effect of tax in their study. A tax shield linked to debt financing increases the leverage of companies. Hence we should see a positive relation between corporate tax and leverage. This could confirm that the Static Trade off model is present in corporate finance decision making in Belgium.

Janssens (1990) reports that for the income of 1944 a special tax[38] on capital of 5% was introduced. The tax was only introduced during this period and is never repeated after 1944. Companies had to increase their stocks by 5% of the outstanding stocks. Then the government became owner of these stocks. This required increase in capital could explain the lower start of leverage in 1950.

It is difficult to make inferences on the effects of specific laws introduced during this period due to the interval of 5 years. The most important law introduced during the period studied was the law Cooreman - De Clercq[39] (1982). This law stimulated the issue of new equity through a fiscally attractive regime for stock issues. At the same time the ownership of stocks also became fiscally attractive.
We see a dip in the evolution of leverage in 1985. This can be linked to the law but a larger sample and a one year interval is needed for more accurate results. The law did not have a long term effect however based on these results of leverage.
The results of a study of D. Breesch and K. Vanhoebroeck (2007) concerning the notional interest deduction[40] that was introduced in Belgium, show that in short term the law on notional interest deduction had a decreasing effect on the leverage of companies in Belgium. This proves the effect of specific laws on leverage.
The results of my study stop in 2005 and hence the effect of the notional interest deduction is not studied.

[38] Law of 15 October 1945.
[39] Law Cooreman-De Clercq 1982 (Royal Decree nr.15, 9 March 1982)
[40] Law 22 June 2005

According to Janssens (1990) the evolution of the corporate tax[41] was as follows:

1955-1962	30% to 48%
1963-1972	34,1% to 37,8%
1973-1974	42%
1975-1981	48%
1982-1985	45%
1986-1989	43%
1990-1991	41%
1991-1993	39%
1993-2002	40,17%
2002-2005	33,99%

Table 7: Evolution of the corporate tax in Belgium (Jansen et al 1990)

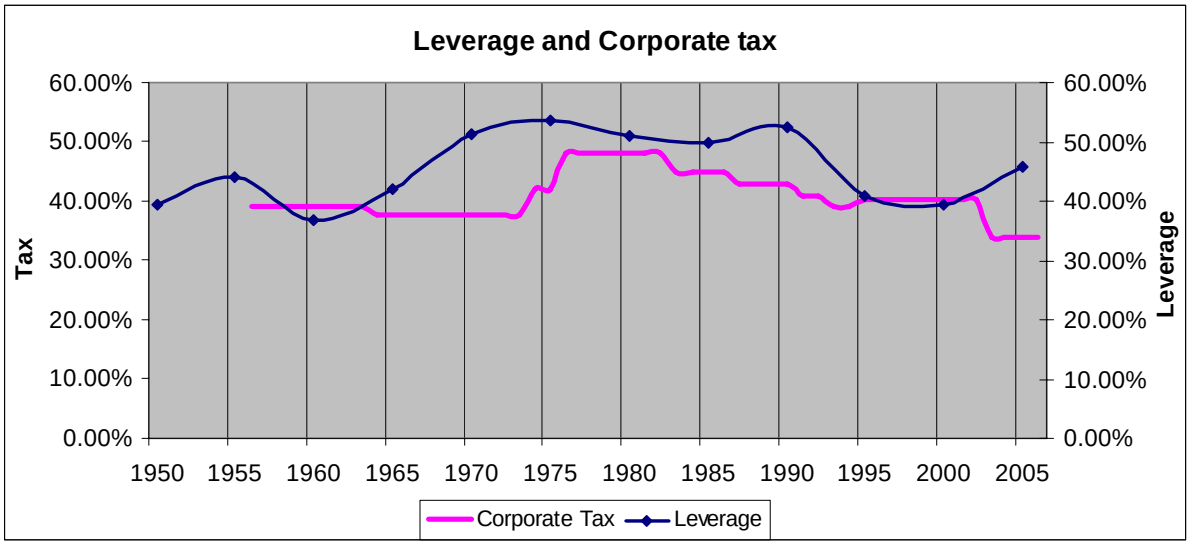


Figure 18: The evolution of corporate tax and leverage in Belgium.

Figure 18 can explain some of the evolution of the leverage. A gradual increase in tax from 1960-1980 is related to an increase in leverage. From 1980 there is a gradual decrease in corporate tax. Leverage only follows this evolution in the period from 1990 to 2000.
There is a strong positive correlation between leverage and tax (beta 0,529 (nS[42])), but the predictability is relatively weak (R^2 of 0,280 (nS[43])).

There is clearly some influence of the static trade of model that can be found in these results. The effect of the theory seems stronger from 1960 to 1980 and between 1990 and 2000. These results are stronger than the results found until now to support the pecking order theory.

[41] Specific data on corporate tax before 1955 was not found.
[42] Significant for alfa = 10%
[43] Significant for alfa =10%

3.2.3.3 Economic situation

The proxy used for the economic situation is the real percentage change in GDP[44]. Previous research showed a negative relation between GDP and the CS. During economic booms we should see an increase in the use of debt. During recessions we should see the opposite. According to Myers (1984) an inverse relation between the economic evolution and leverage proves the presence of a pecking order.

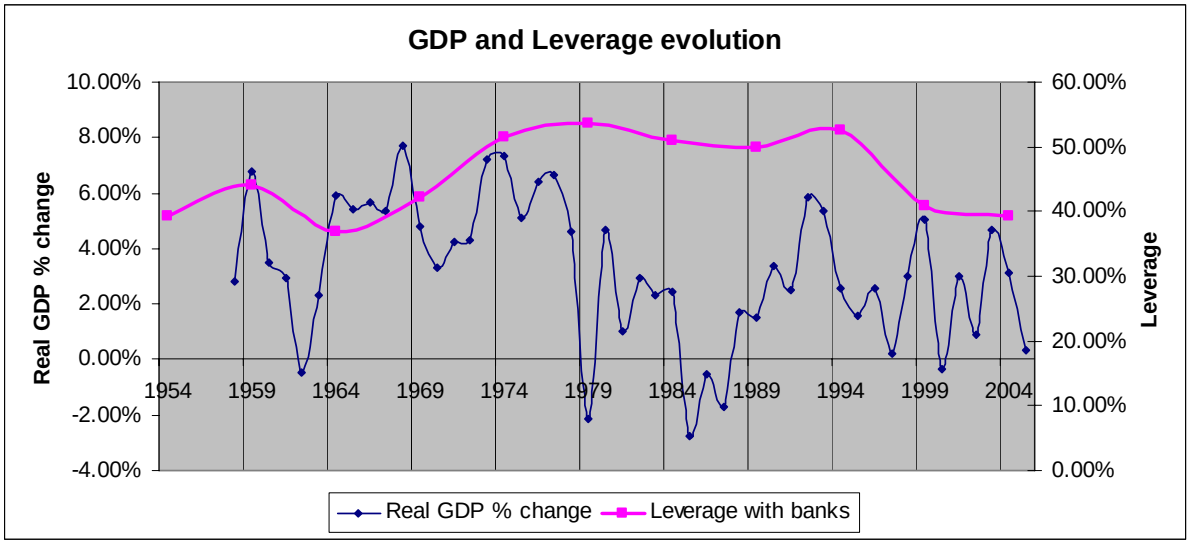


Figure 19: Evolution of Leverage and Economy.

Figure 19 shows us an inverse relation which is very strong especially in the period 1975-2005. From 1975 to 1990 a weak economy and a high leverage is noted. From 1990 onwards the results show a stronger economy and a decrease in leverage.

The correlation is negative (beta -0,488 (nS)) but not very predictive (R^2=0,238 (nS)). Looking at the results for leverage without banks a stronger negative correlation (beta -0,583 (nS[45])) with a better predictability (R^2 of 0,340 (nS[46])) is noted. This could be explained by the fact that banks need to sustain their leverage no matter what the evolution of the economy is. Hence, the influence of the GDP on the entire sample is less than for a model without the banking companies. The results also confirm a stronger influence on leverage from the period 1975-2005 with a strong negative beta of -0,674 (S) and a good predictability (R^2 is 0,455 (S)).

A counter cyclical trend confirms the presence of a pecking order in corporate finance decision making in Belgium. Previously, when discussing the effect of profitability it was difficult to conclude whether a pecking order was present. Only when discussing

[44] IMF Financial Statitics (IMF Website)
Definition GDP: "*The summary data for national accounts are compiled according to the System of National Accounts (SNA). Gross Domestic Product (GDP) is presented in IFS as the sum of final expenditures, following the presentation of the 1993 SNA, as well as the European System of Accounts (1995 ESA).*"

[45] Significant for alfa = 10%
[46] Significant for alfa = 10%

the profitability of one firm we could conclude that there were indications of a pecking order. Here we see that, because of the counter-cyclical trend in the evolution, the pecking order is present for the sample of companies discussed and that it is strongest during the period 1975-2005 and stronger for non-banking companies.

3.2.3.4. Inflation rate

Both Pozdena (1987) and Kim et al. (1988) found a positive correlation between the inflation rate and the use of debt. During high inflation periods the real cost of debt decreases. The effect is an increase in the attractiveness of debt and hence a higher leverage.

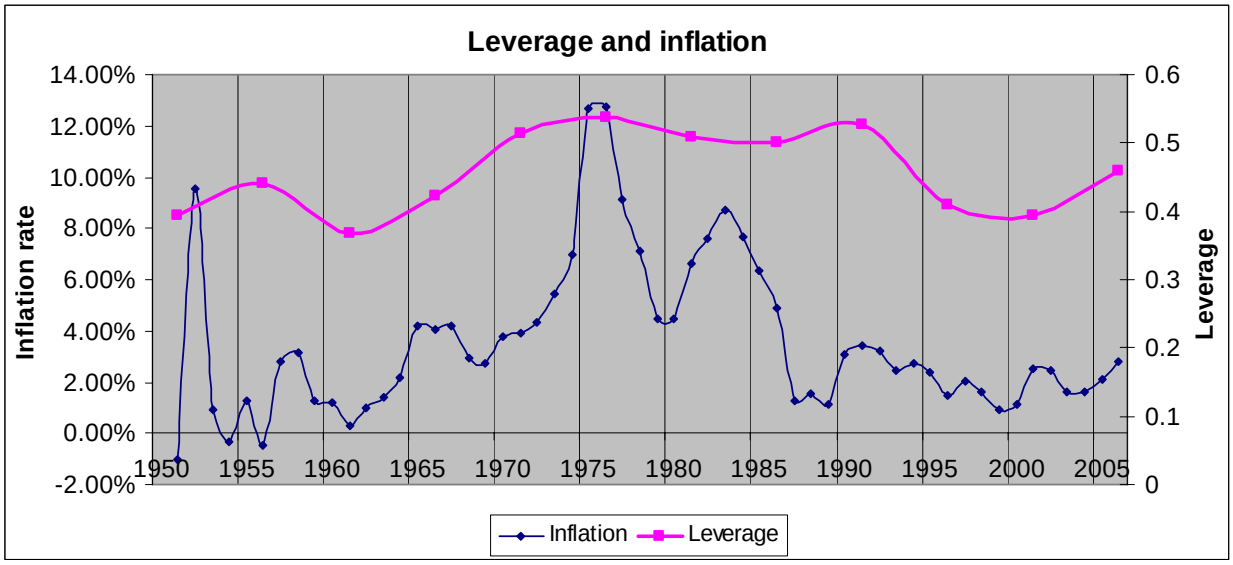


Figure 20: Evolution of the CS and Inflation[47]

Figure 20 shows a strong positive relation (beta is 0,672 (nS)) between the inflation rate and leverage. This relation can be predicted well with an R^2 of 0,451 (nS). During period of high inflation, the Belgian firms consider debt more attractive and finance more with debt. Although there is an influence, the extreme peaks are not reflected in a drastic change in leverage for the companies.
From 1955 to 1990 the relation is very clear. During a period of low inflation and a dip around 1960 we see the same U shape in the evolution of leverage. From 1965 the inflation increases and can be linked to an increase in leverage. The inflation stays mostly high until around 1985. During that period leverage also stays high. The link between inflation and leverage is less pronounced as from 1990.

[47] IMF Financial Statistics (IMF Website)
Definition Inflation: "*Indices shown for Consumer Prices (line 64) are the most frequently used indicators of inflation and reflect changes in the cost of acquiring a fixed basket of goods and services by the average consumer. Preference is given to series having wider geographical coverage and relating to all income groups, provided they are no less current than more narrowly defined series.*"

3.2.3.5 Interest rate

The interest rates used are two interest rates for Belgium available in the IMF statistics, namely the government bond yield [48] and the discount rate [49]. The government bond yield refers to longer term interest rates. The discount rate can be linked to short term interest rates. The influence of this determinant was not very clear based on previous studies. Based on two opposing arguments Downing et al. (2005) stated that both an inverse and positive relations are possible. Higher rates mean higher returns on assets, which increases the debt capacity for firms. This explains the positive relationship between leverage and interest rate. An inverse relation is however also possible. A higher interest rate means a higher weighted average cost of capital. Higher costs for debt financing diminish the attractiveness of debt and hence leverage should decrease.

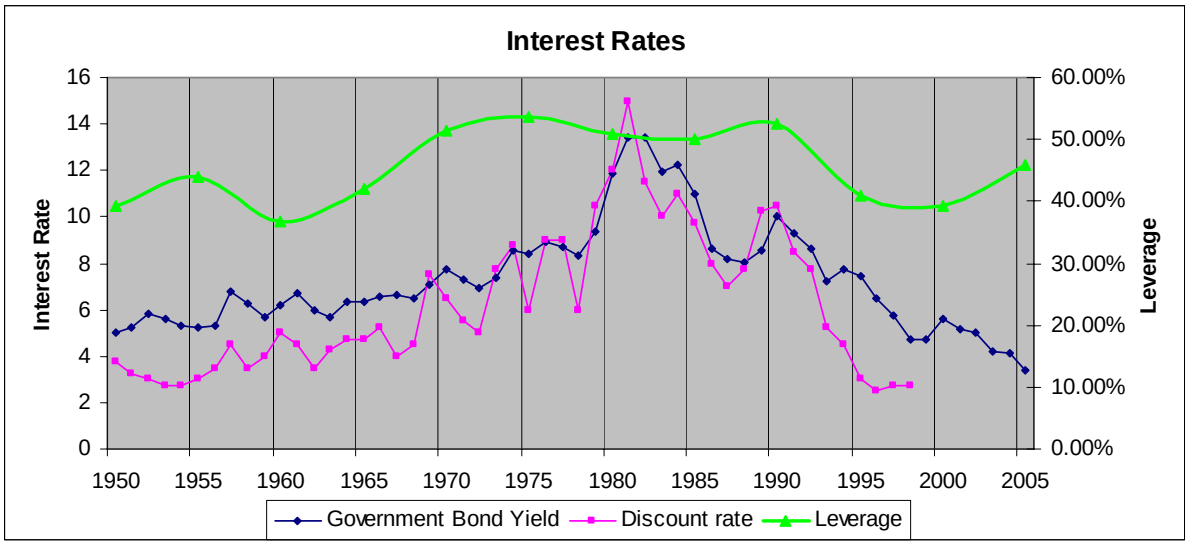


Figure 21: Evolution of Interest Rates and CS.

For both government bond yield and discount rate there is a strong and positive correlation. For the government bond yield the R^2 is 0,415 (nS) and the beta 0,644 (nS). For the discount rate the R^2 is 0,473 (nS) and the beta is 0,687 (nS). We can see that during the period 1970 and 1990 a high leverage is in line with high interest rates. These start to decline gradually as from 1990. Linked to this we can see a decline in leverage.

The first argument is clearly of bigger importance for Belgian companies. The increase of interest rates increases their debt capacity and hence they finance more with debt and vice versa.

[48] IMF Financial Statistics (IMF Website)
Definition Government Bond Yield: "*Government Bond Yield (line 61*) refers to one or more series representing yields to maturity of government bonds or other bonds that would indicate longer term rates.*"
[49] IMF Financial Statistics (IMF Website)
Definition Discount Rate: "*Discount Rate (line 60) is the rate at which the central banks lend or discount eligible paper for deposit money banks, typically shown on an end-of-period basis.*"

3.2.3.6. Stock Exchange

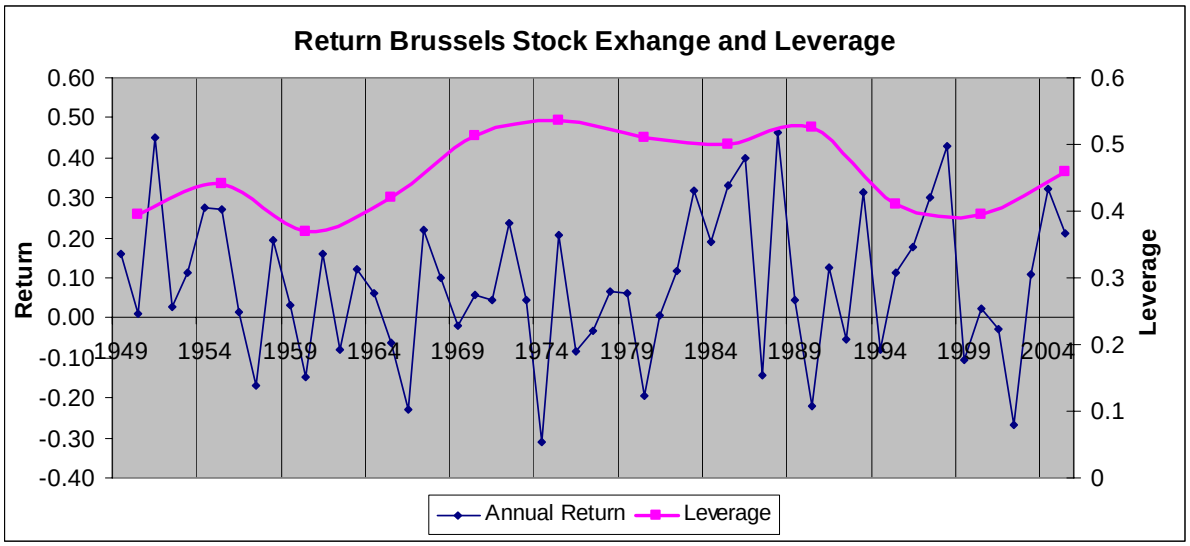


Figure 22: Evolution Stock Exchange Brussels and leverage

Due to the lack of data on the stock performance of each company, the determinant growth opportunities could not be studied. However data on the general performance of the Brussels Stock Exchange from 1950-2005[50] was present. Previous studies on the relation between growth opportunities and leverage showed both a positive and negative correlation. Drobetz (2007) report that European evidence show that firms tend to issue equity following sharp stock price increases. This implies a negative correlation between leverage and stock performance.

At first sight there is no clear connection between the evolution of the stock exchange and the leverage. Indeed the correlation is weakly positive (R^2 of 0,023 (nS) and beta of 0,151 (nS)). These results are too weak to make any inferences. Probably the figures for the stock exchange are too volatile and we need a smaller time period for the leverage to really study the effect of the stock performance on leverage.

[50] Data provided by SCOB: "Evolution over time of the Top 20 Stocks of the Brussels Stock Exchange since 1832" by Beulen Frans et al. (2007)

4. Conclusion

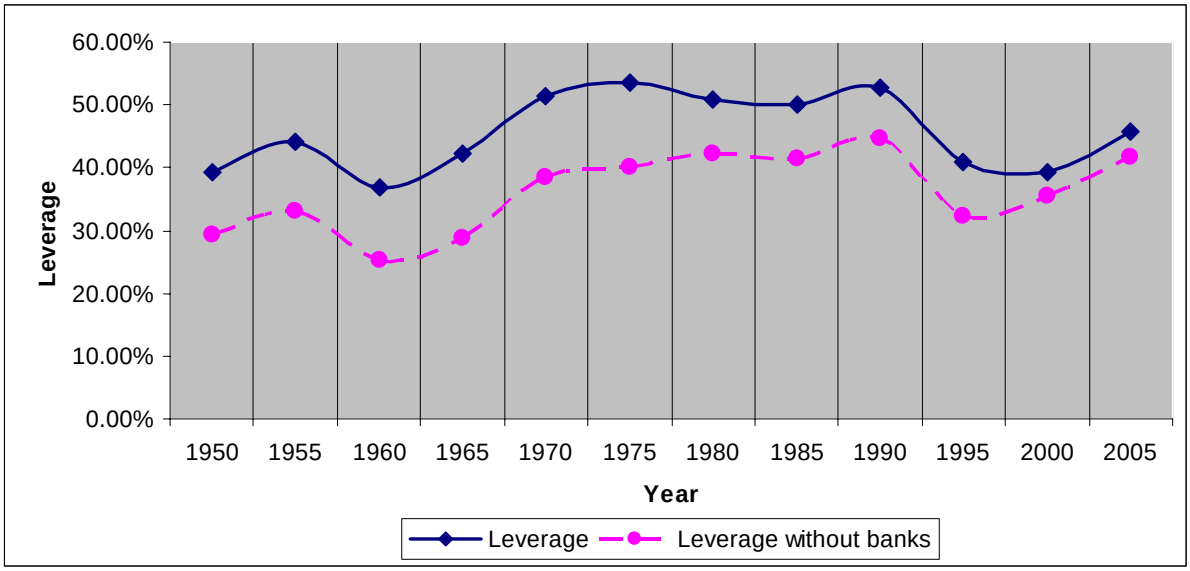


Figure 23: A historical overview of the capital structure in Belgium from 1950-2005

The evolution in figure 23 shows us two major changes in the capital structure. A sharp decrease in leverage in 1960 is followed by a period of high use of debt from 1970 through 1990. From 1995 to 2000 we see again less use of debt with a sharp decrease in leverage. On average the amount of debt used is high (debt to total assets is 45%) even after making abstraction of banks in the sample (debt to total assets 36%).

The reasons behind these changes can be explained by several micro-economic and macro-economic determinants as summarized in table 8.

Research Results		
Micro-economic Determinants		
Determinant	Proxy	Influence on CS
Tangibility	Fixed/Total Assets	Strong Negative
Growth Opportunities	Market/Book Assets	No results
Size	Logassets	Strong Positive
Profitability	Profit/Total Assets	Weak Positive
Macro-economic Determinants		
Determinant	Proxy	Influence on CS
Industry Effects	Industry Representation	Yes
Type of ownership	No data	No results
Tax System	Tax law	Positive
Economic Situation	Real % Change GDP (IMF)	Negative
Inflation Rate	Inflation Rate (IMF)	Strong Positive
Interest Rate	Interest Rate (IMF)	Strong Positive
Stock Exchange Brussels	Stock Performance	Weak Positive

Table 8: Overview results from research

The research results in table 8 show some strong influences from the micro-economic determinants on the evolution of leverage. Tangibility has a strong negative correlation with leverage. Firm size on the other hand has a strong positive effect on leverage. For profitability the result are weak but show a positive correlation with leverage. Hence, the predicted negative effect of profitability was not present when studying the entire sample. The inverse relation could only be confirmed when looking to one specific company. This effect was however too weak.

The macro-economic determinants formed a specific challenge. The evolution of corporate tax showed a relatively strong correlation with the evolution of leverage. On the other hand a strong counter-cyclical trend of leverage was found. During economic boom periods we saw a lower leverage and vice versa.
The effects of different industries on leverage also show in the results. During the period 1960 to 1965 a lot of the mining companies disappeared out of the sample. This partly explained the increase in the CS of the sample. Also the increasing share of energy, chemical and retail companies explain the increase of leverage during the period 1965-1990.
Inflation and interest rate had a strong and positive influence on the evolution of the capital structure. During the period 1970-1990 we had high inflation and interest rates. This period is also characterised by a weaker economy and higher taxation. As a consequence, during this period we see a higher use of debt.
Not every macro-economic determinant could be linked to the evolution of the CS however. The performance of the stock exchange showed no clear influence on leverage.

The weak and positive relation with profitability and the positive relation with corporate tax, closely linked to profit, prove the presence of the static trade of theory in corporate decision making for the sample of companies studied. This is strongest in the period from 1960 to 1980 and 1990 to 2000. Also the presence of an industry effect could confirm the presence of a Static Trade off.
When correlating profitability to a specific company however we see a negative relation and this is in line with the pecking order theory. The counter-cyclical trend in leverage is also present in the evolution. This inverse relation with GDP is a stronger evidence for the presence of a pecking order than the weak inverse relation with profitability. During the period 1975 – 2005 the pecking order is strongest.

Hence it is difficult to pinpoint which theory has the most influence. Korajczyk and Levy (2001) conclude their research by saying that the micro-economic determinants prove a Static Trade off theory and the macro-economic determinants a pecking order. This conclusion can also be made for the results of this study.

A more in depth analysis of the micro-economic determinants with a smaller time interval could lead to a better indication of which theory has the biggest influence on corporate finance decision making in Belgium.

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6. Appendix

6.1. SCOB20

2005
Ackermans en Van Haaren
Almancora
Bekaert
Belgacom
Cofinimmo
Colruyt
Delhaize
Dexia
Electrabel
Financière de Tubize
Fortis
GBL
Inbev
KBC
Mobistar
Nationale Portefeuillemaatschappij
Sofina
Solvay
UCB
Umicore

2000
Almanij
Bekaert
Cobepa
Cofinimmo
Colruyt
Delhaize
Dexia
Electrabel
Electrafina
Fortis
GIB Group
Groupe Bruxelles Lambert (GBL)
KBC
Nationale Portefeuillemaatschappij
Petrofina
Powerfin
Sofina
Solvay
Tractebel
UCB

1995
Almanij
Bank Brussel Lambert
Bekaert
CBR (Cimenteries et Briqueteries Réunies)
Delhaize
Electrabel
Electrafina
Fortis
Generale Bankmaatschappij
Gevaert
GIB Group
Groupe Bruxelles Lambert (GBL)
Kredietbank
La Royale Belge
Petrofina
Powerfin
Société Générale
Solvay
Tractebel
UCB

1990
AG
Almanij
Bank Brussel Lambert
CBR (Cimenteries et Briqueteries Réunies)
Cobepa
Delhaize
Electrabel
Electrafina
GB-INNO-BM "GIB"
Generale Bankmaatschappij
Gevaert
Groupe Bruxelles Lambert (GBL)
Intercom
Kredietbank
La Royale Belge
Petrofina
Société Générale
Solvay
Tractebel
Wagons Lits

1985
Almanij
Bank Brussel Lambert
Bekaert
Cobepa
Delhaize
EBES
Electrobel
GB INNO BM
Generale Bankmaatschappij
Gevaert
Groupe Bruxelles Lambert (GBL)
Intercom
Kredietbank
La Royale Belge
Petrofina
Société Générale
Sofina
Solvay
Tractionel
Unerg

1980
AG
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Bank Brussel Lambert
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Compagnie Bruxelles Lambert pour la Finance et l'Industrie
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Electrobel
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Generale Bankmaatschappij
Gevaert
Intercom
Kredietbank
La Royale Belge
Petrofina
Société de Traction et d'Electricite
Société Générale
Sofina
Solvay
Unerg
Union Minière

1975
Almanij
Bank Brussel Lambert
Banque Nationale de Belgique
Cockerill Ougree Providence Espérance Longdoz
Compagnie Bruxelles Lambert pour la Finance et l'Industrie
EBES
Electrobel
GB INNO BM
Generale Bankmaatschappij
Gevaert
Interbrabant
Intercom
Kredietbank
La Royale Belge
Petrofina
Société de Traction et d'Electricite
Société Générale
Sofina
Solvay
Union Minière

1970
Banque de Bruxelles
Banque Nationale de Belgique
Cockerill Ougree Providence Espérance Longdoz
Compagnie Lambert pour l+Industrie et la Finance
EBES
Electrobel
GB Entreprises (GB Bedrijven)
Generale Bankmaatschappij
Gevaert
Interbrabant
Intercom
Kredietbank
La Royale Belge
Petrofina
Société de Traction et d'Electricite
Société Générale
Société Générale Métallurgique de Hoboken
Sofina
Solvay
Union Minière

1965
Banque de Bruxelles
Banque Nationale de Belgique
CBR (Cimenteries et Briqueteries Réunies)
Cockerill-Ougée-Providence
Compagnie d+Outremer pour l+Industrie et la Finance
EBES
Electrobel
Generale Bankmaatschappij
Gevaert
Glaceries de Saint Roch
Interbrabant
Intercom
Kredietbank
La Royale Belge
Petrofina
Société de Traction et d'Electricite
Société Générale
Sofina
Tessenderloo (Produits Chimiques de Tessenderloo)
Vieille Montagne

1960
ACEC
Banque de Bruxelles
Banque de la Société Générale de Belgique
Banque Nationale de Belgique
Cockerill-Ougée
EBES
Electrobel
Espérance-Longdoz
Forges de Clabecq
Gevaert
Glaceries de Saint Roch
La Royale Belge
Les Grands Magasins "A l'Innovation"
Petrofina
Providence
Société Générale
Société Intercommunale Belge d'Electricite
Sofina
Union Financiere Belge des Tabacs (Tabacofina)
Vieille Montagne

1955
Banque de Bruxelles
Banque de la Société Générale de Belgique
Banque Nationale de Belgique
Brufina
Centrales Electriques des Flandres
Charbonnages de Beeringen
Cockerill-Ougée
Compagnie Financiere Belge des Petroles (Petrofina)
Electrobel
Forges de Clabecq
Gevaert
Ougrée-Marihaye
Providence
Societe d+Electricite de l+Escaut
Société de Traction et d'Electricite
Société Générale
Société Générale Métallurgique de Hoboken
Société Intercommunale Belge d'Electricite
Sofina
Vieille Montagne

1950
ACEC
Banque de Bruxelles
Banque de la Société Générale de Belgique
Banque Nationale de Belgique
Centrales Electriques des Flandres
Charbonnages Andre Dumont
Charbonnages de Beeringen
Cockerill
Compagnie Financiere Belge des Petroles (Petrofina)
Compagnie Maritime Belge (Lloyd Royal) (CMB)
Electrobel
Forges de Clabecq
Gazelec
Gevaert
Ougrée-Marihaye
Providence
Société Générale
Société Générale Métallurgique de Hoboken
Société Intercommunale Belge d'Electricite
Sofina