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Abstract

This paper investigates the financing behaviour of Dutch firms by testing whether a firm's financing decisions are determined by certain factors identified in various theories. Since a firm's financing decision is reflected in the changes of its leverage, our research focuses on the relationship between a firm's debt ratio change and the changes in certain factors. The approach used in the paper is the structural equation modeling (SEM) technique. The model identifies various important factors that are related to Dutch firms' financing decisions. The empirical results provide moderate support for the static trade-off theory, the pecking-order hypothesis, as well as the dynamic capital structure model. However, our data set is insufficient to confirm the static trade-off theory, and our results provide little evidence to back the asymmetric information argument behind the pecking-order hypothesis.

JEL Classification: G32, C31

Key Words: Financing behaviour; Capital structure; Structural equation model (SEM); Dutch firms.

1 Introduction

The traditional static trade-off model of capital structure theory (Miller, 1977) suggests that a firm's choice between debt and equity is determined by trading off various tax benefits of debt financing against the cost of potential financial distresses. The pecking order theory (Myers and Majluf (1984) and Myers (1984)) suggests that due to asymmetric information, firms prefer to fund new investment projects with retained earnings rather than using debt financing, but further prefer debt financing to equity financing. The dynamic models of capital structure, as proposed in Fisher, Heinkel and Zechner (1989) and Leland (1984, 1998), straddle over the above two theories by introducing transaction costs. On the one hand, these models generate short-term pecking order behavior. On the other hand, the dynamic capital structure models suggest that firms will periodically readjust their capital structures towards a target ratio that reflects the costs and benefits of debt financing as suggested in the static trade-off models. Other theories such as agency costs (Jensen and Meckling, 1976; Jensen, 1986; Harris and Raviv, 1990 ; Stulz, 1990; Diamond, 1989; Hirshleifer and Thaker, 1989, etc.), signaling models (Ross, 1977; Heinkel, 1982; Poitevin, 1989, etc.) and industrial organization models (Titman, 1984; Brander and Lewis, 1986; Maksivomic, 1988; Sarig, 1988; Maksimovic and Titman, 1991, etc.) offer alternative explanations to a firm's capital structure choice.

Empirical studies have aimed to test whether certain factors suggested by various theories are the determinants of a firm's capital structure choice. However, in most of the studies, such as Bowen et al. (1982), Bradley et al. (1984), Long and Malitz (1985), Titman and Wessels (1988), Friend and Hasbrouch (1988), Lang (1988), MacKie-Mason (1990), and Rajan and Zingales (1995) etc., while the capital structure is measured by a firm's accumulated leverage, i.e. the total debt-equity ratio, the factors used in the models such as asset tangibility, firm size, growth, profitability, earnings volatility, etc. are mostly constructed based on a firm's current characteristics. Thus, many available studies have reached either inconclusive or contradicting results. We argue that a firm's debt-equity ratio may partially reflect a firm's current financing decision but, to a larger extent, is simply the outcome of a firm's accumulated historical financing decisions. From a dynamic point of view, a firm's current characteristics may only be able to explain a firm's on-going financing behavior. Hovakimian, Opler and Titman (2000) explicitly argue that firms may change over time, thus their capital structure choice may change as well. Evidence in empirical studies suggest

that a firm's history of financing decisions may play a very important role in determining its capital structure. For example, following large increases in stock prices, firms tend to issue equity which leads to the decrease in leverage, see for example Masulis and Korwar (1986); Asquith and Mullins (1986); and Kozajczyk, Lucas, and McDonald (1988) . In addition, after a profitable calendar year, a firm tends to use earnings to pay down debt and consequently becomes less levered, see for example Titman and Wessels (1988). Furthermore, ownership structure change also seems to clearly influence capital structure. In general, the more concentrated a firm's ownership structure, the more debt it seems to desire and to be able to tolerate. Individual managers who place a high value on the personal benefits of controlling a corporation will tend to prefer new debt to new equity issues for financing, because this minimizes dilution of their ownership stake, see Kim and Sörensen (1986), Friend and Long (1988).

In this paper, we test the capital structure theories by investigating the relationship between the change of a firm's leverage and the changes in various factors as well as current level of leverage. The basic idea of looking at the dynamic change in the leverage and various factors is to remove pre-existing firm conditions in our analysis on the one hand, and to be more consistent with various capital structure theories on the other. Since the change of a firm's leverage is mostly resulted from its on-going choice between debt financing and equity financing among other factors, it is essentially the result of a firm's current financing decisions. In other words, we are testing whether a firm's financing decisions are determined by the changes in various factors that are identified by capital structure theories and the focus of our research is on a firm's current financing behavior. We also include the current level of a firm's capital structure in our model in order to test whether a firm's subsequent capital structure change is related to its current debt ratio, i.e. whether firms adjust their capital structures toward an optimal or target debt-equity ratio, which is suggested by the traditional static trade-off model and dynamic capital structure models. Thus our model is different from previous empirical studies in the following aspects. First, our models explicitly account for the fact that firms may change over time, and the analysis of firms' capital structure choice is based on a firm's current financing behavior. Second, in our model, we use the changes in various factors to explain the current financing behavior of a firm, i.e. the change of a firm's debt ratio. In other words, we aim to test whether firms make significant changes debt or equity capital in response to the changes in various factors that determine the

costs and benefits of debt and equity financing. Finally, we also include the current leverage in our model to test whether it is a factor in firms' capital structure choice.

Apart from previously mentioned empirical studies on capital structure, the research on firms' financing behavior in the Netherlands has also been carried out from both micro and macro perspectives. Muuers et al. (1991) test industry differences for Dutch non-financial firms and suggest a significant difference in the equity ratios between industries in the Netherlands. Cross-section and panel data studies by Cools (1993), Kemna et al. (1994), Van Dijk (1997) confirm that firms' leverage is positively related to firms' collateral value and size, and negatively related to firms' business risk. However, they find positive relationship between leverage and growth proxies. Case

studies among Dutch firms include Nationale Investeringsbank (1990), Drop and Schuit (1992), Cools (1993), BDO CampObers (1993) , and De Jong and Veld (2001). Time series macroeconomic approach to the analysis of corporate finance has been carried out to investigate the macroeconomic determinants of aggregate trends. These studies include Fase et al. (1990), Fase and Winder (1990) , Draper (1991), Driehuis and Mulder (1993) , Van Ees et al. (1993), Kusters (1994), Jacobs and Sterken (1994).

The approach used in this paper is the structural equation modeling (SEM) technique. The data is collected from publicly traded Dutch firms. Since the attributes identified as determinants of a firm's capital structure choice by capital structure theories are often not directly observed, there is in general no single accounting indicator that can be used as an exact representation of each attribute. Instead, the theoretical attributes are often related to one or more accounting indicators (often referred to as proxies of the attributes) with embedded measurement error. Consequently, in the empirical analysis of capital structure choice, in order to investigate the relationship between the capital structure and various attributes or factors, one also needs to identify the relationship between the theoretical attributes and certain observed accounting indicators. In the structural equation modeling framework, the former relationship is referred to as the structural model, while the latter relationship is referred to as the measurement model. The structural equation modeling provides a flexible and powerful approach of simultaneously assessing the quality of measurement and examining the structural relations underlying the theory. In the structural model, we identify the attributes or factors that may affect a firm's leverage based on various capital structure theories with consideration of the unique aspect of Dutch institutional setting. In the measurement

model, various leverage measures and proxies for the attributes or factors are constructed based on accounting data, again keeping in mind the specific Dutch accounting rules and tax laws. Furthermore, different from previous studies, observed variables in our model have been carefully re-scaled in order to be consistent with model assumptions.

The rest of the paper is organized as follows: Section 2 presents a discussion of the determinants of firms' financing choices. Section 3 describes the data set used in our study and the construction of proxies of various factors. Section 4 presents the structural equation model of firms financing behavior, with discussions on both the structural model and measurement model. Section 5 presents the empirical results and discuss their implications on Dutch firms' financing behavior. Section 6 concludes.

2 The Cost of Debt Financing versus Equity Financing

According to corporate finance theory, a firm's financing choice depends on the cost of available capitals. The cost of capital is determined by many factors, of which some are country specific factors, pertaining to a country's unique institutional setting, others are generic factors that are common to all countries. Within each country, the factors also include firm specific factors and macroeconomic factors that are common to all firms. In this paper, we focus on firm specific factors and aim to investigate how the changes in these factors affect firms' financing decisions. Understanding that these factors affect a firm's financing decision via the cost of debt and equity, we will briefly discuss the impact of various factors on the cost and benefit of debt financing and equity financing. We start our discussion with some specific institutional settings in the Netherlands.

A. Tax law, accounting rules and bankruptcy law Static trade-off theory claims that the optimal level of a firm's leverage is achieved by weighing the benefits of debt financing against the cost of potential financial distress. In other words, a firm's optimal capital structure level can be reached by trading off the benefit of debt financing, namely tax advantages, against the cost of probability of bankruptcy. For different institutional settings, the tax advantage and the bankruptcy costs are different. Therefore, we may observe different capital structure patterns. In the Netherlands, there is a very unique factor, referred to as "provision", that undermines the tax benefit of debt financing. On the consolidated balance sheets of Dutch firms, there is a line called "the provision for bad debt and pension liability." Ac-

cording to the Dutch tax law, the provision for bad debt can either be subtracted directly from account receivables on the left-hand side of the balance sheet, or be 100% tax deductible against income and with the remaining portion added back to the provision on the right-hand side of the balance sheet[1]. The same applies to pension liability[2]. The provision amount is a very significant portion of the right-hand side of the balance sheet for Dutch firms. For example, the average book value long-term leverage, defined as book value long term debt over book value total capital assets, is 18.9% for the Dutch firms in our sample over the period of 1994-1996, whereas the provision ratio, defined as the provision over book value total capital assets, is 12.1% over the same period[3]. We argue that the favorable tax treatment of provision may undermine the importance of the benefit of debt financing for Dutch firms due to the "crowding-out effect" of non-debt tax shields (DeAngelo and Masulis, 1980). In other words, other things equal, Dutch firms may prefer to use less debt than their competitors in other countries due to the provision, thus the optimal capital structure for Dutch firms will be less levered.

As for the cost of potential bankruptcy, we argue the potential bankruptcy costs for Dutch firms are higher than some other countries, for example, the United States. The argument stems from the fact that the Dutch bankruptcy law gives more weight to creditors' protection relative to facilitating firms to re-organize and to turn around[4]. Firms entering bankruptcy are very likely to be liquidated. Since the liquidation value is generally lower than going concern value, therefore, bankruptcy cost is potentially higher in the Netherlands. Thus from the potential bankruptcy cost perspective, Dutch firms may also be less levered.

B. The structure of debt market and the cost of borrowing In assessing the quality of a firm's debt, for the purpose of pricing, the widely referred approach is the credit rating

[1]For example, if a firm has NLG100 bad debt, it can subtract this amount from its income, assuming the firm's corporate tax rate is 35%, the NLG(100-35)=NLG65 is added to the provision on the right hand side of the balance sheet.

[2]However, it is worth to mention that the pension liability included in the provision is only for top management. The regular employee pension contributions by employers are deducted as a part of the personnel costs.

[3]There is no consensus to whether provision should be treated as equity or liability. From a theoretical point of view, provisions (here excluding deferred tax) are clearly liabilities. However, technically, there is no interest costs on these liabilities, the timing and the amount of the provisions being added to the balance sheet is at a firm's management discretion, therefore, they are not liabilities in a strict sense. Whether or not the provisions should be treated as liabilities can directly affect the leverage ratio of Dutch firms.

[4]For a detailed discussion on Dutch Bankruptcy laws, see Couwenburg (1997).

approach. Such ratings are provided and updated by independent rating agencies, as in the United States due to its well developed bond market. However, if firms don't use capital market, i.e. the bond market, to raise their debt, instead they use their banks as their major source of debt financing, credit rating is of less importance. This is exactly the case in the Netherlands. According to De Bondt (1998), about 97% of the Dutch private debts are lent by financial institutions and only 3% of the private debts are raised from the capital market. If bond prices reflect market information, the value of a bank loan resulting from the long-term relationship between firms and banks is *a priori* unknown, both to the market and to the regulator (James, 1987; Merton and Perold, 1993). In addition, as for the composition of board of directors for Dutch firms, there is usually a board member coming from the firm's bank, which may further imply that there is less information asymmetry between borrowers and lenders, thus lowering firms' cost of debt. However, the overall effects of bank financing versus bond market financing is unclear. It may depend on the distribution of bargaining power between firms and banks and also the industrial structure of Dutch banking sector. It is worth to mention that the concentration level of Dutch banking sector is extremely high compared with other European countries. For example, in 1998, the share of loans from the top three Dutch banks as a percentage of total bank loans is 73.8%, whereas the ratio is only 19.8% for Germany, 24.5% for France, 24% for Italy, 30.9% for UK, and 52.3% for Belgium respectively (De Bondt, 1998) . The high concentration level of Dutch banks can imply that the cost of debt financing in the Netherlands are higher compared with other countries simply due to the industrial structure of Dutch banking sector.

The unique firm-bank relationship may not only affect the cost of borrowing for Dutch firms, but also affect the overall Dutch firms' leverage level. The presence of bankers as board of directors for Dutch firms may cause firms to have lower leverage. As the stake holder of the firm (debt holder more precisely), banks are more conservative about firms' debt financing compared to shareholders. In other words, banks will make certain that firms they finance are not over-levered beyond their comfort level. Therefore, the leverage level may also be lower due to the important role that banks play in debt financing and their presence in Dutch firms' boardrooms.

C. Firm sizes Firm size has a direct impact on the pattern of financing choices. Larger firms are usually believed to have easier access to the financial market due to long retractable financing history, they tend to suffer less information asymmetry due to analysts' coverage

(thus outsiders will have more information about the firm). Therefore, the cost of debt for larger firms may be lower than that of smaller firms holding everything else equal (Myers and Majluf, 1984). Some also argue that larger firms tend to be more diversified in their projects, therefore, the probability of total failure, i.e. bankruptcy, is relatively smaller (Bradley et al. 1984; Long and Malitz, 1985; Harris and Raviv, 1991; and Rajan and Zingales, 1995). Size is often used as an inverse proxy for probability of bankruptcy and is considered to be positively correlated to firms' leverage.

D. Growth perspective "Pecking-order" hypothesis suggests a negative relationship between leverage and growth opportunity. According to Myers and Majluf (1984), information asymmetry demands an extra premium for firms to raise external funds irrespective of the true quality of their investment project. In the case of issuing debt, the extra premium is reflected in the higher required yield. Firms with growth opportunities may find it too costly to rely on debt to finance its growth. The "under-investment" agency problem also suggests a negative relationship between leverage and growth. Highly leveraged firms are more likely to pass up profitable investment opportunities (Myers, 1977).

E. Financial performance The major financial performance indicators mentioned in capital structure literature are profitability and earning volatility. "Pecking-order" hypothesis suggests that firms prefer to use internal funds versus external funds for capital expenditure (Myers and Majluf, 1984). A profitable firm presumably has more internal funds at its disposal than a less profitable firm. Therefore, the relationship between profitability and leverage should be negative. However, Jensen (1986) argues that the relationship between leverage and profitability depends on the effectiveness of the market for corporate control. If the market for corporate control is effective, managers of profitable firms are forced to pay out cash by leveraging up. On the supply side, lenders are also more willing to lend to profitable firms. Therefore, the relationship between leverage and profitability should be positive. On the other hand, if the market for corporate control is ineffective, managers of profitable firms may choose to avoid the disciplining role of debt by leveraging down, then the relationship between leverage and profitability should be negative.

As for earning volatility, the "static trade-off" hypothesis, "pecking-order" hypothesis, agency costs related consideration and product market interaction theory all predict the negative relationship between leverage and earnings volatility.

F. Flexibility Financial flexibility is usually referred to as the amount of cash that firms

build up over time. It can be viewed as negative debt. If there is no effective market for corporate control, management would prefer to retain excess amount of cash (Opler, et al. 1999). “Pecking-order" hypothesis also suggests that there should be a negative relationship between leverage and flexibility.

G. Other risk factors that affect firms' cost of debt Commodity price risk, debt term structure risk (change in the long-term versus short term interest rate) are also factors that affect firms' cost of debt. However, such factors are in general not firm specific and not included in our analysis due to the lack of data.

H. Corporate governance issues The concentration of ownership is very high in the Netherlands, on average 41.4% of a firm's equity is owned by top three largest shareholders (De Jong and Van Dijk, 1999). Takeover defenses are broadly used by Dutch firms[5]. Usually Dutch firms adopt multiple anti-takeover barriers. In addition, as for the composition of supervisory board, Dutch firms adopt a process which is often referred to as the “co-option system” where the new members of the supervisory board are elected by the current members.

3 The Data and Construction of Proxies

The source of all the data is the “Jaarboek van Nederlandse Ondernemingen", which contains the financial statement for all public Dutch firms. From the total sample, we deleted all the financial firms (banks, insurance companies and investment companies) and firms that did not have a complete record on the variables required in our analysis. In total, 118 firms are available.

[5]According to De Jong and Veld (2001), (1) 39.3% of the Dutch firms have priority shares that allow a small number of shares to carry superior voting rights; (2) 63.0% of the Dutch firms have preferred shares arrangement which allows an issue of preferred shares with only 25% of the nominal value to be paid up without further shareholders' approval; (3) In case of a takeover threat, the firm can place the priority shares and the preferred shares with a befriended party in exchange for a loan; (4) For 38.3% of the Dutch firms, shareholders own receipts which carry the cash flow rights without the voting rights; (5) 8.3% of the Dutch firms' share only have limited voting power, irrespective of the number of shares an entity possesses.

3.1 Measures of Financing Behavior

Since firms' financing behavior is ultimately reflected in the change of capital structure, we use the change of a firm's leverage to measure a firm's financing choice. More specifically, we use the following four measures for the change of leverage: namely the change of on-going book value long-term and short term debt over the total book value capital assets (denoted by dLT-LEVB and dST-LEVB), and the change of market value long-term and short term debt over the total market value capital assets (denoted by dLT-LEVM and dST-LEVM). Due to data limitation, the book-value of debt is used as an approximation of market-value of debt. Such an approach is widely adopted in the capital structure literature simply because the cross-sectional correlation between the book value debt and market value debt is very large, thus the mis-specification due to using book value debt is likely very small. The book value of total capital assets is calculated as follows. From the consolidated balance sheet, we move the current liability (excluding short term debt) from the right-hand side of the balance sheet to the left-hand side of the balance sheet, this item can be subtracted from the current assets, the net amount is the net working capital (excluding short term debt). As a result, the items remaining on the right-hand side of the balance sheet are short term debt, long term debt, equity, provision for bad debt and pension liability, and minority interest. The sum of the first four items gives us the book-value of total capital assets. To be comparable among firms, minority interest is not included in the total capital assets[6]. To calculate the market value leverages, the sum of book value short-term and long-term debt, provision and market value equity is used as approximation of the market value of total capital assets.

3.2 Proxies of Various Factors

As mentioned before, in our model we can also test whether a firm's debt ratio is related to its subsequent capital structure change, i.e. whether firms adjust their capital structures toward an optimal or target debt-equity ratio. We include current leverage level as a factor of management financing decision. The measures of current leverage are respectively the book value long-term and short-term debt over the total book value capital assets (denoted by LT-LEVB and ST-LEVB) and the market value long-term and short-term debt over the

[6]If the minority interest is included, then firms with minority interest will appear to be less levered. However, there is no way for us to know the capital structure of the minority firm. If the minority firm is highly levered, then the leverage ratio we obtain by including minority interest can be quite distorted.

total market value capital assets (denoted by LT-LEVM and ST-LEVM).

The consensus of the attributes that affect capital structure choice is "leverage increases with fixed assets, non-debt tax shields, investment opportunities, and firm size, decreases with earning volatility, advertising expenditure, the probability of bankruptcy, profitability and uniqueness of the product" (Harris and Raviv, 1991). In addition, we also include the factors pertaining to the specific institutional setting in the Netherlands. Due to the unavailability of data, advertising expenditure and uniqueness of the product are not included in our analysis.

Provision ratio (RROV) We use the ratio between the provision of bad debt and pension liability and total capital assets which consist of long-term, short-term debt, equity and provision (PROV/TA) as the measure of provision. We argue that this is the most significant and meaningful variable as a proxy of non-debt tax shield in the Dutch case[7]. Cools (1993) uses depreciation ratio[8] (depreciation over book value of total assets) and intangible assets ratio (intangible assets over book value of total assets) as proxy of non-debt tax shield. However, our understanding is that depreciation ratio is set according to certain accounting rules to reflect the remaining value of the underlying assets. Based on our sample, we do not find the relationship between depreciation ratio and leverages anywhere near significant. The problem with respect to using intangible assets ratio to proxy for non-debt tax shield is that not all intangible assets are recorded on the balance sheet for Dutch companies. As a matter of fact, only a very small portion of the total intangible assets, mainly patents, are recorded as intangible assets on the balance sheet. Goodwills due to acquisitions are completely written-off when they occur.

C. Size (SIZE) We use three variables as proxies of size: logarithmic transformation of sales (lnSALES), logarithmic transformation of total number of workers (lnWORKER) and logarithmic transformation of equity market value (lnMV).

D. Growth Opportunity (GROWTH) We use three variables as proxies of growth: percentage change in total assets market value (dTA), percentage change in sales (dSALES) and

[7]Some authors use R&D as proxy of non-debt tax shield (Bradley et al, 1984; Titman and Wessels, 1988), however, only a very limited firms report this amount in the Netherlands. Others use investment tax credits as proxy of non-debt tax shield (Bradley et al., 1984; Titman and Wessels, 1988; and MacKie-Mason, 1990), but such an item is not applicable to the Dutch case (Cools, 1993).

[8]In the U.S. studies, DeAngelo and Maslis (1980), Auerbach (1985), Kim and Sörensen, 1986, and Titman and Wessels (1988).

logarithmic transformation of equity market to book ratio (lnMBR).

E. Profitability (PROF) We use two variables as proxies of profitability: the ratio of EBIT over sales (EBIT/SAL) and return on equity (ROE).

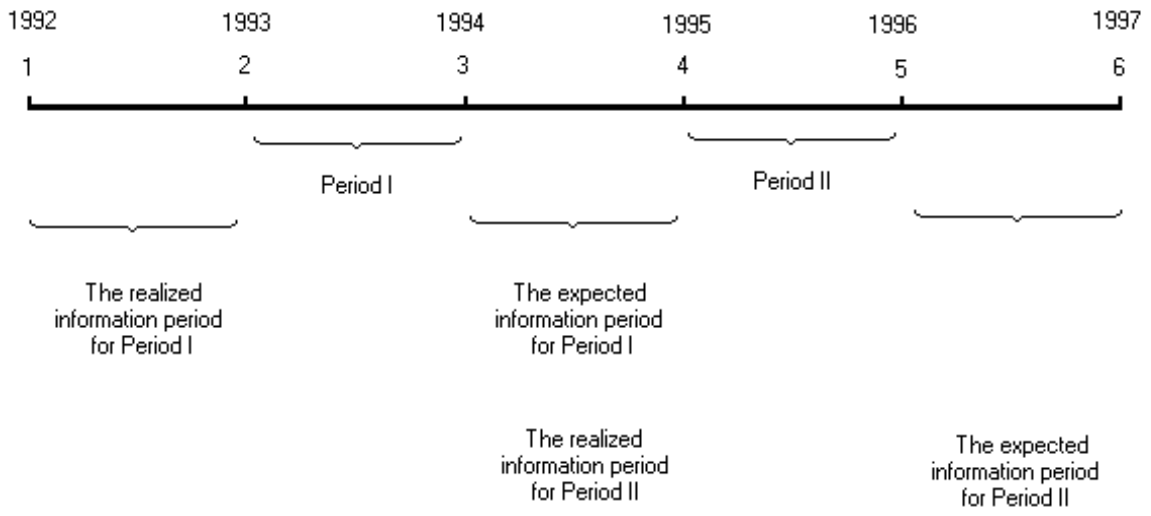
F. Earnings volatility (VOLA) We use two variables as proxies of earnings volatility: the logarithmic transformation of standard deviation of net income (lnSdNI) and the logarithmic transformation of standard deviation of EBIT (lnSdEBIT).

G. Flexibility (FLEX) Financial flexibility is usually referred to as the amount of cash that firms build up over time. It can be viewed as negative debt. If there is no effective market for corporate control, management would prefer to retain excess amount of cash (Opler, et al. 1999). "Pecking-order" hypothesis also suggests that there should be a negative relationship between leverage and flexibility. We define the financial flexibility as the ratio of cash and marketable securities over current assets (C$/CA).

The variables discussed in the previous sections are analyzed over the period of 1992 through 1997. For our analysis, we denote the whole sample period from 1992 to 1997 by year 1, 2, 3, 4, 5, and 6. As illustrated in Figure 1, we calculate the average leverage over years 4 and 5 (period II), compared to the average leverage over years 2 and 3 (period I). Averaging over two years reduces the measurement error due to year over year random fluctuations. The realized information period for period I is years 1 and 2, and the expected information period for period I is years 3 and 4. The realized information period for period II is years 3 and 4, and the expected information period for period II is years 5 and 6. In addition to reducing measurement error, another justification for averaging over two-year period and investigating changes over two-year period instead of year-over-year change is that suppose managers do observe the factors or certain accounting indicators, it can only happen close to the end of a fiscal quarter or year. Consequently there is a time-lag for managers to react to the changes in certain factors and for a firm's leverage to be adjusted to the desirable level.

The similarity between this model and other cross-section studies mentioned in the introduction is that we all aim to test the behavior of firms over a given time span. The difference between this model and the previous studies is that while most authors test the relationship between the absolute level of leverage and the level of various factors, we look at the change of leverage with respect to change of certain factors. Therefore, we emphasize the period over period dynamic behavior of firms' capital structure changes. The dependent variables,

Figure 1: The Illustration of Time Period Used in the Analysis



i.e. the debt ratios, are measured during period I (1993-1994) and period II (1995-96). Three indicators of expected future growth (dTA, dSALES, lnMBR) are calculated over the expected information period, namely 1994 and 1995 for period I and 1996 and 1997 for period II. The idea is to use the realized values as proxies of the expected future growth when the capital structure decision is made. The variables used as indicators of size and profitability are calculated over the realized information period, namely 1992 and 1993 for period I and 1994 and 1995 for period II. The idea of using earlier period to calculate profitability and size proxies is to treat them as realized information. The standard deviations of net income and EBIT are calculated over the whole sample period in order to obtain better estimates. Other variables are calculated contemporaneously with dependent variables, that is over period I (1993-1994) and period II (1995-1996). The summary statistics of the data is reported in Table 1, from which we can see that there are significant variations across firms in both the dependent and independent variables.

Table 1: Summary Statistics of the Data

Factors	Indicators	Mean	Median	Minimum	Maximum	Std Dev
dLEV	dLEVBL	-0.007	-0.005	-0.162	0.328	0.062
	dLEVBS	0.016	0.000	-0.117	0.323	0.069
	dLEVML	-0.021	-0.007	-0.224	0.153	0.061
	dLEVMS	0.004	0.000	-.0142	0.165	0.054
dPROV	dPROV/TA	-0.003	-0.001	-0.095	0.128	0.034
dTANG	dFA/TA	-0.017	-0.014	-0.190	0.152	0.047
dSIZE	dlnSALES	0.118	0.126	-0.701	0.703	0.196
	dlnWORKER	0.015	0.014	-0.604	0.560	0.193
	dlnMV	0.317	0.308	-0.562	2.148	0.439
dGROWTH	ddTA	0.046	0.098	-4.428	0.817	0.492
	ddsales	0.035	0.042	-0.499	0.781	0.171
	dlnMBR	0.299	0.296	-0.922	3.448	0.534
dPROF	dEBIT/SAL	0.007	0.007	-0.095	0.133	0.031
	dROE	0.032	0.187	-1.894	1.436	0.246
dVOLA	dlnSdNI	-0.150	-0.304	-4.466	4.826	1.503
	dlnSdEBIT	-0.145	-0.161	-3.290	4.508	1.225
dFLEX	dC$/CA	0.005	-0.001	-0.296	0.283	0.079
LEV	LEVBL	0.189	0.187	0.000	0.647	0.156
	LEVBS	0.094	0.052	0.000	0.724	0.123
	LEVML	0.151	0.126	0.000	0.663	0.145
	LEVMS	0.077	0.034	0.000	0.609	0.107

Note: Data Source is the “Jaarboek van Nederlandse Ondernemingen". Number of firms: 118

4 The Structural Equation Model: Determinants of Firms' Financing Behavior

As we can see from section 3, a unique and important aspect of the capital structure theory is that many theoretical attributes or factors identified as the determinants of a firm's capital structure choice are often non-directly observed latent variables. That is, there is often no single accounting indicator that can be used as the exact representation of each factor. Consequently, traditional regression model has often relied on various proxies of the unobserved theoretical attributes for empirical analysis. The main drawbacks of the regression model approach, as also summarized in Titman and Wessels (1988) , are as follows. First, in the case that there are more than one possible proxy for a particular attribute, choosing a single indicator as proxy can be arbitrary, and consequently may bias the parameter estimates and change the significance levels of the statistical tests. Second, it is often difficult to find proxies of particular attributes that are unrelated to other attributes. That is, certain indicators can be used as proxies of different attributes or factors. Third, since the observed variables are proxies of the attributes (with measurement errors), their use in regression analysis introduces an errors-in-variable (EIV) problem which can lead to biased parameter estimates. Finally, measurement errors in the proxy variables may be correlated with measurement errors in the dependent variables, creating spurious effects.

In this paper, we use the linear structural equation modelling technique to analyze Dutch firms' financing behavior [9]. Very briefly, this method assumes that, although the relevant theoretical attributes are not directly observable, we can observe a number of indicators that are linear functions of one or more attributes with a random error term. The model consists of two parts: a structural model that describes the relationship between a firm's financing behavior and changes in various theoretical attributes, and a measurement model that identifies the relationship between the attributes and various indicator or proxy variables, in this particular case, a firm's accounting data. The capital structure theory does not specify any functional form for how exactly the factors or attributes are related to a firm's financing behavior and a firm's accounting indicators. In our model, we impose the linear structure on

[9] References to linear structural modeling technique can also be found in the literature under the headings of analysis-of-covariance structures, path analysis, causal models, and content-variables models. A non-technical introduction to the subject providing many references is Bentler and Bonett (1980).

all relations. That is, we only intend to investigate the first-order relationship among all variables, which is determined by the sign and significance of the estimated coefficients. The main advantage of the structural equation modeling is that it provides a unique analysis that simultaneously considers questions of both measurement and structural relations. Unlike exploratory factor analysis which is guided by intuitive and *ad hoc* rules, the measurement model casts a factor analysis in the tradition of hypothesis testing with explicit tests of both the overall quality of measurement and the specific factor loadings composing the model. Moreover, unlike the multiple regression analyses that are exploring the statistical relationship among only observed variables, the structural model allows for the specification and testing of complex "path"or structural relations.

The model we estimate is an application of the LISREL system developed by K. Jöreskog and D. Sörbom (1981). In particular, in our model set-up, only the exogenous variables, i.e. the theoretical attributes of financing decisions, are unobserved or latent variables, while the endogenous variables , i.e. the measures of a firm's financing behavior, are directly observed and free of measurement error. These measures are constructed using the change in a firm's debt-equity ratio. The measurement model is specified as follows:

$$x = \Lambda\xi + \delta, \tag{1}$$

where x is a $q \times 1$ vector of observable indicators, i.e. a firm's accounting data, ξ is an $m \times 1$ vector of unobserved exogenous variables, i.e. the changes in firm-specific attributes, Λ is a $q \times m$ matrix of factor loadings of x on ξ, and δ is a $q \times 1$ vector of measurement error. In our model, we have 15 indicator variables for 9 attributes–thus, x is a matrix of dimension 15×1 and Λ is a matrix of dimension 15×9.

The structural model is specified as the following system of equations:

$$y = \Gamma\xi + \varepsilon, \tag{2}$$

Where y is a $p \times 1$ vector of endogenous variable, i.e. the measures of a firm's financing behavior or the change of a firm's debt-equity ratio, Γ is a $p \times m$ matrix of structural coefficients, and ε is a $p \times 1$ vector of disturbance terms. The model is estimated for two separate 2×1 vectors of debt: short-term and long term debt scaled respectively by book value and market value of total capital assets.

Equation (1) simply states that, although the firm-specific attributes that are believed to be the determinants of financing decisions cannot be observed, a number of other variables

denoted as indicators or proxies are observable. These indicator variables can be expressed as linear function of one or more of the unobservable attributes and a random measurement error. The principal advantage of this estimation procedure over standard regression models is that it explicitly specifies the relation between the unobservable attributes and the observable variables. Equation (2) can be understood as a regression model except that the explanatory variables may be unobserved latent factors.

In order to identify the estimated equations, certain restrictions must be imposed. In most factor-analysis models, the common factors are constrained to be orthogonal and scaled to have unit variances, and the residuals are assumed to be uncorrelated. However, since the common factors in this study are given definite interpretations by identifying them with specific attributes, the assumption that the common factors are uncorrelated is untenable as many firm-specific attributes are likely to be correlated (e.g. profitability and growth). For this reason, the correlations among the unobserved attributes (the matrix Ψ) are estimated within the model. Of course, in order to achieve identification, additional restrictions on the parameters of the model must be imposed.

In total, we have imposed 130 restrictions on the matrix Λ of factor loadings. These are shown in Table 2 as the factor loadings are exogenously specified to equal either one or zero. For example, since lnSALES is not assumed to be an indicator of TANG, its factor loading on the TANG attribute is set to be zero and is not estimated within the model. In addition, we have also constrained the measurement error in the equation of indicator variables PROV/TA, FA/TA and C$/CA to be zero, implying that the factor loadings of these variables on their respective attributes are constrained to equal one. Also, we have assumed that the measurement errors, δ, are uncorrelated with each other, with the attributes, and with the disturbance terms in the structural equations[10].

In contrast to the measurement model, the structural model is totally unrestricted. The model estimates the impact of each of the attributes on different financial leverages. In other words, none of the factor loadings in the structural equations is fixed exogenously. In addition, the correlations between the residual errors in the structural equations are estimated within the model. This allows for the possibility that there exist additional attributes, not

[10]Since the restrictions may not all be appropriate, interpretations of the estimates should be made with caution. It is quite likely, for example, that some of the measurement errors may in fact be correlated. It is unfortunate that there is an arbitrary element in the choice of identifying restrictions; however, similar restrictions must be made implicitly in order to interpret a standard regression model that uses proxy variables.

Table 2: The Structure of the Measurement Model– LAMBDA-X

	dPROV	dTANG	dSIZE	dGROWTH	dPROF	dVOLA	dFLEX	LT-LEVB/M	ST-LEVB/M	δ
dPROV/TA	1	0	0	0	0	0	0	0	0	0
dFA/TA	0	1	0	0	0	0	0	0	0	0
dlnSALES	0	0	$\lambda_{3,3}$	0	0	0	0	0	0	δ_3
dlnWORKER	0	0	$\lambda_{4,3}$	0	0	0	0	0	0	δ_4
dlnMV	0	0	$\lambda_{5,3}$	0	0	0	0	0	0	δ_5
dTA	0	0	0	$\lambda_{6,4}$	0	0	0	0	0	δ_6
dSALES	0	0	0	$\lambda_{7,4}$	0	0	0	0	0	δ_7
dlnMBR	0	0	0	$\lambda_{8,4}$	0	0	0	0	0	δ_8
dEBIT/SA	0	0	0	0	$\lambda_{9,5}$	0	0	0	0	δ_9
dROE	0	0	0	0	$\lambda_{10,5}$	0	0	0	0	δ_{10}
dlnSdNI	0	0	0	0	0	$\lambda_{11,6}$	0	0	0	δ_{11}
dlnSdEBIT	0	0	0	0	0	$\lambda_{12,6}$	0	0	0	δ_{12}
dC$/CA	0	0	0	0	0	0	1	0	0	0
LT-LEVB/M	0	0	0	0	0	0	0	1	0	0
ST-LEVB/M	0	0	0	0	0	0	0	0	1	0

considered in the model, that are determinants of each of the financial leverages.

5 Empirical Results

5.1 Maximum Likelihood (ML) Estimation

The parameters of our model are estimated using the maximum likelihood (ML) method. The basic idea is to fit the covariance matrix of observable variables implied by the specification of the model (Σ) to the covariance matrix (S) of these variables observed from the sampling observations. In the LISREL system, this is done by minimizing the function,

$$F = \ln(\det \Sigma) - \ln(\det S) + tr(S\Sigma^{-1}) - (p+q), \tag{3}$$

with respect to the vector of parameters in the matrices discussed in the previous section. This objective function is derived from maximum-likelihood procedures and assumes that the observed variables are conditionally multinormally distributed.

The asymptotic properties of the ML estimates and the hypothesis test statistics are derived based on large sample size and multivariate normality assumption. To conform with

linear structure of the model and the normality assumption, we rescale certain variables by taking logarithms, e.g. as in other studies, we use logarithmic total sales (lnSALES), logarithmic total workers (lnWORKER), and logarithmic equity market value (lnMV), as proxies of firm size. Different from previous studies, however, we also rescale the standard deviation of net income (SdNI) and the standard deviation of EBIT (SdEBIT) by taking logarithms, both of which are the proxies of a firm's earning volatility. Using logarithmic standard deviation as proxy of volatility, we solve two problems. First, the choice of whether to use standard deviation (σ) or variance (σ^2) as measure of volatility is in general arbitrary. Through logarithmic transformation, they are equivalently ($\ln \sigma$ versus $2 \ln \sigma$) in a linear framework. Second, standard deviations can only take non-negative values and are obviously not normally distributed, thus violating the normality assumption. However, both the plots and summary statistics suggest that it is quite reasonable to assume logarithmic standard deviations of both net income and EBIT following normal distribution. Moreover, our analysis also shows that the parameter estimates based on using SdNI and SdEBIT as proxies of volatility are much less robust than using ln(SdNI) and ln(SdEBIT) as proxies for volatility. This is due to the fact that, without rescaling the standard deviation, very high earnings volatilities for certain firms appear to be outliers. In addition, the quality of measurement is also significantly improved based on lnSdNI and lnSdEBIT. Similar findings are observed for the market book ratio (MBR) after rescaling by taking logarithms (lnMBR).

5.2 Estimates of the Parameters and the Path Diagrams

The estimates of the parameters of the measurement model for the book value based SEM are reported in Tables 3. Almost all factor loadings are highly significant. The estimates are generally in accord with our *a priori* ideas about how well the indicator variables measure the unobserved attributes. Both the direction and the magnitude, as well as the statistical significance, of the estimates suggest that these indicators capture the theoretical attributes we wish to consider as determinants of financing decisions. Very similar results of the measurement model are obtained for the market value based SEM, thus they are not reported.

The path diagrams are plotted in Figure 2 and Figure 3. The estimates of the structural coefficients for both the book value and market value based SEMs are reported in Table 5. These coefficients measure the estimated impact of changes in various attributes or factors on the financial behavior.

Table 3: Measurement Model: Factor Loadings for Independent Variables-LAMBDA-X

	dPROV	dTANG	dSIZE	dGROWTH	dPROF	dVOLA	dFLEX	LT-LEVB	ST-LEVB
dPROV/TA	1.00	- -	- -	- -	- -	- -	- -	- -	
dFA/TA	- -	1.00	- -	- -	- -	- -	- -	- -	- -
dlnSALES	- -	–	0.42	- -	- -	- -	- -	- -	- -
			(0.18)						
			2.38						
dlnWORKER	- -	- -	1.92	- -	- -	- -	- -	- -	- -
			(0.73)						
			2.65						
dlnMV	- -	- -	0.03	- -	- -	- -	- -	- -	- -
			(0.03)						
			0.93						
ddTA	- -	- -	- -	0.74	- -	- -	- -	- -	- -
				(0.12)					
				6.31					
ddSALES	- -	- -	- -	0.38	- -	- -	- -	- -	- -
				(0.10)					
				3.87					
dlnMBR	- -	- -	- -	0.39	- -	- -	- -	- -	- -
				(0.10)					
				3.99					
dEBIT/SAL	- -	- -	- -	- -	0.86	- -	- -	- -	- -
					(0.09)				
					9.80				
dROE	- -	- -	- -	- -	0.56	- -	- -	- -	- -
					(0.08)				
					6.68				
dlnSdNI	- -	- -	- -	- -	- -	0.58	- -	- -	- -
						(0.09)			
						6.52			
dlnSdEBI	- -	- -	- -	- -	- -	0.84	- -	- -	- -
						(0.10)			
						8.49			
dC$/CA	- -	- -	- -	- -	- -	- -	1.00	- -	- -
LT-LEVB	- -	- -	- -	- -	- -	- -	- -	1.00	- -
ST-LEVB	- -	- -	- -	- -	- -	- -	- -	- -	1.00

Table 4: Estimated Correlations between Attributes

Attributes	dPROV	dTANG	dSIZE	dGROWTH	dPROF	dVOLA	dFLEX	LT-LEVB	ST-LEVB
dPROV	1.00								
	(0.11)								
	8.86								
dTANG	-0.01	1.00							
	(0.08)	(0.11)							
	-0.08	8.86							
dSIZE	0.01	0.00	1.00						
	(0.03)	(0.03)							
	0.35	-0.05							
dGROWTH	-0.03	-0.10	0.08	1.00					
	(0.10)	(0.10)	(0.06)						
	-0.32	-1.00	1.46						
dPROF	0.03	0.01	-0.17	0.00	1.00				
	(0.09)	(0.09)	(0.10)	(0.12)					
	0.38	0.11	-1.79	0.01					
dVOLA	-0.11	0.28	0.04	0.08	-0.52	1.00			
	(0.09)	(0.09)	(0.04)	(0.12)	(0.09)				
	-1.15	3.09	1.03	0.72	-5.46				
dFLEX	-0.11	0.08	-0.07	0.00	0.33	-0.14	1.00		
	(0.08)	(0.08)	(0.05)	(0.10)	(0.09)	(0.09)	(0.11)		
	-1.35	1.05	-1.48	-0.03	3.70	-1.53	8.86		
LT-LEVB	0.18	-0.19	-0.04	0.13	0.03	-0.14	0.06	1.00	
	(0.08)	(0.08)	(0.04)	(0.10)	(0.09)	(0.09)	(0.08)	(0.11)	
	2.23	-2.35	-1.10	1.28	0.30	-1.56	0.79	8.86	
ST-LEVB	0.06	0.10	-0.07	-0.40	-0.07	-0.04	-0.11	0.08	1.00
	(0.08)	(0.08)	(0.05)	(0.10)	(0.09)	(0.09)	(0.08)	(0.08)	(0.11)
	0.76	1.20	-1.45	-3.97	-0.79	-0.42	-1.31	0.98	8.86

Figure 2: Path Diagram of Book-Value-Based Structural Equation Model

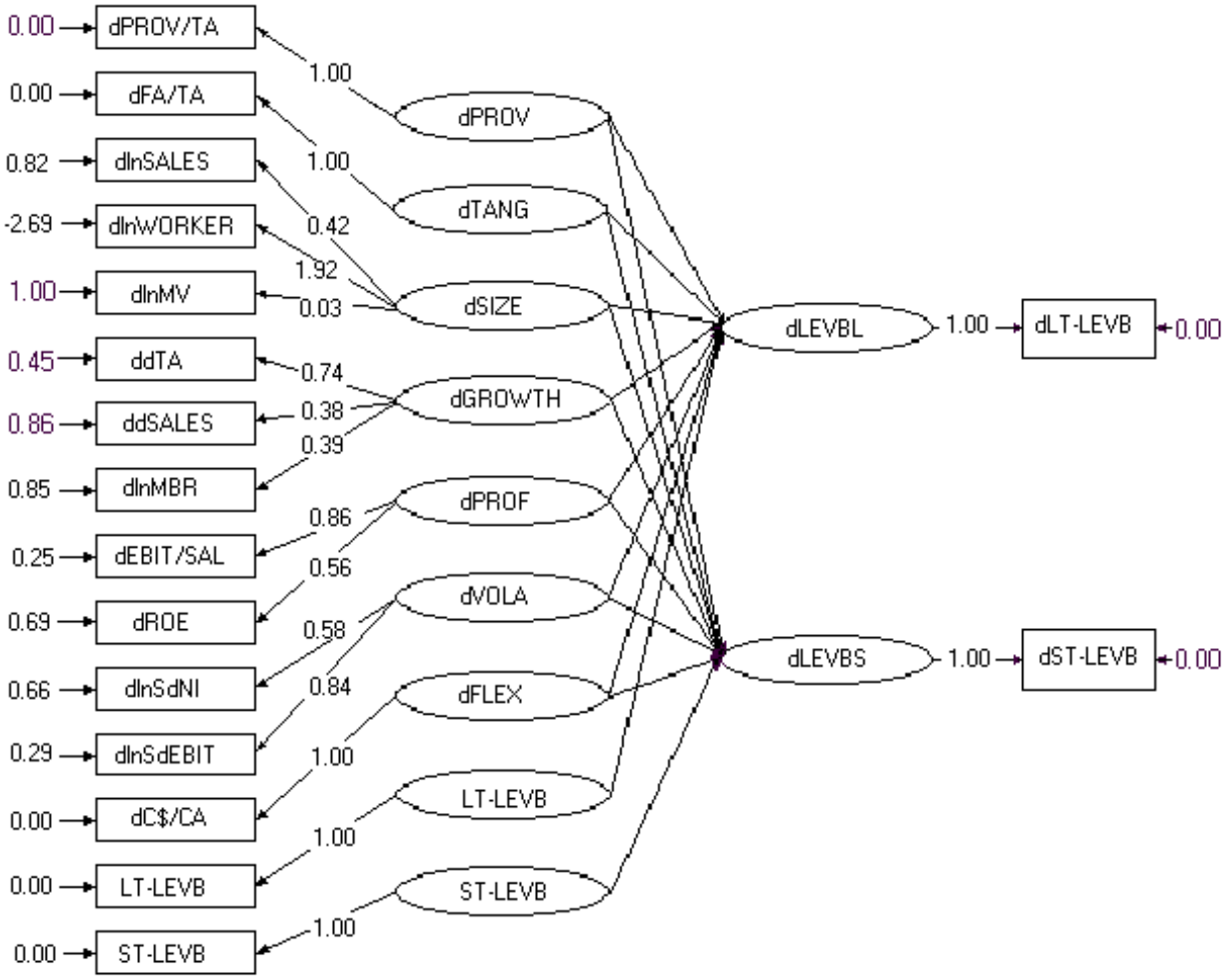
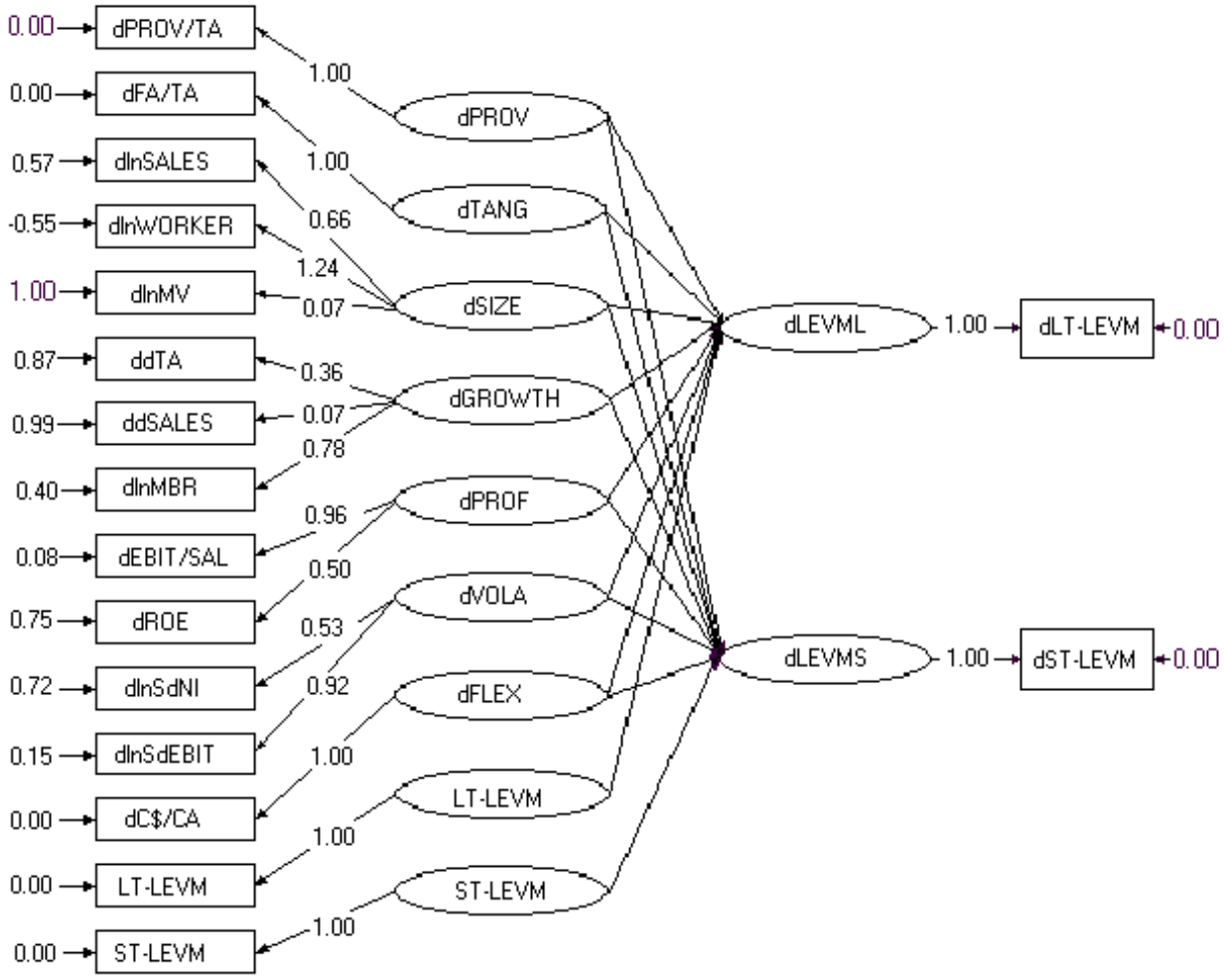


Figure 3: Path Diagram of the Market-Value-Based Structural Euqation Model



For the most part, the coefficient estimates for the long-term and short-term leverages are of the predicted sign from our earlier discussion. We focus our analysis on the book value based model and the estimation results are summarized as follows. Firstly, among the most significant factors of firms' financing decisions are changes in profitability (dPROF), changes in financial flexibility (dFLEX), current debt ratios for both long-term debt and short-term debt (LT-LEVB and ST-LEVB), changes in volatility (dVOLA), changes in tangibility (dTANG), as well as changes in growth (dGROWTH). Secondly, current debt ratios are negatively correlated with the subsequent changes in a firm's leverage, changes in both profitability and growth are negatively correlated with changes of both long-term debt ratio and short-term debt ratio, though the relation between the change of long-term debt ratio and the change in profitability and the relation between the change of short-term debt ratio and the change in growth are insignificant. Changes in both earning's volatility and financial flexibility have significant negative relation with only short-term debt ratio. Thirdly, although changes in provision (dPROV) is negatively correlated with both long-term and short-term debt ratios, neither is statistically significant. Similarly, while changes in size are positively related to changes of both long-term debt ratio and short-term debt ratio, the coefficients are highly insignificant. Changes in tangibility are negatively related to changes of both long-term debt ratio and short-term debt ratio, but only marginally significant with long-term debt ratio. Fourthly, while changes in short-term debt ratio are highly related to (at 1% critical level) current debt ratio and changes in financial flexibility and profitability, changes of long-term debt ratio are only highly related to (at 1% critical level) current debt ratio. Fifthly, the estimation results in the market value based model are consistent with both statistical relations between various variables and the results in the book value based models. Since the higher a firm's growth rate and profitability are, the higher a firm's stock price tends to be, it is not surprising to see the negative relation between changes in both growth and profitability and change of market value debt ratio. It is noted that the negative relation is consistent with the book value based model. Furthermore, the negative relation between change of financial flexibility and change of short-term debt ratio, as well as negative relations between current debt ratio and subsequent leverage changes for both long-term and short-term debt are also consistent with the book value based model. Finally, based on the goodness-of-fit tests, the estimated models are not sufficient to explain the cross-sectional variation in a firm's leverage.

Table 5: Estimates of Structural Coefficients-GAMMA

	dPROV	dTANG	dSIZE	dGROWTH	dPROF	dVOLA	dFLEX	LT-LEVB	ST-LEVB
dLEVBL	-0.11	**-0.16**	0.05	**-0.17**	-0.07	0.08	0.02	**-0.25**	- -
	(0.08)	**(0.08)**	(0.04)	**(0.10)**	(0.12)	(0.12)	(0.08)	**(0.08)**	
	-1.49	**-1.87**	1.24	**-1.70**	-0.58	0.69	0.27	**-3.19**	
dLEVBS	-0.09	0.00	0.01	-0.06	**-0.39**	**-0.24**	**-0.24**	- -	**-0.36**
	(0.07)	(0.08)	(0.03)	(0.10)	**(0.13)**	**(0.13)**	**(0.08)**		**(0.08)**
	-1.28	-0.06	0.31	-0.58	**-3.11**	**-1.94**	**-3.13**		**-4.40**
	dPROV	dTANG	dSIZE	dGROWTH	dPROF	dVOLA	dFLEX	LT-LEVM	ST-LEVM
dLEVML	0.02	-0.12	0.03	**-0.28**	**-0.19**	-0.02	0.05	**-0.39**	- -
	(0.07)	(0.08)	(0.05)	**(0.10)**	**(0.10)**	(0.10)	(0.07)	**(0.08)**	
	0.29	-1.53	0.58	**-2.79**	**-1.98**	-0.22	0.68	**-5.13**	
dLEVMS	-0.10	-0.06	0.01	**-0.29**	**-0.18**	-0.07	**-0.25**	- -	**-0.46**
	(0.07)	(0.08)	(0.05)	**(0.11)**	**(0.10)**	(0.10)	**(0.08)**		**(0.08)**
	-1.36	-0.76	0.12	**-2.73**	**-1.81**	-0.65	**-3.23**		**-5.65**

5.3 Robustness of Estimation Results

As we have mentioned earlier, inappropriate scaling of observed variables may cause the estimation results to be non-robust. In this paper, we have carefully re-scaled the observed variables, in particular the proxies of GROWTH and VOLA via logarithmic transformation, in order to conform with the linear structure of the model and multivariate normality assumption. Our analysis shows that this has led to significant improvement in the robustness of parameters estimates. A further examination of the robustness is also performed by investigating whether certain outliers cause significant change to our empirical results. We repeat the estimation by leaving out the firms with highest or lowest values for a particular factor, the estimation results have no significant changes. An examination of the correlation matrix of the sample data (Table 6) provides further insights about the robustness of our results. We note that there is no high correlation between two proxies of different factors. This finding is consistent with the estimated correlation matrix between factors as in Table 4, which suggests no spurious correlation among the indicators or attributes.

5.4 Further Discussions

Our estimation results conclude that even if the factors considered in our models are indeed the determinants of firms' financial decision, not surprisingly, firms are not adjusting their

Table 6: The Correlation Matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
dLEVBL(1)	1.000									
dLEVBS(2)	-0.081	1.000								
dLEVML(3)	0.655	0.021	1.000							
dLEVMS(4)	-0.064	0.879	0.216	1.000						
dPROV/TA(5)	-0.167	-0.072	-0.049	-0.084	1.000					
dFA/TA(6)	-0.067	-0.127	0.036	-0.057	-0.006	1.000				
dlnSALES(7)	0.092	0.111	0.083	-0.007	-0.010	-0.164	1.000			
dlnWORKER(8)	0.146	0.236	0.141	0.123	0.011	-0.125	0.818	1.000		
dlnMV(9)	-0.008	0.009	0.002	-0.064	0.061	-0.107	0.312	0.217	1.000	
ddTA(10)	-0.160	0.009	-0.082	0.023	-0.037	-0.025	-0.184	-0.070	-0.387	1.000
ddSALES(11)	-0.023	0.099	-0.035	0.129	0.025	-0.006	-0.318	-0.100	-0.072	0.312
dlnMBR(12)	0.088	0.068	-0.250	-0.108	-0.003	-0.250	0.010	0.062	-0.121	0.310
dEBIT/SAL(13)	-0.147	-0.230	-0.201	-0.179	0.042	-0.017	-0.036	-0.258	0.136	-0.010
dROE(14)	0.031	-0.414	-0.010	-0.270	-0.035	0.118	-0.115	-0.263	0.064	0.020
dlnSdNI(15)	0.072	-0.042	0.065	-0.016	-0.094	0.266	-0.001	0.047	-0.273	0.007
dlnSdEBIT(16)	0.078	0.028	0.163	0.140	-0.078	0.206	-0.128	-0.052	-0.223	0.100
dC$/CA(17)	-0.031	-0.293	-0.028	-0.219	-0.108	0.084	-0.091	-0.182	-0.102	-0.004
LT-LEVB(18)	-0.280	-0.077	-0.350	-0.105	0.181	-0.190	-0.063	-0.110	-0.008	0.096
ST-LEVB(19)	0.102	-0.280	0.122	-0.286	0.061	0.096	-0.059	-0.139	0.099	-0.256
LT-LEVM(20)	-0.217	-0.116	-0.443	-0.170	0.162	-0.180	-0.171	-0.224	-0.099	0.063
ST-LEVM(21)	0.103	-0.309	0.058	-0.340	0.038	0.110	-0.151	-0.229	-0.004	-0.150

	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
ddSALES(11)	1.000										
dlnMBR(12)	0.006	1.000									
dEBIT/SAL(13)	-0.053	0.063	1.000								
dROE(14)	0.007	0.041	0.479	1.000							
dlnSdNI(15)	-0.007	-0.066	-0.236	-0.042	1.000						
dlnSdEBIT(16)	0.168	-0.216	-0.410	-0.167	0.491	1.000					
dC$/CA(17)	0.059	-0.050	0.271	0.248	-0.102	-0.112	1.000				
LT-LEVB(18)	-0.016	0.109	0.009	0.050	-0.045	-0.136	0.063	1.000			
ST-LEVB(19)	-0.155	-0.276	-0.107	0.163	0.022	-0.049	-0.105	0.078	1.000		
LT-LEVM(20)	-0.007	0.199	0.038	0.097	-0.063	-0.176	0.066	0.895	0.092	1.000	
ST-LEVM(21)	-0.160	-0.183	-0.103	0.153	0.031	-0.067	-0.103	0.098	0.957	0.180	1.000

financing behavior based on market value measures. Thus, we focus our analysis on the book value based model. Overall, our estimation results provide moderate support for both the traditional trade-off theory, the pecking order theory, and the dynamic capital structure theory.

The fact that a firm's debt ratio is negatively related to subsequent change in leverage implies that firms with relatively high debt ratios tend to re-adjust their leverage downwards, while firms with relatively low debt ratios tend to re-adjust their leverage upward. This finding provides moderate support of the static trade-off model. However, due to the lack of long-run data, our results can not confirm the static trade-off model, according to which a firm is believed to adjust their debt level toward an optimal level. The test of such hypothesis requires not only cross-section but also time-series data of firms. Rather, our empirical findings are more or less consistent with the dynamic models of capital structure, which suggest that firms may periodically re-adjust capital structures toward a target ratio.

The significant negative relationship between profitability change and change of short term debt ratio, the significant negative relationship between growth change and change of long-term debt ratio, as well as the significant negative relation between the change of financial flexibility and the change of short-term debt ratio are all consistent with the "pecking-order" hypothesis. The pecking-order model suggest that firms prefer using retained earnings rather than debt to fund new investment. Thus it is not surprising to see that as profit increases, debt ratio tends to decrease. In particular, our estimation result suggests that firms tend to more consistently replace short-term debt with retained earnings. This is implied from the highly significant negative relation between change of profitability and change of short-term debt ratio, but an insignificant negative relation between change of profitability and change of long-term debt-ratio. Myers (1977) and Myers and Majluf (1984) argue that since a firm consists of both assets in place and growth opportunities, debt ratio is likely determined by the relative weights of these two components. In particular, firms should use relatively more debt to finance assets in place and relatively more equity to finance growth opportunities. As Hovakimian, Opler and Titman (2000) point out that the distinction between the debt capacity of assets in place and growth opportunities is also important in agency settings such as Stulz (1990), Hart and Moore (1996) and Zwiebel (1996). Our empirical results confirm above theories and suggest that as a firm's growth opportunities increase, it tends to rely more on equity financing than on debt financing. It is also not sur-

prising to see that the negative relation between change of growth opportunity and change of debt ratio is more significant for long-term debt, as growth essentially requires long-term debt financing.

While empirical evidence provides support for the pecking-order behavior of firms' financing decision, we argue that it would be difficult, especially in the Dutch case, to justify that the pecking-order behavior is caused by asymmetric information as conjectured by the pecking-order hypothesis. The pecking-order model by Myers and Majluf (1984) suggests that due to informational asymmetry between management and investors, external funds are undervalued in relation to the degree of asymmetry. Thus, external funds, in the order of debt, convertible securities, and equity, are less desirable to firms. However, as Opler et al. (1999) and Graham and Harvey (2000) argue that the pecking-order behavior may not be caused by asymmetric information. Based on survey responses from CFOs of American firms, Graham and Harvey (2000) note that the importance of financial flexibility in particular is not related to informational asymmetry (measured by size or dividend payout) or growth opportunities in the manner suggested by the pecking-order theory. In general, their findings fail to provide support for the theory that informational asymmetry causes pecking-order behavior. As for Dutch firms, it would be even more difficult to justify that the asymmetric information argument behind the "pecking-order" behavior is valid. The firms' dependence on bank financing mentioned before implies little asymmetric information, if there is any, between debt holders and shareholders.

The change in provision is negatively related to the change of short term debt ratio. Our explanation is that when provision ratio goes up, it is very likely that the firm's increase of bad debt raises the cost of short-term debt, because the collateral of short-term debt is usually short-term assets such as account receivables. On the other hand, when provision ratio decreases, bad debt decreases and the cost of short-term debt decreases by the same argument. Thus firms are more willing to issue short-term debt to take advantage of the tax benefits.

Considering that we are measuring the changes of firm size over two-year time span, the relative scale of the firm is not expected to change dramatically, and understandably change in size is not significantly related to the change of long-term debt ratio and short-term debt ratio.

Change of tangibility is negatively related to the change of debt ratios, and moderately

significant (at 10% confidence level) with long-term debt ratio. While change of both earning's volatility and financial flexibility have a significant negative relation with the change of short-term debt ratio, they have an insignificant but positive relation with the change of long-term debt ratio.

Our model has also identified certain important factors such as provision ratio, financial flexibility, which have so far been ignored in the literature of financial decisions for Dutch firms.

Firstly, provision ratio as non-debt tax shield is shown to be negatively correlated with a firm's financial leverage. This suggest that the "static trade-off" hypothesis is strongly supported by the Dutch evidence. Secondly, financial flexibility, measured by the ratio of cash and marketable securities over current assets is also shown to be negatively correlated with a firm's financial leverages. Since a firm's financial flexibility can also be viewed as internal debt, it provides further evidence to support the "pecking-order" hypothesis. However, from the mixing results of other factors, the rationale of asymmetric information behind the "pecking-order" hypothesis is not evident in the Dutch case. To the contrary, the asymmetric information argument is more rejected than accepted. As predicted by the asymmetric information theory, growth, profitability and earnings volatility should all be negatively correlated to a firm's financial leverages. Our empirical results suggest that signs between growth and leverages are consistently the opposite to what is predicted by theory. At the best, growth is an insignificant factor of capital structure for Dutch firms. A possible explanation is that since 97% of the private debt is issued by banks and other financial institutions instead of the capital market in the Netherlands, and on average, there is a representative of the lenders sitting in the board of directors, there is less degree of information asymmetry between the lenders and the borrowers, i.e. the firms.

Furthermore, the fact that financial flexibility is negatively related to a firm's leverages may lead to the conclusion that the corporate management of Dutch firms is in general entrenched. This conclusion appears to be further supported by the argument that there is a lack of market for corporate control in the Netherlands, see De Jong and Veld (2001). However, this observation can also be explained by the fact that the management of Dutch firms is extremely risk averse due to the stringent bankruptcy laws.

Finally, our empirical results show that while tangibility is positively correlated with long-term leverage, it is negatively correlated with short-term leverage, for both book-value

and market-value measures. Since tangibility measures the level of collateral assets, it is safe to assume that firms with higher tangibility are more accessible to loans. Thus the above results suggest that firms, when they can choose, tend to prefer long-term debt to short-term debt.

6 Conclusion

This paper uses the structural equation modeling (SEM) technique to empirically test the determinants of capital structure choice for Dutch firms. We include major factors identified by various capital structure theories and construct proxies for these factors with consideration of specific institutional settings in the Netherlands. We also carefully rescale the observed variables in order to conform with the linear structure of the model and the multivariate normality assumption. Our empirical results shed many important insights on the Dutch firms' financing behavior. In particular, we identified important factors that have so far been ignored in the literature for the Dutch capital structure choice. Furthermore, our results provide evidence supporting the "static trade-off" hypothesis. While our results also imply the "pecking-order" behavior of Dutch firms, they cast doubt on the rationale of asymmetric information behind the "pecking-order" hypothesis. In other words, while available capital structure theories can generate stylized empirical phenomena of firms' financing behavior, they fail to provide the rationale or explanation for such behavior. We also point out that the static cross-section analysis is not sufficient to conclude whether or not the management of Dutch firms is entrenched. Models based on dynamic behavior of firms' capital structure choice are called for such tests, which we will pursue in a separate study.

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