Debt and Taxes: Evidence from a Bank based system

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ABSTRACT

This paper analyzes the impact of corporate taxes on the capital structure in a country where bank financing is the main external financing source. It is found that the existence of a debt tax shield and provisions for tax loss carry-forwards has an important impact on the capital structure of the firm. These results differ from the general result in the literature that taxes do not matter for the capital structure decision. The main difference is that these results are obtained from a bank based financing system where asymmetric information and agency problems are solved differently than under a market-based system where most of the general results from the literature are obtained. Consistent with this, the pecking order theory of capital structure is rejected. Finally, it is found that small firms may be credit rationed by the banks.

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JEL classification codes: G3, G32

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1. Introduction

This paper analyzes the impact of corporate taxes on the capital structure in a country where bank financing is the main external financing source. In a bank based financing system asymmetric information and agency problems are solved differently than under a market-based system. In a market based system the borrowing rate and the amount of debt and to a lesser extent covenants are the main solutions to these problems whereas under a bank based system these problems are solved by continuous monitoring by the bank manager using e.g. the payment system. The other main difference between market based debt and bank based debt is that bank debt is "continuously" re-negotiated whereas market based debt is negotiated once when the debt is issued. In particular, the bank manager has the ability to withhold new credit as well as cancel old credits, which is difficult in a market-based system. Thus in a bank-based system the amount of debt is not primary tool to control agency problems and the borrower is therefore "free" to exploit the tax benefits of debt. In general few research papers have found any empirical effects of the tax benefits of debt financing, but most of these studies are undertaken in market-based systems where tax effects may be subsumed by other affects. To address the question of the impact of the tax shield on the capital structure decision we extend the existing empirical research on capital structure to Portugal, a bank-oriented country, using a large data set from non listed manufacturing firms.

[PLEASE insert Table 1 here]

As shown in Table 1 Portugal is a bank-oriented country. Table 1 shows the relative importance of the stock and bond markets in Portugal, United States, United Kingdom and Canada for the years 1997 to 1999. Compared with market oriented countries and, of cause, richer and more developed countries like US, UK and Canada, the weight of the Portuguese

stock market as percentage of GDP is up to four times smaller than for these larger market oriented countries. The relative importance of the bond market is also smaller than for the market oriented countries but not to the same degree as for the stock market. The main reason for this is the amount of government debt which accounts for 67% of the bond market for Portugal and 57, 54 and 73 respectively for the US, UK and Canada.

Looking at long term financing there are basically two key differences between borrowing in banks and using financial markets. In a market based system the firm issues securities, which are then sold to many different investors. Besides default risk the yield on the loan is determined by the size of the future expected agency problems such as asset substitution, shortsightedness and under investment[1]. Investors attempt to protect themselves by writing various covenants into the loan and often a syndicate leader is chosen to monitor these. The key here is that investors have to assess the likelihood of these problems over the entire life of the loan. Once the loan is issued it is difficult to change the terms of the loan as long as the covenants are satisfied. Also any change in the contract may be difficult to negotiate since many investors may be involved. Considering that these agency problems increases with the amount of debt in the capital structure it is likely that the amount of financing offered by the investors is smaller compared to a world of no such problems. Also asymmetric information problems is an important problem, each time the firm wants to raise new capital they potentially have to approach new investors who are less informed than the company and the old investors, this gives raise to the pecking order theory of capital structure as developed Meyers and Majluf (1984) and tested by Shyam-Sunder and Meyers (1999). On the other hand in a bank-based system the potential maturity of the loan may be long but the bank can at any time renege or cancel the loan. Most bank loans are structured such that the

[1] See Jensen and Meckling (1976) and Meyers (1977).

loan agreement is reviewed at least once a year thus the bank can cancel the loan and/or impose more strict conditions on the loan. The bank initially gathers information about the firm before issuing the first loan and therefore becomes an informed investor, but, more importantly, the bank continues to monitor the firm thus when the firm wants to increase its loans the bank is well informed and the problems of asymmetric information as described under the pecking order theory does not arise. Also the issue of agency problems is reduced by the combination of bank monitoring and the banks ability to reduce or even cancel credit when a problem arises. For smaller firms where information is hard to come by for the investor in financial markets the bank system may be more cost effective for the firms whereas for larger firms where information is more freely available it may be more advantageous to obtain external finance from financial markets and user other controls to limit the agency problems etc. However, given the banks superior information and control of agency problems it may be easier for a firm in such a system to pursue a capital structure policy that utilizes the tax shield compared to an equivalent firm financed in a market based system. The main constraint on the amount of debt in a bank-based system is the credit risk. From an empirical point of view one is therefore more likely to find a significant tax effect in a bank-based system than in a market-based system.

The main task of this paper is to test for tax effects in bank based system. In order to do this a measure for the corporate marginal tax rate is required. Several proxies have been used to measure the marginal tax rate, these include the statutory tax rates, non-debt tax shields, tax loss carryforwards or dummies variables (Bradley et. al. 1984, Titman and Wessels 1988, Bartholdy et. al. 1989, Mackie-Mason 1990 and Scholes et. al. 1990). More recently a new approach has been developed by Graham (1996a, 1998 and 1999) where the firm specific marginal tax rate is estimated. Graham's estimation is based on the tax code and

includes and tries to mimic the tax codes treatment of net operating losses, investment tax credits and the alternative minimum tax. Graham (1996a, 1998 and 1999) finds that that corporate marginal tax rates are positively related to capital structure, that is, the tax shield of debt matters in determining the capital structure. In this paper Graham's estimation technique as well as other proxies for the marginal tax rate are used to test for a tax shield effect.

A target adjustment model representing the traditional trade-off of capital structure is estimated for both for long and short-term bank loans with and without trade creditors for a Portuguese sample of 929 firms for the period 1992 to 1999 (5,980 firm-year observations). The main result of the paper is a significant tax effects on capital structure. In particular a ten percent increase in the marginal tax rate induces a 1,36 percent increase in long-term bank loans.

A main problem in a bank based system it is difficult for a firm to change bank. If the firm approaches another bank then the new bank knows that the old bank has superior information about the client and the new bank does not know whether the firm is looking for a new bank for a better deal or the old bank has dropped it as a bad risk. This problem can be solved through a thorough but expensive credit check. If there are few banks in the system then it is even more difficult to find an alternative source of financing due to the limited competition. This implies that firms are tied to their bank in a marriage for better or worse but in this case probably for the worse since the bank can restrict credit and the firm has limited possibilities for obtaining financing other places. In a market based system the firm has access to different financing sources and credit rationing is therefore likely to be less of a problem.

[PLEASE insert Table 2 here]

Over the last ten years there has been a string of mergers in the banking sector in Portugal, which restricts the competition and makes credit rationing more of a potential problem. Currently the top five financial groups have more than 75 percent of the sector's total assets. Table 2 gives an overview of the financial institutions and directed credit policies in Portugal. The Portuguese financial system comprises the central bank, 90 commercial banks (62 domestic and 28 foreign including Madeira's off-shore banks), insurance companies, leasing companies, factoring companies, etc. In terms of ownership, most of the banks are private since the bank privatisation took place in 1985. Banks in Portugal are universal banks. In such a system in particular smaller firms may face credit rationing. It is found bank reduces both long and short-term credits to small firms that face financial difficulties whereas banks are willing to extend additional long-term credit to large firms in financial difficulties. Thus there is evidence of credit rationing for smaller firms in this particular system.

Finally, above it was argued above that in a bank based system the pecking order theory of capital structure is likely to be rejected. Tests using the same methodology as Shyam-Sunder and Meyers (1999) rejects the pecking order theory.

The remainder of the paper proceeds as follows. In section 2 the target adjustment model used to test for tax effects is discussed. In section 3, data and variables used in the empirical analysis are discussed and the empirical analysis is presented in section 4. Section 5 concludes the paper.

2. Target adjustment model

The basic model used to test for a tax effect is a static trade-off model in the form of a target adjustment model. The basic argument in this model is that debt has some benefits in terms of tax shields but as debt increases so does the probability of bankruptcy and therefore the expected bankruptcy costs increases. Also as debt increases so does the agency costs associated with debt. Thus there is a tradeoff between the advantages and disadvantages of the use of debt. In this "trade-off theory" corporate taxes play an important role. Research from Taggart (1977) and Jalilvand and Harris (1984) suggests that managers pursue a target debt ratio thus over time managers adjust the current debt ratio to an optimal ratio. In a tax-based theory the incentive to use debt financing increases with a firm's marginal tax rate due to the tax deductibility of interest expenses.

According to the trade-off theory firms reach the optimal capital structure by adjusting over time their leverage level towards an optimum. Optimum would normally require a trade-off for example, between the tax benefits of increased debt levels and increased agency and bankruptcy costs that higher debt levels provides. The target adjustment model predicts that firms over time adjust (increase or decrease) their actual debt ratios towards a target debt level with the target determined by firm characteristics. Thus the changes in the debt ratio defined as debt over total assets is given by the deviations of the current ratio from the target:

$$\Delta D_{i\,t} = \gamma\,(D^*_{i\,t} - D_{i\,t-1}) + e_{i\,t} \qquad (1)$$

where, ΔD_{it} is the first difference of debt level for firm i at time t, γ the target adjustment coefficient with $0 < \gamma > 1$, indicating positive adjustment costs and $D^*_{i\,t}$ is the target debt level for firm i at time t.

A firm's optimal debt ratio is a function of its characteristics, such as for example corporate marginal tax rate, collateral value of assets, size and profitability, and the target debt level for firm i at time t is given by:

$$D^*_{i\,t} = \alpha + \beta_{TAX}\, TAX_{i\,t} + \beta_Z\, Z_{it} + e_{it} \quad (2)$$

where, D^*_{it} is the target debt level for firm i at time t, α is intercept term, TAX_{it} is the tax variable, Z is a vector of control variables (size, profitability, bankruptcy risk, etc.) and $e_{i\,t}$ is the error term. Substituting equation (2) into (1) yields:

$$\Delta D_{i\,t} = \gamma\,(\alpha + \beta_{TAX}\, TAX_{i\,t} + \beta_Z\, Z_{it} - D_{i\,t-1}) + e_{i\,t} \quad \Leftrightarrow$$

$$D_{i\,t} = \gamma\,\alpha + \gamma\,\beta_{TAX}\, TAX + \gamma\,\beta_Z\, Z_{it} + (1-\gamma)\, D_{i\,t-1} + e_{it} \quad (3)$$

Equation (3) is a "simple linear model", where D_{it} is the debt level for firm i at time t, α is the constant term, γ the target adjustment coefficient, β_{TAX} the estimated coefficient for the tax variable and β_Z the estimated coefficients for the control variables.

3. The Data Sample

The primary data source is the Bank of Portugal Statistical Departments database. This database contains balance sheet and income statement data on 1,811 non-listed firms with 11,359 non-continuous firm year observations. Several selection criteria were impose for inclusion in the sample: Only manufacturing firms for the period 1990-1999 with more than 100 employees for at least one year is included. Firms with negative net worth and less than three continuous data years are not included in the sample. The final sample consists of 929 firms and 5,980 firm year observations. On average the number of continuos observations are between 6 and 7 years.

[PLEASE insert Table 3 here]

From Table 3 almost one third of the firms have nine years of continuous observations while a few have seven and eight years (79 and 95 respectively) and fifty percent of the firms have between three and six years of continuos observations. The number of observations is well distributed among the years. Surprisingly, the years with fewer observations are the first two (1991 and 1992) and the last two (1998 and 1999). For the other years the number of observations are between a minimum of 696 (1993) and a maximum of 740 (1995). In respect to the number of firms by industry type, classes 3 (wood and paper paste) and 5 (heavy industry) have the smallest number of firms (78 and 67). Class 2 (textiles and clothes) is the largest industry in term of number of firms in the sample, representing nearly 35 percent. On average the number of observations scaled by the number of firms for each industry type is around six (minimum of 6,17 and maximum of 6,67, for industries one and four, respectively). The sample is in general representative for the Portuguese economy.

3.1 Measuring Debt

The three main financing sources for Portuguese firms are bank loans, trade credits and internally generated equity. Two groups of debt measures (dependent variables) are used. The first represents the main financing source namely bank loans and the second is the sum of bank loans and trade credits. Also data is available for both long term and short term[2] and six different ways of measuring debt (dependent variables) are constructed:

a) *LONGBANKLOANS* equal to the book value of total long-term bank loans over book value of total assets;

[2] Long term debt is defined as debt with a maturity longer than one year and short term debt has a maturity less than one year.

b) *SHORTBANKLOANS* equal the book value of total short-term bank loans over book value of total assets;

c) *BANKLOANS* equals the book value of both total short and long-term bank loans over the book value of total assets;

d) *LONGDEBT* equal the book value of total long-term bank loans and trade creditors over the book value of total assets;

e) *SHORTDEBT* as the book value of total short-term bank loans and trade creditors over the book value of total assets;

f) *DEBT* as the book value of both total short and long-term term bank loans and trade creditors over the book value of total assets.

[PLEASE insert Table 4 here]

Table 4 reports the percentage of firm-years observations with positive bank loans, trade credits and both bank loans and trade credits (short and long term). Table 4 shows that 53,66 percent of firm years observations report long term bank loans, 76,34 percent have short term bank loans and 81,66 percent report short and/or long term bank loans. The distinction between short term and long-term bank loans is not clear since firms often have "current accounts" with an open authorized amount by the banks. These are per definition short-term loans but are rolled over and can therefore be interpreted and used as long-term loans. Indeed, the number of firms that report nonzero levels of long term bank loans plus short term bank loans is similar to previous studies (Graham, 1998). If trade credits are included in debt levels, then the number of firm year observations with long term debt levels increase by 2,76 percent, short term debt levels increase by 12,06 percent and short and/or long term debt levels by 9,43 percent. The use of short-term trade credits is higher than long-

term trade credits. However, the main external financing source is bank loans which is used by 82% of the firms, whereas only about 10% of the firms reports using trade credits.

[PLEASE insert Table 5 here]

Table 5 (Panels A and B) reports the percentage of firm year observations with debt in the capital structure divided into size quartiles by total assets. The first and fourth quartile corresponds to small and larger firms, respectively. The percentage of firm year observation with strictly positive levels of debt is significantly higher for large firms than for small firms. Nearly 96 percent of large firms have some kind of debt with 60 percent reporting long-term bank loans. For small firms 79% reports the use of debt but only 35% reports long-term bank loans. Thus there is a distinct difference in the use of debt between small and large firms. A relatively larger number of small firms rely solely on short-term debt and fewer firms in general reports the use of debt.

3.2 Tax Variables

In the existing literature several proxies have been used to measure the impact of taxes on capital structure. Below several different proxies are used to ensure that the results are robust. The variables used are:

a) MTREBIT: *Before-financing marginal tax rate,* a simulated marginal tax rate based on income after depreciation but before interest expenses are deducted;
b) TAXDUMMY: A dummy variable equal to zero if earnings after taxes are positive and equal to one otherwise;

c) TLCF: Tax loss carry-forwards calculated as the book tax loss carry-forwards over total assets;

d) NDTS: Non-debt tax shields defined in two different ways, as total depreciation divided by total assets and as the operating income minus interest payments minus income tax payments over corporate tax rate

e) Kink: Calculated as the ratio of the amount of interests required to make firm's tax function slope downward and the actual interest expenses.

Next, these tax variables are discussed in details.

3.2.1. MTREBIT - Before-Financing Marginal Tax Rate

The marginal tax rate is defined as the present value of current and expected future taxes paid on an additional unit of income earned today. The methodology used here follows Graham (1996a) for calculating firm specific marginal tax rates and involve three sets of inputs: the current tax rules, in particular how losses are treated, the statutory tax rate and expected future earnings. During the period covered by the sample the statutory tax rate changed from 36 to 34 percent (1997) and the carry-forward rule of net operating losses were increase from five to six years in 1996[3].

In order to avoid spurious correlations the marginal tax rate is calculated prior to the capital structure decision. Consider the case of two firms with identical earnings distributions: one with debt and one without debt in the capital structure. If the firm with debt face losses and the firm without debt has positive earnings then the marginal tax is low for the firm with debt due to carry forwards, whereas for the firm without debt the marginal tax rate is high.

[3] Portuguese tax rules do not allow carry-backs.

Thus producing a negative correlation between the ex-post marginal tax rates and debt. To avoid this problem income after depreciations but before interest is used for calculating the marginal tax rates before the financing decision is taken.

The computation of the *before financing* marginal tax rate needs three sets of information: Tax code treatment of net operating losses, expected future income and the statutory tax rate. To forecast the taxable income Shevlin's (1990) model is used which is based on the assumption that pre-tax income follows a random walk with drift:

$$\Delta I_{it} = \mu_i + \varepsilon_{it} \quad (4)$$

where ΔI_{it} is the first difference in pre-tax income of firm i in year t, μ_i is the drift estimated as the sample mean of ΔI_{it} and ε_{it} is a normally distributed random variable with mean zero and variance equal of that of ΔI_{it} over the sample years[4].

Under Portuguese tax rule, with no tax loss carry-backs, a firm with positive income has marginal tax which is equal to the statutory tax. For a firm having negative income then the marginal tax rate is below the statutory rate due to the availability of tax loss carry-forwards. If the firm has negative taxable income then an additional unit of income reduces the losses that can be carried forward and used to offset taxable income in future years thus increasing future taxes. If the losses carried forward fully offset positive income the next year, year 1, then an additional unit of income at year 0 is fully taxed in year 2 (provided that tax losses carried forward does not fully offset the positive income in year 2). Thus the marginal tax rate in year 0 of an additional unit of income is the statutory tax rate discounted for two periods and therefore smaller than the statutory tax rate at time 0. If the firm is not able to generate positive income in the subsequent five or six years to offset the losses carried

[4] For more details see Graham (2000) and appendix A of this paper.

forward then the marginal tax rate is zero[5]. Briefly, to estimate the marginal tax rate for a given firm in a given year: first expected income is estimated by simulation of equation (4) for the next five or six years. For each simulation taxes and tax loss carry-forwards are calculated for each year. Next, the net present value of the expected taxes over the next five or six years is calculated. Then one unit of income is added to the reference year and the present value of the tax bill is recalculated (always taking into account the loss carry forward provisions). Taking the difference between these two present values, and calculating the average over the simulations provides an estimate of the marginal tax rate.

[PLEASE insert Figure 1 here]

Figure 1 shows the distribution of the "before financing" marginal tax rate for all 5,980 firm-year observations. For about 83 percent of the observations (firm years) income before interest and taxes was positive and the before financing marginal tax rate is therefore equal to the statutory tax rate. The remaining 17 percent have negative earnings before interest and taxes and from that group 85 percent has a marginal tax rate of zero (could not offset the losses against the profits in the five or six following years) and the remaining 15% have a marginal tax rate ranging between zero and the statutory tax rate. The annual average marginal tax rates from 1991-1999 are 33,2%, 30,6%, 29,6%, 30,8%, 30,9%, 30,8%, 29,4%, 28,9% and 27,4%, respectively. Part of this variation is generated by the change in statutory tax rate in 1997 from 36 to 34%.

[5] Before 1996 the tax loss carry-forward provision was five years and six years after 1996.

A higher marginal tax rate implies that an increase in debt will decrease taxes more for a firm with high marginal tax rates than for firms with low marginal tax rates. Thus the marginal tax should have a positive correlation with the level of debt.

3.2.2 TAXDUMMY – Dummy variable

An alternative measure of the tax status used in the literature is a dummy variable with a value equal to one if earnings after taxes (EAT) are negative and zero otherwise. If EAT are negative then the tax shield from increasing the amount of debt is smaller than for firms with positive EAT. Thus a negative correlation or coefficient is expected between the dummy variable and the level of debt.

[PLEASE insert Figure 2 here]

A total 58 percent of the firms in the sample have at least one year with negative EAT and a total of 1390 observations corresponding to about one fourth of the total firms years observations have negative EAT.

3.2.3 TLCF - Tax Loss Carry-forwards

If a firm has large tax loss carry-forwards from previous losses then it is less likely that the firm will increase the amount of debt for tax reasons. Firms with large tax loss carry-forwards are ceteris paribus more likely to have negative earnings than firms with low levels of carry forwards. If earnings are negative then taxes are not reduced by utilizing the interest tax deduction from debt, thus the tax shield from increasing the level of debt has little value if the firm has large carry forwards. It is therefore expected that the level of carry forwards and

debt is negatively related. This tax proxy is calculated as the book tax loss carry-forwards over total assets.

3.2.4 NDTS - Non-debt Tax Shields

DeAngelo and Masulis (1980) argue that firms with large non-debt tax shields use less debt in their capital structure. If a firm has a large amount of non-debt tax shields such as depreciation and investment tax credits, the probability of having negative taxable income is higher. Following the argument for tax loss carry-forwards it is expected that debt levels are inversely related to the level of non-debt tax shields. However, firms with large amount of depreciations are probably firms with historical good investment opportunities and profitable operations. If these firms used debt to finance their new investments it is possible that a spurious relation between debt levels and depreciation exists which is unrelated to tax shield issues. Two different measures for the non-debt tax shields variable used. The first one is calculated as total depreciation divided by total assets. The second is based Titman and Wessels (1988) and is defined as the operating income minus interest payments minus the income tax payments over corporate tax rate. Both measures are expected to have an inverse relationship with the amount of debt in the capital structure.

3.2.5 Kink

The last tax variable used is the "kink" variable proposed by Graham (2000). This variable measures whether firms use debt conservatively or aggressively i.e. how aggressively firms utilizes debt as a tax shield. In Graham (2000) the "kink" variable is defined "as the ratio of the amount of interest required to make the tax function slope downwards (in the numerator) to actual interest expense (in the denominator)". The kink therefore happens when the marginal tax function begins to drop from the statutory tax rate, which for Portugal happens when earnings before tax is zero. The total amount of interest required for EBT to be

zero is equal to earnings before interest and taxes EBIT. The kink variable is therefore measured as EBIT divided by the actual interest expense measured as the difference between EBT and EBIT.

[PLEASE insert Figure 3 here]

With this variable it is possible to capture whether the firm operates on the downward-sloping part of its tax rate function (situation when firms have negative earnings and face declining marginal tax rates) or on the flat part (when they pay the statutory tax rate). If kink is less than one the actual interest paid is greater than EBIT and the firm therefore has negative EBT and declining marginal tax rates, if kink is greater than one then EBT is positive and the marginal tax rate is equal to the statutory tax rate (see figure 3)[6]. Because firms with "kink" less than one usually have high amount of interests, they use debt aggressively (high debt levels) and face reduced tax benefits from an additional unit of debt since the marginal tax rate is declining in this area. If, however, "kink" is greater than one, then firms have lower interests expenses and lower debt levels and they can expect full benefit if they add an additional unit of debt to the capital structure since the marginal tax rate is equal to the statutory tax rate. Firms operating in this part of the tax benefit function use debt conservatively. "Kink" is therefore positively correlated with conservatism. But kink is also a proxy for the marginal tax rate and it is therefore expected to have a negative relation to the amount of debt. Figure 3 shows the relation among the marginal tax benefit of debt and "kink" variable.

[PLEASE insert Table 6 here]

[6] Kink will be equal to one if earnings before taxes are equal to zero.

Table 6 shows a resume of all the tax variables used in the estimation below their expected relationship with debt levels. It also presents some of the authors that use the same variables in previous papers.

3.3 Control Variables

The main focus of the paper is whether leverage decisions are affected by tax status. To ensure that the regressions are properly specified other variables are included to control for other factors that may influence the capital structure decision. The theories about capital structure suggest that, among others, collateral value of assets, profitability, and size, volatility of earnings, growth, bankruptcy probability, nominal interest rate, inflation rate, interest rates spread and financial distress may have an influence on the capital structure. Next these control variables are briefly described.

A firm with a high percentage of fixed assets in relation to total assets can support a higher debt level because these assets are marketable in case of liquidation or they can be used as collateral for additional debt thereby reducing the overall financial distress costs. Consequently a positive relation is expected between fixed assets and debt levels. This variable is calculated as fixed assets divided by total assets.

Firms with higher profitability can support higher debt levels without risking financial distress. However, Myers and Majluf (1984) argue that profitability and leverage are negatively related because firms will prefer to finance with internal funds rather than debt. Titman and Wesssels (1988) find a negative relation between profitability and leverage and the effect of profitability can therefore be either positive of negative. The profitability variable

is defined as in Titman and Wessels (1988) and Rajan and Zingales (1995) as operating income divided by the book value of total assets.

Given that there are fixed costs associated with bankruptcy and that large firms in general have a lower probability for bankruptcy than small firms it is expected that large firms have more debt in their capital structure. This variable is calculated as the natural logarithm of the book value of total assets.

As business risk increases so does the probability of bankruptcy thus it is expected that the level of business risk is negatively correlated with the amount of debt. As a business risk proxy the standard deviation of return on assets is used

A fast growing firm is often seen by the banking sector as a healthy firm and growth is therefore expected to be positively correlated with debt levels. This variable is defined as the percentage of change in total assets.

If bankruptcy is costly then the amount of debt should be a decreasing function of the probability of bankruptcy. A modified version of Altman's (1968) discriminant function predictor of bankruptcies is used in this paper. A negative correlation is expected between the modified version of Altmans's Z-Score and debt levels. This variable is defined as:

$$3{,}3\frac{\text{EBIT}}{\text{Total Assets}}+1{,}0\frac{\text{Sales}}{\text{Total Assets}}1{,}4\frac{\text{Retained Earnings}}{\text{Total Assets}}+1{,}2\frac{\text{Working Capital}}{\text{Total Assets}}$$

An alternative measure of the probability of bankruptcy is a dummy variable equal to one if negative operating income exists and zero otherwise. A firm with negative operating income is ceteris paribus more likely to face bankruptcy than a firm with positive earnings. It

is therefore expected that the relationship between the dummy variable and the debt levels is negative.

An increase in nominal interest rates increases the cost of borrowing and it is expected that the firms will borrow less in the face of high interest rates. Since nominal rates are closely related to inflation rates these two variables may capture the same effects.

The difference between the short and long-term rate can be either positively or negatively related with debt levels. It is calculated as the difference between long term and short-term interest rate (given by ten years treasury bonds and three months risk free rate, respectively). An increase in the spread makes long term financing relatively more expensive and it is expected that firms will make more use of short-term finance and roll it over. Thus it is expected that the spread variable is negatively related to long-term debt and positively related to short-term debt.

[PLEASE insert Table 7 here]

Table 7 summarizes the control variables. The expected theoretical relationship with debt levels and references to authors who have used these variables in previous research is shown.

3.4 Descriptive Analysis

[PLEASE insert Table 8 here]

3.4.1 Means, Standard Deviations and Correlation

Panel A of Table 8 reports summary statistics for the levels of the different debt measures. On average, long-term bank debt accounts for 6,86 percent of total assets and short-term bank debt for 10,18 percent. In the case of both bank loans and trade creditors the average long term debt is 7,3 percent and for the short-term debt it is 11,18 percent. If firm-year observations with no debt are excluded, then the average long-term bank debt accounts for 12,79 percent of total assets and short term bank debt for 13,34 percent.

In Panel B the summary statistics for the tax variables are presented. The average value of the *before financing* marginal tax rate is 30,15 percent with a maximum value of 36 percent (statutory tax rate) and a standard deviation of 12,42 percent. The tax loss carry forwards and the non-debt tax shields (one and two) are on average 3,33, 6,75 and 5,63 percent of total assets, respectively. The mean value of kink indicates that the average firm could increase the interest deductions by 69,41 percent before the marginal benefit begins to decline.[7]

Panel C provides the sample statistics for the control variables. The average tangible assets is 39,05 percent of total assets indicating a good level of fixed assets to total assets. Operating income is on average 12,59 percent of the total assets and the mean size of the firms in the sample is 14,54 (or 10,475 thousands Euro). Firms have on average a growth of 9,48 percent (change in total assets). The measure of financial distress, Z-Score averages about 2,14 for all-firm year observations but there is a large dispersion around this number (standard deviation of 2,03). The macroeconomics variables, short term interest rate, long

[7] The maximum kink value was limited to eight.

term minus short term interest rate and inflation rate, are on average 8,96, 0,019 and 5,00 percent, respectively.

[PLEASE insert Table 9 here]

Table 9 shows that nearly 30 percent of sample firms could increase interest deductions by at least 50 percent (1871 observations with a kink equal to 1,5 or higher) before reaching the downward sloping part of their tax benefit function. As expected, debt levels tend to decrease when kink increases (excluding when kink is equal to zero which is a particular case). Comparing the kink values with the before financing marginal tax rate and the control variables, profitability, size and Z-score (Panel B), the results are as expected. The *before financing* marginal tax rate is smaller when firms use more debt (kink<1), profitability and Z-score tend to increase with "kink" (higher kink, less debt level) but there is no difference between the average size of firms with high or low kinks. So, when kink increases (less debt), firms are more profitable and the bankruptcy probability smaller. From panel C the correlation coefficient between "kink", the effective tax rate[8] and *before financing* marginal tax rate are positive and the relation between kink and long term bank loans negative.

[PLEASE insert Table 10 here]

Table 10 reports the correlation matrix for both tax variables and control variables of which the tax variables are of primary concern. The before financing marginal tax rate, MTREBIT is negatively correlated with the tax dummy and positively correlated with the "kink" variable and tax loss carry-forward variable. The highest correlation coefficient is

[8] Calculated as the ratio of earnings after taxes over earnings before taxes.

between the before financing marginal tax rate and the tax dummy variable at about 57%. The relatively low correlation coefficients indicate that the variables may be catching different aspects of the tax effect. In Panel B the correlations between the control variables are reported. Note that *INTEREST*, *DIFFINTERREST* and *INFLATION* are highly correlated and should therefore not be included in the same regression.

4. Results

4.1 Testing for a tax effect on leverage.

In section 2 the basic test equation for the target adjustment model was presented as:

$$D_{i\,t} = \gamma\,\alpha + \gamma\,\beta_{TAX}\,TAX + \gamma\,\beta_{Z}\,Z_{it} + (1-\gamma)\,D_{i\,t-1} + e_{i\,t} \qquad (3)$$

This equation is estimated using a pooled sample across firms and time periods 1992 to 1999. The main estimation problem is the lagged dependent variable on the right hand side of the equation. If there is auto-correlation in the residuals then the lagged dependent variable is correlated with the error term leading to biased and inconsistent estimation. A simple application of the Hausmann test confirms that this indeed a problem. In order to avoid this problem an instrumental variables (IV) estimator is utilized. The dependent variable lagged for two periods is used as an instrument for the lagged dependent variable. Unfortunately, with this procedure 929 firm-year observations are lost.

[PLEASE insert Table 11 here]

In Table 11 (Panels A to F), the results from the pooled time series cross-sectional IV regressions are presented. The dependent variables in these regressions are bank loans and bank loans plus trade creditors (short and long term) expressed as a fraction of total assets. The model is estimated once for each tax variable including the control variable generating a

total of 6 regressions for each measure of the dependent variable. In each panel six regressions are reported (column 1 to 6), one for each tax variable, as well as the target adjustment coefficient and the adjusted R-squared. The control variables used in each regression are: *COLLATERAL*, *PROFITABILITY*, *SIZE*, *BUSINESS RISK*, *GROWTH*; *Z-SCORE*, *INFLATION* and *DISTRESS*. The control variables *INTEREST* and *DIFFINTEREST* are left out due the high correlation with *INFLATION*. However, two additional regressions are run for each tax variable with these two control variables while at the same time leaving out the variable *INFLATION*. The results for the tax variables and for the other control variables are the same (same signs and statistical significance)[9]. For long term bank loans (Table 13, Panel A), all the tax variables have the predicted signs and they are, except for *TLCF* and *KINK*, significant at the five percent level (one percent level for *DUMMY*). On average the target adjustment coefficient is 19 percent with the correct sign and the adjusted R-squared is around 57 percent[10]. If scaled with the target adjustment coefficient, all else being equal, the results indicate that an increase of one percent in the *MTREBIT* will result in a 0,136 percent increase in the firm's long term bank loans ratio. Thus regardless of the tax measure used, it is found that there is a tax effect on the capital structure for long term bank loans.

In respect to the control variables and looking at column 1 (*MTREBIT*), *COLLATERAL*, *SIZE* and *DIFFINTEREST* are not significant. The other control variables are all statistical significant and have the predicted signs.

[9] Due to the lack of information on the 3 months risk free rate in 1991 and for the ten year treasury bonds in 1991 and 1992, 531 observations were lost for the regression that includes the *DIFFINTEREST* variable

[10] Without the lagged dependent variable the R square drops to around 11%. Without the lagged dependent variable the adjusted R-squared is in line with results from analogous studies based on panel data and/or first difference specifications (e.g. Graham 1996a, 1998 and Alworth and Arachi 2001).

Panel B reports the results for short term bank loans. The results are somewhat different from the long term bank loan case. All coefficients have the predicted signs but only TLCF and NDTS are significant. The target adjustment and the adjusted R-squared are equivalent to the long term bank debt case. The control variable *DIFFINTEREST* has a strong autonomous power to explain short term bank loans levels but not long term bank loans. It appears therefore that firms adjust their short term bank loans much more in response to the amounts of tax loss carry-forwards than for the long term bank loans (the coefficient in the short term bank loan case is four times larger than for the long term bank loan case) and if the long rate increases above the short rate then firms increases their short term borrowings but they do not adjust their long term bank loans in response to changes in the term structure.

When short and long term bank loans debt levels are joined the explanatory poweer of the model increases 57 to 71 percent (adjusted R-squared), and all the tax variables have the predicted signs and are, except for TAXDUMMY and KINK, significant.

In Panels D to F trade credits are included in the debt ratios. Considering the relative low amounts of long term trade credits it is not surprising that the results in Panel D and E are similar to the ones leaving out trade credits (Panels A and B). Compared to bank loans a trade credit does not need negotiation and is therefore easier to adjust than bank loans and is therefore used to adjust short term liquidity needs. Bank loans are often more difficult to adjust and are therefore not influenced as much by short term liquidity needs and are therefore more relevant when analysing the more strategic issues such as the influence of taxes on the capital structure. Thus the main results of the paper are the ones that appear in Panels A, B and C.

The results of the regressions confirms that the specifications with the *before-financing* corporate marginal tax rate works well when long term debt levels are analysed, since it incorporates both the tax code treatment of net operating losses and managers expectations concerning the future earnings of the firm. However, the $NDTS_2$ tax proxy also captures the effect of corporate taxes, being statistical significant for all regressions. As argued in section 3.2.4. this proxy simultaneously accounts for depreciation and interest deductions. On the other hand the "kink" variable is not statistical significant in any of the regressions.

Tax loss carry-forwards appears to be important for the choice of short term debt levels. It appears that firms reduce their short term borrowing when they have tax loss carry forwards, and therefore may not be able to use all the tax shields interest payments.

[PLEASE insert Table 12 here]

[PLEASE insert Table 13 here]

4.2. Does small firm behave in the same way as large firms.

Although the SIZE variable is not significant the reaction of small firms and large firms to tax shields may be different. To test whether the behaviour of small and large firms is the same the sample was divided into quartiles based on size and the models were estimated for the first (small firms) and fourth quartile (large firms). Tables 12 and 13 (Panels A to C) show the estimated regressions, summary statistics for debt levels and the percentage of zero and non zero observations for the dependent variables for the first and fourth quartile, respectively.

The main difference between small and large firms is that different tax variables are significant. For the large firms (Panel B) the marginal tax rate, MTREBIT and TAXDUMMY are significant for long term debt and TAXDUMMY for short term debt as well. The TLCF is significant for short term debt consistent with the results for the overall sample. This indicate that that large firms adjust their short term debt in response to tax loss carry-forwards but not their long term debt. The long term debt on the other hand is responsive to the marginal tax rate. Also NDTS is significant for the short term debts, thus it appears that large firms adjust their short term debt to the two types of tax shields (tax loss carry-forwards and non debt tax shields). In contrast small firms adjust both their long and short term debt to tax loss carry forwards (TLCF) and are not responsive to the marginal tax rate (MTREBIT). Surprisingly, the non debt tax shields (TLCF) is not significant for small firms. Considering that small firms often have fewer fixed asset they may have relatively fewer non debt tax shields to begin with.

4.3. Are Small Firms Financial Constrained?

From Table 12 the "Kink" variable is significant for short term debt for small firms and not significant for large firms. So far this variable has been interpreted as a tax variable but an alternative interpretation is that this variable captures the financial health of the company. If "Kink" is below one then the firm is in financial trouble, since earnings after interest is negative where as value of "Kink" above one indicates a financial sound firm. This interpretation is supported by Table 9, Panel B, where "Kink" is positively correlated with both profitability and the Z-score. Any firm trying to obtain an alternative financing source by shifting bank has problems due to the initial asymmetric information; when the firm approaches the new bank this bank does not know whether the old bank has rejected further financing due to poor performance or whether the firm is "shopping" around for a better deal.

The resolution of this asymmetric information requires thorough credit checks of the firm which is expensive. A firm already in financial trouble has a really tough time shifting to a new bank. These problems even more severe in Portugal where, as discussed in section 2, the banking system is concentrated and the firm therefore has few choices when trying to raise or change bank. To the extend that there are economies of scale in credit evaluation, i.e. it is relatively cheaper to analyze a large firm than a small firm, this situation is worse for small compared to large firms. Finally, large firms often have more fixed assets and therefore collateral compared to small firms and therefore have easier access to finance. Thus small firms with financial problems in Portugal are at the mercy of one bank. It is therefore of interest to analyze how small and large firms are treated when they are in financial trouble.

[PLEASE insert Table 14 here]

To analyze what happens to small and large firms in financial trouble the sample was again separated into quartiles based on the size of the firms. Within each quartile firms had to satisfy two conditions to be included in the samle: a "Kink" of less than one and the firm was required to have a larger debt asset ration than the overall average for the sample. Thus two samples of firms in potential financial trouble has been created. Table 14 analyses the correlation between the "Kink" variables of the short and long term bank debt and trade credits. If a small firms financial situation deteriorates ("Kink" decreases) then the amount of long term and short term bank debt decreases but the amount of trade credits increases. Thus when a small firm is in financial trouble then the banks cut back funding and the firms are forced to increase the amount of trade credits. However, the reaction is different for large firms. A deterioration in the financial situation for a large firm leads to an increase in long

term bank debt and a drop in short term bank debt and trade credits. Thus there is some evidence that small firms are being credit rationed if they are in financial trouble.

4.4. The Pecking Order Model

In the introduction to the paper it was argued that it was unlikely that asymmetric information would play an important role in a bank financed system. In order to test this, the pecking order theory is tested. This theory was devised by Myers and Majluf (1984). They argued that one way of avoiding wealth transfers to outsiders is to avoid equity issues. Firms will prefer to fund projects with internally generated cash flows an if external funds are required; debt will be chosen before equity. Indeed, external equity will be issued as a last resort because is more subject to under-valuation. The pecking order theory suggests that a firm does not have an optimal debt level.

Shyam-Sunder and Myers (1999) tests both the pecking order and the static trade-off theory. Using Monte Carlo simulation, the authors find that the pecking order theory is an excellent first order descriptor of corporate finance behavior. However, Frank and Goyal (forthcoming) contradict these results and Hovakimian, Opler and Titman (2001) suggest that these two conceptual frameworks should be integrated rather than opposed in order to understand the firm's financial decisions.

Shyam-Sunder and Myers (1999), argue that the pecking order story provides a better empirical description of capital structures than the traditional trade-off models. The pecking order theory suggests that debt must adjust to accommodate the financing needs of the firm, i.e. according to the pecking order theory new equity is utilized only as a last resort. Firms will use internal funds or issue debt unless they cannot issue risk-free debt. If risky debt is the

only option, them firms will use internal equity. This theory gives less weight to tax considerations comparing with the traditional trade-off models. If debt, earnings, dividends and investments are interrelated, then debt should be a function of the cash flows generated by the firm, its dividend payout and investments. Therefore, debt adjusts to match the financing needs of the firm. Shyam-Sunder and Myers (1999) define the funding deficit as

$$DEF_t = DIV_t + X_t + \Delta W_t + R_t - C_t \quad (5)$$

where C_t is operating cash flows after interest and taxes, DIV_t is dividend payments, X_t is capital expenditures, ΔW_t is the net increase in working capital, and R_t is the current portion of long term debt at start of period. In a strict pecking order model, as long as safe debt can be issued, there is no need to issue equity. If $DIV_t + X_t + \Delta W_t + R_t > C_t$ the firm has a shortage of funds so it issues debt, otherwise the firm has a surplus so retires debt.

The pecking order hypothesis tested by Shyam-Sunder and Myers (1999) is given by:

$$\Delta D_{it} = \alpha + \beta_{PO} DEF_{it} + e_{it} \quad (6)$$

where ΔD_{it} is the amount of debt issued (or retired). The pecking order hypothesis predicts that $\beta_{PO} = 1$ and $\alpha = 0$, that is internal generated funds are used first and if additional financing is required it is obtained using debt. Shyam-Sunder and Myers (1999) find that the coefficient on deficit is statistically close to one. Equation (6) does not include equity because the pecking order model will issue or retire equity only as a last resort.

To test the pecking order hypothesis against the target adjustment model presented so far, the tax variables and the control variables are added to the right hand side of (6):

$$\Delta D_{i\,t} = \alpha + \beta_{PO} DEF_{it} + \beta_{TAX} TAX_{i\,t} + \beta_Z Z_{it} + e_{it} \quad \Leftrightarrow$$

$$D_{i\,t} = \alpha + \beta_{PO} DEF_{it} + \beta_{TAX} TAX_{i\,t} + \beta_Z Z_{it} + \beta_d D_{i\,t-1} + e_{i\,t} \quad (7)$$

where equation (7) is a simple linear model. If pecking order theory holds, then DEF_{it} will be statistically significant and positive (near one) with the tax variable coefficient not statistical significant or with its coefficient lower than the one obtained by the static trade-off theory (target adjustment model), since this theory gives less weight to the effect of corporate taxes on firms financing decisions.

[PLEASE insert Tables 15 and 16]

From Table 13 PROFITABILITY has a negative and significant impact of the amount of debt, which as argued by Myers and Majluf (1984) implies that firms prefer to finance with internal generated funds, i.e. it is evidence that the pecking order theory holds. But this interpretation is not consistent with the results reported in Tables 15 and 16. In Table 15 the coefficient for the flow of funds deficit, DEF, in equation (6) is significantly different from 1 as predicted by the pecking order theory. When all the variables that compose the flow of funds deficit are regressed against ΔD_{it} (Panel B), as in Frank and Goyal (forthcoming), neither of these variables is statistically significant, except for working capital for small firms. In Table 16 the DEF variable is included together with the tax and control variables from section 4.1. The "pecking order" variable, DEF, is not statistically significant confirming that pecking order theory does not hold in this sample of Portuguese firms, and that corporate taxes are important in the mangers financing decisions.

Conclusions

This paper has analyzed the impact of corporate taxes on the capital structure in a country where bank financing is the main external financing source. It was found that the existence of a debt tax shield and provisions for tax loss carry-forwards has an important impact on the capital structure of the firm. These results differ from the general result in the literature that taxes do not matter for the capital structure decision. The main difference is that these results are obtained from a bank based financing system where asymmetric information and agency problems are solved differently than under a market-based system where most of the general results from the literature is obtained. In a market based system the agency and asymmetric information problems are solve via monitoring and the ability to "continuously" re-contracting the debt whereas in a market based system these problems are partly solved by the amount of debt in the capital structure. Therefore in a bank-based system the firm is "free" to pursue tax benefits of debt. Consistent with this theory the pecking order theory of Meyers and Majluf (1984) and tested by Shyam-Sunder and Meyers (1999) was soundly rejected on this dataset.

The main problem in a bank-based system with relatively few banks is that it is difficult for small firms facing financial difficulties to obtain additional financing. The empirical analysis shows that when small firm face financial problems then the banks reduce both long term and short loans forcing the firms to increase their short-term trade credits. Thus there is evidence of credit rationing for smaller firms in this particular system.

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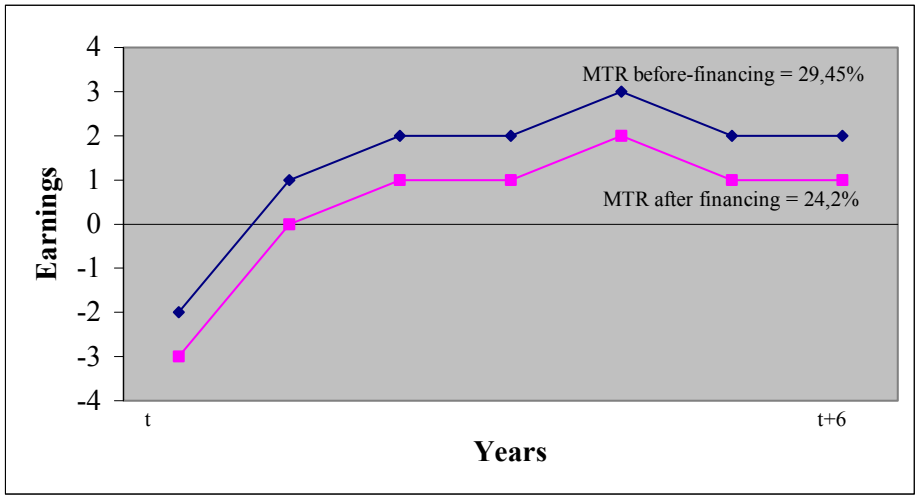
APPENDIX A

Estimating Corporate Marginal Tax Rates[11]

In this appendix a summary of Graham's (1996a, 1996b) methodology for calculating simulated marginal tax rates is presented[12]. In this example it is assumed that the statutory tax rate is 35 and that losses can only be carried forward 5 years (before 1996) and six years (after 1996).

The top line of the figure below shows a firm's forecasted before-financing taxable income for a single simulation. The bottom line depicts the forecasted after-financing taxable income.



Panel A below show taxes paid assuming a tax rate of 35 percent. The 2 euros loss in year t = 0 can be carried forward to shield profits of the other years. In year t = 1 one euro of the carry forward is used to shield one euro of earnings and one Euro remains to offset future earnings. In year t = 2 the other euro of the carry forward is used and the firm pays 35 cents in tax. In the following years, the firm pays 70 cents, 1.05 euro, 70 cents and 70 cents, respectively.

[11] Graham (2000), pages 1935-1939.

[12] The presented procedure was adopted for the calculation of each firm marginal tax rate.

Panel A: Base Case – Top Line of Figure

	T=0	T=1	T=2	T=3	T=4	T=5	T=6
Income	– 2	1	2	2	3	2	2
Tax-loss Carry forward	0	2	1	0	0	0	0
Tax liability	0	0	0.35	0.70	1.05	0.70	0.70

Panel B: Earning an Extra Euro in t = 0

	T=0	T=1	T=2	T=3	T=4	T=5	T=6
Income	– 1	1	2	2	3	2	2
Tax-loss Carry forward	0	1	0	0	0	0	0
Tax liability	0	0	0.70	0.70	1.05	0.	0.70

Panel C: Incremental Tax Liabilities from Earning an Extra Euro in t = 0

	T=0	T=1	T=2	T=3	T=4	T=5	T=6
Tax liability	0	0	0.35	0	0	0.	0

The firm's t = 0 marginal tax rate is defined as the present value of taxes owed on an extra euro of t = 0 income. As shown in Panel C, the extra euro of t = 0 income causes the firm to pay an extra 35 cents of tax in t = 2. If the firm has a 9 percent discount rate, its marginal tax rate is 29,45 percent ($0{,}2945 = \frac{0{,}35}{1{,}09^2}$).

Deducting interest expenses lowers a firm's income stream and consequently can reduce its expected marginal tax rate. For example the bottom line in the figure shows that the firm's tax rate is reduced to 29,45 to 24,79 percent if it takes on one euro in annual interest deductions.

Table 1: Size of Capital Markets in Portugal

	Stock Market capitalization as a Fraction of GDP (%)			Bond Market Nominal Value Outstanding as a Fraction of GDP (%)[1]		
Years	1997	1998	1999	1997	1998	1999
Portugal	37	56	58	47	49	43
United States	137	154	180	140	147	155
United Kingdom	151	168	203	60	63	66
Canada	91	91	126	87	87	84

Source: Merrill Lynch "Size & Structure of the World Bond Market: 2002", International Financial Statistics and World Bank Group "World Development Indicators Database"
[1] Includes both financial and non financial firms

Table 2: Financial Institutions and Directed Credit Policies

Country	Banking Model	Bank Concentration (% of Bank Assets)	Commercial Bank Ownership	Interest Margin	Foreign Commercial Banks (%)
Portugal	Universal	Top 5 Bank Groups 75,1%	Mostly Private (Privatized by end of 1985)	2,2%	45,1%

Source: Bank of Portugal Annual Report (1999)

Table 3: The Structure of Panel Data

The panel data set is unbalanced as there are more observations for some firms than for others.
Sections in the table below are as follows: a) Number of firms having "n" continuous observations during the period; b) number of observations in each year; c) number of firms in each industry class; d) number of observations in each industry class. Class 1: food and drinks; Class 2: textiles and clothes; Class 3: wood and paper paste; Class 4: chemical products; Class 5: heavy industry and Class 6: machinery production and equipment.

a) Number of Firms		**b) Number of Observations**		**c) Number of firms**		**d) Number of Observations**	
n (years)		Years		Industry		Industry	
		1991	531	1	139	1	859
		1992	626	2	325	2	2116
3	135	1993	696	3	78	3	512
4	114	1994	716	4	155	4	1034
5	106	1995	740	5	67	5	427
6	108	1996	735	6	165	6	1032
7	79	1997	707				
8	95	1998	657				
9	292	1999	572				
Total	929	Total	5980	Total	929	Total	5980

Table 4: Percentage of Firms-Years observations with Debt in their Capital Structure

	Long Term	Short Term	Short and/or Long Term
BANK LOANS	53,66	76,34	81,66
TRADE CREDITORS	2,76	12,06	9,43
BANK LOANS plus TRADE CREDITORS	56,42	88,40	91,09

Table 5: Percentage of Firms-Years observations with Debt in their Capital Structure
Panel A: Small Firms (1370 observations)

	Long Term	Short Term	Short and/or Long Term
BANK LOANS	35,26	63,65	71,17
TRADE CREDITORS	3,79	9,27	7,75
BANK LOANS plus TRADE CREDITORS	39,05	72,92	78,92

Panel B: Larger Firms (1664 observations)

	Long Term	Short Term	Short and/or Long Term
BANK LOANS	59,95	82,75	85,16
TRADE CREDITORS	0,87	11,96	10,39
BANK LOANS plus TRADE CREDITORS	60,82	94,71	95,55

Figure 1: Before-Financing Marginal Tax Rates

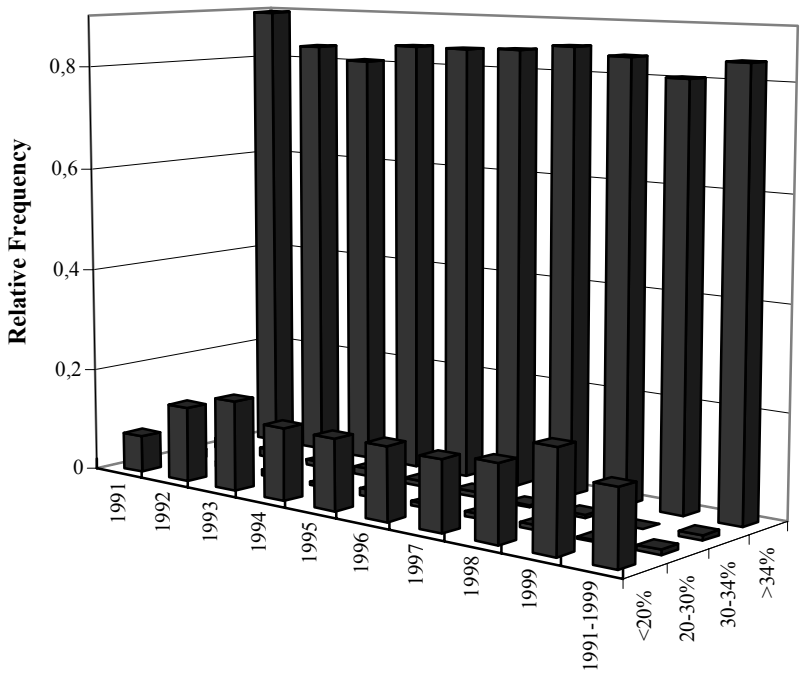


Figure 2: Percentage of Firm-Year Observations with Negative and Positive EAT

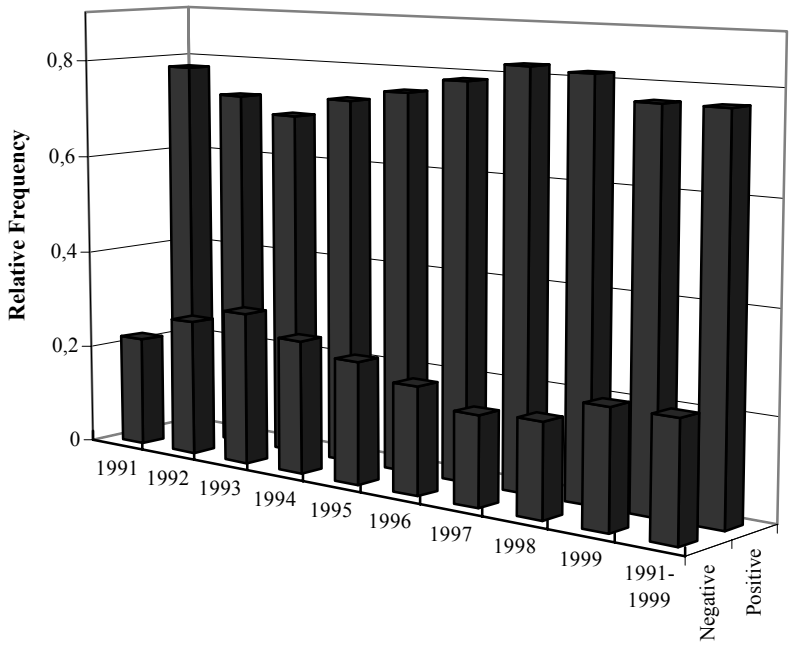


Figure 3: Marginal Tax Benefit and Kink

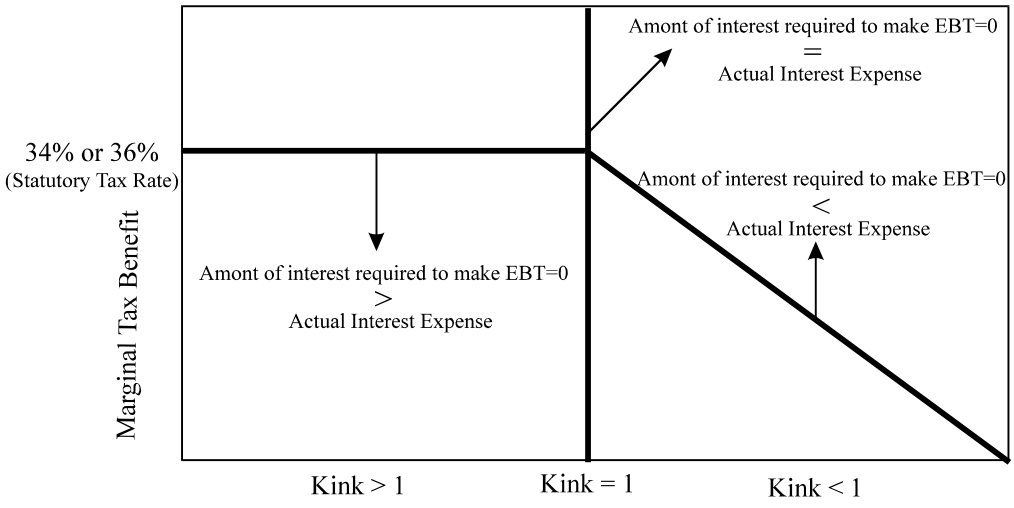


Table 6: Tax Variables and Debt Levels

Tax Variables	Expected relationship with Debt Levels	Authors
▪ MARGINAL TAX RATE	POSITIVE	Graham (1996a) Graham (1996b) Graham et al.(1998) Graham (1999) Graham(2000) Alworth and Arachi (2001)
▪ DUMMY	NEGATIVE	Graham (1996b) Graham (2000)
▪ TAX LOSS CARRYFORWARDS	NEGATIVE	Mackie-Mason (1990) Graham(2000)
▪ NON DEBT TAX SHIELDS	NEGATIVE	Graham (1996a) Mackie-Mason (1990) Alworth and Arachi (2001)
▪ KINK	NEGATIVE	Graham(2000)

Table 7: Control Variables and Debt Levels

Control Variables	Expected relationship with Debt Levels	Authors
▪ COLLATERAL	POSITIVE	Titman and Wessels (1988) Rajan and Zingales (1995) Shum (1996) Graham (1996a, 1998) Shyam-Sunder and Myers (1999) Gordon and Lee (2001) Booth et al. (2001)
▪ PROFITABILITY	POSITIVE	Titman and Wessels (1988) Rajan and Zingales (1995) Shyam-Sunder and Myers (1999) Bevan and Danbolt (2002)
▪ SIZE	POSITIVE	Titman and Wessels (1988) Rajan and Zingales (1995) Graham (1996a, 1998, 1999) Alworth and Arachi (2001) Booth et al. (2001) Bevan and Danbolt (2002)
▪ BUSINESS RISK	NEGATIVE	Bradley et al (1984) Titman and Wessels (1988) Bartholdy (1989) Shum (1996) Booth et al. (2001)
▪ GROWTH	POSITIVE	Titman and Wessels (1988) Bartholdy (1989)
▪ BANKRUPTCY PROBABILITY	NEGATIVE	Mackie-Mason (1990) Graham (1996a, 1998, 1999, 2000) Alworth and Arachi (2001)
▪ NOMINAL INTEREST RATE	NEGATIVE	
▪ INTEREST RATE SPREAD	NEGATIVE (Long Term) POSITIVE (Short Term)	
▪ INFLATION RATE	NEGATIVE	Bartholdy (1989) Booth et al. (2001)
▪ FINANCIAL DISTRESS	NEGATIVE	Graham (1996a)

Table 8 : Summary Statistics for financial policy measures and the explanatory variables

The sample consists of 5,980 observations for firms on Bank of Portugal Statistical Department database with CAE codes between 15000 and 36000 over the period 1991 through 1999. Total Assets is the book value of total assets. *LONGBANKLOANS* is the book value of total long-term bank loans over book value of total assets. *SHORTBANKLOANS* is the book value of total short-term bank loans over book value of total assets. *BANKLOANS* is the book value of both total short and long-term bank debt over total assets. *LONGDEBT* is the book value of total long-term bank loans and trade creditors over the book value of total assets. *SHORTDEBT* is the book value of total short-term bank loans and trade creditors over the book value of total assets. *DEBT* is the book value of both total short and long-term term bank loans and trade creditors over the book value of total assets. *MTREBIT* is the before-financing marginal tax rate simulated based on income after depreciation but before interest expenses are deducted. *TAXDUMMY* is a dummy variable equal to zero if earnings after taxes are positive and equal to one otherwise. *TLCF* is calculated as the book tax loss carryforwards over total assets.. $NDTS_1$ is defined as the total depreciation divided by total assets. $NDTS_2$ is a proxy for non-debt tax shields calculated as the operating income minus interest payments minus income tax payments over corporate tax rate. *KINK* is defined as the ratio of the amount of interests required to make the tax function slope downward and the actual interest expenses. *COLLATERAL* is equal to fixed assets divided by total assets *PROFITABILITY* is the operating income divided by the total assets. *SIZE* is the natural logarithm of total assets. *BUSINESS RISK* is the standard deviation of return on assets. Return on Assets is defined as earnings before taxes over total assets. *GROWTH* is calculated as the percentage change in total assets. *Z-SCORE* is a modified version of Altman's (1968) Z-Score. *INTEREST* is the 3 months risky free interest rate. *DIFFINTEREST* is the difference among long term and short term interest rate. *INFLATION* is the annual inflation rate. *DISTRESS* is a dummy variable equal to one if negative operating income exists and zero otherwise.

Panel A: Summary Statistics for Debt Levels

Variable	Mean	Median	Std Deviation	Min	Max
LONGBANKLOANS	0,0686	0,0125	0,0998	0,0000	0,8160
SHORTBANKLOANS	0,1018	0,0670	0,1115	0,0000	0,6891
BANKLOANS	0,1704	0,1479	0,1513	0,0000	0,9305
LONGDEBT	0,0730	0,0208	0,1025	0,0000	0,8160
SHORTDEBT	0,1118	0,0796	0,1129	0,0000	0,6902
DEBT	0,1848	0,1621	0,1543	0,0000	0,9366

Panel B: Summary Statistics for Tax Variables

Variable	Mean	Median	Std Deviation	Min	Max
MTREBIT	0,3015	0,36	0,1242	0,0000	0,36
TLCF	0,0330	0,0184	0,0925	– 1,1367	0,9191
$NDTS_1$	0,0675	0,0603	0,0370	0,0024	0,2916
$NDTS_2$	0,0563	0,0551	0,0692	– 1,0264	0,4866
KINK	1,6941	1,0554	2,2915	0,0000	8,0000

Panel C: Summary Statistics for Control Variables

Variable	Mean	Median	Std Deviation	Min	Max
COLLATERAL	0,3905	0,3813	0,1739	0,0075	0,9699
PROFITABILITY	0,1259	0,1204	0,0933	– 0,5472	1,1809
SIZE	14,5431	14,4479	1,2800	10,4876	20,1253
BUSINESS RISK	0,0527	0,0428	0,0461	0,0007	0,6047
GROWTH	0,0948	0,0562	0,2801	– 0,8791	11,9302
Z-SCORE	2,1451	2,0379	0,9470	– 0,2226	9,0447
INTEREST	0,0896	0,0984	0,0423	0,0304	0,1634
DIFFINTEREST	0,0019	0,0070	0,0179	– 0,0374	0,0174
INFLATION	0,0500	0,0410	0,0286	0,0220	0,1140

Table 9: Summary Statistics for KINK variable
Panel A: Kink and Debt levels

Kink	Observations	*LONGBANKLOANS*	*SHORTBANKLOANS*	*BANKLOANS*	*LONGDEBT*	*SHORTDEBT*	*DEBT*
0,0*	1906	0,0475	0,0728	0,1203	0,0514	0,08290	0,1343
0,0	363	0,0894	0,1208	0,2102	0,0932	0,1312	0,2243
0,5	450	0,0956	0,1322	0,2278	0,1009	0,1399	0,2408
1,0	1390	0,0996	0,1446	0,2442	0,1049	0,1534	0,2583
1,5	444	0,0861	0,1180	0,2041	0,0928	0,1286	0,2214
2,0	634	0,0575	0,1018	0,1594	0,0600	0,1130	0,1730
4,0	229	0,0609	0,0689	0,1297	0,0642	0,0813	0,1455
6,0	119	0,0303	0,0694	0,0997	0,0321	0,0787	0,1108
8,0	445	0,0306	0,0558	0,0864	0,0350	0,0678	0,1028

Panel B: Kink and Tax / Control Variables

Kink	Observations	MTREBIT	PROFITABILITY	SIZE	Z-SCORE
0,0*	1906	0,226424	0,0980	14,6749	2,0467
0,0	363	0,2651	0,0715	14,515	1,6164
0,5	450	0,2730	0,0917	14,4727	1,8236
1,0	1390	0,3553	0,1334	14,3196	2,1264
1,5	444	0,3539	0,1404	14,4444	2,2314
2,0	634	0,352208	0,1570	14,5247	2,4019
4,0	229	0,351616	0,1648	14,8308	2,3670
6,0	119	0,348571	0,1881	14,5663	2,5291
8,0	445	0,349978	0,2063	14,7402	2,7121

Panel C: Correlations between Tax Variables and Long-Term Bank Loans levels

Correlations	KINK	EFFECTIVE	MTR	Y1
KINK	1,0000	0,0205	0,2776	-0,0893
EFFECTIVE		1,0000	0,0210	-0,0031
MTR			1,0000	-0,0153
Y1				1,0000

Table 10: Correlation Matrix

The sample consists of 5,980 observations for firms on Bank of Portugal Statistical Department database with CAE codes between 15000 and 36000 over the period 1991 through 1999. *MTREBIT* is the before-financing marginal tax rate simulated based on income after depreciation but before interest expenses are deducted. *TAXDUMMY* is a dummy variable equal to zero if earnings after taxes are positive and equal to one otherwise. *TLCF* is calculated as the book tax loss carryforwards over total assets. $NDTS_1$ is defined as the total depreciation divided by total assets. $NDTS_2$ is a proxy for non-debt tax shields calculated as the operating income minus interest payments minus income tax payments over corporate tax rate. *KINK* is defined as the ratio of the amount of interests required to make the tax function slope downward and the actual interest expenses. *COLLATERAL* is equal to fixed assets divided by total assets *PROFITABILITY* is the operating income divided by the total assets. *SIZE* is the natural logarithm of total assets. *BUSINESS RISK* is the standard deviation of return on assets. Return on Assets is defined as earnings before taxes over total assets. *GROWTH* is calculated as the percentage change in total assets. *Z-SCORE* is a modified version of Altman's (1968) Z-Score. *INTEREST* is the 3 months risky free interest rate. *DIFFINTEREST* is the difference among long term and short term interest rate. *INFLATION* is the annual inflation rate. *DISTRESS* is a dummy variable equal to one if negative operating income exists and zero otherwise.

Panel A: Tax Variables

	MTREBIT	*TAXDUMMY*	*TLCF*	$NDTS_1$	$NDTS_2$	*KINK*
MTREBIT	1,0000	– 0,5661	0,4410	– 0,0155	0,3414	0,2776
TAXDUMMY		1,000	– 0,5487	– 0,1009	– 0,4622	– 0,3340
TLCF			1,0000	0,0663	0,4530	0,3219
$NDTS_1$				1,0000	0,5241	0,0593
$NDTS_2$					1,0000	0,1681
KINK						1,0000

Panel B: Control Variables

	COLLATERAL	*PROFITABILITY*	*SIZE*	*BUSINESS RISK*	*GROWTH*	*Z-SCORE*	*INTEREST*	*DIFFINTEREST*	*INFLATION*	*DISTRESS*
COLLATERAL	1,0000	0,0119	– 0,0977	0,0065	– 0,0674	– 0,3880	0,0100	– 0,0188	0,0137	0,1429
PROFITABILITY		1,0000	– 0,0239	0,0236	0,0364	0,5763	0,0094	0,0074	– 0,0016	– 0,4844
SIZE			1,0000	0,0173	0,0651	– 0,2693	– 0,1158	0,0880	– 0,1061	– 0,0127
BUSINESS RISK				1,0000	– 0,0124	0,0858	0,0438	– 0,0314	0,0419	0,1607
GROWTH					1,0000	0,0076	0,0020	– 0,0103	0,0020	– 0,0923
Z-SCORE						1,0000	0,0182	0,0070	0,0017	– 0,3437
INTEREST							1,0000	– 0,7374	0,9494	0,0970
DIFFINTEREST								1,0000	– 0,8389	– 0,0794
INFLATION									1,0000	0,1016
DISTRESS										1,0000

Table 11: Instrumental Variables (IV) Regressions

The sample consists of 5,051 firm-year observations over the period 1991 through 1999. The following regression is estimated: $D_{i\,t} = \gamma\,\alpha + \gamma\,\beta_{TAX}\,TAX + \gamma\,\beta_Z\,Z_{it} + (1-\gamma)\,D_{i\,t-1} + e_{i\,t}$. $D_{i\,t}$ is the debt level of firm i in year t. α is the constant term. γ is the target adjustment coefficient. TAX are taxation proxies to account the effect of corporate taxes on capital structure (previously defined) and used one of each time. Z_{it} is a vector of predetermined control variables used is past studies of capital structure, such as: collateral, profitability, size, business risk, growth, bankruptcy, nominal interest rate, interest rate spread, inflation rate and financial distress. $D_{i\,t-1}$ is the debt level of firm i in year t – 1. e_{it} is the error term. White heteroskedasticity - consistent standard errors & covariance in parenthesis. Superscript asterisks indicate statistical significance at 0,01(*), 0,05 (**) and 0,10 (***) levels. Two stage least square estimation procedure is used.

Panel A: Dependent Variable – Long Term Bank Loans

Tax Variable	MTREBIT (1)	TAXDUMMY (2)	TLCF (3)	$NDTS_1$ (4)	$NDTS_2$ (5)	KINK (6)
	0,0262**	– 0,0231*	– 0,0258	– 0,0877**	– 0,0300**	– 0,0004
	(0,0106)	(0,0066)	(0,0214)	(0,0348)	(0,0139)	(0,0004)
Control Variables						
BANK LOANS $_{(t-1)}$	0,8070*	0,8093*	0,8064*	0,8064*	0,8082*	0,8089*
	(0,0176)	(0,0175)	(0,0178)	(0,0176)	(0,0175)	(0,0175)
COLLATERAL	0,0091	0,0075	0,0055	0,0150***	0,0092	0,0074
	(0,0073)	(0,0073)	(0,0077)	(0,0084)	(0,0074)	(0,0073)
PROFITABILITY	– 0,0263***	– 0,0134	0,0044	0,0024	– 0,0040	– 0,0110
	(0,0138)	(0,0131)	(0,0215)	(0,0131)	(0,0131)	(0,0133)
SIZE	0,0004	0,0005	0,0007	0,0000	0,0003	0,0005
	(0,0007)	(0,0007)	(0,0007)	(0,0007)	(0,0007)	(0,0007)
BUSINESS RISK	– 0,0441**	– 0,0519**	– 0,0491**	– 0,0525**	– 0,0565**	– 0,0520**
	(0,0222)	(0,0223)	(0,0222)	(0,0223)	(0,0227)	(0,0223)
GROWTH	0,0163***	0,0166***	0,0172***	0,0157	0,0169***	0,0167***
	(0,0099)	(0,0100)	(0,0103)	(0,0098)	(0,0101)	(0,0100)
Z-SCORE	– 0,0047*	– 0,0048*	– 0,0047*	– 0,0050*	– 0,0051*	– 0,0048*
	(0,0015)	(0,0015)	(0,0015)	(0,0015)	(0,0015)	(0,0015)
INFLATION	– 0,1019**	– 0,0889**	– 0,0953**	– 0,1039**	– 0,0972**	– 0,0909**
	(0,0426)	(0,0427)	(0,0431)	(0,0424)	(0,0425)	(0,0428)
DISTRESS	0,0055***	0,0257*	0,0017	0,0029	0,0011	0,0023
	(0,0032)	(0,0064)	(0,0030)	(0,0030)	(0,0031)	(0,0030)
Constant	0,0124	0,0189	0,0158	0,0274**	0,0227***	0,0190
	(0,0134)	(0,0130)	(0,0132)	(0,0133)	(0,0132)	(0,0130)
Target Adjustment Coefficient	0,1930	0,1807	0,1936	0,1936	0,1938	0,1911
Adjusted R-Squared	0,5756	0,5747	0,5743	0,5748	0,5742	0,5739

Tax Variable	MTREBIT (1)	TAXDUMMY (2)	TLCF (3)	$NDTS_1$ (4)	$NDTS_2$ (5)	KINK (6)
	0,0267**	– 0,0225*	– 0,0265	– 0,0883**	– 0,0301**	– 0,0004
	(0,0107)	(0,0066)	(0,0215)	(0,0348)	(0,0139)	(0,0004)
	0,0262**	– 0,0236*	– 0,0246	– 0,0849**	– 0,0285**	– 0,0003
	(0,0112)	(0,0086)	(0,0229)	(0,0366)	(0,0145)	(0,0004)
Control Variables						
INTEREST	– 0,0534**	– 0,0454**	– 0,0493**	– 0,0535**	– 0,0498**	– 0,0468**
	(0,0227)	(0,0226)	(0,0228)	(0,0225)	(0,0225)	(0,0226)
DIFFINTEREST	0,0256	0,0164	0,0228	0,0262	0,0230	0,0192
	(0,0549)	(0,0549)	(0,0548)	(0,0546)	(0,0546)	(0,0549)
	0,1930	0,1907	0,1936	0,1936	0,1918	0,1910
Target Adjustment Coefficient	0,1867	0,1846	0,1872	0,1876	0,1858	0,1850
Adjusted R-Squared	0,5756	0,5747	0,5743	0,5749	0,5742	0,5739
	0,5729	0,5720	0,5715	0,5721	0,5715	0,5711

Panel B: Dependent Variable – Short Term Bank Loans (Cont.)

The sample consists of 5,051 firm-year observations over the period 1991 through 1999. The following regression is estimated: $D_{i\,t} = \gamma\,\alpha + \gamma\,\beta_{TAX}\,TAX + \gamma\,\beta_Z\,Z_{it} + (1-\gamma)\,D_{i\,t-1} + e_{i\,t}$. $D_{i\,t}$ is the debt level of firm i in year t. α is the constant term. γ is the target adjustment coefficient. TAX are taxation proxies to account the effect of corporate taxes on capital structure (previously defined) and used one of each time. Z_{it} is a vector of predetermined control variables used is past studies of capital structure, such as: collateral, profitability, size, business risk, growth, bankruptcy, nominal interest rate, interest rate spread, inflation rate and financial distress. $D_{i\,t-1}$ is the debt level of firm i in year t – 1. e_{it} is the error term. White heteroskedasticity - consistent standard errors & covariance in parenthesis. Superscript asterisks indicate statistical significance at 0,01(*), 0,05 (**) and 0,10 (***) levels. Two stage least square estimation procedure is used.

Tax Variable	MTREBIT (1)	TAXDUMMY (2)	TLCF (3)	$NDTS_1$ (4)	$NDTS_2$ (5)	KINK (6)
	0,0038	– 0,0475	– 0,1376*	– 0,0258	– 0,0805*	– 0,0003
	(0,0121)	(0,0512)	(0,0286)	(0,0334)	(0,0239)	(0,0004)
Control Variables						
BANK LOANS $_{(t-1)}$	0,8213*	0,8217*	0,8062	0,8207	0,8195*	0,8219*
	(0,0187)	(0,0196)	(0,0194)	(0,0187)	(0,0186)	(0,0186)
COLLATERAL	– 0,0252*	– 0,0253*	– 0,0377*	– 0,0233*	– 0,0209*	– 0,0254*
	(0,0076)	(0,0076)	(0,0084)	(0,0081)	(0,0077)	(0,0077)
PROFITABILITY	– 0,0324***	– 0,0309***	0,0607**	– 0,0260	– 0,0064	– 0,0287***
	(0,0175)	(0,0168)	(0,0249)	(0,0184)	(0,0179)	(0,0171)
SIZE	– 0,0010	– 0,0010	– 0,0000	– 0,0011	– 0,0014	– 0,0010
	(0,0009)	(0,0009)	(0,0009)	(0,0009)	(0,0009)	(0,0009)
BUSINESS RISK	– 0,0606**	– 0,0606**	– 0,0433	– 0,0619**	– 0,0722*	– 0,0613**
	(0,0266)	(0,0264)	(0,0269)	(0,0265)	(0,0271)	(0,0265)
GROWTH	0,0176**	0,0176**	0,0206**	0,0174**	0,0182**	0,0177**
	(0,0085)	(0,0085)	(0,0094)	(0,0085)	(0,0088)	(0,0086)
Z-SCORE	– 0,0033***	– 0,0034***	– 0,0029	– 0,0034***	– 0,0042**	– 0,0033***
	(0,0019)	(0,0019)	(0,0019)	(0,0019)	(0,0018)	(0,0019)
INFLATION	– 0,0101	– 0,0090	– 0,0397	– 0,0126	– 0,0309	– 0,0102
	(0,0518)	(0,0518)	(0,0518)	(0,0518)	(0,0520)	(0,0518)
DISTRESS	0,0162*	0,0631	0,0105*	0,0158*	0,0115*	0,0154*
	(0,0037)	(0,0513)	(0,0035)	(0,0034)	(0,0034)	(0,0034)
Constant	0,0508*	0,0518*	0,0359**	0,0543*	0,0622*	0,0519*
	(0,0171)	(0,0170)	(0,0170)	(0,0173)	(0,0169)	(0,0170)
Target Adjustment Coefficient	0,1787	0,1783	0,1938	0,1793	0,1805	0,1781
Adjusted R-Squared	0,5540	0,5542	0,5603	0,5542	0,5560	0,5540

Tax Variable	MTREBIT (1)	TAXDUMMY (2)	TLCF (3)	$NDTS_1$ (4)	$NDTS_2$ (5)	KINK (6)
	0,0043	– 0,0475	– 0,1387*	– 0,0273	– 0,0811*	– 0,0003
	(0,0121)	(0,0511)	(0,0287)	0,0335)	(0,0238)	(0,0004)
	0,0049	– 0,0689	– 0,1269*	– 0,0187	– 0,0701*	– 0,0003
	(0,0126)	(0,0572)	(0,0300)	(0,0348)	(0,0256)	(0,0004)
Control Variables						
INTEREST	– 0,0132	– 0,0120	– 0,0301	– 0,0144	– 0,0234	– 0,0131
	(0,0260)	(0,0259)	(0,0260)	(0,0260)	(0,0261)	(0,0260)
DIFFINTEREST	0,2159*	0,2119*	0,2370*	0,2162*	0,2278*	0,2161*
	(0,0659)	(0,0656)	(0,0656)	(0,0659)	(0,0659)	(0,0660)
	0,1786	0,1782	0,1937	0,1792	0,1804	0,1780
Target Adjustment Coefficient	0,1621	0,1618	0,1751	0,1623	0,1634	0,1614
Adjusted R-Squared	0,5540	0,5541	0,5604	0,5542	0,5560	0,5540
	0,5561	0,5563	0,5617	0,5561	0,5576	0,5559

Panel C: Dependent Variable – Short and Long Term Bank Loans (Cont.)

The sample consists of 5,051 firm-year observations over the period 1991 through 1999. The following regression is estimated: $D_{i\,t} = \gamma\,\alpha + \gamma\,\beta_{TAX}\,TAX + \gamma\,\beta_Z\,Z_{it} + (1-\gamma)\,D_{i\,t-1} + e_{i\,t}$. $D_{i\,t}$ is the debt level of firm i in year t. α is the constant term. γ is the target adjustment coefficient. TAX are taxation proxies to account the effect of corporate taxes on capital structure (previously defined) and used one of each time. Z_{it} is a vector of predetermined control variables used is past studies of capital structure, such as: collateral, profitability, size, business risk, growth, bankruptcy, nominal interest rate, interest rate spread, inflation rate and financial distress. $D_{i\,t-1}$ is the debt level of firm i in year t – 1. e_{it} is the error term. White heteroskedasticity - consistent standard errors & covariance in parenthesis. Superscript asterisks indicate statistical significance at 0,01(*), 0,05 (**) and 0,10 (***) levels. Two stage least square estimation procedure is used.

Tax Variable	MTREBIT	TAXDUMMY	TLCF	$NDTS_1$	$NDTS_2$	KINK
	(1)	(2)	(3)	(4)	(5)	(6)
	0,0219***	– 0,0719	– 0,1331*	– 0,0818***	– 0,1012*	– 0,0006
	(0,0130)	(0,0582)	(0,0308)	(0,0444)	(0,0254)	(0,0005)
Control Variables						
BANK LOANS $_{(t-1)}$	0,8601*	0,8623*	0,8489*	0,8595*	0,8594*	0,8621*
	(0,0113)	(0,0111)	(0,0118)	(0,0115)	(0,0112)	(0,0112)
COLLATERAL	– 0,0173**	– 0,0184**	– 0,0294*	– 0,0117	– 0,0127	– 0,0186**
	(0,0086)	(0,0086)	(0,0091)	(0,0097)	(0,0088)	(0,0086)
PROFITABILITY	– 0,0588*	– 0,0485**	0,0420	– 0,0333	– 0,0173	– 0,0433**
	(0,0203)	(0,0190)	(0,0280)	(0,0203)	(0,0198)	(0,0194)
SIZE	– 0,0009	– 0,0009	0,0002	– 0,0013	– 0,0014	– 0,0008
	(0,0010)	(0,0010)	(0,0010)	(0,0010)	(0,0010)	(0,0010)
BUSINESS RISK	– 0,0827**	– 0,0873*	– 0,0745**	– 0,0899*	– 0,1030*	– 0,0882*
	(0,0325)	(0,0325)	(0,0327)	(0,0327)	(0,0336)	(0,0327)
GROWTH	0,0345**	0,0348**	0,0377**	0,0340**	0,0355**	0,0350**
	(0,0167)	(0,0167)	(0,0178)	(0,0167)	(0,0171)	(0,0168)
Z-SCORE	– 0,0065*	– 0,0066*	– 0,0064*	– 0,0068*	– 0,0077*	– 0,0065*
	(0,0021)	(0,0021)	(0,0021)	(0,0021)	(0,0021)	(0,0021)
INFLATION	– 0,1206**	– 0,1111***	– 0,1407**	– 0,1236**	– 0,1384**	– 0,1138**
	(0,0567)	(0,0567)	(0,0571)	(0,0567)	(0,0571)	(0,0569)
DISTRESS	0,0188*	0,0879	0,0115*	0,0167*	0,0111*	0,0157*
	(0,0039)	(0,0582)	(0,0037)	(0,0036)	(0,0037)	(0,0037)
Constant	0,0600*	0,0653*	0,0503*	0,0735*	0,0785*	0,0655*
	(0,0178)	(0,0178)	(0,0181)	(0,0182)	(0,0175)	(0,0178)
Target Adjustment Coefficient	0,1399	0,1377	0,1511	0,1405	0,1406	0,1379
Adjusted R-Squared	0,7113	0,7111	0,7136	0,7114	0,7125	0,7110

Tax Variable	MTREBIT	TAXDUMMY	TLCF	$NDTS_1$	$NDTS_2$	KINK
	(1)	(2)	(3)	(4)	(5)	(6)
	0,0299***	– 0,0712	– 0,1349*	– 0,0837***	– 0,1018*	– 0,0006
	(0,0131)	(0,0582)	(0,0309)	(0,0444)	(0,0254)	(0,0005)
	0,0238***	– 0,0939	– 0,1245*	– 0,0742	– 0,0896*	– 0,0005
	(0,0136)	(0,0661)	(0,0321)	(0,0456)	(0,0272)	(0,0005)
Control Variables						
INTEREST	– 0,0700**	– 0,0634**	– 0,0813*	– 0,0707*	– 0,0778*	– 0,0657**
	(0,0281)	(0,0280)	(0,0283)	(0,0281)	(0,0282)	(0,0281)
DIFFINTEREST	0,2464*	0,2362*	0,2631*	0,2464*	0,2566*	0,2426*
	(0,0690)	(0,0684)	(0,0684)	(0,0689)	(0,0688)	(0,0690)
	0,1397	0,1375	0,1510	0,1403	0,1404	0,1376
Target Adjustment Coefficient	0,1292	0,1269	0,1387	0,1395	0,1296	0,1271
Adjusted R-Squared	0,7108	0,7106	0,7132	0,7109	0,7120	0,7105
	0,7158	0,7157	0,7179	0,7158	0,7167	0,7155

Panel D: Dependent Variable – Long Term Bank Loans plus Long Term Trade Creditors (Cont.)

The sample consists of 5,051 firm-year observations over the period 1991 through 1999. The following regression is estimated: $D_{i\,t} = \gamma\,\alpha + \gamma\,\beta_{TAX}\,TAX + \gamma\,\beta_Z\,Z_{it} + (1-\gamma)\,D_{i\,t-1} + e_{i\,t}$. $D_{i\,t}$ is the debt level of firm i in year t. α is the constant term. γ is the target adjustment coefficient. TAX are taxation proxies to account the effect of corporate taxes on capital structure (previously defined) and used one of each time. Z_{it} is a vector of predetermined control variables used is past studies of capital structure, such as: collateral, profitability, size, business risk, growth, bankruptcy, nominal interest rate, interest rate spread, inflation rate and financial distress. $D_{i\,t-1}$ is the debt level of firm i in year t – 1. e_{it} is the error term. White heteroskedasticity - consistent standard errors & covariance in parenthesis. Superscript asterisks indicate statistical significance at 0,01(*), 0,05 (**) and 0,10 (***) levels. Two stage least square estimation procedure is used.

Tax Variable	MTREBIT	TAXDUMMY	TLCF	$NDTS_1$	$NDTS_2$	KINK
	(1)	(2)	(3)	(4)	(5)	(6)
	0,0245**	– 0,0234*	– 0,0216	– 0,0929**	– 0,0269***	– 0,0003
	(0,0110)	(0,0066)	(0,0229)	(0,0364)	(0,0147)	(0,0004)
Control Variables						
BANK LOANS $_{(t-1)}$	0,8145*	0,8167*	0,8143*	0,8136*	0,8157*	0,8163
	(0,0176)	(0,0174)	(0,0177)	(0,0175)	(0,0174)	(0,0174)
COLLATERAL	0,0123	0,0108	0,0092	0,0188**	0,0123	0,0107
	(0,0076)	(0,0076)	(0,0079)	(0,0088)	(0,0077)	(0,0076)
PROFITABILITY	– 0,0316**	– 0,0195	– 0,0046	– 0,0028	– 0,0111	– 0,0175
	(0,0144)	(0,0139)	(0,0232)	(0,0140)	(0,0141)	(0,0141)
SIZE	– 0,0001	0,0000	0,0001	– 0,0005	– 0,0002	– 0,0000
	(0,0007)	(0,0007)	(0,0008)	(0,0008)	(0,0007)	(0,0007)
BUSINESS RISK	– 0,0475**	– 0,0548**	– 0,0525**	– 0,0554**	– 0,0589**	– 0,0549**
	0,0228)	(0,0230)	(0,0229)	(0,0230)	(0,0234)	(0,0230)
GROWTH	0,0203***	0,0206***	0,0211***	0,0196***	0,0208***	0,0207***
	(0,0111)	(0,0112)	(0,0115)	(0,0111)	(0,0114)	(0,0113)
Z-SCORE	– 0,0045*	– 0,0046*	– 0,0045*	– 0,0048*	– 0,0049*	– 0,0046*
	(0,0016)	(0,0016)	(0,0016)	(0,0016)	(0,0016)	(0,0016)
INFLATION	– 0,1384*	– 0,1261*	– 0,1316*	– 0,1423*	– 0,1336*	– 0,1278*
	(0,0441)	(0,0442)	(0,0446)	(0,0440)	(0,0441)	(0,0443)
DISTRESS	0,0052	0,0258*	0,0017	0,0028	0,0011	0,0022
	(0,0033)	(0,0065)	(0,0031)	(0,0031)	(0,0032)	(0,0031)
Constant	0,0222	0,0283**	0,0257***	0,0374*	0,0318**	0,0284**
	(0,0140)	(0,0136)	(0,0139)	(0,0139)	(0,0137)	(0,0136)
Target Adjustment Coefficient	0,1855	0,1833	0,1857	0,1864	0,1843	0,1837
Adjusted R-Squared	0,5674	0,5665	0,5670	0,5677	0,5669	0,5666

Tax Variable	MTREBIT	TAXDUMMY	TLCF	$NDTS_1$	$NDTS_2$	KINK
	(1)	(2)	(3)	(4)	(5)	(6)
	0,0252**	– 0,0226*	– 0,0225	– 0,0936**	– 0,0270***	– 0,0003
	(0,0110)	(0,0067)	(0,0228)	(0,0364)	(0,0147)	(0,0004)
	0,0256**	– 0,0234*	– 0,0168	– 0,0934**	– 0,0233	– 0,0002
	(0,0115)	(0,0087)	(0,0244)	(0,0382)	(0,0154)	(0,0004)
Control Variables						
INTEREST	– 0,0714*	– 0,0637*	– 0,0671*	– 0,0725*	– 0,0677*	– 0,0649*
	(0,0234)	(0,0233)	(0,0236)	(0,0232)	(0,0232)	(0,0234)
DIFFINTEREST	0,0539	0,0447	0,0495	0,0555	0,0503	0,0470
	(0,0558)	(0,0558)	(0,0557)	(0,0556)	(0,0556)	(0,0559)
	0,1857	0,1834	0,1859	0,1865	0,1845	0,1838
Target Adjustment Coefficient	0,1793	0,1772	0,1790	0,1803	0,1783	0,1775
Adjusted R-Squared	0,5666	0,5657	0,5662	0,5669	0,5660	0,5658
	0,5653	0,5644	0,5647	0,5656	0,5647	0,5644

Panel E: Dependent Variable – Short Term Bank Loans plus Short Term Trade Creditors (Cont.)

The sample consists of 5,051 firm-year observations over the period 1991 through 1999. The following regression is estimated: $D_{i\,t} = \gamma\,\alpha + \gamma\,\beta_{TAX}\,TAX + \gamma\,\beta_Z\,Z_{it} + (1-\gamma)\,D_{i\,t-1} + e_{i\,t}$. $D_{i\,t}$ is the debt level of firm i in year t. α is the constant term. γ is the target adjustment coefficient. TAX are taxation proxies to account the effect of corporate taxes on capital structure (previously defined) and used one of each time. Z_{it} is a vector of predetermined control variables used is past studies of capital structure, such as: collateral, profitability, size, business risk, growth, bankruptcy, nominal interest rate, interest rate spread, inflation rate and financial distress. $D_{i\,t-1}$ is the debt level of firm i in year t – 1. e_{it} is the error term. White heteroskedasticity - consistent standard errors & covariance in parenthesis. Superscript asterisks indicate statistical significance at 0,01(*), 0,05 (**) and 0,10 (***) levels. Two stage least square estimation procedure is used.

Tax Variable	MTREBIT (1)	TAXDUMMY (2)	TLCF (3)	$NDTS_1$ (4)	$NDTS_2$ (5)	KINK (6)
	0,0011	– 0,0453	– 0,1428*	– 0,0097	– 0,0789*	– 0,0004
	(0,0125)	(0,0516)	(0,0292)	(0,0351)	(0,0237)	(0,0004)
Control Variables						
BANK LOANS $_{(t-1)}$	0,8229*	0,8229*	0,8063*	0,8227*	0,8212*	0,8231*
	(0,0184)	(0,0184)	(0,0192)	(0,0184)	(0,0185)	(0,0184)
COLLATERAL	– 0,0202**	– 0,0201**	– 0,0328*	– 0,0194**	– 0,0158**	– 0,0202**
	(0,0079)	(0,0079)	(0,0086)	(0,0085)	(0,0080)	(0,0079)
PROFITABILITY	– 0,0304***	– 0,0303***	0,0652**	– 0,0281	– 0,0062	– 0,0273
	(0,0179)	(0,0172)	(0,0257)	(0,0188)	(0,0182)	(0,0175)
SIZE	– 0,0016***	– 0,0016***	– 0,0005	– 0,0017***	– 0,0020**	– 0,0016***
	(0,0009)	(0,0010)	(0,0009)	(0,0009)	(0,0009)	(0,0009)
BUSINESS RISK	– 0,0638**	– 0,0630**	– 0,0450	– 0,0642**	– 0,0742*	– 0,0634**
	(0,0274)	(0,0271)	(0,0275)	(0,0271)	(0,0278)	(0,0271)
GROWTH	0,0238**	0,0238	0,0269**	0,0237**	0,.0243**	0,0239**
	(0,0101)	(0,0100)	(0,0110)	(0,0101)	(0,0103)	(0,0101)
Z-SCORE	– 0,0034***	– 0,0035***	– 0,0030	– 0,0035***	– 0,0043**	– 0,0034***
	(0,0019)	(0,0019)	(0,0019)	(0,0019)	(0,0019)	(0,0019)
INFLATION	– 0,0520	– 0,0521	– 0,0858	– 0,0531	– 0,0739	– 0,0542
	(0,0534)	(0,0534)	(0,0535)	(0,0535)	(0,0538)	(0,0535)
DISTRESS	0,0145*	0,0595	0,0089**	0,0144*	0,0102*	0,0139*
	(0,0038)	(0,0516)	(0,0035)	(0,0035)	(0,0035)	(0,0035)
Constant	0,0628*	0,0631*	0,0468*	0,0640*	0,0733*	0,0632*
	(0,0174)	(0,0173)	(0,0173)	(0,0176)	(0,0173)	(0,0173)
Target Adjustment Coefficient	0,1771	0,1771	0,1937	0,1773	0,1788	0,1769
Adjusted R-Squared	0,5366	0,5368	0,5436	0,5367	0,5386	0,5367

Tax Variable	MTREBIT (1)	TAXDUMMY (2)	TLCF (3)	$NDTS_1$ (4)	$NDTS_2$ (5)	KINK (6)
	0,0018	– 0,0450	– 0,1443*	– 0,0114	– 0,0796*	– 0,0005
	(0,0125)	(0,0515)	(0,0294)	(0,0351)	(0,0237)	(0,0004)
	0,0021	– 0,0658	– 0,1314*	– 0,0071	– 0,0697*	– 0,0004
	(0,0131)	(0,0581)	(0,0305)	(0,0364)	(0,0253)	(0,0004)
Control Variables						
INTEREST	– 0,0202**	– 0,0338	– 0,0536**	– 0,0349	– 0,0453	– 0,0355
	(0,0079)	(0,0269)	(0,0271)	(0,0270)	(0,0271)	(0,0270)
DIFFINTEREST	0,2459*	0,2428*	0,2701*	0,2459*	0,2587*	– 0,2476
	(0,0673)	(0,0672)	(0,0671)	(0,0674)	(0,0675)	(0,0675)
	0,1771	0,1770	0,1937	0,1773	0,1786	0,1768
Target Adjustment Coefficient	0,1602	0,1601	0,1744	0,1602	0,1613	0,1598
Adjusted R-Squared	0,5368	0,5369	0,5437	0,5368	0,5386	0,5368
	0,5392	0,5395	0,5454	0,5392	0,5407	0,5392

Panel F: Dependent Variable – Short and Long Term Bank Loans plus Trade Creditors (Cont.)

The sample consists of 5,051 firm-year observations over the period 1991 through 1999. The following regression is estimated: $D_{i\,t} = \gamma\,\alpha + \gamma\,\beta_{TAX}\,TAX + \gamma\,\beta_Z\,Z_{it} + (1-\gamma)\,D_{i\,t-1} + e_{i\,t}$. $D_{i\,t}$ is the debt level of firm i in year t. α is the constant term. γ is the target adjustment coefficient. TAX are taxation proxies to account the effect of corporate taxes on capital structure (previously defined) and used one of each time. Z_{it} is a vector of predetermined control variables used is past studies of capital structure, such as: collateral, profitability, size, business risk, growth, bankruptcy, nominal interest rate, interest rate spread, inflation rate and financial distress. $D_{i\,t-1}$ is the debt level of firm i in year t – 1. e_{it} is the error term. White heteroskedasticity - consistent standard errors & covariance in parenthesis. Superscript asterisks indicate statistical significance at 0,01(*), 0,05 (**) and 0,10 (***) levels. Two stage least square estimation procedure is used.

Tax Variable	MTREBIT (1)	TAXDUMMY (2)	TLCF (3)	$NDTS_1$ (4)	$NDTS_2$ (5)	KINK (6)
	0,0175	– 0,0701	– 0,1322*	– 0,0724	– 0,0969*	– 0,0007
	(0,0134)	(0,0585)	(0,0320)	(0,0467)	(0,0260)	(0,0005)
Control Variables						
BANK LOANS $_{(t-1)}$	0,8657*	0,8674*	0,8539*	0,8653*	0,8650*	0,8672*
	(0,0115)	(0,0113)	(0,0119)	(0,0115)	(0,0113)	(0,0113)
COLLATERAL	– 0,0097	– 0,0106	– 0,0212**	– 0,0724	– 0,0051	– 0,0108
	(0,0089)	(0,0090)	(0,0094)	(0,0467)	(0,0092)	(0,0090)
PROFITABILITY	– 0,0633*	– 0,0552*	0,0351	– 0,0046	– 0,0253	– 0,0507**
	(0,0211)	(0,0199)	(0,0295)	(0,0101)	(0,0208)	(0,0203)
SIZE	– 0,0021**	– 0,0020**	– 0,0009	– 0,0417***	– 0,0025**	– 0,0020**
	(00010)	(0,0010)	(0,0010)	(0,0214)	(0,0010)	(0,0010)
BUSINESS RISK	– 0,0886*	– 0,0919*	– 0,0793**	– 0,0024**	– 0,1068*	– 0,0926*
	(0,0334)	(0,0335)	(0,0336)	(0,0010)	(0,0345)	(0,0336)
GROWTH	0,0446**	0,0447**	0,0476**	– 0,0942*	0,0454**	0,0449**
	(0,0196)	(0,0197)	(0,0208)	(0,0336)	(0,0201)	(0,0198)
Z-SCORE	– 0,0063*	– 0,0064*	– 0,0062*	0,0440**	– 0,0075*	– 0,0063*
	(0,0022)	(0,0022)	(0,0022)	(0,0196)	(0,0022)	(0,0022)
INFLATION	– 0,1910*	– 0,1833*	– 0,2153*	– 0,0066*	– 0,2100*	– 0,1864*
	(0,0589)	(0,0588)	(0,0594)	(0,0022)	(0,0594)	(0,0591)
DISTRESS	0,0169*	0,0846	0,0101*	– 0,1947*	0,0098*	0,0142*
	(0,0040)	(0,0585)	(0,0038)	(0,0590)	(0,0038)	(0,0038)
Constant	0,0805*	0,0847*	0,0701*	0,0151*	0,0973*	0,0849*
	(0,0184)	(0,0183)	(0,0187)	(0,0038)	(0,0180)	(0,0184)
Target Adjustment Coefficient	0,1343	0,1326	0,1461	0,1347	0,1350	0,1328
Adjusted R-Squared	0,7008	0,7001	0,7028	0,7003	0,7014	0,7000

Tax Variable	MTREBIT (1)	TAXDUMMY (2)	TLCF (3)	$NDTS_1$ (4)	$NDTS_2$ (5)	KINK (6)
	0,0188	– 0,0689	– 0,1345*	– 0,0746	– 0,0975*	– 0,0007
	(0,0134)	(0,0586)	(0,0322)	(0,0467)	(0,0260)	(0,0005)
	0,0209	– 0,0906	– 0,1205*	– 0,0736	– 0,0845	– 0,0005
	(0,0140)	(0,0668)	(0,0331)	(0,0478)	(0,0278)	(0,0005)
Control Variables						
INTEREST	– 0,1046*	– 0,0990*	– 0,1183*	– 0,1058*	– 0,1131*	– 0,1015*
	(0,0292)	(0,0290)	(0,0294)	(0,0292)	(0,0294)	(0,0292)
DIFFINTEREST	0,2974*	0,2877*	0,3160*	0,2983*	0,3076*	0,2942*
	(0,0705)	(0,0699)	(0,0699)	(0,0705)	(0,0704)	(0,0704)
	0,1344	0,1325	0,1462	0,1347	0,1350	0,1327
Target Adjustment Coefficient	0,1253	0,1233	0,1348	0,1255	0,1256	0,1235
Adjusted R-Squared	0,7003	0,7002	0,7029	0,7004	0,7015	0,7001
	0,7062	0,7061	0,7083	0,7062	0,7070	0,7059

Table 12: 1st Quartile – Small firms
Panel A: Instrumental Variables (IV) Regressions

The sample consists of 232 firms and 1138 firm-year observations over the period 1991 through 1999. The following regression is estimated: $D_{i\,t} = \gamma\,\alpha + \gamma\,\beta_{TAX}\,TAX + \gamma\,\beta_Z\,Z_{it} + (1-\gamma)\,D_{i\,t-1} + e_{i\,t}$. $D_{i\,t}$ is the debt level of firm i in year t. α is the constant term. γ is the target adjustment coefficient. TAX are taxation proxies to account the effect of corporate taxes on capital structure (previously defined) and used one of each time. Z_{it} is a vector of predetermined control variables used is past studies of capital structure, such as: collateral, profitability, size, business risk, growth, bankruptcy, nominal interest rate, interest rate spread, inflation rate and financial distress. $D_{i\,t-1}$ is the debt level of firm i in year t – 1. e_{it} is the error term. Control variables coefficients are not reported. White heteroskedasticity - consistent standard errors & covariance in parenthesis. Superscript asterisks indicate statistical significance at 0,01(*), 0,05 (**) and 0,10 (***) levels. Two stage least square estimation procedure is used.

	MTREBIT (1)	TAXDUMMY (2)	TLCF (3)	$NDTS_1$ (4)	$NDTS_2$ (5)	KINK (6)
LONGBANKLOANS	0,0152	---	– 0,0882*	– 0,0052	– 0,0542**	0,0003
	(0,0177)		(0,0263)	(0,0627)	(0,0253)	(0,0007)
Target Adjustment Coefficient	0,2329	---	0,2473	0,2327	0,2362	0,2323
Adjusted R-Squared	0,4466	---	0,4526	0,4462	0,4483	0,4462
SHORTBANKLOANS	– 0,0074	---	– 0,0642	0,0135	– 0,0014	– 0,0021**
	(0,0236)		(0,0444)	(0,0595)	(0,0345)	(0,0008)
Target Adjustment Coefficient	0,2210	---	0,2325	0,2223	0,2229	0,2242
Adjusted R-Squared	0,4790	---	0,4825	0,4790	0,4791	0,4813
BANKLOANS	0,0051	---	– 0,1186**	0,0338	– 0,0366	– 0,0017
	(0,0235)		(0,0487)	(0,0720)	(0,0356)	(0,0010)
Target Adjustment Coefficient	0,1670	---	0,1843	0,1657	0,1688	0,1681
Adjusted R-Squared	0,6460	---	0,6502	0,6459	0,6464	0,6468
LONGDEBT	0,0124	---	– 0,0724**	– 0,0369	– 0,0404	0,0003
	(0,0199)		(0,0352)	(0,0695)	(0,0339)	(0,0007)
Target Adjustment Coefficient	0,2301	---	0,2421	0,2305	0,2325	0,2295
Adjusted R-Squared	0,4159	---	0,4206	0,4160	0,4170	0,4156
SHORTDEBT	– 0,0208	----	– 0,0805***	0,0466	– 0,0021	– 0,0025*
	(0,0242)		(0,0470)	(0,0641)	(0,0349)	(0,0009)
Target Adjustment Coefficient	0,2235	---	0,2373	0,2243	0,2254	0,2275
Adjusted R-Squared	0,4575	---	0,4619	0,4575	0,4575	0,4605
DEBT	– 0,0107	---	– 0,1074**	0,0354	– 0,0188	– 0,0020**
	(0,0246)		(0,0490)	(0,0805)	(0,0377)	(0,0010)
Target Adjustment Coefficient	0,1523	---	0,1687	0,1523	0,1549	0,1547
Adjusted R-Squared	0,6250	---	0,6289	0,6250	0,6253	0,6262

Panel B: Summary Statistics for Debt Levels

Variable	Mean	Median	Std Deviation	Min	Max
LONGBANKLOANS	0,0430	0,0000	0,0811	0,0000	0,4464
SHORTBANKLOANS	0,0812	0,0437	0,0983	0,0000	0,5090
BANKLOANS	0,1242	0,0962	0,1273	0,0000	0,5870
LONGDEBT	0,0492	0,0000	0,0860	0,0000	0,4464
SHORTDEBT	0,0911	0,0582	0,1020	0,0000	0,6138
DEBT	0,1403	0,1127	0,1355	0,0000	0,6385

Panel C: Percentage of Zero and Non Zero Dependent Variables

Variable	Percentage of Non Zero Obs.	Percentage of Zero Obs.
LONGBANKLOANS	35,32	64,68
SHORTBANKLOANS	64,14	35,86
BANKLOANS	71,44	28,56
LONGDEBT	39,54	60,46
SHORTDEBT	73,46	26,54
DEBT	79,35	20,65

Table 13: 4th Quartile – Large firms

Panel A: Instrumental Variables (IV) Regressions

The sample consists of 232 firms and 1431 firm-year observations over the period 1991 through 1999. The following regression is estimated: $D_{i\,t} = \gamma\,\alpha + \gamma\,\beta_{TAX}\,TAX + \gamma\,\beta_Z\,Z_{it} + (1-\gamma)\,D_{i\,t-1} + e_{i\,t}$. $D_{i\,t}$ is the debt level of firm i in year t. α is the constant term. γ is the target adjustment coefficient. TAX are taxation proxies to account the effect of corporate taxes on capital structure (previously defined) and used one of each time. Z_{it} is a vector of predetermined control variables used is past studies of capital structure, such as: collateral, profitability, size, business risk, growth, bankruptcy, nominal interest rate, interest rate spread, inflation rate and financial distress. $D_{i\,t-1}$ is the debt level of firm i in year t – 1. e_{it} is the error term. Control variables coefficients are not reported. White heteroskedasticity - consistent standard errors & covariance in parenthesis. Superscript asterisks indicate statistical significance at 0,01(*), 0,05 (**) and 0,10 (***) levels. Two stage least square estimation procedure is used.

	MTREBIT (1)	TAXDUMMY (2)	TLCF (3)	$NDTS_1$ (4)	$NDTS_2$ (5)	KINK (6)
LONGBANKLOANS	0,0549*	– 0,0470*	0,0118	– 0,0917	– 0,0274	0,0000
	(0,0195)	(0,0094)	(0,0486)	(0,0724)	(0,0250)	(0,0007)
Target Adjustment Coefficient	0,1730	0,1715	0,1719	0,1749	0,1726	0,1727
Adjusted R-Squared	0,6124	0,6099	0,6098	0,6106	0,6101	0,6098
SHORTBANKLOANS	– 0,0252	– 0,2653*	– 0,1420*	– 0,0785	– 0,1448*	0,0002
	(0,0258)	(0,0126)	(0,0515)	(0,0843)	(0,0359)	(0,0007)
Target Adjustment Coefficient	0,2113	0,2136	0,2307	0,7839	0,2131	0,2142
Adjusted R-Squared	0,5406	0,5443	0,5470	0,5412	0,5467	0,5406
BANKLOANS	0,0209	– 0,3255*	– 0,0997***	– 0,1467	– 0,1721*	0,0001
	(0,0270)	(0,0121)	(0,0549)	(0,1051)	(0,0409)	(0,0009)
Target Adjustment Coefficient	0,1544	0,1503	0,1612	0,1566	0,1526	0,1534
Adjusted R-Squared	0,7063	0,7089	0,7075	0,7068	0,7106	0,7061
LONGDEBT	0,0577*	– 0,0472*	0,0057	– 0,0852	– 0,0302	0,0001
	(0,0194)	(0,0093)	(0,0487)	(0,0728)	(0,0250)	(0,0007)
Target Adjustment Coefficient	0,1644	0,1629	0,1637	0,1664	0,1640	0,1641
Adjusted R-Squared	0,6178	0,6150	0,6149	0,6156	0,6153	0,6150
SHORTDEBT	– 0,0273	– 0,2684*	– 0,1401*	– 0,0921	– 0,1473	0,0000
	(0,0257)	(0,0125)	(0,0520)	(0,0856)	(0,0349)	(0,007)
Target Adjustment Coefficient	0,2103	0,2131	0,2303	0,2154	0,2119	0,2134
Adjusted R-Squared	0,5331	0,5369	0,5394	0,5339	0,5392	0,5331
DEBT	0,0202	– 0,3304*	– 0,0986***	– 0,1530	– 0,1778*	0,0000
	(0,0269)	(0,0121)	(0,0542)	(0,1056)	(0,0392)	(0,0009)
Target Adjustment Coefficient	0,1440	0,1401	0,1507	0,1462	0,1421	0,1430
Adjusted R-Squared	0,7108	0,7134	0,7119	0,7113	0,7152	0,7106

Panel B: Summary Statistics for Debt Levels

Variable	Mean	Median	Std Deviation	Min	Max
LONGBANKLOANS	0,0663	0,0165	0,1010	0,0000	0,5625
SHORTBANKLOANS	0,1030	0,0685	0,1133	0,0000	0,6891
BANKLOANS	0,1693	0,1350	0,1576	0,0000	0,7037
LONGDEBT	0,0680	0,0197	0,1021	0,0000	0,5625
SHORTDEBT	0,1119	0,0785	0,1142	0,0000	0,6902
DEBT	0,1799	0,1465	0,1597	0,0000	0,7298

Panel C: Percentage of Zero and Non Zero Dependent Variables

Variable	Percentage of Non Zero Obs.	Percentage of Zero Obs.
LONGBANKLOANS	58,63	41,37
SHORTBANKLOANS	82,46	17,54
BANKLOANS	85,05	14,95
LONGDEBT	60,59	39,41
SHORTDEBT	94,55	5,45
DEBT	95,39	4,61

Table: 14: Cross Correlations

Panel A: Small Firms (156 observations)

	LONGBANKLOANS	*SHORTBANKLOANS*	*CREDITORS*[(1)]
KINK	0,1016	0,0875	– 0,1275

(1) Short-Term Trade Creditors.

Panel B: Large Firms (212 observations)

	LONGBANKLOANS	*SHORTBANKLOANS*	*CREDITORS*
KINK	– 0,0256	0,1292	0,07458

Table 15: Pecking Order Test: Simple and Disaggregating the Flow of Funds Deficit Test

The sample period is 1991-99. The following regressions are estimated: $\Delta D_{it} = \alpha + \beta_{PO} DEF_{it} + e_{it}$ (Panel A) and $\Delta D_{it} = \beta_X X_t + \beta_W \Delta W_t + \beta_R R_t - \beta_C C_t + e_{it}$ (Panel B). ΔD_{it} is the first difference of long-term bank loans. DEF_t is the sum of capital expenditures, change in working capital, current portion of long-term debt at start of period, minus operating cash flows after interest and taxes. All the variables are scaled by total assets. Under records "All" means that all the variables are included, "First" and "Fourth" means that only firms of the first/fourth quartile are included, respectively and "Restricted" means that only no zero firm-years observations are included. White heteroskedasticity - consistent standard errors & covariance in parenthesis. Superscript asterisks indicate statistical significance at 0,01(*), 0,05 (**) and 0,10 (***) levels.

PANEL A

	1	2	3	4
Constant	0,0031*	0,0011	0,0048*	0,0049*
	(0,0010)	(0,0018)	(0,0018)	(0,0019)
Flow of Funds Deficit	0,0026	0,0305**	– 0,0255***	0,0100
	(0,0034)	(0,0131)	(0,0139)	(0,0161)
Records	All	First	Fourth	Restricted
Number of Observations	5980	1370	1665	3477

PANEL B

	1	2	3	4
Constant	0,0031*	0,0011	0,0038***	0,0052*
	(0,0011)	(0,0020)	(0,0021)	(0,0019)
Capital Expenditures	0,0000	– 0,0014	– 0,0004	0,0005
	(0,0003)	(0,0014)	(0,0012)	(0,0011)
Working Capital Change	– 0,0002	– 0,0017***	0,0005	– 0,0010
	(0,0004)	(0,0009)	(0,0019)	(0,0014)
Current Portion of Debt	0,0003	– 0,0026	– 0,0014	0,0009
	(0,0009)	(0,0043)	(0,0032)	(0,0014)
Cash Flows	0,0014	0,0111	0,0010	0,0029
	(0,0083)	(0,0136)	(0,0150)	(0,0140)
Records	All	First	Fourth	Restricted
Number of Observations	5980	1370	1665	3477

Table 16: Pecking Order Hypothesis and Taxation with IV Regressions

The sample consists of 5,051 firm-year observations over the period 1991 through 1999. The following regression is estimated: $d_{i\,t} = \alpha + \beta_{PO}\, DEF_{it} + \beta_{TAX}\, TAX_{i\,t} + \beta_Z\, Z_{it} + \beta_d\, d_{i\,t-1} + e_{i\,t}$. α is the constant term. $d_{i\,t}$ is the long-term bank loans level of firm i in year t. DEF_t is the sum of capital expenditures, change in working capital, current portion of long-term debt at start of period, minus operating cash flows after interest and taxes. TAX are taxation proxies to account the effect of corporate taxes on capital structure (previously defined) and used one of each time. Z_{it} is a vector of predetermined control variables used is past studies of capital structure, such as: collateral, profitability, size, business risk, growth, bankruptcy, nominal interest rate, interest rate spread, inflation rate and financial distress. $d_{i\,t-1}$ of firm i in year t – 1. e_{it} is the error term. The coefficients on the control variables are not reported. White heteroskedasticity - consistent standard errors & covariance in parenthesis. Superscript asterisks indicate statistical significance at 0,01(*), 0,05 (**) and 0,10 (***) levels. Two stage least square estimation procedure is used.

	MTREBIT	DUMMY	TLCF	$NDTS_1$	$NDTS_2$	KINK
	0,0245**	– 0,0238*	– 0,0205	– 0,0800**	– 0,0270**	– 0,0004
	(0,0109)	(0,0070)	(0,0239)	(0,0362)	(0,0148)	(0,0004)
DEF	0,0083	0,0103	0,0089	0,0069	0,0090	0,0103
	(0,0097)	(0,0069)	(0,0102)	(0,0098)	(0,0098)	(0,0095)
Adjusted R-Squared	0,5749	0,5742	0,5745	0,5749	0,5744	0,5742