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# When are Preferred Shares Preferred? Theory and Empirical Evidence

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**Theory And Empirical Evidence**


## Abstract

This paper demonstrates that preferred stock may arise as an optimal security in a tax-induced equilibrium. This result is driven by graduated tax schedules and by uncertainty. In a more general sense, our results can be interpreted as a template for including any security with a different tax treatment in a firm's capital structure. The first part of the paper demonstrates that the Miller (1977) equilibrium framework can accommodate more than two securities if different investor classes are taxed differently on each security and the tax schedule for each investor group is upward sloping. We then simplify the tax schedule, but introduce uncertainty, which implies the possibility of bankruptcy and the possible loss of tax shelters. The interaction of tax rates and seniority now affects the contribution of each security to after-tax firm value, as in some states the firm may not be able to pay either interest (or dividends) or even principal to its various claimholders. It is shown why and how these features, i.e. the various tax rates and seniority, determine the financing equilibrium, which is obtained by equating the expected marginal tax benefit of all securities. We demonstrate that non- profitable firms will tend to issue preferred shares whereas profitable firms will not find preferred stock advantageous in our framework. Comparative statics with respect to various tax rates are derived as well. These predictions are tested using a large sample of firms for the last twenty-five years. The empirical testing broadly confirms the theoretical predictions.

## 1. INTRODUCTION AND LITERATURE REVIEW.

In this paper we show how the interaction of corporate taxes, personal taxes, tax shelters and bankruptcy affects the choice among equity, debt and preferred shares as instruments of financing. Specifically, we relate tax rates and profitability to the choice of preferred stock as part of the financing mix. In the second part of the paper we test our propositions and find results that are consistent with our theoretical model. In a more general sense, our results can be interpreted as a template for including any security with a different tax treatment in a firm's capital structure.

Preferred stock has been used as means of financing for a long time, yet the existing literature provides few convincing explanations for issuing this security by non-regulated firms. Preferred stock resembles debt in that it promises pre-determined levels of dividends. However, unlike interest on debt, preferred dividends are not tax-deductible to the issuing firms. On the other hand, omission of dividends will not result in bankruptcy. Empirical studies (see for example Masulis (1983)) show that when a firm repurchases equity and increases the proportion of preferred shares in the capital structure, the stock price impact is similar but of a lower magnitude than that resulting from retiring equity so as to increase debt. In other words, preferred stock seems to be viewed as a partial substitute for debt.

The traditional literature suggests two motives for issuing preferred stock by utilities (see, e.g., Brealey and Myers (2000), Copeland and Weston (1988)). First, preferred stock is considered equity by the regulators, but provides a pattern of payments similar to that of debt. It is therefore advantageous for utilities to issue preferreds instead of debt, thus meeting regulators' equity constraints. Secondly, utilities can pass their costs on to consumers and hence are less affected by the tax disadvantages of preferreds.

A large percentage of preferred issues, however, are issued by industrial firms. These issues also tend to be larger (See our table 3 and Houston and Houston (1990)). A traditional rationale for issuing preferred stock by non-regulated firms is clientele effects. Seventy percent of dividends received by corporations (85 percent according to the former U.S. tax law) are tax-exempt. Thus corporations will be better off receiving dividends of preferred stock rather than interest on debt or capital gains. Linn and Pinegar (1988) find that issuance of preferred stock by frequent issuers, such as utilities was anticipated by the market and hence provided no new information; issuance by financials provided tax benefits; and issuance by industrials conveyed new, and negative, information regarding the firm's prospects.

Since 1993 some firms (in particular, Enron and Texaco) have been issuing a new type of preferred stock: "Structured Preferred Stock" (also referred to as monthly income preferred stock, MIPS). Firms that issue MIPS create subsidiaries that raise money via preferred shares. That money is then loaned to the original company. The latter pays interest to the subsidiary. The subsidiary in turn passes

the cash through to investors as preferred dividends (see Irvine and Rosenfeld, 2000). MIPS are treated as preferred stock for financial statements and as debt for tax purposes. Practitioners attribute the popularity of this instrument to the fact that it lowers the debt-equity ratio, providing the issuer with better credit ratings with some credit rating agencies (see Engle, Erickson, and Maydew, 1999). However, ever since its inception, the favorable tax treatment of this hybrid has been called into question by the government and the IRS. In the aftermath of the Enron bankruptcy in 2002 it seems MIPS may indeed be on the way out[1].

Most of the earlier papers discussing preferred stock have been fairly descriptive in nature, and usually ignored taxation issues altogether. They include Fisher and Wilt (1968), Bildersee (1973), and Winger, Chen, Martin, Petty and Hayden (1986). Some elegant theoretical models include the option-pricing framework developed by Emmanuel (1983), and papers by Titman (1984), and Heinkel and Zechner(1990). Emmanuel (1983) points out that a key feature of preferred stock, from the common equity-holders' point of view, is its dividend flexibility. That is, the preferred stock dividend can be omitted by the firm without penalty, as opposed to omission of interest payment on debt. Similarly, Titman (1984), suggests that preferred stock can be used to eliminate stockholders' incentive to liquidate in sub-optimal states of nature without causing bankruptcy and in that sense can be an optimal security. Heinkel and Zechner (1990) present an informational equilibrium with preferred stock. They show that preferred stock enhances the firm's debt capacity, because it creates additional incentives to invest. In their model, debt creates incentives for under-investment (similar to Myers (1977)) whereas equity creates incentives for over-investment. In a world without taxes both effects may cancel out, creating an equilibrium in which the first best investment policy is pursued. If taxes are introduced, then too much debt will be issued, creating wrong incentives. Preferred stock, which allows for dividend omission when a good investment opportunity occurs, will eliminate these incentives, restoring optimality. Hence, in Heinkel and Zechner (1990) firms with "moderate growth opportunities" are most likely to issue preferred stock. Heinkel and Zechner (1990) also show that debt and preferred shares are complements-in order to create the proper incentives, an increase in preferred stock must be accompanied by an increase in debt.

Two contributions (Fooladi and Roberts (1986) and Trigeorgis (1988)) discuss some extensions of Miller's (1977) framework to include preferred stock. The two papers provide useful empirical insights which relate preferred stock and taxes: Fooladi and Roberts show that in Canada, where preferred stock income enjoyed a more favorable tax treatment (by virtue of dividend tax incentives) during the time

[1] A nice description of the history of MIPS in the context of the Enron bankruptcy can be found in the Wall Street

period they discuss, preferreds' proportion in the financing mix is four times higher than in the U.S. Trigeorgis considers a sample of utilities, and shows that tax rates and dividend payments are statistically related to the weight of preferred stock in the capital structure. More recently, Hovakimian, Opler and Titman (2001) consider firms, which issued securities to raise external capital. They find that issuers of preferred stock tend to be highly leveraged. They also find that, unlike issuers of common equity and convertible debt, preferred stock issuers had low or negative returns two years prior to issuing preferreds.

Finally, there are two papers, which provide additional empirical support for the tax hypothesis that we develop in the current study. The first study (Houston and Houston (1990)) sought to identify issuing firms and firms which purchased preferred stock. Most issuing firms in their sample had a lower effective tax rate than industry and market averages. Corporations purchasing preferreds, on the other hand, had a significantly higher tax rate than industry averages. In a latter paper (Ely et al., 2002), the authors find a significant negative correlation between a tax variable and the probability of issuing preferreds. Hovakimian et al. (2001) find a negative relationship between profitability and the probability of issuing preferred. This study will be discussed later.

The purpose of this paper is to provide an integrative and more robust tax-based model, which can explain the inclusion of preferred stock in the financing mix. This latter phenomenon is explained in two ways. First, if a graduated tax system is assumed, then Miller's (1977) model can be extended to include preferred stock as well. Second, if we introduce uncertainty, then the resulting possibility of bankruptcy and loss of tax shelters (even without the assumption of graduated tax schedules) may establish preferred stock as part of the optimal financing mix. Our theory implies that less profitable firms will tend to use preferred stock in their financial mix. We also provide some insights concerning the effect of taxation on the simultaneous choice of debt and preferred stock. We test our conjectures on a recent sample of firms over a twenty-five year period, relating the percentage of preferred shares to profitability, to the tax rates, to the firm's leverage, and to several control variables. We also consider preferred stock issues. The results support the views expressed in the theory part of the study.

The paper is organized as follows. The next section offers a discussion of the differences between the three types of securities: equity, debt and preferred stock. The advantages and disadvantages to the issuers and buyers of each type of security as functions of their tax status are addressed. In Section 3, we discuss direct extensions of Miller's model, assuming a graduated tax schedule and no bankruptcy. The existence of equilibrium with positive amounts of each security is demonstrated. In Section 4 the case where the firm may not be able to meet its full contractual obligations is considered. Here we

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Journal (see Mckinnon and Hitt , 2002).

assume the same tax rates on each security for all investors, however, we allow for different tax rates across securities. Section 5 contains the empirical analysis. Section 6 concludes.

## 2. ON DIFFERENCES OF TAXATION AND SENIORITY BETWEEN SECURITIES.

Most income to preferred shareholders is in the form of dividends, whereas common stockholders obtain a large percentage of their income in the form of capital gains. Prior to the enactment of the 1986 tax law, there was a clear differentiation between the taxation of capital gains on the one hand, and preferred income (dividends) and interest income on the other hand. For a while, the statutory rates were closer, but in the 90's, while the top personal rate kept going up, the long-term capital gains rate remained at 20%. Furthermore, one can defer capital gains, but not interest or dividend income. Most recently, the tax reform of 2003 lowered the tax rate on dividends, which again changes the relative tax status of preferred shares and common shares[2]. Another important issue is corporate tax deductibility. U.S. corporations are allowed to deduct 70% (85% according to the pre-1986 law) of the dividends they receive from other corporations for tax purposes. This differentiation leads again, to different effective taxation on preferred and common stock for different tax clienteles. Individuals may observe lower effective tax rates on total equity income, whereas for corporations, effective tax payments on total preferred income may be lower.

There is also a difference in the tax effects of each type of financing for the issuer of the securities. Dividend payments are not deductible, whereas interest payments are (MIPS, discussed earlier, are an interesting hybrid, but for analytical purposes they can be viewed as debt for one corporation and preferred stock for another). The tax advantage of debt to the issuer, however, depends upon its tax status. This advantage will be more important for a profitable firm than for a non-profitable firm.

In addition to the different tax treatment, there are differences in the seniority structure of claims that separate the three types of securities. Bondholders must receive their income first. Next come preferred shareholders, and finally equity holders, who are the residual claimants.

As we shall demonstrate, such tax and seniority differentials may lead to equilibria, which include debt, equity, and preferred stock.

[2] Our model is flexible enough to include any specification, however, since all our data precedes the 2003 tax reform, its provisions of course do not yet hold.

## 3. THE CASE OF NO BANKRUPTCY.

In this section, the Miller (1977) model is extended to include preferred stock.[3] Like Miller, we assume no bankruptcy. The only reason for the potential existence of any security in equilibrium is thus the differential statutory marginal tax rates of investors, and the marginal corporate tax rates of the issuers of securities. To simplify the presentation, we assume a risk-neutral, one period framework. Consider a firm that consists of a project requiring an investment of I. It is financed in general by an amount D of debt, S of equity and P of preferred stock, where I = P+S+D. Similar to Miller, investors are in different tax brackets. Also, the same investor may face different tax rates on the income from different securities. Denote the tax rate of investors in preferred stock by $t_p$, the tax rate of investors in common stock by $t_g$, and the tax rate on interest income as $t_b$[4]. Given a corporate tax rate of $t_c$, the after tax cash flows to the firm's claimants are as follows:

| | | |
|---|---|---|
| To bond holders | $D + DR(1 - t_b)$ | (3.1) |
| To preferred shareholders | $P + PR_p(1 - t_p)$ | (3.2) |
| To common shareholders | $\{[(X - I - RD)(1 - t_c) + I - P - D - PR_p] - S\}(1 - t_g) + S$ | (3.3) |

R and $R_p$ denote the promised rates of return on debt and preferred stocks, respectively. The depreciation allowance is exogenous to the model and equal to the entire investment, I[5]. X denotes the cash flows resulting from the project. We assume that all cash flows available in Period 1 are treated as taxable income by the tax authorities. By assumption X is large enough so that all security holders pay taxes. The value of a firm financed by common stock, preferred stock and equity is given by[6]

$$V_L = V_U + \frac{\{RD[(1 - t_b) - (1 - t_c)(1 - t_g)] + PR_p(t_g - t_p)\}}{1 + R} \tag{3.4}$$

[3] In addition to extending and generalizing studies such as Fooladi and Roberts (1986) and Trigeorgis (1988), the analysis is constructive as a preliminary step towards the uncertainty model in the ensuing section.

[4] In principle, each tax rate on a given security must be indexed also by investor type i. However, again following Miller, we shall abstract from this notation for now. Later we introduce the required indices.

[5] This is of course consistent with a one period model (see for example, Dotan and Ravid (1985) for similar modeling). We can easily assume that only a fraction of the investment is depreciated. The results will not change.

[6] Note that for an unlevered firm I=S, whereas for the levered firm, per definition, I = S+D+P.

$V_u$ is the value of the un-levered firm. The second term, $RD\left[\left(1 - t_b\right) - \left(1 - t_c\right)\left(1 - t_g\right)\right]$, is the one period gain from using debt (as in Miller (1977)), whereas the last term, $PR_p\left(t_g - t_p\right)$, represents the one period gain from using preferred stock.[7]

The linearity of the value function (3.1) implies that if there is no graduated tax schedule across individuals and the rates $t_p, t_g, t_b$, and $t_c$ are the same for all investors, a corner solution will usually emerge. Securities with lower tax rates will prevail and others will be eliminated.

Under a graduated tax system however, strict clienteles may form, where each investor group will hold the combination of debt and non-debt security, which it finds optimal. This will occur under the following assumption (Assumption A): Suppose investors can be grouped into two groups I and J. For investors in group I, equity is taxed less than preferred stock, i.e. $t_{p_i} > t_{g_i}$ for each investor i in this group. For investors in group J, the opposite holds true, i.e. $t_{p_j} < t_{g_j}$ for each investor j in this group. Investors in class I can be for example, individuals under the pre-2003 tax code. Investors in class J can be considered as firms for whom taxes on preferred stock are lower than taxes on interest.

Proposition 3.1 states conditions under which only two securities will survive, and conditions that will allow for the three types of securities to be held in equilibrium.

**Proposition 3.1**

a) If for all investors, i, $t_{p_i} > t_{g_i}$ only equity and debt will be issued in equilibrium. If $t_{p_i} < t_{g_i}$ only preferreds and debt will be held.

b) Under Assumption A, equilibrium clienteles form as follows: Low (interest) tax bracket investors (to be precisely defined below) from both groups will invest in debt. High tax bracket investors in group I will invest in equity whereas high tax bracket investors in group J will invest in preferred shares. Two marginal investors i* and j* will emerge for whom $t_{g_i^*} = t_{P_j^*} = t_b$.

Proof: The first part of the proposition is essentially a re-statement of Miller's equilibrium, except that one additional security is available. Specifically, assume that the tax rate on preferred dividend is higher

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[7] Similar to Miller and his followers, we assume no tax-arbitrage via short-sales of any security. Also note that in a risk neutral framework where everybody gets paid all rates of return are essentially equal to the risk free rate. We could either allow for risk aversion or else write R everywhere, but since in later sections the distinction between the various rates of return becomes important, we preferred to keep the presentation consistent and retain the present notation.

for all investors than the tax rate on common shares income. Following Miller, we can now normalize the tax rate on common stock income to zero. If we assume a graduated tax rate schedule for interest income, then the Miller equilibrium can be re-derived. Given the option of tax-free equity and a tax advantage to debt on the corporate level, no investor will buy preferreds, which are assumed to be taxed higher on the personal level without any offsetting corporate tax benefit.

The above argument can be reversed to demonstrate that if equity is taxed higher it will not be included in the financing mix (or perhaps one controlling share will remain, the same way that the Modigliani-Miller model predicts 100% debt). This demonstrates the first part of the proposition.

We now turn to the second part. Suppose that for some investors in group I the normalized tax rate on equity income is zero, the tax rate on preferred dividend is positive, and a graduated tax schedule exists for interest income. Then these investors whose tax rate is lower than the corporate tax rate will invest in debt, whereas investors in this group who are at a higher tax bracket than the corporate tax rate will invest in equity. Nobody will buy preferred stock, which is taxed higher than equity and offers no tax advantage to the issuer. Similarly, suppose that for the other group, J, the normalized tax rate on preferred dividend is zero, whereas the constant tax rate on equity is positive. The members of this group who are in a tax bracket below the corporate tax rate will invest in debt, whereas the ones in a higher tax bracket will invest in preferreds.

The "marginal investors" from groups I and J will feature equal tax rates which, in the normalized case developed in the proof, will also be equal to the corporate rate, as stated in the proposition. Note however that these two marginal investors will be taxed differently on both equity and preferreds.

If the base tax rate in the lower tax security is non-zero a similar analysis will apply, except that the tax rate of the marginal investor will differ from the corporate tax rate[8].

QED.

Proposition 3.1 shows that in equilibrium, groups of investors with different tax rates will gravitate towards the instrument which provides this group with a superior tax treatment. In a graduated enough tax system, as per Assumption A, there will be a clientele for each type of security. In the following section, we show that uncertainty about future income, which may lead to the loss of tax shelters, allows firms to influence the expected tax rate of the marginal investors. This, in a way, creates differential effective tax rates to different groups of investors, and hence in equilibrium, each firm may issue positive amounts of debt, preferred shares and equity.

[8] Note that the description above is as general as the Miller model. Even in Miller's model, if tax schedules are completely independent of each other, then many equilibria are possible, and the well known results may not hold.

## 4. OPTIMAL LEVELS OF STOCK, PREFERRED STOCK AND DEBT WHEN BANKRUPTCY IS POSSIBLE.

In the previous section we have demonstrated that preferred stock may be issued in equilibrium even under certainty (or certainty equivalence) as long as graduated tax rates are allowed. This section focuses on the impact of bankruptcy and the loss of tax shelters on firms' decisions to issue preferreds. To that end, we simplify the tax structure, assuming now that all investors are in the same tax bracket for all three securities (although these tax rates may be different for different securities). While one cannot derive general solutions, we propose several scenarios under which preferreds will be issued as part of the optimal security mix. The model presented is a one period, risk neutral model.[9] Thus the value of the firm (with an exogenous investment decision) is equivalent to the expected after tax value of cash flows to all security holders. The firm receives a stochastic operating income distributed over the support $(0,\infty)$, and then divides up cash flows according to strict seniority rules. Similar to several other papers (see for example Kraus and Litzenberger (1973); Dotan and Ravid (1985)), it is assumed that upon bankruptcy, a fixed bankruptcy cost, B, is incurred. We further assume, for simplicity sake, that both debt and preferred stock are issued at par, and all market value adjustments are made through the promised rate of interest.

We now detail the ranges of cash flows to claimants. In the uncertainty case, dividend, interest and principal may or may not be paid depending on the realization of the stochastic cash flow X. The ranges are also functions of the decision variables: P, D and S, and the promised interest rate, R, on debt, the promised preferred dividend $R_p$ and the tax rates.[10] These ranges are presented below.

**Definition of the limits:**

$$X_0 = I + RD + \frac{PR_p}{1 - t_c}$$

[9] State prices such as introduced by De-Angelo and Masulis (1980) could be incorporated into this model as well. This would render the model slightly more general, but it would complicate the presentation a great deal without substantially altering the results.

[10] Since there is a possibility of non-payment, the promised interest and preferred dividend rates will differ from the risk free rate even under a risk-neutral scenario.

[11] $X_1 = I + RD$

$X_2 = P(1 + R_p) + D(1 + R)$

$X_3 = P + D(1 + R)$

$X_4 = D(1 + R)$

$X_5 = D$

$X_6 = B$

First Range $X \geq X_0$

Income is high enough so the firm pays all taxes and uses both depreciation and interest tax shields.

Stockholders income is

$$(1 - t_g)\left[(1 - t_c)(X - I - RD) + I - PR_p - P - D - S\right] + S$$

Bondholders income is

$$D + RD(1 - t_b)$$

Preferred-holders income is

$$P + PR_p(1 - t_p)$$

(Note that I = P + D + S).

Stockholders pay taxes on the difference between their income and the amount initially invested, S. Bondholders pay taxes on the interest, and preferred -holders pay taxes only on the preferred dividends.

Second Range[12] $X_0 > X \geq X_1$

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[11] If $P > \frac{I - D}{1 + R_p}$, then $X_1$ and $X_2$ are switched and cash flows are somewhat different. Propositions 3.1 will usually hold however. Also, $P > \frac{I - D}{1 + R_p}$ implies $S < PR_p$ which is usually not the case.

[12] While in principle when capital losses occur tax carry-forwards and carry-backs can offset the losses, there is never full offset. To simplify the presentation somewhat, we assume that in the case of capital losses there is no refund. A more accurate tax code would only make the presentation cumbersome while adding no new insight. This approach is common in papers which discuss tax issues, see for example De-Angelo and Masulis (1980) or Dotan and Ravid (1985).

X is somewhat lower. Now shareholders receive an amount lower than their initial investment, and hence pay no taxes. The firm still pays income tax.

Stockholders now receive

$$(1 - t_c)(X - I - RD) + I - P - D - PR_p$$

Bondholders' income is

$$D + RD(1 - t_b)$$

Preferred-holders income is

$$P + PR_p(1 - t_p)$$

Third Range $X_2 \leq X < X_1$

Now the firm's income is less than the value of its tax shelters, I + RD. The firm and its shareholders pay no taxes. Preferred stock-holders and debt-holders are still paid in full.

Stockholders receive

$$X - D - RD - P - PR_p$$

Bondholders' income is

$$D + RD(1 - t_b)$$

Preferred-holders income is

$$P + PR_p(1 - t_p)$$

Fourth Range $X_3 \leq X < X_2$

The firm cannot pay its obligations to both preferred shareholders and bondholders in full. Shareholders receive no income, preferred-holders get all the principal owed and some dividend. Bondholders are not affected.

Here Stockholders income is 0. This range is important to our analysis. To appreciate the importance of this range note that the total taxes paid in this range are:

$$(X - D - RD - P)t_P + RD\,t_b$$

An increase in P for this range of earnings decreases the total taxes of the firm, increasing the value of the firm, which is instrumental in establishing the possibility of including P in the financial mix.

Stockholders get 0

Preferred-holders receive $P + (X - D - RD - P)(1 - t_P)$

Bondholders get $D + RD(1 - t_b)$

Fifth Range $X_4 \leq X < X_3$

Similar to the previous range, except that the firm cannot even pay the preferred principal. Here only bondholders pay any taxes.

Stockholders get 0

Preferred-holders get $X - D - RD$

Bondholders get $D + RD(1 - t_b)$

Sixth Range[13] $X_5 \leq X < X_4$

In this and the following range, only bondholders receive any income. Specifically, debt principal is paid but interest cannot be repaid in full.

Stockholders get 0

Preferred-holders get 0

[14]Bondholders get $D + (X - D)(1 - t_b)$

Seventh (last) Range $B = X_6 \leq X < X_5$

Bondholders take control of the firm and its residual cash flows. A bankruptcy cost (B) is paid.

Stockholders get 0

Preferred-holders get 0

Bondholders get $X - B$

Since we are assuming a risk neutral world, the value of the firm is computed as the expected value of all cash flows according to the cumulative distribution function F(X). Technically, we integrate the cash flows over all ranges. This is presented in appendix A.

[13] Technically speaking, the firm is already bankrupt in this range. However, in order not to over-burden the paper with assumptions about the magnitude of the bankruptcy cost, we preferred to assume that bankruptcy occurs only when principal can't be paid. Thus all we need to assume is that $B \leq D$ and of course $B \leq X$.

[14] In theory, bankruptcy cost might have to be paid here, since interest is not paid in full. This will somewhat complicate the presentation and will not change the results.

The optimal amounts of debt and preferred stocks are obtained by differentiating the firm value expression in Appendix A with respect to D and P, and equating the derivatives to zero.[15]
We obtain:[16]

$$\frac{\partial V_L}{\partial P} = \left\{t_g\left[1-F(X_0)\right](R_P P)'\right\} - \left\{t_P\left[1-F(X_2)\right]\right\}(R_P P)' + \left[F(X_2)-F(X_3)\right]t_P = 0 \qquad (4.1)$$

Where $(RD)'$ is $\frac{\partial R}{\partial D}D + R$ and $(R_P P)' \equiv R_P + \frac{\partial R_P P}{\partial P}$.

$$\frac{\partial V_L}{\partial D} = (RD)'\left[(1-t_b)-(1-t_c)(1-t_g)\right]\left[1-F(X_0)\right] - \left[F(X_0)-F(X_4)\right](RD)'t_b + \left[F(X_0)-F(X_1)\right]t_c +$$
$$+\left[F(X_2)-F(X_3)\right]\left[t_P + (RD)'t_g\right] + \left[F(X_4)-F(X_5)\right]t_b - \left[F(X_0)-F(X_2)\right]P\,t_P\frac{\partial R_P}{\partial D} +$$
$$+P\frac{\partial R_P}{\partial D}\left[1-F(X_0)\right](t_g - t_P) - B\,F(X_5) = 0 \qquad (4.2))$$

The equation above provides important intuitive insights into the role of preferred shares in a tax and seniority equilibrium. An increase in P, the principal amount of preferreds, leads to three different effects.

First, an increase in the principal increases the dividend paid, $PR_p$. Because $PR_p$ is higher, cash flows left over for shareholders in states in which they pay taxes (states in which $X>X_0$)) are lower. Hence, they pay lower taxes. Secondly and conversely, for preferred shareholders, an increase in principal (and the induced increase in dividends) implies higher dividend payments in states in which they get paid in full ($X> X_2$). More payments imply higher taxes.

This trade-off is reflected in the first two terms of the first order condition. Clearly, tax rates and

[15] The equations in the appendix implicitly derive the required rate of return for bondholders and preferred shareholders respectively. While an explicit calculation of these rates requires specific assumptions, all we need for the subsequent results is the signs of the derivatives. Clearly, as D goes up, the *promised* rate of return to bondholders goes up as the probability of full payment declines. Similarly, as P goes up, $R_p$ goes up, since the probability of paying principal and interest declines.

[16] It is assumed that the second order conditions are satisfied. Also note that while the decision variables appear in the limits, the derivatives with respect to the limits often cancel.

distribution functions will determine the sign and the magnitude of this combined effect.

Thirdly, an increase in P decreases the portion of payment considered taxable dividends in states in which preferred shareholders are not paid in full. These additional tax savings are reflected in the third term of the first order conditions. The fact that all three effects are not in the same direction leads to the possibility of an interior solution, which is explored below.

Note, that if $t_g = t_p$ then the sum of the first two terms must be negative, since preferred shareholders get paid in more states.

This discussion leads to the following Proposition.

***Proposition 4.1***

In the case of uncertainty, even without progressive taxation, if equity and preferred shares are taxed differentially, an interior optimal level of preferred shares may obtain in equilibrium.

***Proof:***

See Appendix B where we derive sufficient conditions for an interior optimum to obtain.

Note that proposition 4.1 and the following discussion should be viewed as specific examples for cases in which taxes (we do not require graduated schedules) and the effect of seniority of the various financial instruments on payments in different states of nature lead firms to choose preferreds as part of their financing mix.[17]

We now proceed to discuss some interesting special cases where preferred shares may or may not be issued. These cases are corollaries to proposition 4.1.

***Corollary 1***

If the firm is sufficiently unprofitable(in a sense to be defined below), it may optimally issue only preferred shares, even if $t_g = 0$ and $t_p > 0$.

***Proof:***

By F.O.C. (first order conditions). If the firm is sufficiently unprofitable in the sense that $F(X_2) = 1$, then equation (4.1) becomes $\frac{\partial V_L}{\partial P} = \left[F(X_2) - F(X_3)\right] t_P > 0$. In this case the firm will increase P as much as possible. Whereas this result is quite intuitive when taxation of capital gains is larger than

[17] For a discussion of the role of seniority and taxes in the determination of the value of residual securities in a similar framework, see Ravid (1994).

taxation of interest, it holds also when the opposite is true and may even hold when $t_g = 0$ and $t_p > 0$. QED.

The intuition is the following: if the firm is sufficiently unprofitable, it is less likely to be able to pay its obligations in full. As noted, an increase in preferred principal will thus reduce the tax burden in states where only part of the dividend is paid.

***Corollary 2***

If the firm is sufficiently profitable, but (at least weakly) there is some probability that shareholders' taxable income will not be positive, preferred shares will not be issued. This occurs even if $t_p = t_g$.

***Proof:***

If the firm is very profitable, the third term in the F.O.C. will approach 0, and the first two terms will always be negative. It therefore follows that $\frac{\partial V_L}{\partial P} < 0$. Issuing preferreds is never optimal since it reduces the value of the firm. Q.E.D.

The intuition is the following. Increasing payoffs to preferred shareholders will (weakly) increase the tax burden in states in which common shareholders pay no taxes, whereas preferred shareholders who are still paid in full, receive taxable dividends. If the firm is sufficiently profitable, but shareholders do not always pay taxes, it may be advantageous to transfer cash to shareholders, since lower taxes will be paid in that case. If the firm is likely to always pay preferred shareholders in full, then states in which only preferred principal and no dividend is paid ($X_2 > X > X_3$)) are unlikely. Hence, the tax consequences of increased principal in such states matters less (see Ravid (1994) for further discussion of this issue). Finally, if a company is sufficiently profitable so that every claim holder, including shareholders always pays taxes, we basically reach the certainty case discussed in the previous section.

Under uncertainty, different priorities in cash flow distribution may cause the expected marginal tax rates to differ even when statutory tax rates are the same.[18] A change in the amount of any security

[18] The empirical analysis in Houston and Houston (1990) agrees with this prediction. The tax rates of firms which issue preferreds (except to some extent, utilities) tend to be lower than industry and market medians and means. This seems to imply lower profitability. However, Heinkel and Zechner's (1990) conclusion, i.e. that firms with "moderate growth opportunities" will tend to issue preferred shares is somewhat at odds with our analysis. The model is of course very different.

issued will therefore change these expected rates, creating room for several tax-deductible and several non-tax-deductible securities at equilibrium. This contrasts with the certainty case where, if tax rates on each security are the same for all investors, equilibrium will result in only one security being issued.

It is thus the prediction of this model that moderately profitable companies will tend not to issue preferred shares whereas less profitable firms will tend to issue more preferreds. A test of the model would be to relate these facts to the corporate tax structure and profitability[19].

We now turn to some additional comparative statics. Specifically, we analyze the effects of changes in tax rates on the optimal amounts of debt and preferred stock. Exact derivations and proofs are relegated to Appendix B.

**Claim 1**

If debt and preferreds are "complement assets", i.e. if the cross derivative of a change in firm value with respect to the two assets is positive, then an increase in the rate of taxation on equity will increase both the optimal level of debt and the optimal level of preferred shares.

Proof: See Appendix B.

The intuition is the following: an increase in the tax rate on equity makes both preferred stock and debt more desirable. Note that if the securities are "substitutes" then conclusions could be reversed, since the change in the optimal level of one non-equity security could inversely affect the benefits of the other.

**Claim 2**

An increase in the corporate tax rate will increase the optimal level of debt; it will increase the optimal level of preferred stock only if the two securities are "complements".

Proof: See Appendix B.

[19] The empirical analysis in Houston and Houston (1990) agrees with this prediction. The tax rates of firms which issue preferreds (except to some extent, utilities) tend to be lower than industry and market medians and means. This seems to imply lower profitability. However, Heinkel and Zechner's (1990) conclusion, i.e. that firms with "moderate growth opportunities" will tend to issue preferred shares is somewhat at odds with our analysis. The model is of course very different.

The intuition is this: An increase in the corporate tax rate will increase the optimal level of debt because of the increase in the value of tax benefits. The change in the level of preferred stock depends on the substitution between the two securities.[20]

If the two securities are complements, then as the marginal value of debt rises, so will the marginal value of preferred shares, and more of the latter security will be issued. This is in spite of the fact that preferreds, like equity, are not tax-deductible.

This point, and the pervasive influence of the cross derivative between the two securities are important aspects of the comparative statics analysis since they highlight the inter-dependence between debt and preferred stock. In other words, because of the tax interactions, corporate taxes will affect the optimal levels of all securities. One should note that if Heinkel and Zechner (1990) hypothesis holds, and debt and preferred are complements, then an increase in corporate tax rate will lead to an increase in preferred debt and in debt (at the expense of equity). Complementarity in our case means a positive cross derivative, which may be different.

## 5. EMPIRICAL ANALYSIS.

In the previous sections we have derived two predictions regarding the issuance of preferred stock. First, we have established a negative relationship between preferred stock and profitability. Thus, ceteris paribus, the percentage of preferred stock in a firm's capital structure should decrease with (expected) profitability. The second prediction concerns the relationship between the percentage of preferred stock and the corporate tax rate. We show that the correlation between these two variables depends on whether preferred stock and debt are "substitutes" or "complements". If debt and preferred stock are substitutes, then a higher tax rate results in a decrease in the preferred ratio, and the opposite occurs in the latter case. Even if we cannot directly establish whether the two securities are substitutes or complements, a significant correlation between corporate tax rates and the share of preferreds in the capital structure would provide conditional support for the predictions of the model.

To test our model, we provide a broad empirical investigation of the determinants of preferred issuance. While the debt- equity choice has been studied extensively (for well known examples see Long and Malitz (1985) Titman and Wessels (1988) Rajan and Zingales (1995)), and Welch (2004)). Preferred stocks have received less attention. There have been several earlier event studies such as Masulis (1983)

[20] This claim should be interpreted carefully - although the absolute quantities of both preferreds and debt may increase, the relative use of debt vs. preferred may change in either direction (see Trigeorgis (1988) for an empirical investigation of this issue).

or Linn and Pinegar (1988). Houston and Houston (1990) and Ely et al. (2002) consider tax aspects of issuers and buyers of preferred shares. In a different context, Hovakimian et al. (2001) study the issue of various types of securities within the context of target ratios. Our study differs from earlier work in that it covers a wider data-base, considers specific hypotheses and focuses on preferred stock. In the work that follows, we thus regress the percentage of preferred stock on proxies for profitability, on the corporate tax rate, and on control variables.

The leverage ratio is an important control variable. Since in our model the percentage of preferred stock depends on the level of debt, and since the relationship between the percentage of preferred stock and the corporate tax rate depends on whether preferred stock and debt are substitutes or complements, the percentage of debt in the capital structure is a key control variable21. Other control variables identified in the literature as important in determining the financing mix, and which we use here, include the level of fixed assets, growth opportunities, and firm size (see, e.g., Titman and Wessels (1988), Harris and Raviv (1991) and Rajan and Zingales (1995)). As tax laws changed in 1986, we also include a dummy variable for the post 1986 period. Our basic structure is stated below, however, we also provide Probit analysis of preferred share issuance:

$$\Pr ef = C + \beta_1 Debt + \beta_2 Tax + \beta_3 Grow + \beta_4 Tang + \beta_5 Size + \beta_6 \Pr of + \varepsilon \qquad (5.1)$$

***Pref*** denotes the ratio of preferred stock to the combined value of equity and debt; ***Debt*** equals the proportion of debt in the firm's capital structure, and ***Tax*** denotes the corporate tax rate. We use two alternative measures of tax rates. The first measure is the average tax rate measured by the ratio of taxes paid to total income. The second is the "expected' marginal tax rate as defined by Graham (1996a, 1996b). Our proxy for growth opportunities, ***Grow***, is the firm's market to book ratio; for tangibility (***Tang***), we employ the proportion of fixed assets out of total assets. Firm size (***Size***) is measured by the logarithm of total sales, and for profitability, **Prof**, we use the return on assets, and **Year1986** is the post 1986 dummy variable (not shown in equation 5.1).

Our model predicts a negative sign for the coefficient of the profitability proxy, and a significant correlation between preferred stock and corporate tax rate, (positive or negative) depending on whether

[21] One might argue that capital structure choices are endogenous. The difficulty is that the same explanatory variables determine the choice of both debt and preferred stock. Hovakimian et al. (2001) use similar methodologies as we do. However, to partially address this issue, we also ran regressions without the debt variable (not reported here). The qualitative results were similar, with better statistical significance.

debt and preferred stock are complements or substitutes.[22] The Tax Reform Act of 1986 includes one feature detrimental to the usage of preferred stock by firms, namely the new rules allowed firms to deduct only 70% of dividends received from their income as compared to 85% according to the previous laws. We therefore expect a negative sign for the coefficient of the post 1986 dummy.[23]

We do not make a specific prediction regarding the other control variables. However, Chaplinsky and Niehaus (1990), Kim and Sorensen (1986) and Titman and Wessels (1988) find a negative relationship between leverage and firm's growth opportunities. The impact on preferred shares is not clear ex-ante. We expect the tangibility coefficient to have the same sign as in debt equations, since Friend and Lang (1988), Gonedes et. al. (1988), and Marsh (1982) argue that using fixed assets as collateral reduces the agency costs of debt. Also, Titman (1984) suggests that firms may want to use preferred stock to reduce the common shareholders' incentive to liquidate the firm in certain states of nature. Finally, the Tax Reform Act of 1986 includes one feature detrimental to the usage of preferred stock by firms, namely the new rules allowed firms to deduct only 70% of dividends received from their income as compared to 85% according to the previous laws. We therefore expect a negative sign for the coefficient of the post 1986 dummy (see Givoly et al. (1992) for a comprehensive discussion of the impact of that tax law)

We gather data on all the above variables from Compustat for the period 1977 to 2001[24]. We also collect from the Securities Data Corporation (SDC) New Issues database all issues of preferred stock from 1977 to 2001; that we use in our probit analysis. Our dataset comprises over 170,000 firm-year observations; out of those, in over 31,000 cases the firm's capital contains preferred stock. We are able to match 1,496 issues from SDC with the firm-year observations from Compustat. Appendix C describes in detail each variable and provides the corresponding Compustat annual data items used in its calculation.

This section is organized as follows: in subsection 5.1 we provide summary statistics of our data, in subsection 5.2 we explain the methodology of our analysis, in subsection 5.3 we present the results, and in subsection 5.4 we provide robustness checks.

*5.1 Summary Statistics*

Table I provides summary statistics for the entire sample in Panel A, and for those firms that issue preferred stocks in Panel B. This sample is much larger than in previous studies and covers both issues

[22] Friend and Lang (1988), Gonedes et al. (1988), Kester (1986) and Titman and Wessels (1998) also find a negative relationship between profitability and leverage.

[23] See Givoly et al. (1992) for a comprehensive discussion of the impact of this particular tax law.

[24] For the simulated marginal tax rates we are grateful to John Graham. They can be obtained at http://www.duke.edu/ ~jgraham/taxform.html.

and preferred stock ratios in the capital structure. Thus we can obtain a balanced view of the universe of preferred stocks. Preferred stock represents only 2.05% of the amount of debt+ equity, when equity is measured at book value, and 1.42% when we compute it in terms of market value. These low values are due to the relatively small number of firms that issue preferred stock. Among those firms that issue preferred stock, however, (Panel B), preferred stock represents 11.07% of their equity+ debt in book terms, and 7.85% in quasi-market terms. In our sample, short-term debt is more than twice the amount of long-term debt. Average and marginal tax rates are 25.33% and 31.12% respectively.

Panels A and B in Table I show some additional interesting differences between firms that have preferred stocks in their capital structure and those that do not (these differences will be analyzed more rigorously in the following regressions). The debt ratio is ten percent higher for firms, which issued preferred stock than in the whole sample. Most of the difference is due to higher issuance of short-term debt. One also notes that firms that issue preferred stocks are on average larger, less profitable, and hold a larger fraction of fixed assets.

We also observe that, consistent with the predictions of our paper for those firms that issue preferred stock, the preferred ratios increase (in both book and quasi-market terms) as both average and marginal tax rates decrease, and as profitability declines. Columns six to eleven, which provide a finer partition of the sample period, also indicate that consistent with the predictions of the current paper as tax rates and profitability decline between 1977 and 2001 the preferred ratios monotonically increase.

Table III focuses on cross-industry differences in the preferred ratio. We classify firms into 48 industries based on each firm's SIC code, following the methodology in Fama and French (1997). Most issues come from the business services, banking, retail, and petroleum and natural gas industries. As argued in most textbooks (see, e.g., Brealey and Myers (2002)),Utilities is the industry that uses preferred stocks most heavily; more than 70% of all utilities have preferred stock in their capital structure. Surprisingly however, when only firms with a positive preferred ratio are considered, the average and median preferred ratio for the utilities industry is close to the sample average and median. Banking is another industry, which has been singled out in the literature, because it is tightly regulated and banks' typical high leverage may stem from factors different than those affecting other industries. We observe that in spite of the large number of issues, the overall preferred ratio for the banking industry is the lowest among all industries. This finer analysis enables us to put in perspective the samples and descriptive analysis of previous work. In the next section, we will take these observations into account when testing our model.

*5. 2 Methodology*

We estimate equation (1) for the whole sample period, for the pre- and post-1986 years, as well as for the six four-year periods between 1977 and 2001. We follow the methodology in Rajan and Zingales (1995) and average the independent variables in each four-year period to reduce noise. To control for endogeneity, one-period lagged values of the explanatory variables are used. While this approach is adequate for relatively short periods, averaging the explanatory variables for the whole sample, or even for the pre-1986 and post-1986 sub samples, would be less instructive. For the longer samples, pre- and Post-1986 and the whole sample, we follow the approach in Graham et al. (1998). We run a pooled time-series cross-sectional regression. To address the serial dependence in the error terms, we run year-by-year cross-sectional regressions and use a first-order autocorrelation corrected *t*-test to test the significance of the time-series mean of each independent variable coefficient. Regardless of the estimation method, since our dependent variable is censored from below (by zero) and above (by one), we calculate Tobit regressions with double censoring.[25]

Welch (2004) argues that capital structure is almost entirely determined by stock returns. Therefore, we estimate equation (1) in both book value and quasi-market form; that is, we measure equity at both book and market value. Since firms within an industry may have a more similar capital structure than those in different industries (see Bowen et al. (1982), Bradley et al. (1984), and Rajan and Zingales (1995)), we estimate equation (5.1) using industry fixed effects. Our observations in the previous sub-section also support the industry effects view. Our basic equations are then,

$$B\_\Pr ef = C + \beta_1 B\_Debt + \beta_2 Tax + \beta_3 Grow + \beta_4 Tang + \beta_5 Size + \beta_6 \Pr of + \sum_i Industry_i + \varepsilon \quad (5.1')$$

$$M\_\Pr ef = C + \beta_1 M\_Debt + \beta_2 Tax + \beta_3 Grow + \beta_4 Tang + \beta_5 Size + \beta_6 \Pr of + \sum_i Industry_i + \varepsilon \quad (5.1'')$$

where $B\_\Pr ef, B\_Debt, M\_\Pr ef, M\_Debt$ are the book and market value of the preferred and debt ratio, respectively, and $Industry_i$ denotes the appropriate industry dummy.

*5.3 Results.*

Tables IV and V report the estimates for regressions (5.1') and (5.1''). In Table IV Panel A, the book preferred ratio is regressed on the explanatory variables. We first note that the coefficient of ROA is

[25] We also report below probit regressions using the data on new preferred issues.

negative and statistically significant. This confirms the first hypothesis of our paper, and is consistent with Hovakimian et al. (2001). However, this is at odds with the predictions of Heinkel and Zechner (1990). Consistent with our prediction, the coefficient for the average tax rate is significant (and negative), both for the overall sample and for the different sub-samples. This is also consistent with earlier findings on smaller samples by Houston and Houston (1990) and Ely et al. (2002). Our main predictions are therefore broadly confirmed, and seem robust to different time periods. For the overall sample, we observe that the coefficient of the debt ratio is significantly positive. This result holds for the pre- and post-1986 sub-samples, as well as for the six four-year samples between 1977 and 2001, and confirms the prediction in Heinkel and Zechner (1990) that preferred stock enhances a firm's debt capacity. The size coefficient is significantly positive, except for the latest four-year period, where it is insignificantly different from zero. The evidence regarding the tangibility and market to book ratios is less clear. The tangibility ratio is significant for the whole sample. However, it is significantly positive prior to 1986 and insignificant afterwards. The market to book ratio coefficient is significantly positive for the overall sample, driven by the pre-1986 years; but is insignificantly different from zero from 1990 onwards.

The year 1986 dummy is consistent with the expected effect of the Tax reform Act of 1986. Its coefficient is significantly negative in the four different econometric specifications.

For comparison, Table IV, Panel B uses the quasi-market preferred and debt ratio instead. The results do not change significantly. The debt ratio coefficient remains significantly positive and the average tax rate and ROA coefficients continue to be significantly negative. The ambiguity regarding the tangibility ratio disappears. Its coefficient is significantly positive for all different sub-samples.

Table V allows us to isolate the impact of using average versus marginal tax rates. Using marginal rather than tax rates does not alter our results in any substantive way. The coefficient for the marginal tax rate is larger in absolute values than the coefficient of the average tax rate, regardless of whether we use book of quasi-market values. As in Table IV, the economic impact of marginal tax rates is larger when using a quasi-market rather than a book value approach. On the other hand, the importance of the profitability measure is significantly greater when we measure the impact of taxes using average rather than marginal rates. The tangibility coefficient is significantly positive in this specification.

*5.4 Model extensions and robustness checks.*

In this section we examine some extensions of the empirical model and provide several robustness checks.

**Profitable vs. Non-profitable firms**

Although profitability is an explanatory variable in our model, in what follows we analyze separately and compare the behavior of profitable and non -profitable firms. The behavior of the former may differ from the latter, because of lower agency costs, and also since incremental analysis of changes in profits and taxes may be less relevant for non-profitable firms. Table VI replicates the results of Table IV, while restricting the sample to firm-year observations with a positive return on assets.

We observe that the predictions of our model are robust to excluding negative profitability observations. The tax rate coefficient remains significantly negative; this is also true for the ROA coefficient, but the impact of the profitability measure is magnified. The debt coefficient stays significantly positive and the Year 1986 continues to be significantly different from zero. Excluding the negative profitability observations increases significantly the predictive ability of our model, as evidenced by the higher R2's.

**ROE as a measure of profitability**

In addition to ROA, ROE is often regarded as an important measure of profitability. We prefer to use ROA in our main analysis since ROE depends significantly on the debt ratio, a variable we already use in the analysis. In what follows we repeat, for completeness, the analysis with ROE as our measure for profitability.

Table VII reports the whole sample estimates for the different model specifications using ROE rather than ROA. The first four models replicate the results in Tables IV and V; models five to eight exclude firm-year observations with a negative return on equity. It turns out that using an alternative measure of profitability does not change significantly our results. As predicted by our model, the tax rate coefficient, both for average and marginal tax rates, is significantly negative, and the profitability coefficient remains significantly negative. The book and market, and especially the tangibility coefficient, however, are in most regressions insignificantly different from zero.

**Probit regressions**

Our theoretical model considers the preferred ratio as a monotone function, varying between zero and one, of the explanatory variables. However, since many firms do not issue preferred shares at all, there may be a mass point at zero, where the positive impact of all the variables we consider does not exceed the transaction cost of issuing preferreds. Thus we now consider the issuing decision assuming that the

same factors affecting the level of preferred stock in our model, influence the chance of a firm deciding to issue preferred stock.

Tables VIII and IX replicate the approach of Tables IV-VII using Probit regressions. The dependent variable takes the value of one if the firm issues preferred stock that year, and zero otherwise. In these regressions we use new issues data from SDC. These tables show that our results are robust to the estimation methodology. An increase in either of the different proxies for the tax rates and the profitability measures decreases the probability that the firm will issue preferred stock in the following year. The signs of the profitability and market to book variables are broadly consistent with Hovakimian et al. (2001) whereas the tax rate result is consistent with Ely et al. (2002). We have of course, a greater number of observations26.

**Panel Data.**

Since we have cross–sectional time series data it may make sense to run panel data in order to check for robustness and consistency. In order to test our hypothesis on panel data we need to use GLS methods. Specifically, we use Feasible Generalized Least Squares (FGLS),which uses an estimated covariance matrix, instead of an assumed one. In Table X, we present panel data estimates of equations (5.1') and (5.1'') using feasible generalized least squares. This table confirms that our results are robust to the use of the alternative statistical methodology and possible heteroskedasticity biases.

**Additional robustness tests.**

Appendix D below contains several additional robustness checks. Namely, we split the sample to small and large firms, we consider regression with and without banks and utilities, and we use additional control variables. Our qualitative conclusions do not change.

## 6. CONCLUSIONS.

This paper presents a theoretical model that shows how tax and bankruptcy considerations alone, may lead firms to include preferred stocks in the optimal financing mix. We provide several predictions, relating the percentage of preferred stock to variables such as profitability, tax rates, and the percentage of

[26] Our issuing sample contains 38% convertible preferred stocks. There is no clear theory that suggests that the characteristics of large established firms issuing preferreds should differ from firms issuing convertible preferreds, and our theory does not speak to this difference either. Sahlman (1990) and Gompers (1997), among many others, report the extensive use of convertible securities in the venture capital context. Thus, we ran regressions on the two sub-samples separately, as well as on the entire sample with a dummy for convertible preferreds. The results are quantitatively unchanged, and thus not reported here.

debt in the capital structure. We then test our predictions on a large sample of firms over a 25 year period.

By and large, the results from our regressions are consistent with the model. We find that as profitability increases, the percentage of preferred stock in the capital structure decreases. We also find that as the tax rate increases, the percentage of preferred stock in the capital structure decreases. Our results are robust to the use of different proxies and different splits of the data set, as well as to looking at new issues. Our results are broadly consistent with previous studies, which consider sub-sets of the issues raised here. Our work does not resolve the question of whether debt and preferred shares are substitutes or complements, and how should such relationships be defined. However, we do find that firms that have more debt tend to issue more preferred shares. Finally, it should be clear that our framework can be extended to include any type of security with a different tax status and/or seniority level. In that sense, our contribution can be summarized as follows: even if one only cares about taxes and bankruptcy costs, the optimal capital structure may include several non-tax deductible securities, as long as non-tax-paying and bankruptcy states are possible. Empirical analysis confirms most of the main predictions of the tax-cum-bankruptcy theory.

***Appendix A***

Calculation of the value of the firm:

f(X) is the density function of cash flows over the support [0, ∞]. We are taking the expected value of cash flows to all claim-holders.

$$
\begin{aligned}
&F(X_i) = \int_{-\infty}^{x_i} f(X)\,dX \\
&V_L = \int_{X_0}^{\infty} \left\{\left[(X-I)(1-t_c)(1-t_g)+I\right]+(RD)\left[(1-t_b)-(1-t_c)(1-t_g)\right]+PR_P(t_g-t_P)\right\} f(X)\,dX + \\
&+\int_{X_1}^{X_0} \left\{(1-t_c)(X-I)+I+RD(t_c-t_b)-PR_P t_P\right\} f(X)\,dX + \int_{X_2}^{X_1} \left\{X-PR_P t_P-RD\,t_b\right\} f(X)\,dX + \\
&+\int_{X_3}^{X_2} \left\{X(1-t_P)+D\left[R(t_p-t_b)+t_P\right]+Pt_P\right\} f(X)\,dX + \int_{X_4}^{X_3} (X-RD\,t_b) f(X)\,dX + \\
&+\int_{X_5}^{X_4} \left[X(1-t_b)+D\,t_b\right] f(X)\,dX + \int_{X_6}^{X_5} (X-B) f(X)\,dX
\end{aligned}
\qquad (A.1)
$$

Note that the tax differentials play an important role in the determination of firm value since in different intervals, different claimholders are responsible for the tax liabilities relevant for the same cash flow. We now compute the required rate of interest on bonds and on preferred stocks respectively. These

rates are the solutions of the following implicit equations:

$$\int_{X_2}^{\infty}\left[P + PR_P\left(1 - t_P\right)\right]f\left(X\right)dX + \int_{X_3}^{X_2}\left[P + \left(X - D - RD - P\right)\left(1 - t_P\right)\right]f\left(X\right)dX + \\ + \int_{X_4}^{X_3}\left(X - D - RD\right)f\left(X\right)dX = P + PR_0\left(1 - t_P\right) \qquad \left(\text{for preferreds}\right) \tag{A.2}$$

$$\int_{X_4}^{\infty}\left[D + RD\left(1 - t_b\right)\right]f\left(X\right)dX + \int_{X_5}^{X_4}\left[D + \left(X - D\right)\left(1 - t_b\right)\right]f\left(X\right)dX + \\ + \int_{0}^{X_5}\left(X - B\right)f\left(X\right)dX + D = DR_0\left(1 - t_b\right) \qquad \left(\text{for debt}\right) \tag{A.2'}$$

where $R_0$ is the interest rate on risk free taxable bonds. One notes from the equations and the definition of the limits of integration that R (the promised rate of interest on bonds) is a function of D, and $R_p$ (the promised preferred dividend) is a function of D and P. Since all investors are assumed to be risk neutral, the equations promise both preferred shareholders and bondholders expected returns equal to the risk free rate.

Proof of Proposition (4.1)

Both the distribution function and $\left(R_P P\right)'$ are non-linear functions of P. A sufficient condition for a positive amount of preferred stock to be issued is that $\frac{\partial V}{\partial P} > 0$ at P = 0. Using Equation (4.1), the requirement $\left.\frac{\partial V}{\partial P}\right|_{P=0} > 0$ translates into the following sufficient condition.

$$\frac{t_g}{t_P} > \left.\frac{1 - F\left(X_2\right)}{1 - F\left(X_0\right)}\right|_{P=0} \tag{A.3}$$

This clearly requires:

$$\frac{t_g}{t_p} > 1 \tag{A.4}$$

To prevent a corner solution, we must require that at P = I the derivative with respect to P will be less than zero.

For $P > \frac{I - D}{1 + R_P}$ the following is the derivative in question:

$$\frac{\partial V}{\partial P} = \left[t_g\left(1 - F\left(X_0\right)\right) - t_P\left(1 - F\left(X_1\right)\right)\right]\left(R_P P\right)' - t_P\left(F\left(X_1\right) - F\left(X_3\right)\right) \tag{A.5}$$

For the above derivative to be negative at P = I, we require:

$$\frac{t_g}{t_p} < \left.\frac{\left(1 - F\left(X_1\right)\right)\left(R_P P\right)' + \left(F\left(X_1\right) - F\left(X_3\right)\right)}{\left(1 - F\left(X_0\right)\right)\left(R_P P\right)'}\right|_{P=I} \tag{A.6}$$

Combining the inequalities above for $\frac{t_g}{t_p}$ we obtain that the necessary condition for a positive P becomes:

$$\left.\frac{\left(1 - F\left(X_2\right)\right)}{\left(1 - F\left(X_0\right)\right)}\right|_{P=I} < \left.\frac{\left(1 - F\left(X_1\right)\right)}{\left(1 - F\left(X_0\right)\right)}\right|_{P=I} + \left.\frac{\left(F\left(X_1\right) - F\left(X_3\right)\right)}{\left(1 - F\left(X_0\right)\right)\left(R_P P\right)'}\right|_{P=I} \tag{A.7}$$

This inequality will be true if $\left(R_P P\right)'$ is very small, in which case, we can find $t_g > t_p$ such that $\frac{\partial V}{\partial P} > 0$ at P = 0, and hence a positive amount of P will be issued.

***Appendix B***

Proofs of comparative statics results:

All derivatives will be taken with respect to a tax rate, and the proofs will utilize the following derivations:

$$\frac{d\,D^*}{d\,t_i} = -\frac{\left[\frac{\partial^2 V}{\partial D\,\partial t_i}\frac{\partial^2 V}{\partial P^2} - \frac{\partial^2 V}{\partial P \partial D}\frac{\partial^2 V}{\partial P\,\partial t_i}\right]}{H} \tag{B.1}$$

$$\frac{d\,P^*}{d\,t_i} = -\frac{\left[\frac{\partial^2 V}{\partial P\,\partial t_i}\frac{\partial^2 V}{\partial D^2} - \frac{\partial^2 V}{\partial P \partial D}\frac{\partial^2 V}{\partial P\,\partial t_i}\right]}{H} \tag{B.2}$$

where H is the determinant of the second order conditions which must be positive for a maximum to exist. Second order conditions also imply that:

$$\frac{\partial^2 V}{\partial D^2} < 0\,;\frac{\partial^2 V}{\partial P^2} \tag{B.3}$$

We can now demonstrate claim 1:

***Claim 1***

$$\text{If } \frac{\partial^2 V}{\partial P \partial D} \geq 0 \text{ then } \frac{d\,P^*}{d\,t_g} > 0\,;\ \frac{d\,D^*}{d\,t_g} > 0 \tag{B.4}$$

Proof: differentiating F.O.C with respect to $t_g$ and using the derivation of H above, one obtains:

$$\frac{\partial^2 V}{\partial P \partial t_g} = \left(1 - F\left(X_0\right)\right)\left(R_P + \frac{\partial R_P}{\partial P}P\right) > 0 \tag{B.5}$$

$$\frac{\partial^2 V}{\partial D \partial t_g} = \left(1 - t_c\right)\left(RD\right)'\left(1 - F\left(X_0\right)\right) + P\frac{\partial R_P}{\partial D}\left(1 - F\left(X_0\right)\right) > 0 \tag{B.6}$$

The result now follows from inserting the derivatives in the equations for $\frac{d\,P}{d\,t}$ and $\frac{d\,D}{d\,t}$ respectively.

**Claim 2**

$$\frac{d\,D^*}{d\,t_c} > 0\,;\ \text{Sign}\ \frac{d\,P^*}{d\,t_c} = \text{Sign}\ \frac{\partial^2 V}{\partial P \partial D} \tag{B.7}$$

Proof:

Similar to the proof of claim 1, the result follows from the following derivation

$$\frac{\partial^2 V}{\partial D \partial t_c} = (1-)(RD)'\,t_c\,(1-F(X_0)) + F(X_0) - F(X_1) > 0 \tag{B.8}$$

**Appendix C**

***Description of the Variables***

The empirical part of this paper centers on the regression equation

$$B\_\Pr ef = C + \beta_1 B\_Debt + \beta_2 Tax + \beta_3 Grow + \beta_4 Tang + \beta_5 Size + \beta_6 \Pr of + \sum_i Industry_i + \varepsilon \tag{C.1}$$

The dependent variable, Pref_Ratio is computed as follows:

**Pref_Ratio**: Equals Preferred Stock – Liquidating Value divided by the sum of Total Debt plus Market Value of Equity.

**Preferred Stock** – Liquidating Value: This item represents the total dollar value of the net number of preferred shares outstanding in the event of involuntary liquidation. Compustat annual data item 10.

**Total Debt**: Equals the sum of Long-Term Debt-Total plus Debt in Current Liabilities. Long-Term Debt-Total represents debt obligations due more than one year from the company's Balance Sheet date or due after the current operating cycle (Compustat annual data item 9). Debt in Current Liabilities measures the total amount of short-term notes and the current portion of long-term debt that is due in one year (Compustat annual data item 34).

**Market Value of Equity**: Defined as product of Common Shares Outstanding times Price – Close.

**Common Shares Outstanding**: Represents the net number of all common shares outstanding at year-end

for the annual file, and as of the Balance Sheet date for the quarterly file excluding treasury shares. Common treasury shares carried as either assets or liabilities on the Balance Sheet are netted against the number of common shares issued. Compustat annual data item 25.

**Price – Close**: Represent the last transaction price during the year for companies on national stock exchanges and bid prices for over-the-counter issues. Prices are reported on a calendar year basis, regardless of the company's fiscal year-end. Prices are adjusted for all stock splits and stock dividends that occurred in the calendar year, except for (06-11) fiscal year companies which have declared stock splits and stock dividends between the end of their fiscal year and the end of the calendar year. In those instances, the stated prices are not adjusted. When a (01-05) fiscal year company has a stock split and/or a stock dividend after the calendar year-end but before their fiscal year-end, fiscal year-end prices are adjusted. Compustat annual data item 24.

The list of explanatory variables includes two profitability measures, ROA and ROE. The rest of controls are computed as follows:

**Return on Assets**: Equals Income Before Extraordinary Items – Available for Common, divided by Assets – Total. Income Before Extraordinary Items – Available for Common represents income after preferred dividend requirements, but before adding savings due to common stock equivalents and before extraordinary items and discontinued operations. (Compustat annual data item 237).

**Assets** – Total: Current assets plus net property, plant, and equipment plus other noncurrent assets (including intangible assets, deferred charges, and investments and advances). Compustat annual data item 6.

**Return on Equity**: Equals Income Before Extraordinary Items – Available for Common, divided by Common Equity. Common Equity represents the common shareholders' interest in the company (Compustat annual data item 60).

**Tax Rate**: Equals Income Taxes–Total divided by Pretax Income, multiplied by 100. Income Taxes–Total represents all income taxes imposed by federal, state, and foreign governments (Compustat annual data item 16). Pretax Income measures operating and nonoperating income before provisions for income

taxes and minority interest (Compustat annual data item 170).

**Debt Ratio**: Equals Total Debt divided by Assets – Total.

**Sales (Net)**: Represents gross sales (the amount of actual billings to customers for regular sales completed during the period) reduced by cash discounts, trade discounts, and returned sales and allowances for which credit is given to customers. Compustat annual data item 12.

**Tangibility Ratio**: Equals Property, Plant, and Equipment – Total (Gross), divided by Assets – Total. Property, Plant, and Equipment – Total (Gross): Represents the cost of fixed property of a company used in the production of revenue before adjustments for accumulated depreciation, depletion, and amortization. Compustat annual data item 7.

**Growth**: We measure growth by the **Market to Book ratio**. The Market to Book ratio equals the Market Value of Equity divided by the Book Value of Equity. Market Value of Equity equals the product of Common Shares Outstanding times Price – Close.

**Book Value of Equity**: This item represents the common shareholders' interest in the company; and includes: common stock (including effects of common treasury stock), capital surplus, retained earnings, and treasury stock adjustments for both common and non-redeemable preferred stock. This figure is not adjusted for either excess liquidating value over carrying value of preferred stock or intangibles. Compustat annual data item 60.

**Advertising Ratio**: Equals the Advertising Expense divided by Total Assets. Advertising Expense represents the cost of advertising media (radio, television, newspapers, periodicals) and promotional expenses. This item excludes selling and marketing expenses. This item is not available for banks or utilities. Compustat annual data item 45.

**Research and Development Ratio**: Equals the Research and Development Expense divided by Total Assets. Research and Development Expense represents all costs that relate to the development of new products or services. This item includes company-sponsored research and development, purchased research and development when reported as a special item, research and development expense from

continuing operations (for companies engaged in the primary business of research and development), and software development expense. Compustat annual data item 46.

**Appendix D: Additional Robustness checks**

*D.1 Regressions that exclude Utilities and Banks.*

In Table III we note that over 70% of all utilities have preferred stock in their capital structure. Since this level is so much higher than other industries, and because of regulations that make preferred stocks more desirable to utility firms than to other firms, it is worthwhile to analyze the sample while excluding utilities. Similarly banking firms may deserve a special analysis since their exceptionally high debt ratio may indicate that their capital structure is determined by factors different from those affecting other firms. In this section we examine to what extent our results are driven by these two industries.

In Panel A of Table XI, we re-estimate the different specifications of our model, while excluding utilities. In Panel B, we repeat this analysis while excluding banking firms. Panel C presents regression estimates where both utilities and banks have been excluded. Finally, Panel D replicates the results of Panel C, but using Probit analysis.

Panels A-D in Table XI show that our results are not driven by observations from the utilities or the banking industries. When banks and/or utilities are excluded, the coefficient of the debt, tax rate and profitability measures remains unaltered. Excluding both banks and utilities, however, reduces the predictive ability of our regressions. It seems therefore that the same factors that affect all firms affect also utilities and banks, but the effect is stronger for the latter firms

*D.2 Firm Size.*

We now explore in greater depth the role of firm size as a determinant of capital structure. The analysis is important given that the literature does not provide clear-cut explanations of the causality between size and capital structure. In Table XII, Panel A we exclude those firm-year observations with less than ten million dollars in sales. Excluding small firms does not alter significantly our results. Debt, tax and profitability measures retain their significance. On the other hand, the market to book and the tangibility ratio coefficient are always insignificantly different from zero, except when using book capital structure measures, marginal tax rates and measuring profitability by the return on equity. The size coefficient remains significantly positive, consistent with size being a proxy for the inverse probability of default, or a proxy for the inverse informational asymmetry between insiders and outsiders of the firm and preferred stock being an informationally sensitive security. Excluding small firms increases the predictive ability of our model.

*D.3 Advertising and R&D expenses.*

Advertising and R&D expenses have been mentioned as factors affecting the capital structure decision (see Titman and Wessels (1988) Harris and Raviv, 1991, and Rajan, and Zingales, 1995). Advertising and research and development expenditures can be fully depreciated, providing non-debt tax shields therefore yielding a negative relationship with preferred stocks (Bradley et al. (1984) and Long and Malitz (1985)). Working in the same direction, Myers (1977) argues that advertising and R&D expenses are discretionary assets, with high agency costs. Similarly, this negative relationship also holds for the advertising and research and development expenditures (Bradley et al. (1984) and Long and Malitz (1985)).

We could have included these variables in our main analysis; however data on advertising and research expenditures are available for less than one third of the observations. Since these two variables are not essential for our analysis, we decided the inclusion of these two additional controls is not worth the reduction in sample size. Therefore, we exclude advertising and research expenditures from our main analysis, but analyze their impact on preferred stocks in this subsection.

In Table XIII, results include the advertising and the research and the development ratio as additional control variables. Adding these variables does not significantly alter the results. The significance and sign of the debt and tax rate variables coefficient remains unchanged. Only when profitability is measured by the return of equity and we use average tax rate, the profitability measure is no longer significant. The coefficient of the tangibility and book to market variables is insignificantly different from zero. Regarding the two new variables, the coefficient of the advertising ratio is significantly negative for the different models. The results for the research and development ratio are inconclusive; its coefficient appears as significantly positive, negative and insignificant for different specifications. Including the additional controls, however, does not increase the predictive ability of our model.

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**Panel A: Whole Sample**

| | N. Obs | All | Pre 1986 | Post 1987 | Diff | 1977-81 | 1982-85 | 1986-89 | 1990-93 | 1994-97 | 1998-2001 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pref_Ratio (book) | 169,459 | 0.0205 | 0.0178 | 0.0219 | -0.0042 *** | 0.0170 | 0.0179 | 0.0206 | 0.0246 | 0.0226 | 0.0196 |
| Pref_Ratio (mkt) | 146,468 | 0.0142 | 0.0155 | 0.0136 | 0.0019 *** | 0.0167 | 0.0147 | 0.0146 | 0.0142 | 0.0123 | 0.0138 |
| Debt_Ratio (book) | 169,459 | 0.3466 | 0.3646 | 0.3373 | 0.0272 *** | 0.3761 | 0.3525 | 0.3633 | 0.3387 | 0.3202 | 0.3384 |
| Debt_Ratio (mkt) | 146,468 | 0.2777 | 0.3193 | 0.2577 | 0.0616 *** | 0.3631 | 0.2868 | 0.2878 | 0.2621 | 0.2246 | 0.2696 |
| Short Debt_Ratio (mkt) | 169,459 | 0.2396 | 0.2460 | 0.2363 | 0.0097 *** | 0.2568 | 0.2357 | 0.2421 | 0.2287 | 0.2288 | 0.2472 |
| Short Debt_Ratio (book) | 146,468 | 0.1927 | 0.2186 | 0.1802 | 0.0384 *** | 0.2516 | 0.1943 | 0.1907 | 0.1767 | 0.1612 | 0.1957 |
| Long Debt_Ratio (book) | 169,459 | 0.1070 | 0.1186 | 0.1010 | 0.0176 *** | 0.1193 | 0.1168 | 0.1212 | 0.1100 | 0.0914 | 0.0912 |
| Long Debt_Ratio (mkt) | 146,468 | 0.0850 | 0.1007 | 0.0775 | 0.0232 *** | 0.1115 | 0.0924 | 0.0971 | 0.0855 | 0.0634 | 0.0739 |
| Tax Rate | 170,905 | 0.2533 | 0.3092 | 0.2244 | 0.0847 *** | 0.3366 | 0.2846 | 0.2528 | 0.2265 | 0.2238 | 0.2122 |
| Marginal Tax Rate | 90,029 | 0.3112 | 0.4033 | 0.2733 | 0.1299 *** | 0.4293 | 0.3977 | 0.3095 | 0.2722 | 0.2700 | 0.2664 |
| Market to Book | 147,144 | 4.3244 | 3.1856 | 4.8699 | -1.6843 *** | 2.5386 | 3.5609 | 3.9302 | 4.6815 | 4.9623 | 5.5237 |
| Tangibility | 156,217 | 0.5591 | 0.5739 | 0.5510 | 0.0229 *** | 0.5745 | 0.5736 | 0.5786 | 0.5899 | 0.5262 | 0.5214 |
| Size | 168,034 | 4.2378 | 3.8610 | 4.4354 | -0.5744 *** | 3.9079 | 3.8204 | 3.9542 | 4.2301 | 4.4613 | 4.8612 |
| ROA | 170,733 | -0.0392 | 0.0093 | -0.0642 | 0.0735 *** | 0.0398 | -0.0113 | -0.0345 | -0.0217 | -0.0446 | -0.1453 |
| ROE | 170,396 | -0.2565 | -0.1572 | -0.3079 | 0.1507 | -0.0157 | -0.2691 | -0.4629 | -0.3099 | -0.0734 | -0.4474 |
| Advertising_Ratio | 50,333 | 0.0462 | 0.0405 | 0.0510 | -0.0105 *** | 0.0369 | 0.0438 | 0.0490 | 0.0449 | 0.0583 | 0.0539 |
| R&D Ratio | 78,535 | 0.0743 | 0.0440 | 0.0893 | -0.0452 *** | 0.0292 | 0.0558 | 0.0663 | 0.0786 | 0.0954 | 0.1044 |

**Panel B: Positive Preferred Ratio**

| | N. Obs | All | Pre 1986 | Post 1987 | Diff | 1977-81 | 1982-85 | 1986-89 | 1990-93 | 1994-97 | 1998-2001 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pref_Ratio (book) | 31,405 | 0.1107 | 0.0870 | 0.1250 | -0.0380 *** | 0.0797 | 0.0903 | 0.1105 | 0.1277 | 0.1339 | 0.1219 |
| Pref_Ratio (mkt) | 26,511 | 0.0785 | 0.0729 | 0.0819 | -0.0090 *** | 0.0724 | 0.0730 | 0.0814 | 0.0771 | 0.0771 | 0.0907 |
| Debt_Ratio (book) | 31,405 | 0.4319 | 0.4475 | 0.4225 | 0.0250 *** | 0.4500 | 0.4433 | 0.4574 | 0.4256 | 0.3963 | 0.4234 |
| Debt_Ratio (mkt) | 26,511 | 0.3766 | 0.4375 | 0.3392 | 0.0983 *** | 0.4679 | 0.4148 | 0.3895 | 0.3512 | 0.3003 | 0.3357 |
| Short Debt_Ratio (mkt) | 31,405 | 0.3139 | 0.3303 | 0.3039 | 0.0263 *** | 0.3402 | 0.3208 | 0.3278 | 0.2977 | 0.2851 | 0.3136 |
| Short Debt_Ratio (book) | 26,511 | 0.2735 | 0.3249 | 0.2421 | 0.0828 *** | 0.3582 | 0.2987 | 0.2741 | 0.2434 | 0.2168 | 0.2463 |
| Long Debt_Ratio (book) | 31,405 | 0.1181 | 0.1172 | 0.1186 | -0.0014 | 0.1099 | 0.1225 | 0.1296 | 0.1279 | 0.1112 | 0.1098 |
| Long Debt_Ratio (mkt) | 26,511 | 0.1030 | 0.1127 | 0.0971 | 0.0155 *** | 0.1097 | 0.1162 | 0.1153 | 0.1078 | 0.0835 | 0.0893 |
| Tax Rate | 32,149 | 0.2497 | 0.3231 | 0.2064 | 0.1167 *** | 0.3457 | 0.3017 | 0.2591 | 0.2228 | 0.1991 | 0.1693 |
| Marginal Tax Rate | 16,829 | 0.3155 | 0.4210 | 0.2666 | 0.1543 *** | 0.4427 | 0.4167 | 0.3201 | 0.2712 | 0.2552 | 0.2503 |
| Market to Book | 26,718 | 4.2873 | 2.3604 | 5.4577 | -3.0974 *** | 1.6541 | 2.9121 | 4.5035 | 5.7921 | 5.7371 | 5.2629 |
| Tangibility | 28,832 | 0.6590 | 0.7069 | 0.6290 | 0.0779 *** | 0.6992 | 0.7133 | 0.7123 | 0.6633 | 0.5874 | 0.5771 |
| Size | 31,832 | 5.1698 | 5.2864 | 5.1001 | 0.1863 *** | 5.3121 | 5.2927 | 5.2023 | 5.0291 | 4.9712 | 5.2356 |
| ROA | 32,026 | -0.0448 | 0.0145 | -0.0800 | 0.0945 *** | 0.0353 | 0.0002 | -0.0226 | -0.0440 | -0.0913 | -0.1477 |
| ROE | 31,790 | -0.5461 | -0.0776 | -0.8259 | 0.7483 *** | 0.0893 | -0.2106 | -0.7120 | -0.5775 | -0.7203 | -1.2073 |
| Advertising_Ratio | 7,753 | 0.0408 | 0.0349 | 0.0462 | -0.0113 *** | 0.0333 | 0.0371 | 0.0377 | 0.0403 | 0.0610 | 0.0533 |
| R&D Ratio | 12,008 | 0.0741 | 0.0336 | 0.0947 | -0.0611 *** | 0.0215 | 0.0436 | 0.0582 | 0.0819 | 0.1121 | 0.1077 |

**Table I: Summary Statistics.**

Table I presents summary statistics for different measures of capital structure, tax payments, growth opportunities and profitability. We compute the Preferred Ratio in book form as the ratio between Preffered Stock (Compustat annual data item 10) and the sum of Total Debt (Compustat 9 + Compustat 34) plus Book Value of Equity (Compustat 60). We also compute the Preferred ratio in market form, where we substitute the Book Value of Equity by the Market Value of Equity (Compustat 24 * Compustat 25). We simmilarly compute the Debt, Short Tem Debt (Compustat 34) and Long Term Debt (Compustat 9) ratios. We report two measures of tax rates: the average tax rate (Compustat 16 / Compustat 170); and a measure of marginal tax rate as in Graham (1996a, 1996b). Size is measured as the logarithm of Total Assets (Compustat 6). The two profitability measures, Return on Assets and Return on Equity, are computed by dividing the Income Before Extraordinary Items (Compustat 237) by Total Assets (Compustat 6), and by the Book Value of Equity (Compustat 60), respectively. The Market to Book ratio equals the Market Value of Equity divided by the Book Value of Equity. The Tangibility, Advertising and R&D Ratios come from Compustat annual data items 7, 45, and 46. We report the arithmetic mean for the relevant variables in this study, for the whole sample period, and for six four-year intervals. Given that in 1986 a new tax code was implemented, we also compare the pre- and post-1986 samples, and perform a two-sample t-test of difference in means. Panel A reports summary statistics for the whole sample; Panel B is restricted to observations with a positve preferred ratio. The different variables are explained in detail in Appendix C.

*,**,*** indicate that the associated coefficient is significantly different from zero at the 1, 5 and 10 percent level, respectively.

| | Pref Ratio (book) | Pref Ratio (mkt) | DebtRatio (book) | Debt_Ratio (mkt) | Tax Rate | Marginal Tax | Market to Book | Tangibility | Size | ROA | ROE | Advert Ratio | R&D Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pref_Ratio (book) | 1.0000 | | | | | | | | | | | | |
| Pref_Ratio (mkt) | 0.8640 *** (<0.0001) | 1.0000 | | | | | | | | | | | |
| Debt_Ratio (book) | -0.0416 *** (<0.0001) | 0.0057 (1.0000) | 1.0000 | | | | | | | | | | |
| Debt_Ratio (mkt) | -0.0162 *** (<0.0001) | 0.0442 *** (<0.0001) | 0.8491 *** (<0.0001) | 1.0000 | | | | | | | | | |
| Tax Rate | -0.0225 *** (<0.0001) | 0.0248 *** (<0.0001) | 0.7940 *** (<0.0001) | 0.6662 *** (<0.0001) | 1.0000 | | | | | | | | |
| Marginal Tax | -0.1371 *** (<0.0001) | -0.0806 *** (<0.0001) | 0.0957 *** (<0.0001) | 0.1353 *** (<0.0001) | 0.4664 (<0.0001) | 1.0000 | | | | | | | |
| Market to Book | 0.0034 (1.0000) | 0.0603 *** (<0.0001) | 0.7018 *** (<0.0001) | 0.8127 *** (<0.0001) | 0.8792 *** (<0.0001) | -0.0591 *** (<0.0001) | 1.0000 | | | | | | |
| Tangibility | -0.0366 *** (<0.0001) | -0.0255 *** (<0.0001) | 0.5249 *** (<0.0001) | 0.4572 *** (<0.0001) | -0.1007 *** (<0.0001) | 0.0000 (1.0000) | -0.0825 *** (<0.0001) | 1.0000 | | | | | |
| Size | -0.0326 *** (<0.0001) | -0.0084 * (0.0836) | 0.4760 *** (<0.0001) | 0.5799 *** (<0.0001) | -0.0859 *** (<0.0001) | 0.4330 *** (<0.0001) | -0.0033 (1.0000) | 0.9001 *** (<0.0001) | 1.0000 | | | | |
| ROA | -0.0950 *** (<0.0001) | -0.0756 *** (<0.0001) | 0.0164 *** (<0.0001) | 0.0279 *** (<0.0001) | 0.0755 *** (<0.0001) | 0.4345 *** (<0.0001) | 0.0805 *** (<0.0001) | -0.0789 *** (<0.0001) | -0.0645 *** (<0.0001) | 1.0000 | | | |
| ROE | 0.0268 *** (<0.0001) | -0.0011 (1.0000) | 0.0161 *** (<0.0001) | -0.0364 *** (<0.0001) | 0.0049 (1.0000) | 0.0978 *** (<0.0001) | -0.0316 *** (<0.0001) | 0.0195 *** (<0.0001) | -0.0183 *** (<0.0001) | -0.0366 *** (<0.0001) | 1.0000 | | |
| Advertising_Ratio | 0.0119 *** (0.0002) | 0.0221 *** (<0.0001) | 0.0468 *** (<0.0001) | 0.0557 *** (<0.0001) | 0.0718 *** (<0.0001) | -0.0177 (0.2631) | 0.0759 *** (<0.0001) | -0.0268 *** (<0.0001) | -0.0135 *** (0.0001) | 0.0023 (1.0000) | -0.0056 (1.0000) | 1.0000 | |
| R&D Ratio | -0.0604 *** (<0.0001) | -0.0110 *** (0.0019) | 0.2294 *** (<0.0001) | 0.2182 *** (<0.0001) | 0.2631 *** (<0.0001) | -0.3975 *** (<0.0001) | 0.2303 *** (<0.0001) | 0.0061 (0.8444) | 0.0520 *** (<0.0001) | 0.3318 *** (<0.0001) | -0.0377 *** (<0.0001) | 0.0256 *** (<0.0001) | 1.0000 |
| | Pref Ratio (book) | Pref Ratio (mkt) | DebtRatio (book) | Debt_Ratio (mkt) | Tax Rate | Marginal Tax | Market to Book | Tangibility | Size | ROA | ROE | Advert Ratio | R&D Ratio |

**Table II: Correlation Among Variables.**

Table II shows the Pearson correlation matrix for the different measures of capital structure, tax payments, growth opportunities and profitability identified in Table I. We compute the Preferred Ratio in book form as the ratio between Preffered Stock (Compustat annual data item 10) and the sum of Total Debt (Compustat 9 + Compustat 34) plus Book Value of Equity (Compustat 60). We also compute the Preferred ratio in market form, where we substitute the Book Value of Equity by the Market Value of Equity (Compustat 24 * Compustat 25). We simmilarly compute the Debt, Short Tem Debt (Compustat 34) and Long Term Debt (Compustat 9) ratios. We report two measures of tax rates: the average tax rate (Compustat 16 / Compustat 170); and a measure of marginal tax rate as in Graham (1996a, 1996b). Size is measured as the logarithm of Total Assets (Compustat 6). The two profitability measures, Return on Assets and Return on Equity, are computed by dividing the Income Before Extraordinary Items (Compustat 237) by Total Assets (Compustat 6), and by the Book Value of Equity (Compustat 60), respectively. The Market to Book ratio equals the Market Value of Equity divided by the Book Value of Equity. The Tangibility, Advertising and R&D Ratios come from Compustat annual data items 7, 45, and 46. We report in brackets the Bonferroni-adjusted significance level of each correlation coefficient. Data for the different variables is from Compustat, for the period 1977 to 2001.

*,**,*** indicate that the associated coefficient is significantly different from zero at the 1, 5 and 10 percent level, respectively.

| Industry | N.Obs | Issues | Proceeds | % Obs+ | Pref Ratio | Pref Ratio + | Median R + |
|---|---|---|---|---|---|---|---|
| Agriculture | 661 | 5 | 66 | 17.70% | 0.0359 | 0.2027 | 0.0901 |
| Food Products | 3,044 | 10 | 479 | 19.91% | 0.0136 | 0.0685 | 0.0328 |
| Candy & Soda | 282 | 1 | 250 | 20.92% | 0.0174 | 0.0830 | 0.0756 |
| Beer & Liquor | 481 | 1 | 300 | 22.87% | 0.0230 | 0.1004 | 0.0573 |
| Tobacco Products | 217 | 0 | 0 | 11.98% | 0.0054 | 0.0448 | 0.0328 |
| Recreation | 1,520 | 5 | 312 | 14.54% | 0.0196 | 0.1345 | 0.0793 |
| Entertainment | 3,019 | 15 | 84 | 17.46% | 0.0240 | 0.1373 | 0.0745 |
| Printingand Publishing | 1,602 | 3 | 96 | 16.29% | 0.0216 | 0.1324 | 0.0420 |
| ConsumerGoods | 3,268 | 4 | 95 | 16.22% | 0.0164 | 0.1013 | 0.0518 |
| Apparel | 2,292 | 3 | 68 | 13.66% | 0.0114 | 0.0834 | 0.0322 |
| Healthcare | 2,595 | 10 | 100 | 17.84% | 0.0240 | 0.1348 | 0.0612 |
| Medical Equipment | 4,312 | 8 | 57 | 11.48% | 0.0251 | 0.2190 | 0.1195 |
| Pharmaceutical Products | 5,286 | 11 | 97 | 17.03% | 0.0399 | 0.2343 | 0.1408 |
| Chemicals | 2,706 | 15 | 94 | 25.20% | 0.0219 | 0.0869 | 0.0330 |
| Rubber and Plastic Products | 1,972 | 2 | 28 | 17.39% | 0.0190 | 0.1091 | 0.0520 |
| Textiles | 1,374 | 3 | 66 | 16.38% | 0.0141 | 0.0859 | 0.0312 |
| Construction Materials | 4,407 | 15 | 71 | 18.70% | 0.0157 | 0.0838 | 0.0442 |
| Construction | 2,267 | 13 | 53 | 13.59% | 0.0147 | 0.1083 | 0.0826 |
| Steel Works Etc | 2,545 | 19 | 119 | 24.40% | 0.0173 | 0.0710 | 0.0442 |
| Fabricated Products | 877 | 2 | 112 | 12.66% | 0.0139 | 0.1099 | 0.0619 |
| Machinery | 5,607 | 14 | 73 | 15.05% | 0.0169 | 0.1121 | 0.0613 |
| Electrical Equipment | 2,506 | 9 | 72 | 14.29% | 0.0199 | 0.1394 | 0.1011 |
| Automobiles and Trucks | 2,517 | 21 | 290 | 20.30% | 0.0163 | 0.0805 | 0.0481 |
| Aircraft | 731 | 4 | 71 | 26.54% | 0.0213 | 0.0804 | 0.0457 |
| Shipbuilding, Railroad Equipment | 363 | 3 | 29 | 15.70% | 0.0133 | 0.0848 | 0.0243 |
| Defense | 156 | 2 | 61 | 14.10% | 0.0092 | 0.0650 | 0.0595 |
| PreciousMetals | 1,624 | 5 | 100 | 9.42% | 0.0127 | 0.1347 | 0.0405 |
| Non-Metallic and Industrial Metal Mining | 1,026 | 9 | 152 | 15.20% | 0.0120 | 0.0790 | 0.0501 |
| Coal | 191 | 2 | 26 | 25.13% | 0.0408 | 0.1624 | 0.1107 |
| Petroleumand Natural Gas | 8,107 | 77 | 80 | 19.28% | 0.0273 | 0.1414 | 0.0833 |
| Utilities | 6,215 | 321 | 73 | 72.39% | 0.0484 | 0.0668 | 0.0631 |
| Communication | 4,937 | 40 | 198 | 29.55% | 0.0267 | 0.0905 | 0.0414 |
| PersonalServices | 1,420 | 4 | 72 | 13.03% | 0.0153 | 0.1175 | 0.0357 |
| BusinessServices | 14,628 | 31 | 161 | 13.02% | 0.0243 | 0.1866 | 0.0856 |
| Computers | 6,615 | 10 | 87 | 11.50% | 0.0264 | 0.2298 | 0.1475 |
| Electronic Equipment | 7,914 | 15 | 271 | 8.85% | 0.0164 | 0.1856 | 0.1061 |
| Measuringand Control Equipment | 3,394 | 4 | 33 | 7.28% | 0.0132 | 0.1814 | 0.1053 |
| BusinessSupplies | 2,511 | 23 | 129 | 19.47% | 0.0154 | 0.0788 | 0.0544 |
| ShippingContainers | 542 | 3 | 228 | 24.35% | 0.0144 | 0.0593 | 0.0433 |
| Transportation | 4,104 | 42 | 72 | 19.15% | 0.0154 | 0.0804 | 0.0432 |
| Wholesale | 7,141 | 40 | 84 | 19.07% | 0.0214 | 0.1124 | 0.0445 |
| Retail | 8,434 | 17 | 272 | 14.50% | 0.0120 | 0.0829 | 0.0304 |
| Restaraunts, Hotels, Motels | 3,437 | 10 | 134 | 12.69% | 0.0150 | 0.1180 | 0.0338 |
| Banking | 12,867 | 347 | 145 | 19.17% | 0.0090 | 0.0470 | 0.0217 |
| Insurance | 4,191 | 71 | 126 | 19.54% | 0.0189 | 0.0966 | 0.0415 |
| Real Estate | 2,459 | 10 | 52 | 17.24% | 0.0176 | 0.1022 | 0.0593 |
| Trading | 7,939 | 208 | 111 | 16.63% | 0.0206 | 0.1238 | 0.0627 |
| Miscellaneous | 2,672 | 9 | 102 | 18.26% | 0.0257 | 0.1410 | 0.0677 |

**Table III: Preferred Ratio by Industry.**
This table reports summary statistics for the (book) preferred ratio by industry. The Preferred Ratio in book form equals the ratio between Preffered Stock (Compustat annual data item 10) and the sum of Total Debt (Compustat 9 + Compustat 34) plus Book Value of Equity (Compustat 60). We compute the number of observations for each industry in the overall sample, the percentage of observations with a postive preferred ratio, the average preferred ratio for all observations, as well as the average and median preferred ratio for those firm-year observations in which the firm has preferred stock in his capital structure (i.e. for observations with a positve preferred ratio), from Compustat. We gather the number of issues and the average proceeds per issue from SDC. We use the Fama-French (1997) classification of SIC codes into 48 different industries. A concordance between SIC code and FF industry can be found at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/det_48_ind_port.html.

**Panel A: Book Value of Assets**

| | All | Pre 1986 | Post 1987 | 1977-81 | 1982-85 | 1986-89 | 1990-93 | 1994-97 | 1998-2001 |
|---|---|---|---|---|---|---|---|---|---|
| Debt Ratio (book) | 0.0977 *** | 0.1355 *** | 0.1624 *** | 0.1190 *** | 0.1458 *** | 0.1392 *** | 0.1457 *** | 0.1623 *** | 0.1838 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Tax Rate | -0.1274 *** | -0.0397 *** | -0.1464 *** | -0.0313 *** | -0.0437 *** | -0.0895 *** | -0.1435 *** | -0.1534 *** | -0.1759 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Tangibility | -0.0018 ** | 0.0659 *** | 0.0006 | 0.0619 *** | 0.0758 *** | 0.0469 *** | 0.0327 *** | 0.0169 *** | -0.0012 |
| | (0.0500) | (<0.0001) | (0.3510) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (0.2700) |
| Market to Book | 0.0000 * | 0.0002 *** | 0.0000 | 0.0005 *** | 0.0003 *** | 0.0002 * | 0.0001 | -0.0001 | -0.0001 |
| | (0.0530) | (0.0030) | (0.8170) | (<0.0001) | (0.0040) | (0.0700) | (0.1250) | (0.3590) | (0.4680) |
| Size | 0.0135 *** | 0.0212 *** | 0.0115 *** | 0.0223 *** | 0.0205 *** | 0.0220 *** | 0.0163 *** | 0.0102 *** | -0.0003 |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (0.8420) |
| ROA | -0.1361 *** | -0.1508 *** | -0.1336 *** | -0.1666 *** | -0.1456 *** | -0.1407 *** | -0.1396 *** | -0.1887 *** | -0.1041 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Year1986 | -0.0337 *** | | | | | | | | |
| | (0.0000) | | | | | | | | |
| Constant | -0.2574 *** | -0.3001 *** | -0.3352 *** | -0.2602 *** | -0.3295 *** | -0.3671 *** | -0.3332 *** | -0.3353 *** | -0.3413 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| N. Obs | 111,070 | 35,772 | 75,298 | 14,432 | 17,054 | 17,802 | 17,830 | 22,338 | 21,614 |
| R-Square | 0.1641 | 0.2542 | 0.0650 | 0.4568 | 0.2055 | 0.1155 | 0.0882 | 0.0815 | 0.0560 |

**Panel B: Quasi-Market Value of Assets**

| | All | Pre 1986 | Post 1987 | 1977-81 | 1982-85 | 1986-89 | 1990-93 | 1994-97 | 1998-2001 |
|---|---|---|---|---|---|---|---|---|---|
| Debt Ratio (mkt) | 0.0980 *** | 0.1577 *** | 0.1470 *** | 0.1492 *** | 0.1581 *** | 0.1376 *** | 0.1418 *** | 0.1580 *** | 0.1454 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Tax Rate | -0.3233 *** | -0.1605 *** | -0.3452 *** | -0.0736 | -0.1346 *** | -0.2184 *** | -0.4606 *** | -0.4083 *** | -0.4237 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Tangibility | 0.0033 | 0.0650 *** | 0.0258 *** | 0.0555 *** | 0.0721 *** | 0.0529 *** | 0.0340 *** | 0.0173 *** | 0.0124 *** |
| | (0.2270) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (0.0010) | (0.0040) |
| Market to Book | 0.0001 ** | 0.0009 *** | 0.0000 | 0.0013 *** | 0.0013 *** | 0.0003 ** | 0.0010 *** | 0.0004 ** | -0.0004 |
| | (0.0210) | (<0.0001) | (0.2360) | (<0.0001) | (<0.0001) | (0.0310) | (<0.0001) | (0.0120) | (0.1450) |
| Size | 0.0152 *** | 0.0216 *** | 0.0148 *** | 0.0222 *** | 0.0208 *** | 0.0241 *** | 0.0209 *** | 0.0151 *** | 0.0076 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| ROA | -0.1343 *** | -0.1018 *** | -0.1346 *** | -0.1213 *** | -0.1147 *** | -0.1655 *** | -0.1185 *** | -0.1327 *** | -0.1100 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (0.0010) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Year1986 | -0.0591 *** | | | | | | | | |
| | (0.0000) | | | | | | | | |
| Constant | -0.2369 *** | -0.2801 *** | -0.2763 *** | -0.2708 *** | -0.2928 *** | -0.3293 *** | -0.2553 *** | -0.2554 *** | -0.2550 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| N. Obs | 69,701 | 18,221 | 51,480 | 2,987 | 12,135 | 12,745 | 13,099 | 14,337 | 14,398 |
| R-Square | 0.1733 | 0.2027 | 0.0839 | 0.3358 | 0.2009 | 0.1237 | 0.1072 | 0.1029 | 0.0748 |

**Table IV: Regression Estimates. Average Tax Rates.**
We estimate the following regression for the whole sample, for the pre- and post-1986 years, as well as for six four-year periods:

$$\Pr ef = C + \beta_1 Debt + \beta_2 Tax + \beta_3 Grow + \beta_4 Tang + \beta_5 Size + \beta_6 \Pr of + \varepsilon$$

The dependent variable in Panel A is the Preferred Ratio in book form, measured by the ratio between Preffered Stock (Compustat annual data item 10) and the sum of Total Debt (Compustat 9 + Compustat 34) plus Book Value of Equity (Compustat 60). The dependent variable in Panel B is the Preferred ratio in market form, where we substitute the Book Value of Equity by the Market Value of Equity (Compustat 24 * Compustat 25). We simmilarly compute the Debt book and market ratios. The average tax rate is computed Compustat annual data item 16 divided by Compustat annual data item 170. Size is measured as the logarithm of Total Assets (Compustat 6). The Return on Assets is computed by dividing the Income Before Extraordinary Items (Compustat 237) by Total Assets (Compustat 6). The Market to Book ratio equals the Market Value of Equity divided by the Book Value of Equity. Given that in 1986 a new tax code was implemented, we add ad Year 1986 dummy, that takes the value of 1 for port 1986 observations. The Tangibility Ratio come from Compustat annual data items 7. To control for possible endogeneity, we use the one-period lagged value of the control variables. We account for the noise in capital structure measures using the period´s averages rather than individual observations, in the six four-year samples. For the longer samples, we run pooled time-series cross-sectional regressions. Since capital structure data is censored, we report tobit estimates. All models use industry fixed effects. We report in square brackets the corresponding estimate´s p-value.
*,**,*** indicate that the associated coefficient is significantly different from zero at the 1, 5 and 10 percent level, respectively.

**Panel A: Book Value of Assets**

| | All | Pre 1986 | Post 1987 | 1977-81 | 1982-85 | 1986-89 | 1990-93 | 1994-97 | 1998-2001 |
|---|---|---|---|---|---|---|---|---|---|
| Debt Ratio (book) | 0.1073 *** | 0.1473 *** | 0.1693 *** | 0.1368 *** | 0.1573 *** | 0.1465 *** | 0.1528 *** | 0.1794 *** | 0.1906 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Marginal Tax Rate | -0.1595 *** | -0.0672 *** | -0.1810 *** | -0.0473 *** | -0.0713 *** | -0.1223 *** | -0.1742 *** | -0.1931 *** | -0.2040 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Tangibility | 0.0001 | 0.0714 *** | 0.0022 *** | 0.0618 *** | 0.0801 *** | 0.0552 *** | 0.0330 *** | 0.0179 *** | 0.0001 |
| | (0.8710) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (0.9520) |
| Market to Book | 0.0001 *** | 0.0002 *** | 0.0001 ** | 0.0003 *** | 0.0003 *** | 0.0001 | 0.0001 | 0.0001 | 0.0000 |
| | (<0.0001) | (<0.0001) | (0.0270) | (<0.0001) | (<0.0001) | (0.3710) | (0.2460) | (0.1930) | (0.8530) |
| Size | 0.0095 *** | 0.0187 *** | 0.0068 *** | 0.0214 *** | 0.0178 *** | 0.0181 *** | 0.0128 *** | 0.0025 ** | -0.0057 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| ROA | -0.0010 *** | 0.0003 | -0.0010 *** | -0.0032 *** | 0.0010 | -0.0010 *** | -0.0023 *** | -0.0010 *** | -0.0005 * |
| | (<0.0001) | (0.3870) | (<0.0001) | (<0.0001) | (0.2330) | (<0.0001) | (0.0030) | (0.0020) | (0.0990) |
| Year1986 | -0.0286 *** | | | | | | | | |
| | (0.0000) | | | | | | | | |
| Constant | -0.2419 *** | -0.2924 *** | -0.3078 *** | -0.2647 *** | -0.3191 *** | -0.3479 *** | -0.3120 *** | -0.2977 *** | -0.3090 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| N. Obs | 111,070 | 35,772 | 75,298 | 14,432 | 17,054 | 17,802 | 17,830 | 22,338 | 21,614 |
| R-Square | 0.1414 | 0.2340 | 0.0448 | 0.4377 | 0.1904 | 0.1001 | 0.0731 | 0.0473 | 0.0400 |

**Panel B: Quasi-Market Value of Assets**

| | All | Pre 1986 | Post 1987 | 1977-81 | 1982-85 | 1986-89 | 1990-93 | 1994-97 | 1998-2001 |
|---|---|---|---|---|---|---|---|---|---|
| Debt Ratio (mkt) | 0.1075 *** | 0.1720 *** | 0.1528 *** | 0.1589 *** | 0.1747 *** | 0.1512 *** | 0.1478 *** | 0.1652 *** | 0.1441 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Marginal Tax Rate | -0.4234 *** | -0.2468 *** | -0.4472 *** | -0.1169 ** | -0.2299 *** | -0.3333 *** | -0.5661 *** | -0.5124 *** | -0.4909 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Tangibility | 0.0054 ** | 0.0682 *** | 0.0260 *** | 0.0559 *** | 0.0739 *** | 0.0586 *** | 0.0336 *** | 0.0176 *** | 0.0119 *** |
| | (0.0420) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (0.0010) | (0.0060) |
| Market to Book | 0.0002 *** | 0.0009 *** | 0.0000 | 0.0012 *** | 0.0011 *** | 0.0002 | 0.0010 *** | 0.0002 | -0.0008 *** |
| | (<0.0001) | (<0.0001) | (0.6630) | (<0.0001) | (<0.0001) | (0.1290) | (<0.0001) | (0.3930) | (0.0050) |
| Size | 0.0132 *** | 0.0212 *** | 0.0127 *** | 0.0221 *** | 0.0204 *** | 0.0217 *** | 0.0201 *** | 0.0130 *** | 0.0054 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (0.0010) |
| ROA | -0.0020 *** | 0.0021 ** | -0.0041 *** | -0.0124 *** | 0.0025 * | -0.0008 | -0.0040 *** | -0.0050 *** | -0.0098 *** |
| | (<0.0001) | (0.0350) | (<0.0001) | (0.0060) | (0.0720) | (0.1350) | (<0.0001) | (0.0010) | (<0.0001) |
| Year1986 | -0.0666 *** | | | | | | | | |
| | (0.0000) | | | | | | | | |
| Constant | -0.1993 *** | -0.2522 *** | -0.2380 *** | -0.2597 *** | -0.2608 *** | -0.2876 *** | -0.2225 *** | -0.2178 *** | -0.2214 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| N. Obs | 69,701 | 18,221 | 51,480 | 2,987 | 12,135 | 12,745 | 13,099 | 14,337 | 14,398 |
| R-Square | 0.1608 | 0.1984 | 0.0728 | 0.3321 | 0.1953 | 0.1095 | 0.1017 | 0.0907 | 0.0665 |

**Table V: Regression Estimates. Marginal Tax Rates.**

We estimate the following regression for the whole sample, for the pre- and post-1986 years, as well as for six four-year periods:

$$\Pr ef = C + \beta_1 Debt + \beta_2 Tax + \beta_3 Grow + \beta_4 Tang + \beta_5 Size + \beta_6 \Pr of + \varepsilon$$

The dependent variable in Panel A is the Preferred Ratio in book form, measured by the ratio between Preffered Stock (Compustat annual data item 10) and the sum of Total Debt (Compustat 9 + Compustat 34) plus Book Value of Equity (Compustat 60). The dependent variable in Panel B is the Preferred ratio in market form, where we substitute the Book Value of Equity by the Market Value of Equity (Compustat 24 * Compustat 25). We simmilarly compute the Debt book and market ratios. The marignal tax rate comes from Graham (1996a, 1996b). Size is measured as the logarithm of Total Assets (Compustat 6). The Return on Assets is computed by dividing the Income Before Extraordinary Items (Compustat 237) by Total Assets (Compustat 6). The Market to Book ratio equals the Market Value of Equity divided by the Book Value of Equity. The Tangibility Ratio come from Compustat annual data items 7. Given that in 1986 a new tax code was implemented, we add ad Year 1986 dummy, that takes the value of 1 for port 1986 observations. To control for possible endogeneity, we use the one-period lagged value of the control variables. We account for the noise in capital structure measures using the period´s averages rather than individual observations, in the six four-year samples. For the longer samples, we run pooled time-series cross-sectional regressions. Since capital structure data is censored, we report tobit estimates. All models use industry fixed effects. We report in square brackets the corresponding estimate´s p-value.

*,**,*** indicate that the associated coefficient is significantly different from zero at the 1, 5 and 10 percent level, respectively.

**Panel A: Book Value of Assets; Average Tax Rates**

| | All | Pre 1986 | Post 1987 | 1977-81 | 1982-85 | 1986-89 | 1990-93 | 1994-97 | 1998-2001 |
|---|---|---|---|---|---|---|---|---|---|
| Debt Ratio (book) | 0.0575 *** | 0.0813 *** | 0.1110 *** | 0.0521 *** | 0.0968 *** | 0.0977 *** | 0.1198 *** | 0.0961 *** | 0.1217 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Tax Rate | -0.0717 *** | 0.0128 ** | -0.1047 *** | -0.0135 * | 0.0287 *** | -0.0240 ** | -0.1143 *** | -0.1291 *** | -0.1285 *** |
| | (<0.0001) | (0.0360) | (<0.0001) | (0.0990) | (0.0040) | (0.0410) | (<0.0001) | (<0.0001) | (<0.0001) |
| Tangibility | -0.0007 | 0.0687 *** | 0.0226 *** | 0.0621 *** | 0.0747 *** | 0.0615 *** | 0.0284 *** | 0.0163 *** | 0.0118 *** |
| | (0.7590) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Market to Book | 0.0000 | 0.0007 *** | 0.0000 | 0.0018 *** | 0.0006 *** | 0.0006 *** | 0.0002 *** | -0.0001 | -0.0001 |
| | (0.1530) | (<0.0001) | (0.9810) | (<0.0001) | (0.0050) | (0.0020) | (<0.0001) | (0.5890) | (0.7770) |
| Size | 0.0128 *** | 0.0176 *** | 0.0126 *** | 0.0197 *** | 0.0166 *** | 0.0176 *** | 0.0154 *** | 0.0124 *** | 0.0084 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| ROA | -0.4880 *** | -0.8287 *** | -0.4807 *** | -0.8940 *** | -0.8479 *** | -0.6182 *** | -0.3529 *** | -0.6789 *** | -0.3448 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Year1986 | -0.0399 *** | | | | | | | | |
| | (<0.0001) | | | | | | | | |
| Constant | -0.1384 *** | -0.2104 *** | -0.2333 *** | -0.1721 *** | -0.2360 *** | -0.2599 *** | -0.2335 *** | -0.2076 *** | -0.2571 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| N. Obs | 82,201 | 29,487 | 52,714 | 13,084 | 13,321 | 12,770 | 12,674 | 16,027 | 14,325 |
| R-Square | 0.3496 | 0.4951 | 0.1462 | 0.6936 | 0.4129 | 0.2780 | 0.2006 | 0.1513 | 0.0887 |

**Panel B: Quasi-Market Value of Assets; Marginal Tax Rates**

| | All | Pre 1986 | Post 1987 | 1977-81 | 1982-85 | 1986-89 | 1990-93 | 1994-97 | 1998-2001 |
|---|---|---|---|---|---|---|---|---|---|
| Debt Ratio (mkt) | 0.0861 *** | 0.1388 *** | 0.1052 *** | 0.0957 *** | 0.1405 *** | 0.1122 *** | 0.1058 *** | 0.1133 *** | 0.0790 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Marginal Tax Rate | -0.1530 *** | -0.0949 *** | -0.1154 *** | 0.0684 | -0.0870 ** | -0.0917 *** | -0.2070 *** | -0.2069 *** | -0.1548 *** |
| | (<0.0001) | (0.0030) | (<0.0001) | (0.4590) | (0.0380) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Tangibility | -0.0002 | 0.0601 *** | 0.0180 *** | 0.0604 *** | 0.0605 *** | 0.0544 *** | 0.0235 *** | 0.0150 *** | 0.0093 *** |
| | (0.9430) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Market to Book | 0.0000 | 0.0017 *** | 0.0000 | 0.0028 *** | 0.0016 *** | 0.0003 * | 0.0004 ** | 0.0000 | 0.0000 |
| | (0.2970) | (<0.0001) | (0.7020) | (0.0050) | (<0.0001) | (0.0540) | (0.0130) | (0.9280) | (0.8830) |
| Size | 0.0101 *** | 0.0156 *** | 0.0105 *** | 0.0182 *** | 0.0153 *** | 0.0143 *** | 0.0126 *** | 0.0104 *** | 0.0093 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| ROA | -0.2772 *** | -0.4721 *** | -0.2823 *** | -0.6675 *** | -0.5087 *** | -0.4324 *** | -0.1812 *** | -0.3159 *** | -0.2468 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Year1986 | -0.0421 *** | | | | | | | | |
| | (<0.0001) | | | | | | | | |
| Constant | -0.1137 *** | -0.1944 *** | -0.1774 *** | -0.2379 *** | -0.1991 *** | -0.1989 *** | -0.1565 *** | -0.1406 *** | -0.1782 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| N. Obs | 52,405 | 14,696 | 37,709 | 2,658 | 9,765 | 9,308 | 9,523 | 10,828 | 10,323 |
| R-Square | 0.3910 | 0.4679 | 0.1741 | 0.6221 | 0.4389 | 0.3319 | 0.2217 | 0.2109 | 0.0926 |

**Table VI: Positive Return on Assets.**
We estimate the following regression for the whole sample, for the pre- and post-1986 years, as well as for six four-year periods, but limited to observations with a positive Return on Assets:

$$\Pr ef = C + \beta_1 Debt + \beta_2 Tax + \beta_3 Grow + \beta_4 Tang + \beta_5 Size + \beta_6 \Pr of + \varepsilon$$

The dependent variable in Panel A is the Preferred Ratio in book form, measured by the ratio between Preffered Stock (Compustat annual data item 10) and the sum of Total Debt (Compustat 9 + Compustat 34) plus Book Value of Equity (Compustat 60). The dependent variable in Panel B is the Preferred ratio in market form, where we substitute the Book Value of Equity by the Market Value of Equity (Compustat 24 * Compustat 25). We simmilarly compute the Debt book and market ratios. We report two measures of tax rates: the average tax rate (Compustat 16 / Compustat 170); and a measure of marginal tax rate as in Graham (1996a, 1996b). Size is measured as the logarithm of Total Assets (Compustat 6). The Return on Assets is computed by dividing the Income Before Extraordinary Items (Compustat 237) by Total Assets (Compustat 6). The Market to Book ratio equals the Market Value of Equity divided by the Book Value of Equity. The Tangibility Ratio come from Compustat annual data items 7. Given that in 1986 a new tax code was implemented, we add ad Year 1986 dummy, that takes the value of 1 for port 1986 observations. To control for possible endogeneity, we use the one-period lagged value of the control variables. We account for the noise in capital structure measures using the period´s averages rather than individual observations, in the six four-year samples. For the longer samples, we run pooled time-series cross-sectional regressions. Since capital structure data is censored, we report tobit estimates. All models use industry fixed effects. We report in square brackets the corresponding estimate´s p-value.
*,**,*** indicate that the associated coefficient is significantly different from zero at the 1, 5 and 10 percent level, respectively.

**Whole Sample**

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Debt Ratio (book) | 0.1112 *** | | 0.1166 *** | |
| | (0.0000) | | (0.0000) | |
| Debt Ratio (mkt) | | 0.1108 *** | | 0.1176 *** |
| | | (0.0000) | | (0.0000) |
| Tax Rate | -0.0979 *** | -0.2403 *** | | |
| | (0.0000) | (0.0000) | | |
| Marginal Tax Rate | | | -0.1197 *** | -0.3087 *** |
| | | | (0.0000) | (0.0000) |
| Tangibility | -0.0014 * | 0.0014 | 0.0000 | 0.0027 |
| | (0.0990) | (0.5230) | (0.9820) | (0.2080) |
| Market to Book | 0.0000 | 0.0000 | 0.0001 *** | 0.0001 *** |
| | (0.2160) | (0.1150) | (0.0010) | (0.0000) |
| Size | 0.0114 *** | 0.0125 *** | 0.0086 *** | 0.0112 *** |
| | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| ROE | -0.0958 *** | -0.0930 *** | -0.0007 *** | -0.0014 *** |
| | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| Year1986 | -0.0260 *** | -0.0447 *** | -0.0221 *** | -0.0496 *** |
| | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| Constant | -0.2217 *** | -0.1969 *** | -0.2100 *** | -0.1708 *** |
| | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| N. Obs | 110,386 | 69,360 | 110,386 | 69,360 |
| R-Square | 0.2196 | 0.2223 | 0.1981 | 0.2109 |

**Positive ROE**

| | 5 | 6 | 7 | 8 |
|---|---|---|---|---|
| Debt Ratio (book) | 0.1033 *** | | 0.1204 *** | |
| | (<0.0001) | | (<0.0001) | |
| Debt Ratio (mkt) | | 0.1085 *** | | 0.1160 *** |
| | | (<0.0001) | | (<0.0001) |
| Tax Rate | -0.0678 *** | -0.2340 *** | | |
| | (<0.0001) | (<0.0001) | | |
| Marginal Tax Rate | | | -0.0566 *** | -0.1736 *** |
| | | | (<0.0001) | (<0.0001) |
| Tangibility | 0.0008 | 0.0011 | 0.0001 | 0.0001 |
| | (0.6990) | (0.6740) | (0.9720) | (0.9630) |
| Market to Book | -0.0002 * | -0.0006 *** | -0.0002 | -0.0005 *** |
| | (0.0510) | (<0.0001) | (0.1560) | (<0.0001) |
| Size | 0.0127 *** | 0.0118 *** | 0.0114 *** | 0.0104 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| ROE | 0.0024 * | 0.0062 *** | 0.0016 | 0.0057 *** |
| | (0.0620) | (<0.0001) | (0.1580) | (<0.0001) |
| Year1986 | -0.0387 *** | -0.0554 *** | -0.0313 *** | -0.0427 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Constant | -0.1900 *** | -0.1446 *** | -0.1789 *** | -0.1345 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| N. Obs | 82,201 | 52,557 | 81,849 | 52,405 |
| R-Square | 0.3273 | 0.2893 | 0.4241 | 0.3813 |

**Table VII: Retun on Equity Estimates.**
We estimate the following regression for observations with a positive Return on Assets:

$$\Pr ef = C + \beta_1 Debt + \beta_2 Tax + \beta_3 Grow + \beta_4 Tang + \beta_5 Size + \beta_6 \Pr of + \varepsilon$$

Panel A reports estimates for the whole sample; Panel B is restricted to firm-year observations with a positive return on equity. The dependent variable in Panel A is the Preferred Ratio in book form, measured by the ratio between Preffered Stock (Compustat annual data item 10) and the sum of Total Debt (Compustat 9 + Compustat 34) plus Book Value of Equity (Compustat 60). The dependent variable in Panel B is the Preferred ratio in market form, where we substitute the Book Value of Equity by the Market Value of Equity (Compustat 24 * Compustat 25). We simmilarly compute the Debt book and market ratios. We report two measures of tax rates: the average tax rate (Compustat 16 / Compustat 170); and a measure of marginal tax rate as in Graham (1996a, 1996b). Size is measured as the logarithm of Total Assets (Compustat 6). The Return on Equity is computed by dividing the Income Before Extraordinary Items (Compustat 237) by the Book Value of Equity (Compustat 60), respectively. The Market to Book ratio equals the Market Value of Equity divided by the Book Value of Equity. The Tangibility Ratio come from Compustat annual data items 7. Given that in 1986 a new tax code was implemented, we add ad Year 1986 dummy, that takes the value of 1 for port 1986 observations. To control for possible endogeneity, we use the one-period lagged value of the control variables. We run pooled time-series cross-sectional regressions. Since capital structure data is censored, we report tobit estimates. All models use industry fixed effects. We report in square brackets the corresponding estimate´s p-value.
*,**,*** indicate that the associated coefficient is significantly different from zero at the 1, 5 and 10 percent level, respectively.

**Panel A: Book Value of Assets**

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Debt Ratio (book) | 0.9426 *** | 1.0665 *** | 0.9542 *** | 1.0923 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Tax Rate | -0.6069 *** | | -0.6302 *** | |
| | (<0.0001) | | (<0.0001) | |
| Marginal Tax Rate | | -0.6279 *** | | -0.8477 *** |
| | | (0.0020) | | (<0.0001) |
| Tangibility | 0.0051 | 0.0870 *** | 0.0075 ** | 0.0868 *** |
| | (0.1070) | (<0.0001) | (0.0170) | (<0.0001) |
| Market to Book | 0.0000 | 0.0000 | 0.0001 | 0.0001 |
| | (0.8870) | (0.9370) | (0.7850) | (0.8990) |
| Size | 0.1425 *** | 0.1663 *** | 0.1389 *** | 0.1628 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| ROA | -0.1864 *** | -0.3695 *** | | |
| | (<0.0001) | (<0.0001) | | |
| ROE | | | -0.0006 * | -0.0025 ** |
| | | | (0.0722) | (0.0344) |
| Year1986 | -0.2308 *** | -0.2792 *** | -0.2249 *** | -0.2983 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Constant | -3.2445 *** | -3.4401 *** | -3.2297 *** | -3.3456 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| N. Obs | 111,504 | 69,957 | 111,504 | 69,957 |
| R-Square | 0.1097 | 0.1259 | 0.1087 | 0.1243 |

**Panel B: Quasi-Market Value of Assets**

| | 5 | 6 | 7 | 8 |
|---|---|---|---|---|
| Debt Ratio (mkt) | 0.8177 *** | 0.9956 *** | 0.8296 *** | 1.0240 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Tax Rate | -0.6006 *** | | -0.6223 *** | |
| | (<0.0001) | | (<0.0001) | |
| Marginal Tax Rate | | -0.6879 *** | | -0.8897 *** |
| | | (0.0010) | | (<0.0001) |
| Tangibility | 0.0048 | 0.0842 *** | 0.0072 ** | 0.0842 *** |
| | (0.1330) | (<0.0001) | (0.0220) | (<0.0001) |
| Market to Book | 0.0002 * | 0.0003 | 0.0003 ** | 0.0007 ** |
| | (0.0910) | (0.2860) | (0.0390) | (0.0370) |
| Size | 0.1457 *** | 0.1749 *** | 0.1426 *** | 0.1718 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| ROA | -0.1919 *** | -0.3888 *** | | |
| | (<0.0001) | (<0.0001) | | |
| ROE | | | -0.0021 * | -0.0049 ** |
| | | | (0.0610) | (0.0250) |
| Year1986 | -0.1696 *** | -0.2229 *** | -0.1633 *** | -0.2385 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Constant | -3.1968 *** | -3.4063 *** | -3.1852 *** | -3.3240 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| N. Obs | 111,504 | 69,957 | 111,504 | 69,957 |
| R-Square | 0.1052 | 0.1254 | 0.1043 | 0.1243 |

**Table VIII: Probit Estimates for New Preferred Issues.**
We estimate the following Probit regression

$$\Pr ef\_Issue = C + \beta_1 Debt + \beta_2 Tax + \beta_3 Grow + \beta_4 Tang + \beta_5 Size + \beta_6 \Pr of + \varepsilon$$

The dependent variable takes the value of one if the firm issues preferred stock that year, and zero otherwise. Debt Ratio in book form equals the ratio between Total Debt (Compustat 9 + Compustat 34) and the sum of Total Debt plus Book Value of Equity (Compustat 60). We also compute the Debt ratio in market form, where we substitute the Book Value of Equity by the Market Value of Equity (Compustat 24 * Compustat 25). We report two measures of tax rates: the average tax rate (Compustat 16 / Compustat 170); and a measure of marginal tax rate as in Graham (1996a, 1996b). Size is measured as the logarithm of Total Assets (Compustat 6). The two profitability measures, Return on Assets and Return on Equity, are computed by dividing the Income Before Extraordinary Items (Compustat 237) by Total Assets (Compustat 6), and by the Book Value of Equity (Compustat 60), respectively. The Market to Book ratio equals the Market Value of Equity divided by the Book Value of Equity. The Tangibility Ratio come from Compustat annual data items 7. Given that in 1986 a new tax code was implemented, we add ad Year 1986 dummy, that takes the value of 1 for port 1986 observations. To control for possible endogeneity, we use the one-period lagged value of the control variables. All models use industry fixed effects. We report in square brackets the corresponding estimate´s p-value.
*,**,*** indicate that the associated coefficient is significantly different from zero at the 1, 5 and 10 percent level, respectively.

**Panel A: Book Value of Assets**

| | All | Pre 1986 | Post 1987 | 1977-81 | 1982-85 | 1986-89 | 1990-93 | 1994-97 | 1998-2001 |
|---|---|---|---|---|---|---|---|---|---|
| Debt Ratio (book) | 1.0029 *** | 1.1512 *** | 0.9454 *** | 1.0545 *** | 1.9026 *** | 0.9385 *** | 1.1347 *** | 0.6848 *** | 0.7519 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Tax Rate | -0.7529 *** | -0.8148 *** | -0.5968 *** | -0.8375 *** | -0.9935 *** | -0.3769 * | -0.7588 *** | -0.7468 *** | -0.3786 |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (0.0870) | (<0.0001) | (<0.0001) | (0.1100) |
| Tangibility | 0.1027 *** | 0.7008 *** | 0.0473 * | 0.7376 *** | 0.7727 *** | 0.2602 *** | 0.1578 *** | -0.2016 ** | -0.2139 ** |
| | (<0.0001) | (<0.0001) | (0.0640) | (<0.0001) | (<0.0001) | (0.0020) | (<0.0001) | (0.0380) | (0.0480) |
| Market to Book | -0.0120 * | -0.0057 | -0.0108 | 0.0127 | -0.1722 *** | -0.0445 | -0.0026 | -0.0021 | -0.0187 |
| | (0.0580) | (0.6960) | (0.1050) | (0.3140) | (0.0040) | (0.1880) | (0.6470) | (0.8420) | (0.2710) |
| Size | 0.1576 *** | 0.1760 *** | 0.1408 *** | 0.1752 *** | 0.1858 *** | 0.1725 *** | 0.1453 *** | 0.1321 *** | 0.1664 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| ROA | -3.2276 *** | -4.1946 *** | -2.7787 *** | -4.7705 ** | -1.0684 * | -3.2655 ** | -0.6412 ** | -6.0499 *** | -5.1774 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (0.0110) | (0.0578) | (0.0470) | (0.0403) | (<0.0001) | (0.0020) |
| Year1986 | -0.2063 *** | | | | | | | | |
| | (<0.0001) | | | | | | | | |
| Constant | -3.2280 *** | -3.8148 *** | -3.3264 *** | -3.8683 *** | -4.1549 *** | -3.2846 *** | -3.3527 *** | -2.9521 *** | -3.4048 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| N. Obs | 82,502 | 29,540 | 52,962 | 13,095 | 13,357 | 12,800 | 12,722 | 16,094 | 14,434 |
| R-Square | 0.1410 | 0.1941 | 0.1244 | 0.1921 | 0.2456 | 0.1550 | 0.1257 | 0.1256 | 0.1560 |

**Panel B: Quasi-Market Value of Assets**

| | All | Pre 1986 | Post 1987 | 1977-81 | 1982-85 | 1986-89 | 1990-93 | 1994-97 | 1998-2001 |
|---|---|---|---|---|---|---|---|---|---|
| Debt Ratio (mkt) | 0.9494 *** | 0.9148 *** | 0.9197 *** | 0.6571 *** | 1.6650 *** | 0.8827 *** | 0.9634 *** | 0.7987 *** | 0.6128 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (0.0060) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (0.0020) |
| Tax Rate | -0.7272 *** | -0.7865 *** | -0.5757 *** | -0.8006 *** | -0.9669 *** | -0.3597 * | -0.7208 *** | -0.7301 *** | -0.3839 |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (0.1000) | (<0.0001) | (<0.0001) | (0.1020) |
| Tangibility | 0.1020 *** | 0.6879 *** | 0.0518 ** | 0.7401 *** | 0.7613 *** | 0.2569 *** | 0.1555 *** | -0.1908 ** | -0.1889 * |
| | (<0.0001) | (<0.0001) | (0.0300) | (<0.0001) | (<0.0001) | (0.0020) | (<0.0001) | (0.0500) | (0.0790) |
| Market to Book | 0.0001 | 0.0033 | 0.0001 | 0.0211 *** | -0.0022 | -0.0017 | 0.0003 | 0.0008 | -0.0029 |
| | (0.8430) | (0.2820) | (0.9390) | (0.0010) | (0.9170) | (0.9270) | (0.6420) | (0.7820) | (0.7950) |
| Size | 0.1639 *** | 0.1695 *** | 0.1518 *** | 0.1644 *** | 0.1873 *** | 0.1756 *** | 0.1565 *** | 0.1379 *** | 0.1786 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| ROA | -2.7871 *** | -3.9869 *** | -2.4157 *** | -5.5017 *** | -1.4607 ** | -3.1443 * | -0.5550 ** | -5.1495 *** | -5.3933 *** |
| | (<0.0001) | (0.0010) | (<0.0001) | (0.0010) | (0.0427) | (0.0510) | (0.0468) | (0.0010) | (0.0010) |
| Year1986 | -0.1336 *** | | | | | | | | |
| | (<0.0001) | | | | | | | | |
| Constant | -3.2817 *** | -3.6813 *** | -3.3521 *** | -3.6194 *** | -4.2302 *** | -3.3061 *** | -3.2851 *** | -3.0121 *** | -3.4060 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| N. Obs | 82,502 | 29,540 | 52,962 | 13,095 | 13,357 | 12,800 | 12,722 | 16,094 | 14,434 |
| R-Square | 0.1395 | 0.1888 | 0.1233 | 0.1852 | 0.2392 | 0.1531 | 0.1186 | 0.1280 | 0.1515 |

**Table IX: Probit Estimates for Positive Return on Asset Observations.**
We estimate the following Probit regression for firm-year observations with a positive Return on Assets:

$$\Pr ef\_Issue = C + \beta_1 Debt + \beta_2 Tax + \beta_3 Grow + \beta_4 Tang + \beta_5 Size + \beta_6 \Pr of + \varepsilon$$

The dependent variable takes the value of one if the firm issues preferred stock that year, and zero otherwise. Debt Ratio in book form equals the ratio between Total Debt (Compustat 9 + Compustat 34) and the sum of Total Debt plus Book Value of Equity (Compustat 60). We also compute the Debt ratio in market form, where we substitute the Book Value of Equity by the Market Value of Equity (Compustat 24 * Compustat 25). We report two measures of tax rates: the average tax rate (Compustat 16 / Compustat 170); and a measure of marginal tax rate as in Graham (1996a, 1996b). Size is measured as the logarithm of Total Assets (Compustat 6). The Return on Assets is computed by dividing the Income Before Extraordinary Items (Compustat 237) by Total Assets (Compustat 6). The Market to Book ratio equals the Market Value of Equity divided by the Book Value of Equity. The Tangibility Ratio come from Compustat annual data items 7. Given that in 1986 a new tax code was implemented, we add ad Year 1986 dummy, that takes the value of 1 for port 1986 observations. To control for possible endogeneity, we use the one-period lagged value of the control variables. All models use industry fixed effects. We report in square brackets the corresponding estimate´s p-value.
*,**,*** indicate that the associated coefficient is significantly different from zero at the 1, 5 and 10 percent level, respectively.

**Panel A: Book Value of Assets**

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Debt Ratio (book) | 0.0059 *** | 0.0055 *** | 0.0079 *** | 0.0076 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Tax Rate | -0.0242 *** | | -0.0322 *** | |
| | (<0.0001) | | (<0.0001) | |
| Marginal Tax Rate | | -0.0476 *** | | -0.0674 *** |
| | | (<0.0001) | | (<0.0001) |
| Tangibility | 0.0002 | 0.0039 *** | 0.0006 *** | 0.0042 *** |
| | (0.2520) | (<0.0001) | (<0.0001) | (<0.0001) |
| Market to Book | 0.0000 *** | 0.0001 *** | 0.0000 *** | 0.0001 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Size | 0.0002 ** | 0.0000 | -0.0006 *** | -0.0004 *** |
| | (0.0280) | (0.7360) | (<0.0001) | (<0.0001) |
| ROA | -0.0330 *** | -0.0335 *** | | |
| | (<0.0001) | (<0.0001) | | |
| ROE | | | -0.0005 *** | -0.0012 *** |
| | | | (<0.0001) | (<0.0001) |
| Constant | 0.0215 *** | 0.0277 *** | 0.0266 *** | 0.0349 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| N. Obs | 111,070 | 69,701 | 111,070 | 69,701 |

**Panel B: Quasi-Market Value of Assets**

| | 5 | 6 | 7 | 8 |
|---|---|---|---|---|
| Debt Ratio (mkt) | 0.0180 *** | 0.0159 *** | 0.0187 *** | 0.0173 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Tax Rate | -0.0174 *** | | -0.0216 *** | |
| | (<0.0001) | | (<0.0001) | |
| Marginal Tax Rate | | -0.0275 *** | | -0.0376 *** |
| | | (<0.0001) | | (<0.0001) |
| Tangibility | 0.0004 *** | 0.0039 *** | 0.0006 *** | 0.0040 *** |
| | (0.0010) | (<0.0001) | (<0.0001) | (<0.0001) |
| Market to Book | 0.0000 ** | 0.0000 | 0.0000 *** | 0.0000 *** |
| | (0.0190) | (0.4120) | (0.0020) | (<0.0001) |
| Size | 0.0005 *** | 0.0002 * | 0.0001 | -0.0001 |
| | (<0.0001) | (0.0850) | (0.2180) | (0.5470) |
| ROA | -0.0169 *** | -0.0163 *** | | |
| | (<0.0001) | (<0.0001) | | |
| ROE | | | -0.0002 *** | -0.0005 *** |
| | | | (<0.0001) | (<0.0001) |
| Constant | 0.0117 *** | 0.0145 *** | 0.0145 *** | 0.0182 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| N. Obs | 110,386 | 69,360 | 110,386 | 69,360 |

**Table X: Panel Data Estimation.**
We estimate the following regression using panel data and feasible generalised least squares:

$$\Pr ef = C + \beta_1 Debt + \beta_2 Tax + \beta_3 Grow + \beta_4 Tang + \beta_5 Size + \beta_6 \Pr of + \varepsilon$$

The dependent variable in Panel A is the Preferred Ratio in book form, measured by the ratio between Preffered Stock (Compustat annual data item 10) and the sum of Total Debt (Compustat 9 + Compustat 34) plus Book Value of Equity (Compustat 60). The dependent variable in Panel B is the Preferred ratio in market form, where we substitute the Book Value of Equity by the Market Value of Equity (Compustat 24 * Compustat 25). We simmilarly compute the Debt book and market ratios. We report two measures of tax rates: the average tax rate (Compustat 16 / Compustat 170); and a measure of marginal tax rate as in Graham (1996a, 1996b). Size is measured as the logarithm of Total Assets (Compustat 6). The two profitability measures, Return on Assets and Return on Equity, are computed by dividing the Income Before Extraordinary Items (Compustat 237) by Total Assets (Compustat 6), and by the Book Value of Equity (Compustat 60), respectively. The Market to Book ratio equals the Market Value of Equity divided by the Book Value of Equity. The Tangibility Ratio come from Compustat annual data items 7. To control for possible endogeneity, we use the one-period lagged value of the control variables. All models use industry fixed effects. We report in square brackets the corresponding estimate´s p-value.
*,**,*** indicate that the associated coefficient is significantly different from zero at the 1, 5 and 10 percent level, respectively

**Panel A: Utilities Excluded**

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Debt Ratio (book) | 0.0916 *** | 0.0879 *** | 0.0932 *** | 0.0950 *** | | | | |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | | | | |
| Debt Ratio (mkt) | | | | | 0.1060 *** | 0.1041 *** | 0.1059 *** | 0.1072 *** |
| | | | | | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Tax Rate | -0.1507 *** | | -0.1713 *** | | -0.1109 *** | | -0.1246 *** | |
| | (<0.0001) | | (<0.0001) | | (<0.0001) | | (<0.0001) | |
| Marginal Tax Rate | | -0.3578 *** | | -0.4545 *** | | -0.2630 *** | | -0.3262 *** |
| | | (<0.0001) | | (<0.0001) | | (<0.0001) | | (<0.0001) |
| Tangibility | 0.0006 | 0.0089 *** | 0.0017 *** | 0.0103 *** | 0.0008 * | 0.0090 *** | 0.0015 *** | 0.0098 *** |
| | (0.3160) | (<0.0001) | (0.0080) | (<0.0001) | (0.1000) | (<0.0001) | (0.0020) | (<0.0001) |
| Market to Book | 0.0001 *** | 0.0001 *** | 0.0001 *** | 0.0001 *** | 0.0000 *** | 0.0000 | 0.0000 ** | 0.0001 ** |
| | (<0.0001) | (0.0040) | (<0.0001) | (<0.0001) | (0.0100) | (0.1730) | (0.0200) | (0.0240) |
| Size | 0.0145 *** | 0.0177 *** | 0.0118 *** | 0.0158 *** | 0.0119 *** | 0.0141 *** | 0.0101 *** | 0.0129 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| ROA | -0.0760 *** | -0.1068 *** | | | -0.0520 *** | -0.0704 *** | | |
| | (<0.0001) | (<0.0001) | | | (<0.0001) | (<0.0001) | | |
| ROE | | | -0.0008 *** | -0.0005 *** | | | -0.0005 *** | -0.0003 ** |
| | | | (<0.0001) | (<0.0001) | | | (<0.0001) | (0.0120) |
| Year1986 | -0.0310 *** | -0.0592 *** | -0.0269 *** | -0.0664 *** | -0.0239 *** | -0.0445 *** | -0.0211 *** | -0.0491 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | | (<0.0001) | (<0.0001) | (<0.0001) |
| Constant | -0.3153 *** | -0.2351 *** | -0.3011 *** | -0.1940 *** | -0.2496 *** | -0.1932 *** | -0.2391 *** | -0.1651 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | | (<0.0001) | (<0.0001) | (<0.0001) |
| N. Obs | 126,100 | 78,563 | 126,100 | 78,563 | 126,100 | 78,563 | 126,100 | 78,563 |
| R-Square | 0.0415 | 0.0558 | 0.0312 | 0.0461 | 0.0699 | 0.0502 | 0.0613 | 0.0625 |

**Panel B: Banks Excluded**

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Debt Ratio (book) | 0.0994 *** | 0.1007 *** | 0.1089 *** | 0.1101 *** | | | | |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | | | | |
| Debt Ratio (mkt) | | | | | 0.1134 *** | 0.1135 *** | 0.1187 *** | 0.1202 *** |
| | | | | | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Tax Rate | -0.1276 *** | | -0.1597 *** | | -0.0980 *** | | -0.1198 *** | |
| | (<0.0001) | | (<0.0001) | | (<0.0001) | | (<0.0001) | |
| Marginal Tax Rate | | -0.3233 *** | | -0.4230 *** | | -0.2411 *** | | -0.3092 *** |
| | | (<0.0001) | | (<0.0001) | | (<0.0001) | | (<0.0001) |
| Tangibility | -0.0019 * | 0.0028 | 0.0001 | 0.0050 * | -0.0015 | 0.0010 | 0.0000 | 0.0023 |
| | (0.0550) | (0.3090) | (0.9020) | (0.0650) | (0.1150) | (0.6630) | (0.9440) | (0.2890) |
| Market to Book | 0.0000 * | 0.0001 ** | 0.0001 *** | 0.0002 *** | 0.0000 | 0.0000 | 0.0001 *** | 0.0001 *** |
| | (0.0640) | (0.0250) | (<0.0001) | (<0.0001) | (0.2190) | (0.1160) | (0.0010) | (<0.0001) |
| Size | 0.0135 *** | 0.0152 *** | 0.0093 *** | 0.0131 *** | 0.0113 *** | 0.0125 *** | 0.0085 *** | 0.0112 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| ROA | -0.1361 *** | -0.1337 *** | | | -0.0958 *** | -0.0928 *** | | |
| | (<0.0001) | (<0.0001) | | | (<0.0001) | (<0.0001) | | |
| ROE | | | -0.0010 *** | -0.0020 *** | | | -0.0007 *** | -0.0013 *** |
| | | | (<0.0001) | (<0.0001) | | | (<0.0001) | (<0.0001) |
| Year1986 | -0.0334 *** | -0.0588 *** | -0.0282 *** | -0.0662 *** | -0.0257 *** | -0.0444 *** | -0.0217 *** | -0.0492 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Constant | -0.2586 *** | -0.2382 *** | -0.2429 *** | -0.2007 *** | -0.2229 *** | -0.1981 *** | -0.2110 *** | -0.1720 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| N. Obs | 109,915 | 69,084 | 109,915 | 69,084 | 109,240 | 68,746 | 109,240 | 68,746 |
| R-Square | 0.1645 | 0.1735 | 0.1418 | 0.1611 | 0.2201 | 0.2226 | 0.1986 | 0.2113 |

**Panel C: Utilities and Banks Excluded**

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Debt Ratio (book) | 0.1139 *** | 0.1166 *** | 0.1244 *** | 0.1268 *** | | | | |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | | | | |
| Debt Ratio (mkt) | | | | | 0.1220 *** | 0.1234 *** | 0.1279 *** | 0.1305 *** |
| | | | | | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Tax Rate | -0.1408 *** | | -0.1756 *** | | -0.1073 *** | | -0.1309 *** | |
| | (<0.0001) | | (<0.0001) | | (<0.0001) | | (<0.0001) | |
| Marginal Tax Rate | | -0.3577 *** | | -0.4641 *** | | -0.2674 *** | | -0.3406 *** |
| | | (<0.0001) | | (<0.0001) | | (<0.0001) | | (<0.0001) |
| Tangibility | -0.0022 * | 0.0026 | 0.0000 | 0.0050 | -0.0018 | 0.0006 | -0.0002 | 0.0021 |
| | (0.0970) | (0.4240) | (0.9980) | (0.1080) | (0.2030) | (0.8220) | (0.8490) | (0.4010) |
| Market to Book | 0.0000 | 0.0001 ** | 0.0001 *** | 0.0002 *** | 0.0000 | 0.0000 | 0.0001 *** | 0.0001 *** |
| | (0.1070) | (0.0430) | (<0.0001) | (<0.0001) | (0.1830) | (0.1140) | (0.0010) | (<0.0001) |
| Size | 0.0151 *** | 0.0167 *** | 0.0105 *** | 0.0145 *** | 0.0126 *** | 0.0138 *** | 0.0094 *** | 0.0123 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| ROA | -0.1459 *** | -0.1424 *** | | | -0.1031 *** | -0.0995 *** | | |
| | (<0.0001) | (<0.0001) | | | (<0.0001) | (<0.0001) | | |
| ROE | | | -0.0011 *** | -0.0021 *** | | | -0.0007 *** | -0.0014 *** |
| | | | (<0.0001) | (<0.0001) | | | (<0.0001) | (<0.0001) |
| Year1986 | -0.0328 *** | -0.0604 *** | -0.0269 *** | -0.0682 *** | -0.0238 *** | -0.0449 *** | -0.0194 *** | -0.0500 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Constant | -0.2999 *** | -0.2749 *** | -0.2832 *** | -0.2349 *** | -0.2535 *** | -0.2249 *** | -0.2407 *** | -0.1968 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| N. Obs | 105,134 | 66,080 | 105,134 | 66,080 | 104,488 | 65,749 | 104,488 | 65,749 |
| R-Square | 0.0851 | 0.0990 | 0.0638 | 0.0875 | 0.1095 | 0.1201 | 0.0893 | 0.1096 |

**Panel D: Utilities and Banks Excluded. Probit Estimation.**

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Debt Ratio (book) | 0.5856 *** | 0.6583 *** | 0.5919 *** | 0.6792 *** | | | | |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | | | | |
| Debt Ratio (mkt) | | | | | 0.8595 *** | 0.9676 *** | 0.8629 *** | 0.9859 *** |
| | | | | | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Tax Rate | -0.5382 *** | | -0.5538 *** | | -0.5236 *** | | -0.5384 *** | |
| | (<0.0001) | | (<0.0001) | | (<0.0001) | | (<0.0001) | |
| Marginal Tax Rate | | -0.4852 *** | | -0.7049 *** | | -0.5154 *** | | -0.7227 *** |
| | | (0.0060) | | (<0.0001) | | (0.0060) | | (<0.0001) |
| Tangibility | 0.0062 ** | 0.0746 *** | 0.0074 ** | 0.0751 *** | 0.0054 | 0.0661 *** | 0.0066 ** | 0.0665 *** |
| | (0.0490) | (<0.0001) | (0.0170) | (<0.0001) | (0.1070) | (0.0020) | (0.0460) | (0.0010) |
| Market to Book | -0.0018 | -0.0009 | -0.0015 | -0.0007 | 0.0001 | 0.0007 | 0.0001 | 0.0011 |
| | (0.2370) | (0.5270) | (0.3250) | (0.6370) | (0.6400) | (0.2310) | (0.7770) | (0.1350) |
| Size | 0.1440 *** | 0.1617 *** | 0.1417 *** | 0.1579 *** | 0.1525 *** | 0.1674 *** | 0.1506 *** | 0.1643 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| ROA | -0.0960 *** | -0.2895 *** | | | -0.0973 *** | -0.2845 *** | | |
| | (<0.0001) | (<0.0001) | | | (0.0010) | (<0.0001) | | |
| ROE | | | 0.0006 * | -0.0003 * | | | 0.0000 | 0.0014 |
| | | | (0.0856) | (0.0908) | | | (0.0978) | (0.0651) |
| Year1986 | -0.2158 *** | -0.2487 *** | -0.2121 *** | -0.2686 *** | -0.1548 *** | -0.1899 *** | -0.1512 *** | -0.2083 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Constant | -3.1421 *** | -3.2978 *** | -3.1310 *** | -3.1971 *** | -3.3009 *** | -3.4291 *** | -3.2898 *** | -3.3361 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| N. Obs | 131,253 | 81,838 | 131,253 | 81,838 | 110,598 | 77,588 | 110,598 | 77,588 |
| R-Square | 0.0903 | 0.1000 | 0.0897 | 0.0975 | 0.1083 | 0.1184 | 0.1076 | 0.1163 |

**Table XI: Regression Estimates Excluding Utilities, Banks, Utilities and Banks**

We estimate the following regression excluding utilities, banks, and banks and utilities, respectively:

$$\Pr ef = C + \beta_1 Debt + \beta_2 Tax + \beta_3 Grow + \beta_4 Tang + \beta_5 Size + \beta_6 \Pr of + \varepsilon$$

The dependent variable in Models 1-4 in Panels A-C is the Preferred Ratio in book form, measured by the ratio between Preffered Stock (Compustat annual data item 10) and the sum of Total Debt (Compustat 9 + Compustat 34) plus Book Value of Equity (Compustat 60). The dependent variable in Models 5-8 in Panels A-C is the Preferred ratio in market form, where we substitute the Book Value of Equity by the Market Value of Equity (Compustat 24 * Compustat 25). We simmilarly compute the Debt book and market ratios. In Panel D, we report Probit estimates, where the dependent variable takes the value of one if the firm issues preferred stock that year, and zero otherwise. The marignal tax rate comes from Graham (1996a, 1996b). Size is measured as the logarithm of Total Assets (Compustat 6). The two profitability measures, Return on Assets and Return on Equity, are computed by dividing the Income Before Extraordinary Items (Compustat 237) by Total Assets (Compustat 6), and by the Book Value of Equity (Compustat 60), respectively.The Market to Book ratio equals the Market Value of Equity divided by the Book Value of Equity. The Tangibility Ratio come from Compustat annual data items 7. Given that in 1986 a new tax code was implemented, we add ad Year 1986 dummy, that takes the value of 1 for port 1986 observations. To control for possible endogeneity, we use the one-period lagged value of the control variables. Since capital structure data is censored, we report tobit estimates. All models use industry fixed effects. We report in square brackets the corresponding estimate´s p-value.

*,**,*** indicate that the associated coefficient is significantly different from zero at the 1, 5 and 10 percent level, respectively.

**Panel A: Book Value of Assets**

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Debt Ratio (book) | 0.0894 *** | 0.0934 *** | 0.1064 *** | 0.1130 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Tax Rate | -0.0913 *** | | -0.1242 *** | |
| | (<0.0001) | | (<0.0001) | |
| Marginal Tax Rate | | -0.2142 *** | | -0.3320 *** |
| | | (<0.0001) | | (<0.0001) |
| Tangibility | -0.0025 | 0.0043 | -0.0009 | 0.0056 * |
| | (0.3310) | (0.1760) | (0.7210) | (0.0830) |
| Market to Book | 0.0000 | 0.0000 | 0.0000 | 0.0001 * |
| | (0.6000) | (0.8150) | (0.3970) | (0.0980) |
| Size | 0.0148 *** | 0.0148 *** | 0.0126 *** | 0.0136 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| ROA | -0.1886 *** | -0.1917 *** | | |
| | (<0.0001) | (<0.0001) | | |
| ROE | | | -0.0008 *** | -0.0008 *** |
| | | | (<0.0001) | (0.0060) |
| Year1986 | -0.0417 *** | -0.0548 *** | -0.0377 *** | -0.0652 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Constant | -0.2324 *** | -0.1962 *** | -0.2321 *** | -0.1601 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| N. Obs | 92,259 | 59,840 | 92,259 | 59,840 |
| R-Square | 0.2537 | 0.2467 | 0.2251 | 0.2269 |

**Panel B: Quasi-Market Value of Assets**

| | 5 | 6 | 7 | 8 |
|---|---|---|---|---|
| Debt Ratio (mkt) | 0.1075 *** | 0.1082 *** | 0.1217 *** | 0.1238 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Tax Rate | -0.0754 *** | | -0.0989 *** | |
| | (<0.0001) | | (<0.0001) | |
| Marginal Tax Rate | | -0.1762 *** | | -0.2595 *** |
| | | (<0.0001) | | (<0.0001) |
| Tangibility | -0.0023 | 0.0041 | -0.0013 | 0.0049 * |
| | (0.3050) | (0.1350) | (0.5630) | (0.0750) |
| Market to Book | 0.0000 | 0.0000 | 0.0000 | 0.0001 |
| | (0.3410) | (0.8840) | (0.1050) | (0.1210) |
| Size | 0.0131 *** | 0.0131 *** | 0.0116 *** | 0.0123 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| ROA | -0.1419 *** | -0.1396 *** | | |
| | (<0.0001) | (<0.0001) | | |
| ROE | | | -0.0007 *** | -0.0006 ** |
| | | | (<0.0001) | (0.0150) |
| Year1986 | -0.0344 *** | -0.0451 *** | -0.0304 *** | -0.0516 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Constant | -0.2104 *** | -0.1785 *** | -0.2106 *** | -0.1533 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| N. Obs | 91,922 | 59,707 | 91,922 | 59,707 |
| R-Square | 0.3201 | 0.3065 | 0.2955 | 0.2901 |

**Table XII: Big Firms.**
We estimate the following regression for firm-year observations with more that $10 million is sales:

$$\Pr ef = C + \beta_1 Debt + \beta_2 Tax + \beta_3 Grow + \beta_4 Tang + \beta_5 Size + \beta_6 \Pr of + \varepsilon$$

The dependent variable in Panels A is the Preferred Ratio in book form, measured by the ratio between Preffered Stock (Compustat annual data item 10) and the sum of Total Debt (Compustat 9 + Compustat 34) plus Book Value of Equity (Compustat 60). The dependent variable in Panels B is the Preferred ratio in market form, where we substitute the Book Value of Equity by the Market Value of Equity (Compustat 24 * Compustat 25). We simmilarly compute the Debt book and market ratios. In Panel D, we report Probit estimates, where the dependent variable takes the value of one if the firm issues preferred stock that year, and zero otherwise. The marignal tax rate comes from Graham (1996a, 1996b). Size is measured as the logarithm of Total Assets (Compustat 6). The two profitability measures, Return on Assets and Return on Equity, are computed by dividing the Income Before Extraordinary Items (Compustat 237) by Total Assets (Compustat 6), and by the Book Value of Equity (Compustat 60), respectively.The Market to Book ratio equals the Market Value of Equity divided by the Book Value of Equity. The Tangibility, Advertising and R&D Ratios come from Compustat annual data items 7, 45, and 46. Given that in 1986 a new tax code was implemented, we add ad Year 1986 dummy, that takes the value of 1 for port 1986 observations. To control for possible endogeneity, we use the one-period lagged value of the control variables. Since capital structure data is censored, we report tobit estimates. All models use industry fixed effects. We report in square brackets the corresponding estimate´s p-value.
*,**,*** indicate that the associated coefficient is significantly different from zero at the 1, 5 and 10 percent level, respectively.

**Panel A: Book Value of Assets**

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Debt Ratio (book) | 0.1244 *** | 0.1193 *** | 0.1467 *** | 0.1413 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Tax Rate | -0.1491 *** | | -0.1802 *** | |
| | (<0.0001) | | (<0.0001) | |
| Marginal Tax Rate | | -0.3149 *** | | -0.4439 *** |
| | | (<0.0001) | | (<0.0001) |
| Tangibility | 0.0057 | 0.0160 | 0.0066 | 0.0200 |
| | (0.5910) | (0.2300) | (0.5430) | (0.1360) |
| Market to Book | 0.0000 | 0.0000 | 0.0000 | 0.0001 * |
| | (0.8510) | (0.7040) | (0.6910) | (0.0630) |
| Size | 0.0201 *** | 0.0223 *** | 0.0165 *** | 0.0200 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| ROA | -0.1374 *** | -0.1883 *** | | |
| | (<0.0001) | (<0.0001) | | |
| ROE | | | -0.0002 | -0.0020 *** |
| | | | (0.2220) | (0.0070) |
| Advertising | -(0.2946) *** | -(0.2078) *** | -(0.1422) *** | -(0.1726) *** |
| | (<0.0001) | (<0.0001) | (0.0010) | (0.0030) |
| R&D | (0.0040) | -(0.1023) ** | (0.2156) *** | (0.0731) * |
| | (0.9070) | (0.0330) | (<0.0001) | (0.0980) |
| Year1986 | -0.0308 *** | -0.0513 *** | -0.0290 *** | -0.0632 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Constant | -0.1974 *** | -0.2392 *** | -0.1974 *** | -0.1992 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| N. Obs | 22,498 | 14,018 | 22,498 | 14,018 |
| R-Square | 0.1119 | 0.1334 | 0.0950 | 0.1207 |

**Panel B: Quasi-Market Value of Assets**

| | 5 | 6 | 7 | 8 |
|---|---|---|---|---|
| Debt Ratio (mkt) | 0.1266 *** | 0.1284 *** | 0.1442 *** | 0.1460 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Tax Rate | -0.1120 *** | | -0.1331 *** | |
| | (<0.0001) | | (<0.0001) | |
| Marginal Tax Rate | | -0.2429 *** | | -0.3263 *** |
| | | (<0.0001) | | (<0.0001) |
| Tangibility | 0.0030 | 0.0118 | 0.0030 | 0.0136 |
| | (0.7140) | (0.2380) | (0.7100) | (0.1770) |
| Market to Book | 0.0000 | 0.0000 | 0.0000 | 0.0001 * |
| | (0.5890) | (0.6000) | (0.3350) | (0.0550) |
| Size | 0.0162 *** | 0.0172 *** | 0.0137 *** | 0.0159 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| ROA | -0.0977 *** | -0.1226 *** | | |
| | (<0.0001) | (<0.0001) | | |
| ROE | | | -0.0002 | -0.0014 ** |
| | | | (0.1040) | (0.0130) |
| Advertising | -(0.2378) *** | -(0.1675) *** | -(0.1271) *** | -(0.1437) *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (0.0010) |
| R&D | -(0.0207) | -(0.0740) ** | (0.1304) *** | (0.0413) |
| | (0.4350) | (0.0450) | (<0.0001) | (0.2240) |
| Year1986 | -0.0207 *** | -0.0377 *** | -0.0184 *** | -0.0449 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| Constant | -0.1644 *** | -0.1832 *** | -0.1649 *** | -0.1575 *** |
| | (<0.0001) | (<0.0001) | (<0.0001) | (<0.0001) |
| N. Obs | 22,379 | 13,955 | 22,379 | 13,955 |
| R-Square | 0.1471 | 0.1672 | 0.1296 | 0.1562 |

**Table XIII: Advertising and Research and Development Expenses.**
We estimate the following regression for firm-year observations with more that $10 million is sales:

$$\Pr ef = C + \beta_1 Debt + \beta_2 Tax + \beta_3 Grow + \beta_4 Tang + \beta_5 Size + \beta_6 \Pr of + \varepsilon$$

The dependent variable in Panels A is the Preferred Ratio in book form, measured by the ratio between Preffered Stock (Compustat annual data item 10) and the sum of Total Debt (Compustat 9 + Compustat 34) plus Book Value of Equity (Compustat 60). The dependent variable in Panels B is the Preferred ratio in market form, where we substitute the Book Value of Equity by the Market Value of Equity (Compustat 24 * Compustat 25). We simmilarly compute the Debt book and market ratios. In Panel D, we report Probit estimates, where the dependent variable takes the value of one if the firm issues preferred stock that year, and zero otherwise. The marignal tax rate comes from Graham (1996a, 1996b). Size is measured as the logarithm of Total Assets (Compustat 6). The two profitability measures, Return on Assets and Return on Equity, are computed by dividing the Income Before Extraordinary Items (Compustat 237) by Total Assets (Compustat 6), and by the Book Value of Equity (Compustat 60), respectively.The Market to Book ratio equals the Market Value of Equity divided by the Book Value of Equity. The Tangibility Ratio come from Compustat annual data items 7. Given that in 1986 a new tax code was implemented, we add ad Year 1986 dummy, that takes the value of 1 for port 1986 observations. To control for possible endogeneity, we use the one-period lagged value of the control variables. Since capital structure data is censored, we report tobit estimates. All models use industry fixed effects. We report in square brackets the corresponding estimate´s p-value.
*,**,*** indicate that the associated coefficient is significantly different from zero at the 1, 5 and 10 percent level, respectively.