Macroeconomic Conditions and Corporate Financing Decisions

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ABSTRACT

In an attempt to understand the effect of macroeconomic conditions on corporate financing decisions, this paper investigates the effect of the term structure of interest rates—defined by a three–factor model which includes the Treasury bill yield, the Treasury bond yield, and the volatility of the yield curve— on the debt–equity choice. Having controlled for well–known microeconomic determinants of financing decisions, I document that as the Treasury bill yield rises, the incidence of debt financing increases. However, as the Treasury bond yield or the volatility of the yield curve rise, the likelihood of debt financing drops. I find that the information content of the term structure of interest rates regarding aggregate corporate profitability (i.e. aggregate default risk) accounts for most of the observed effects. I also find that tax shield distortions induced by changes of interest rates marginally affect the debt–equity choice. Additionally, inflation cyclicality, corporate credit spreads, mortgage rates, and personal tax rates materially are shown to affect the firm's financing decisions materially.

Introduction

TRADITIONALLY, CAPITAL STRUCTURE LITERATURE has focused on how a firm's characteristics determine corporate financing decisions. Equally important question is *whether* macroeconomic conditions affect corporate financing decisions. Recent discussions of corporate capital structure suggest that macroeconomic factors may provide more information regarding the cost differential between debt and equity beyond what the firm's characteristics measure. More specifically, the term structure of interest rate, as an *ex ante* measure of the changes in the macroeconomy, may have significant impact on financing decisions.[1]

This study pursues the topic of macroeconomic determinants of financing decisions with three primary objectives. The term structure of interest rates contains valuable information about changes in the macroeconomy.[2] Thus, one objective is to investigate whether the term structure of interest rate—hereafter modeled by the short–rate (the Treasury bill yield), the long–rate (the Treasury bond yield), and the volatility of the yield curve—affect the debt–equity choice.[3] Interest rate may reflect information about aggregate corporate profitability (i.e. aggregate risk premia) [e.g., Chen (1991), Duffie (1999), Fama and French (1990), Leland (1994 and 1998), and Longstaff and Schwartz (1995)] or influence a firm's tax shield and distress costs [e.g., Fischer, Heinkel and Zechner (1989) and Leland (1994 and 1998)]. Hence, the second objective is to verify whether

[1] A number of continuous time models of capital structure [e.g. Fischer, Heinkel, and Zechner (1989), and Leland (1994)] have examined the effect of the risk-free rate on optimal leverage in a comparative static setting. Though these results may not stand as valid in a richer, more dynamic setting with stochastic interest rates, nonetheless they can shed light as to how the risk-free rate affect financing choices. In empirical analyses, Chen (1991) and Duffie (1999) find that the Treasury bill yield affect both bond and equity premiums negatively yet with different magnitudes. They find that the Treasury term spread (measured by the difference between Treasury bond and bill yields) affects the bond default premium negatively and equity premium positively. More recently, in a field survey, Graham and Harvey (2000) report that one third of all financial managers do consider interest rates and inflation as pertinent factors in their financing decisions.

[2] Macroeconomic indicators such as interest rates, inflation, gross domestic product, and industrial production are highly cointegrated variables [e.g., Sims (1980), and Litterman and Scheinkman (1985)]. A large body of studies in macroeconomics [e.g., Fama (1981), and Litterman and Scheinkman (1985)] shows that interest rates can predict the future changes of other macro-indicators. Indeed, a number of studies argue that indeed the term structure of interest rates can be used to infer information about the latent economic state variables [see Cox, Ingersoll and Ross (1985), Fama and French (1990), and Chen (1991)].

[3] A number of studies [e.g., Litterman and Scheinkman (1991), Litterman, Scheinkman and Weiss (1991), and Chen and Scott (1993)] show that the level (Treasury bill yield), steepness (the difference between Treasury bond and Treasury bill yield) and curvature (volatility of the yield curve) of the yield curve explain the vast majority of the variation in the term structure of interest rates. More recently, Barclay and Smith (1995) and Duffie (1998) have used similar variables to proxy the term structure of interest rates in their empirical analyses. Accordingly, I choose short-rate (which is related to Treasury bill yield), long-rate (which is related to Treasury bond yield) and the volatility of the yield curve (which is related to standard deviation of the yield spread between Treasury bill and bond yields) to model the term structure of interest rates.

either of these hypotheses explains the possible impact of the term structure of interest rates on the debt–equity choice. The term structure of interest rates also influences a firm's investment decisions [see Hartman (1980)] as well as maturity structure [see Barclay and Smith (1995) and Guedes and Opler (1996)]. Thus, I examine the robustness of our finding in presence of such confounding effects. Last objective of this study to examine whether other macroeconomic indicators such as the inflation, corporate quality spreads, mortgage rates and personal tax rates affect the debt–equity choice.

Most existing empirical studies of financing decisions at best suffice to use only industry and year dummies to control for the impact of latent macroeconomic factors. Bradely et al (1984), and Timan and Weiss (1987) show that the industry dummies have significant effect on the firm's debt ratio. MacKie–Mason (1990) shows that year dummies have significant impact on the debt–equity choice. Although industry dummies, year dummies and other dummy variables have been used extensively to proxy and control for industry and economy wide effects, our understanding as to how and why the macroeconomy affects financing decisions remains limited.

This study extends the prior research in two important ways. First, I examine whether the term structure of interest rates as major macroeconomic indicators influence the debt–equity financing choice, controlling for the previously known determinants of financing decisions. Though interest rates and the macroeconomy are not synonymous, the highly cointegrated nature of macroeconomic factors such as interest rates, inflation, investment, and consumption allows one to infer considerable information about the changes in the economy by focusing on the term structure of interest rates. By focusing on interest rates as major macroeconomic indicators, I obtain that the changes of macroeconomy to the extent captured reflected by the term structure of interest rates *do* influence a firm's financing decisions.

Existing theories and empirical evidence suggest that the information content of interest rates about aggregate profitability of firms, distortions of the net trade–off between tax benefits and financial distress costs caused by interest rates, or the confounding effect of the debt maturity can account for the observed phenomena. Thus, the second feature of this paper is that to investigate whether any of the aforementioned hypotheses explains why the term structure of interest rates affects the debt–equity choice.

I documents that the short–rate (Treasury bill yield), long–rate (Treasury bond yield), and the volatility of the yield curve *do* affect financing choices. I find that as the Treasury bill yield rises (i.e. the yield curve becomes more inverted), firms which do seek external financing are more likely to issue bonds. In contrast, when Treasury bond yield rises or when interest rates become more volatile, firms are less likely to choose debt financing. I find that the effects of Treasury bill and bond yields are mainly due to the information content of these variables regarding aggregate corporate profitability. However, I posit that that the impact of the volatility of the yield curve is mostly due to the embedded option value of debt contracts. Distortions in tax shields and distress costs weakly relate to the term structure of interest rates. I also document that other macroeconomic factors such as inflation cyclicality, mortgage rates, personal tax rates and corporate quality spreads have significant impact on the debt–equity choice.

The paper proceeds as follows. The first section puts forth a number of macroeconomic factors which can potentially influence a firm's financing decisions. Section II briefly reviews other factors, primarily firm characteristics, that may influence debt–equity choices. Section III describes the empirical method and discusses characteristics of the sample data. The results of preliminary analysis are presented in Section IV. Section V examines a number of explanations as to why interest rates affect financing decisions. I test whether interest rates signal the aggregate profitability of firms.. I also examine whether interest rates influence the tax benefit and distress costs of the firm. I then test if the debt maturity confounds the effect of interest rates on the debt–equity choice. Last, Section VI summarizes the results and provides suggestions for further investigations. Data construction details are provided in the Appendix.

I. Macroeconomic Determinants of Financing Decisions

Existing literature on capital structure postulates that macroeconomic factors influence the firm's financing decisions. Despite unanimous agreement of both theoreticians and empiricists on the pertinence of such effects, the nature of macroeconomic determinants of corporate financing decisions remains a puzzle. Most theoretical studies of capital structure focus on the firm's characteristics as determining factors of the firm's financing choices, considering macroeconomic variables to be incidental. And, though admitting to the pertinence of macroeconomic factors, most empirical models of financing decisions, at best, suffice to indicator variables such as year or industry dummies to control for possible confounding effects.

Though there may not be a clear way to capture the complex behavior of the economy, the term structure of interest rates contains valuable information regarding the changes of the macroeconomy that can be proven useful [see Sims (1985)]. Indeed, there is some evidence that the term structure of interest rates may affect the optimal capital structure and hence influence the firm's financing decisions.

In continuous time models of corporate capital structure, Fischer, Heinkel, and Zechner (1989), and Leland (1994, and 1998) show that as the risk–free rate rises, the optimal debt capacity and coupon payments increase. These studies postulate that the positive relationship between changes of the risk–free rate and optimal leverage is due to an increasing tax shield and a decreasing likelihood of default. As the risk–free rate rises, so does the coupon payment of a newly issued debt, assuming that bonds are sold at par. Hence, a rise in the risk–free leads to an increase in tax shields, making debt more beneficial. On the other hand, in the context of risk–neutral pricing, as risk–free rises, so does the return on all assets, reducing the likelihood of default.

In empirical analyses, Chen (1991) and Duffie (1991) shows that the Treasury bill yield and the Treasury term spread significantly influence default and equity premiums. While default and equity premiums are both negatively related to the risk–free rate, the magnitude and significance of the impact on the default premium is much more pronounced. The Treasury term spread, however, affects default and equity premiums differently. While the correlation between the Treasury term spread and the default premium is negative, the association between the Treasury term spread and the equity premium is positive.

These results imply that it is quite likely that the entire yield curve (i.e. the term structure of interest rates) affects a firm's financing decisions. To capture the evolution of interest rate accurately, I use a three–factor yield curve model similar to that of Litterman and Scheinkman (1988) to model the behavior of term structure. Litterman and Scheinkman (1991) and Litterman, Scheinkman and Weiss (1991) show that the level, steepness (slope) and curvature of the yield curve can be used as a yield factor basis for the term structure of interest rates. They suggest that the yield on shortest maturity Treasury instrument can proxy the level of the yield curve. Hence, I use the annual average of the three–month Treasury bill monthly yield for the year prior to the date of issue as a measure of short–rate (equivalent to the level of yield curve).

Since Litterman and Scheinkman define the steepness of the yield as essentially the difference between the yields on longest and shortest maturity Treasury instruments, I use a measure of long–rates to proxy the effect of the steepness factor. I define long–rate as the annual average of the 30–year maturity Treasury bond monthly yield prior to the date of issue.

Litterman, Scheinkman and Weiss show that the curvature of the yield curve is related to the volatility of the yield curve. Therefore, I use the annual standard deviation of the difference between the 1–year Treasury bill and the 10–year Treasury bond monthly yields prior to the date of issue to capture the volatility of the whole yield curve.

Since the aforementioned term structure variables are computed using nominal interest rates, one conceivably suspects that any effect can equally be attributed to real interest rates or inflation. Indeed, Schall (1984) shows that inflation may distort tax shields, hence affecting the firm's financing decisions. Though the impact of such distortions, *ex ante*, are not clear, Schall shows that in some cases they may discourage debt issue. To disentangle the impact of inflation, I use the annual average of monthly changes in the consumer price index (CPI) as a proxy for inflation. Additionally, I use both seasonally adjusted and non-adjusted measures of the CPI to control for the cyclicality of inflation.

II. Other Determinants of Financing Choice

The existing literature of capital structure recognizes a number of determinants of financing decisions. To prevent potential biases due to the omission of variables, I include the previously found determinants of financing choices in my model. I review the extant literature briefly and explain what variables are used in the analysis.

A. Taxes

Modigliani and Miller (1963) and Miller (1977) show that debt tax shields provide strong incentive for leverage. DeAngelo and Masulis (1985) show that in addition to debt tax shields, non-debt tax shields such as investment tax credits or loss carryforwards can in fact affect optimal capital structure. Bradley et al (1984), MacKie-Mason (1990) and Chaplinsky and Niehuas (1990) document a positive relationship between leverage and non-debt tax shields. I use Graham's (1992) marginal tax rate to account for tax effects. To control for non-debt tax shields, I also use two measures: the ratio of depreciation to total sales and the ratio of the combined value of investment tax credits and tax loss carryforwards to total sales.

The optimal financing choice is the one that maximizes the firm's value. Thus, the very characteristics of the choice itself are pertinent in financing decisions. In the context of static trade–

off, the optimal choice is the one that yields the most marginal tax benefits and the least marginal bankruptcy costs. To test if tax shields generated by a new debt issue have any impact on the firm's financing choice, I include the interaction between the firm's marginal tax rate at the time of issue and the log of the debt issue's proceeds.

Miller (1977) shows that not only the corporate marginal tax rate, but also the personal marginal tax rate affects the optimal corporate capital structure. Miller shows that a firm would be indifferent between issuing debt and equity only if the corporate bond yield is equal to one minus the corporate marginal tax rate of the tax-exempt bonds. Fama (1977) argues that, in absence of tax-arbitrage opportunities for banks, the marginal personal tax rate should be equal to the marginal corporate tax rate. Buser and Hess (1986), however, show that the implied personal marginal tax rate reveals much more volatility than its corporate counterpart.[4] They conclude that this is partly due to tax-arbitrage activities and mostly due to aggregate corporate productivity, or the likelihood of corporate financial distress. Hence, I use the imputed personal marginal tax rate to account for any clientele effects as well as aggregate corporate financial outlook.

B. Financial Distress

MacKie-Mason (1990) contends that a firm should be reluctant to raise debt when debt service increases the likelihood of distress. DeAngelo and Masulis (1985) also show that the firm is less likely to be able to benefit from its non-debt tax shields when the likelihood of bankruptcy is high. Bradley et al (1984), Titman and Wessel (1988) and MacKie-Mason (1990) show that the volatility of earnings has a negative impact on leverage or debt financing. Like MacKie-Mason, I use the standard deviation of the firm's profitability ratio over the past five years prior to issue, as a measure of the firm's business risk.

To reduce further biases created by possible omitted measures of default risk, I also use a non-linear numerical equivalent of Standard and Poor's credit rating.[5] As Diamond (1993) points out, the maturity of debt is a nonlinear function of credit rating. To control for such complexities, I

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[4] Since Buser and Hess (1986) use the maximum corporate tax rate, it is conceivable that they cannot fully capture the volatility of the true corporate marginal tax rate. As shown by Graham's simulations, the volatility of corporate marginal tax rate is considerable. Nonetheless, to capture the impact of personal marginal tax rate, I use their proxy of personal marginal tax rate, however imprecise it may be.

[5] The COMPUSTAT database transforms the Standard and Poors credit rating to a non-linear numerical equivalent variable. I adopt the COMPUSTAT's convention, with the exception of private debt issues and missing values that are codes differently.

also include the credit rating squared in the model. Since issuing debt can distort the firm's financial distress costs, I include the interaction between the firm's credit rating at the time of issue and the log of the debt issue's proceeds to account for any distortion of tax shields. To control for nonlinearities, I also include the interaction between the firm's credit rating squared at the time of issue and the log of the debt issue's proceeds.

C. Agency Costs

A number of theories predict that conflicts of interest between managers, creditors, and stockholders lead to severe inefficiencies, decreasing the value of the firm. Myers (1977) presents a model in which debt financing can lead to underinvestment in future opportunities. Managers will only invest in new projects if the payoff is sufficient not only to earn an acceptable return on incremental investments but also to pay off the outstanding debt claims as well as. Jensen and Meckling (1976) discuss another form of agency problems. Having assumed that borrowers always have better knowledge regarding their investment opportunity set, Jensen and Meckling show that a firm can borrow cheap funds for a presumably low risk project and then use the funds to finance a risky project. To compensate for borrowers' opportunistic behavior, *a priori*, lenders adjust the cost of debt accordingly, creating a dead–weight agency cost of borrowing. This suggests that the magnitude of agency costs corresponds to the riskiness of the firm's opportunity set. The more risky the opportunity set is, the higher the agency costs will be. Though true measures of the riskiness of the firm's investment opportunity set are hard to come by, one posits that the book–to–market ratio, the amount of research and development expenditures, and advertising costs can be used to proxy the riskiness of the firm's projects and the magnitude of agency costs.

Bradley, et al (1984), and Long and Malitz (1984) find that the ratio of advertising and research and development expenditures to total assets are negatively related to leverage. Titman and Wessel (1988) find that growth options negatively influence the leverage. In a model of financing choice, MacKie-Mason (1990) also finds similar results.

Harris and Raviv (1990) and Stulz (1990) discuss the conflict of interest between managers and investors regarding operating decisions. Harris and Raviv assert that managers always prefer to maintain the existing operation, even if investors prefer to liquidate the firm. Stultz depicts that managers almost always tend to invest all available funds, even if paying off the free cash flow is the optimal strategy for equity holders. Both models predict that debt can be used to mitigate such problems because debtholders can always enforce liquidation and impose prepayment. Hence, one postulates that firms with more fixed assets (assets in place) face less severe agency costs.

Bradley, et al (1984), Long and Malitz (1984) and MacKie-Mason (1990) find that the ratio of plant-equipment to total asset is positively related to leverage. Chang (1987) depicts that due to agency problems of debt, the leverage is negatively correlated with profitability. Kester (1986), Friend and Hasbrouck (1988) and Titman and Wessel (1988) have found that there exits a negative association between leverage and profitability.

Following the foregoing models, I use variables such as the book–to–market ratio, the ratio of fixed assets (plant and equipment) to the book value of total assets, the ratio of advertising expenditures to total sales, the ratio of research and development expenditures to total sales, and the profitability ratio (operating income to total sales) to proxy agency costs.

D. Asymmetric Information

Pioneered by Ross (1977) and Leland and Pyle (1977), this strand of the literature on capital structure presents models in which a firm uses leverage as a signaling device to resolve asymmetries of information about its quality. In Ross (1977), managers know the true distribution of the firm's return while investors do not. In a pooled market of good and bad firms, without any sign of quality, investors would only pay the average price for any firm. Hence, the high quality firms may choose to reveal their true type by assuming debt in their capital structure. Leland and Pyle (1977) depict that managers are generally concerned about their future employability. Using managers risk averse behavior, Leland and Pyle design a signaling scheme in which the firm uses debt to reveal its true type.

Myers and Majluf (1984) discuss another form of asymmetric information. They show that if new investors are less informed than existing shareholders, then any equity issue leads to a loss of the firm's value. Investors assume that a firm would never issue an equity offering unless the firm's equity is overvalued, and thus they pay less than the current price of the equity for any new stock issue. Because of this underpricing, a firm may not be able to raise enough funds to finance all projects, and thus the firm may forgo some profitable investment opportunities. To circumvent such problems, as noted by Myers (1984), firms may follow a pecking order in their financing policy: first, a firm uses its internal cash; then when slack cash resources are exhausted, the firm issues risk free debt, then risky debt, then hybrid instruments and lastly equity.

Myers and Majluf (1984) imply that leverage increases with the degree of informational asymmetry. Ross (1977) and Leland and Pyle (1977) imply that there exists a positive relationship between leverage and firm value in a cross section of similar firms. Hence, I use the change in debt ratio, long–term debt to total book value of assets, from the previous year to measure the extent of these agency costs.

I also use some of the previously hypothesized signaling measures. Miller and Rock (1985) and Jensen, Solberg and Zorn (1992) found that there exists a statistically significant negative relationship between the debt ratio and the dividend payout ratio. I use the ratio of dividends to sales to control for costly signaling. Also a firm's stock price movements can proxy the extent to which investors are convinced of the firm's future prospective [Bagnoli and Khanna (1987)]. Thus, I also use the growth of the firm's stock price from the previous year as a measure for the magnitude of signaling costs.

E. Other Factors

I use the log of the total proceeds of the issue and the proportion of the log of proceeds of the issue to the log of the market value of the firm as proxies for dilution of value and floatation costs. I also use industry, year and regulation dummies (for regulated industries) to control for unforeseen complexities. I use the year of issue as a determining variable to control for any trends in financing decisions.

III. Empirical Implementation

A. The Data

For debt financing, I focused on external financing activities, external debt[6] and seasoned equity offering, of non-financial operating companies in the United States during 1980 – 1995. The data on debt issues for the period of 1980 – 1995 was gathered from two major sources: the Security Data Corporation (SCD) database[7] and Opler's debt issuance[8] database. I first gathered all

[6] All the commercial papers, and debt instruments with less than one-year maturity are dropped from the final sample.
[7] SDC is currently owned and operated on a subscription basis by Thompson Publishing Co., Inc.
[8] As discussed in Guedes and Opler (1995), these are essentially the data compiled by the Capital Markets Division of the Board of Governors of the Federal Reserve Board.

public (non-convertible and convertible) and private debt issues from the Security Database Corporation (SDC) database. I then merged the resulting sample with Opler's debt issuance database to correct for any missing information.

For equity financing, I used equity offering data from SDC for the period of 1980 – 1995. I used the seasoned equity offerings as a measure of equity financing. Since initial public offerings are inherently different from seasoned equity offerings and accounting data prior to issuance are basically non-existent, I dropped these issues from my analysis. Table I provides a summary of statistics of the issue data. As shown in the table, debt financing overwhelms equity financing in size and frequency. This is indeed in accordance to findings of Bolton and Scharfstein (1998) which conclude that debt financing represents 85 percent of all external financing activities. In fact, Figures 1 through 3 provide a comparison of the two types of financing from a different perspective. As it appears, debt financing has grown exponentially since the early eighties while equity financing has increased moderately.

Macroeconomic data were obtained from the Federal Reserve Board of Governor's database and Federal Reserve Economic Database (FRED). Data for Treasury bill yield, Treasury bond yield, Corporate AAA-rated Bond yield, Corporate BAA-rated Bond yield, Municipalities and Local Bond yield, Mortgage Rates, and Industrial Production were derived from the Federal Reserve Board of Governor's database. The Economic Database (FRED) was the information source for the Consumer Price Index (CPI) and the Gross Domestic Product (GDP). For Treasury bill yield the data span the period of 1953 – 1999. For Treasury 10–year constant–maturity bond yield, the data cover the period of 1953 – 1999. Since the US Treasury abandoned issuing 20–year bonds in 1986, the data for 20–year Treasury bond yield span only the period of 1953 – 1986. For 30–year Treasury constant–maturity bonds, the yield data cover the period of 1977 – 1999. The data for corporate bonds, mortgage rates, and municipal bond yields are available for the period of 1954 – 1999. The industrial production data also span the period of 1943 – 1999. All the aforementioned macroeconomic data are available on a monthly basis. The data for the gross domestic product, provided by the Bureau of Economic Analysis at the US Department of Commerce, span the period of 1947 – 1999, only on a quarterly basis. The data for Consumer Price Index, provided by the Bureau of Labor Statistics at the US Department of Labor, span the period of 1946 – 1999, and are available on a monthly basis. Table II provides a summary of statistics for macroeconomic variables during the period 1980 – 1995.

For relevant accounting information during the period 1980 – 1995, I used COMPUSTAT industrial Primary, Secondary and Tertiary (PST), Full Coverage and Research tapes. Having constructed macroeconomic variables using the previously described macroeconomic data, I then matched macroeconomic variables with issuance data based on the month of issue. I matched the resulting sample with the COMPUSTAT database. Since the COMPUSTAT reporting year depends on whether the fiscal year is in the first half or second half of the year, I carefully matched the dates so that for each security issue, debt or equity, the most recent accounting information is used. The summary of statistics for all the important variables for the whole sample and for each type of issue are provided in Table I.

B. Empirical Method

Following recent studies of capital structure [MacKie-Mason (1990), and Guedes and Opler (1996)], I analyze the marginal corporate financing decision using of a Probit model. In essence, I estimate the following model:

$$\Pr(y^* = 1 | \mathbf{X}_f, \mathbf{X}_c, \mathbf{X}_m) = \Phi(\mathbf{X}_f \beta_f + \mathbf{X}_c \beta_c + \mathbf{X}_m \beta_m) \tag{1}$$

where, y* is a indicator variable equal to one if the firm has issued debt, and zero if the firm has issued equity. The determinants of financing are, $\mathbf{X}_f$, the firm's characteristics, $\mathbf{X}_c$, the choice variables, more specifically tax and bankruptcy effects of debt issue, and, $\mathbf{X}_m$, the vector of macroeconomic variables.

Having observations on only a subset of financing alternatives, debt and equity, influences the econometric methodology. Attaining unconditional, consistent estimates of the choice between debt and equity necessitates that financing decision making be a nested process. One such possibility is illustrated in Fig. 4. Having determined if extra funds are needed, the firm decides whether to issue bonds or shares. In such a case, estimating the debt–equity choice using model (1) is appropriate[9].

However, the nested decision model may not be appropriate if common factors influence decisions at different levels of the tree. Macroeconomic factors can potentially affect decisions

[9] As discussed by McFadden (1981) and MacKie-Mason (1990), terminal branches of a nested preference tree can be consistently estimated using standard discrete choice models such as Probit.

prior to the debt–equity choice. In such a case, unconditional consistent estimates of the debt–equity choice require specification and estimation of the full set of simultaneous decisions involving investment decisions, liability management policies, and complete financing choices (including external, i.e. debt and equity, and non–external, i.e. banks, internal cash flows, etc., financing sources). However, one can yield conditional consistent estimates of the debt–equity choice using a limited choice menu only for the observed alternatives. In the context of random utility models, the system of equations for complete financing choices can be transformed to a reduced form for the choice between debt and equity, conditional on the firm seeking external sources. Nevertheless, I do address some of the potential biases and econometric issues involved in obtaining unconditional consistent estimates of the debt–equity choice later.

IV. Empirical Findings

A. Interest Rates and Financing Decision

As is evident in Table III, the short–rate has a surprisingly positive impact on debt financing. In other words, when Treasury bill yield rises, corporations are more likely to choose debt as an external financing choice than equity. This is rather counterintuitive in the sense that despite the increase in cost of debt, firms find debt more lucrative than equity. However, this result conforms to comparative static findings of Fischer, et al (1989), Leland (1994 and 1998), Longstaff and Schwartz (1995) and Duffie (1998). Fischer et al (1989) suggest that an increase in risk–free rate increases the tax benefits of debt and hence raises the optimal debt ratio. Leland (1994 and 1998) as well as Longstaff and Schwartz (1995) assert that in a risk–neutral world, as the risk–free rate increases so do the assets' returns. Hence, as assets become more profitable, the likelihood of bankruptcy drops. Duffie (1998) in fact shows that credit spread of corporate bonds is negatively related to the short–rate. Since I control both tax and bankruptcy effects of debt issues in the model, it seems rather unlikely that the observed phenomenon can be associated with tax benefits or bankruptcy costs of the new debt issue.

As to whether assets in general are more productive when risk–free is high, further analysis is required. It is evident from policy making practices of the Federal Reserve and from a number of studies[10], that the term structure of interest rates may be indicative of future changes in real economic activities, which in turn can convolute the results. I intend to overcome some of these difficulties in section V.

The analysis also shows that the long–rate and curvature of the yield curve have a significant negative impact on debt financing. This indeed conforms to the intuition that as cost of debt capital increases, firms are less likely to finance their operations with debt capital.

I further examine the possible effects of inflation and changes in the yield curve on the firm's financing decisions. I include seasonally adjusted and non–adjusted inflation as described in previous sections, and changes of short–rate and long–rate[11] over the year prior to the month of issue as additional macro–variables. The results of this analysis, as noted in Table III, indicate that despite the significant impact of these new macro–variables, the short–rate, long–rate and curvature of the yield curve are still significant at the 1% level and reveal the same effects. This suggests that the relationship between the Treasury term structure variables and financing decision is of a more fundamental nature. Indeed, the changes in short–rate and long–rate also reveal the same effect as the short–rate and long–rate themselves. The seasonally non–adjusted inflation have a statistically significant negative effect on debt financing. However, the seasonally adjusted inflation has a positive association with debt financing (significant at 1% level). This, in turn, suggests that when inflation rises, firms may prefer to issue debt. Assuming that non–monopolistic firms are able to transmit the input price pressure to buyers of goods and services, such firms may find debt financing more desirable when inflation is high. Since the debt service payments are not inflation adjusted, non–monopolistic firms can reduce the distress costs by inflating output prices and hence their revenues. The coefficients on seasonally adjusted and non-adjusted measures of inflation have opposite signs. Thus, debt financing and inflation are countercyclical, meaning that firms borrow less at the peak of an inflationary cycle.

To control for possible confounding effects of the term structure of the credit spread, I also include, in my model, corporate AAA–bond yield, corporate BAA–yield and their changes in the year prior to issue. Since many debt instruments are hybrid combinations of complicated options–like securities and a plain–vanilla bond, as suggested by Berk (1999), I include mortgage

[10] As dicussed in footnote 9, Sims (1980), Fama (1982), Litterman and Wiess (1985), Lawrence and Siow (1985), Estrella and Hardouvelis (1991), and Chen (1991) have shown that term structure of interest rate can be indicative of future inflation, consumption and investment.

rate and its change over the year prior to issue, in order to control for confounding effects of embedded options. Lastly, as pointed out by Miller (1977), the marginal personal tax rate is also a determinant of equilibrium corporate debt yield, and thus financing decisions. I include the imputed marginal tax rate in my model as well.

Except for AAA–bond yield, the aforementioned variables have significant impact on the firm's financing decisions. As BAA–bond yield rises, firms issue less debt. Assuming that most borrowers are high credit risk firms, as the cost of borrowing increases, firms are less inclined to raise debt capital. The embedded option value of debt contracts also affect the firm's financing choices. Berk (1998) suggests that the prepayment option in mortgages resembles the embedded options in debt contracts. Hence, as mortgage rates rise, these options become more expensive, making debt a less desirable instrument. Also, as predicted by Miller (1977) and Buser and Hess (1985), as the marginal personal tax rate increases, so does the cost of debt, diminishing the comparative advantage of debt to equity.

B. Other Determining Factors

As discussed previously, I included variables to control for taxes, distress costs, agency problems and signaling costs. On the whole, the estimated coefficients are consistent with those in previous studies. Additionally, I control for tax and distress effects of the new debt issue as well. I shall discuss the results briefly.

Except for the new debt issue's tax effect, and non–debt tax shields (i.e. depreciation, investment tax credits, and tax loss carryforwards), the firm's marginal tax rate does not have a significant impact on financing decisions. As the new debt issue's tax shields increase, so does the likelihood of debt financing. Except for depreciation, the non–debt tax shields have a significant positive impact on debt financing. Like Kim and Sorensen (1986), I find that as depreciation increases, the firm has less incentive to utilize its potential tax shields by issuing debt.

Most of the evidence on distress costs is consistent with theory. A high fraction of fixed assets in the asset base makes the debt choice more likely. Intangible projects such as R&D reduce the likelihood of debt financing. Like MacKie-Mason, I find that large advertising expenditures make debt financing more likely. The evidence on the firm's operating risk is rather mixed. As the

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[11] The change in short–rate is defined as the short–rate at the month of issue minus the short–rate at eleven months prior to the month of issue. The change in long–rate is computed in similar way.

volatility of profitability ratio rises, the likelihood of debt financing decreases. However, a diminishing credit rating can either increase or decrease the value of debt. As suggested by Diamond (1993), the effect of credit worthiness is rather complicated. As is apparent from Table III, the impact of distress costs, as measured by credit rating, on the debt–equity choice is quite nonlinear. Moreover, the new debt issue's distress costs also have a large significant nonlinear impact on financing decisions. Low credit rating firms prefer debt to equity. However, these firms are heavily scrutinized by the market.

Many of the aforementioned variables also proxy for agency costs. The evidence on agency costs confirms theoretical implications. Firms with low growth rate, measured by the book–to–market ratio, issue more debt. On the other hand, as a firm grows larger, it prefers debt to equity.

The evidence on the signaling costs is rather weak. The dividend paying firm are less likely to issue debt. As has been shown in other studies (e.g. MacKie-Mason (1990)), firms are more likely to issue stocks when their stock price has recently risen.

The issue–to–firm size, a measure of ownership dilution, has a significant positive impact on debt financing. Firms which require large amounts of external funding relative to their size are more likely to issue bonds. On the other hand, the issue size itself has a significant adverse impact on debt financing. Firms are less likely to issue debt when large sums of funds are needed. Since a large debt issue induces more distress costs, firms may prefer to issue stocks. As such, the net effect of the issue size is unclear.

C. Specification Analysis and Robustness

The goodness-of-fit statistic, as measured by MacFadden ρ^2, is quite good for the aforementioned model. Table III indicates that 27.46% of the variations in the financing behavior of industrial firms over the period of 1980 – 1995 is explained by model (1). As a benchmark, MacKie-Mason (1990) reports a MacFadden ρ^2 of 25.6%.[12] Clearly, a discrete choice model of financing can be improved materially by incorporating the term structure variables. Moreover, when measures of corporate term structure, mortgage rates, and personal tax rates are considered (see Table III), the MacFadden ρ^2 increases to 29.43%. The macroeconomic determinants not only

[12] I also estimate the MacFadden ρ^2 for a model such as MacKie-Mason's in which industry-time dummies are used to control for the effects of macroeconomic factors. The MacFadden ρ^2 in such model is 25.2%.

materially improve the predictive power of a discrete choice model of financing, but also affect the financing choice significantly, as is evident from the marginal effects of these variables.

Another summary measure is the ability of the model to correctly classify the observed choices in the sample and accurately predict the observed choices outside of the sample. Model (1) correctly classifies almost 84.9% of the observed choices in the full sample. As a benchmark, MacKie-Mason (1990) reports a prediction measure of 77%. For out of sample prediction, the time-series and holdout methods are implemented. In the time-series method, I estimate the model over the period of 1980 – 1992. Then, using the estimated coefficients, I predict the financing choice for each issuing firm over the period of 1993 – 1995. The model correctly predicts the financing choices out of the sample 83.5% of the time. I also compute the prediction measures using the holdout sample method. First, the discrete choice model is estimated using two thirds of the full sample. Then, using the estimated coefficients, the financing choice for each remaining issuing firm is determined. The model correctly predicts almost 84.9% of the out of sample choices, using the holdout sample method.

One troubling problem with the foregoing analysis is that many of the macroeconomic variables have ominous interdependencies. To correct some of these confounding effects, I estimate model (1) using a yield spread model which includes the following macroeconomic variables: the real short–rate and its change, the Treasury term spread (the difference between short–rate and long–rate) and its change, inflation and its change, inflation cyclicality (the difference between the seasonally adjusted and non–adjusted inflation), the AAA–bonds credit spread (the difference between AAA–bond and T–bond yields) and its change, the BAA–bond credit spread (the difference between BAA–bond and AAA–bond yields) and its change, the mortgage spread (the difference between mortgage rate and AAA–rated bond yield) and its change, and the personal tax rate and its change. As is evident in Table V, the term spread, inflation cyclicality, the change in AAA–bond credit spread, the mortgage spread and its change, and the personal tax rate and its change significantly affect financing decisions. Though not statistically significant, the real short–rate increases the likelihood of financing. This suggests that, regardless of model specifications, the term structure of interest rates fundamentally influences financing decisions. To further reduce and disentangle the interdependencies, I use principle components of the macroeconomic variables in model (1). I find that fourteen of the seventeen principle components are statistically significant. This result suggests that the impact of interest rates on financing choices not only has economic significance, but it also indicates a degree of complexity which requires sophisticated high dimensional models to study the phenomena, despite the econometric complications that it may cause.

As noted previously, macroeconomic factors may influence a wide range of financial decisions, confounding estimates of the debt–equity financing decision. Suppose that a firm may wish to exploit opportunities arising from interest rate movements by "timing the debt issue".[13] The firm then issues debt only when borrowing is cheap. Hence, determining the true impact of macroeconomic factors on the choice between debt and equity requires a focused analysis of financing decisions of firms which face a shortage of funds (fund deficit). I reexamine model (1), using a sub–sample of firms which for the year of financing had a fund deficit.[14] As is apparent in Table IV, results conform to previously observed effects (Table III), confirming that macroeconomic factors *do* affect the debt–equity financing decision. Undeniably, the impact of macroeconomic factors far exceeds the realm of the debt-equity choice. However, the preference for a debt issue relative to equity is significantly determined by macroeconomic factors, specifically the term structure of interest rates.

D. Sample Selection and Financing Decisions

Though the preceding method partially addresses confounding effects of structural dependencies between other decisions and the debt–equity choice, it provides no direct measurement of the magnitude and direction of such biases. To investigate the problem more directly, as mentioned previously, one needs to fully understand inter–relationships among a rich set of corporate decisions. This, however, requires estimating a rather complicated set of simultaneous equations, involving investment, financing, and other corporate policies. In the simplest form, one may consider a system of simultaneous equations which includes the decision to visit capital markets or not, as well as the debt–equity choice. Such an intricate yet complex setting demands quite advanced econometric technologies to achieve a consistent and efficient estimate of the parametric structure. Unfortunately, in our case, the complexity wins over the technology. Though there are number of methods to estimate parameters of a system of simultaneous equations

[13] Graham and Harvey (2000) report that about one quarter of financial managers attempt to time their debt issues.
[14] I account for the changes in working capital, R&D, advertising, M&A, dividends, and stock repurchases to measure the usage of funds. I then measure the flow of funds using operating cash flows, divestitures, and retained earnings. The cash deficit is defined as the difference between the usage of funds and the flow of funds.

involving dichotomous variables[15], none provides promising results[16]. However, despite such disappointing outcomes, the goal of simultaneously measuring the impact of the macroeconomic conditions on financing decisions and correcting for possible confounding interdependencies between financing and other decisions is not unachievable!

Having examined carefully the debt–equity choice, one posits that the latent driving process, (equivalent to the utility derived from the choice in the context of the random utility model) is not that latent! MacKie–Mason (1990) suggests that such process can be viewed as the incremental increase in the value of the firm, if the only available financing choice was debt. Though this interpretation does not perfectly reflects the value added (i.e. utility derived) when equity is issued, it provides a benchmark for constructing a more appealing continuous proxy for the latent process. Since a firm maximizes its value by getting closer to its optimal capital structure, one posits that the change in the debt ratio can be viewed as a proxy for underlying value–adding latent process. Hence, I use this variable, i.e. the ratio of the issue proceeds to the firm's value with positive (negative) sign when debt (equity) is issued, to examine the impact of the term structure of interest rates on financing decisions, and measure the sample selection bias introduced by the choice between external and non–external financing sources.

Essentially, I estimate a Heckit model such as following:

$$\Delta DR = \mathbf{X}_f \beta_f + \mathbf{X}_c \beta_c + \mathbf{X}_m \beta_m + \eta \lambda + \varepsilon \qquad (2)$$

where, ΔDR is the change in the debt ratio. The determinants of financing are $\mathbf{X}_f$, the firm's characteristics; $\mathbf{X}_c$, the choice variables, more specifically tax and bankruptcy effects of debt issue, and; $\mathbf{X}_m$, is the vector of macroeconomic variables. The λ is the inverse Mill's ratio from the following model:

[15] Detail discussions of such methods can be found in Maddala (1999), Amemiya (1978), Poirier (1979), Meng, and Schmidt (1985), and Greene (1992 and 1998). Table VI reports findings of a 2–step procedure prescribed by Maddala (1999), page 246. Despite some indications to potential simultaneity of the financing source and form decisions, the model fails to account for the impact of choice characteristics on either decision. Since our earlier results indicated that the choice variables significantly affect the debt–equity choice, I choose to pursue the problem form the change in debt ratio perspective.

[16] I estimated a system of equations governing the external vs. non–external financing choice, and the debt–equity choice, using bivariate Probit with partial observability and Amemiya's two–stage least square methods. In both cases, the estimates of majority of parameters where insignificant while there were no statistically viable indication of any

$$\Pr(z^* = 1) = \Phi(\mathbf{Y}_f \zeta_f + \mathbf{Y}_m \zeta_m) \qquad (3)$$

and, z* is a dichotomous variable that equals one if the firm did seek outside financing, and zero otherwise. Also, $\mathbf{Y}_f$ is the vector of the firm's characteristics capturing investment activities, payout policies, and flow of funds. The $\mathbf{Y}_m$ is the vector of macroeconomic variables. The inverse Mill's ratio, λ, is then defined as:

$$\lambda = \frac{\phi(\mathbf{Y}\,\hat{\mathbf{z}})}{\Phi(\mathbf{Y}\,\hat{\mathbf{z}})} \qquad \text{where} \qquad \mathbf{Y} \equiv \begin{bmatrix}\mathbf{Y}_f & \mathbf{Y}_m\end{bmatrix} \quad \text{and} \quad \hat{\mathbf{z}} \equiv \begin{bmatrix}\hat{\zeta}_f & \hat{\zeta}_m\end{bmatrix}'$$

where, $\phi(\cdot)$ is the standard normal density function, $\Phi(\cdot)$ is the standard normal cumulative density function, $\mathbf{Y}$ is the matrix of independent variables, and $\hat{\mathbf{z}}$ are the estimated coefficients.

As is evident from Table VII, the impact of the term structure variables, the change in the real short rate and the term spread, are still significant. The selection bias, measured by the inverse Mill's ratio from the choice between external and non–external financing, is statistically significant. As is apparent (Table VII), inflation, inflation cyclicality, credit spreads, the mortgage spread and the personal tax rate significantly influence financing decisions, even when the sample selection bias is accounted for.

V. Why Interest Rates Matter

Though the aforementioned results show an interesting relationship between macroeconomic factors and financing decision, the question remains: why does the term structure of interest rates affect a firm's financing decisions?

A. Interest Rates and Aggregate Profitability

Changes in interest rates significantly influence aggregate business activities, affecting corporate profitability and hence distress costs across the board. Fama (1986) and Stambaugh (1988) present evidence showing that increases in forward rates precede economic expansion while

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interdependency between the two sets of choices. This can attributed to complexity of likelihood function and high decreases in forward rates precede recessions. Chen (1991) and Duffie (1999) show that the Treasury bill yield and the Treasury term spread influence default and equity premiums. Buser and Hess (1985) and Chen (1991) document that the industrial production affects corporate bond yields and equity returns. Sims (1980), Fama (1982), Litterman and Wiess (1985), Lawrence and Siow (1985), and Estrella and Hardouvelis (1991) show that nominal rates can reflect the economic agents' forecasts of future economic activities. Nominal interest rates have predictive power in forecasting future inflation, future real activity, and even industrial production[17]. One apparent example of this is the periodic announcement of the Board of Governors of the Federal Reserve Bank regarding its monitory policy. As is frequently stated by Federal Reserve officials, the Fed systematically uses industrial production and a number of other leading economic indicators to gauge the economy's outlook.

Thus, if the impact of the term structure of interest rate is primarily due to the information content of the yield curve regarding aggregate profitability (i.e. aggregate default risk), by adding measures of aggregate prosperity such Gross Domestic Product (GDP) and industrial production, the significance of the term structure variables should diminish materially.

To control for overall cyclicality and expansion of the economy, I use measures of the economy's size, the economy's growth, and the change in economy's growth. I define the economy's size as the annual average of the detrended gross domestic product[18] for the year prior to the security issue. I also define the economy's growth as the annual average of the quarterly change of the gross domestic product for the year prior to the security issue. The change in economy's growth is the annual average of the quarterly change of the economy's growth for the year prior to the security issue.

To account for industry effects, I use the industrial size, the industrial growth, and the change in industrial growth. I define the industrial size as the annual average of detrended industrial production for the year prior to the security issue. I define the industrial growth as the

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degree of parsimony in the model.

[17] Sims (1980) asserts that the comovements in industrial production can be attributed to changes in interest rates. Fama (1982) finds that nominal rates as well as real activities have significant predictive power for forecasting future inflation. Litterman and Wiess (1985), and Lawrence and Siow (1985) show that real inflation and nominal rates best forecast components of GNP. Additionally, Estrella and Hardouvelis (1991) show that not only the level but the slope of the yield curve has significant predictive power in forecasting consumption and investment. Chen (1991) finds that indeed macroeconomic indicators such as lagged production growth, default premium , term premium, and short-rates are significant indicators of recent and future economic growth. Thus, I use the aforementioned macroeconomic indicators to control for complex and subtle interrelations between these variables and term structure of interest rates.

annual average of the monthly change of the gross domestic product for the year prior to the security issue. The change in industrial growth is the annual average of the monthly change of the industrial growth for the year prior to the security issue.

Opler, Saron, and Titman (1997) posit that comparative profitability of a firm to that of its industry can influence corporate financial decision making. Accordingly, I include measures of the level and volatility of the relative profitability of a firm to its major cohort. I define relative profitability as the ratio of the firm's profitability ratio to that of its corresponding primary industry[19]. Additionally, I contend that both the firm's relative performance and it's ability to sustain performance affect the firm's financing decisions. Hence, I also include the standard deviation of the relative profitability over the past five years prior to security issue, in order to control for the firm's ability to sustain its relative profitability.

Essentially, I estimate a Probit model such as the following:

$$\Pr(y^* = 1 | \mathbf{X}_f, \mathbf{X}_c, \mathbf{X}_m, \mathbf{X}_P) = \Phi(\mathbf{X}_f \beta_f + \mathbf{X}_c \beta_c + \mathbf{X}_m \beta_m + \mathbf{X}_P \beta_P) \quad (3)$$

and, alternatively, I estimate a linear model such as:

$$\Delta DR = \alpha_0 + \mathbf{X}_f \alpha_f + \mathbf{X}_c \alpha_c + \mathbf{X}_m \alpha_m + \mathbf{X}_P \alpha_P + \varepsilon \quad (4)$$

where, like model (1), y* is an indicator variable equal to one, if the firm has issued debt, and to zero if the firm has issued equity. ΔDR is the change in debt ratio. The determinants of financing are; $\mathbf{X}_f$, the firm's characteristics; $\mathbf{X}_c$, the choice variables (more specifically tax and bankruptcy effects of debt issue); $\mathbf{X}_m$, the vector of macroeconomic variables; and, $\mathbf{X}_P$, the vector of macroeconomic prosperity measures. The arguments of the vector $\mathbf{X}_P$ include the economy's size, the economy's growth, the change in economy's growth, the industrial size, the industrial growth, the change in industrial growth, the relative profitability and the volatility of the relative profitability.

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[18] The Federal Reserve Board of Governors' database contains data for quarterly gross domestic product for the period of 1943 – 2000, as well as monthly industrial production for the period of 1968 – 2000. I use simple detrending techniques to extract time dependence from the data.

[19] Fama and French (1997) define industry categories based on SIC four digit codes. I generally follow the same categorizations.

I find that, in the presence of these new variables, neither short–rate nor long–rate are pertinent in financing decision making (Table VIII). However, the curvature of the yield curve weakly affects financing decisions. On the other hand, inflation cyclicality, the mortgage spread and personal tax rate strongly influence financing decisions. I also find that when the economy as a whole is wealthier, i.e. the detrended gross domestic product is high, firms are more likely to choose debt financing. Since higher gross domestic product indicates the health of the economy and capital markets, it is not surprising that in more prosperous times, debt financing is more prevalent. However, as apparent from Table VIII, the GDP growth is significantly negatively related to the likelihood of debt financing. This can be attributed to the fact that during prolonged periods of economic prosperity, it is more likely that stock prices appreciate significantly; so much so that equity capital becomes cheaper than debt. Indeed when industrial production increases, as evident from the industrial production growth or its change, the equity financing becomes more preferable. Since firms are apt to have higher equity values when productivity is high, it is not surprising that the likelihood of debt financing drops when firms become more productive.

To further examine what components of GDP affect financing decisions most, I replace GDP related measures by the major components of GDP: State Expenditures and Investments, Federal Expenditures and Investment, and Private Investments. I also include major components of the money supply, as well as the Eurodollar deposit rate. As evident from Table IX, the Eurodollar spread (difference between 3–month LIBOR rate and Treasury bill yield) and its change, private non–residential investments, private debt, and institutional holdings affect the debt–equity choice significantly. Since these measures reflect the competitive conditions of borrowing and lending, these results suggests that beyond the information content of the yield curve about aggregate default risk, the inter–capital market competition can also greatly account for the impact of the term structure of interest rates on the debt–equity choice. As evident from the significant positive impact of non-residential private fixed investments, undoubtedly, as firms increase their investment activities more funds will be required. Since in such instance a firm is more likely to run short of internal funds, external financing may be necessary to sustain the firm's growth. A firm, however, will prefer debt financing if private lending conditions are also favorable. As shown in Table IX, as private debt holding raises, so does the likelihood of debt financing.

As predicted by Opler, Saron, and Titman (1997), firms that are more profitable than others in their cohort choose debt more often. However, as the relative profitability becomes more uncertain, firms may in fact choose less debt financing.

B. Interest Rates, Tax Shields and Bankruptcy Costs

A firm's financing decision depends primarily on the outcome of a tradeoff between tax advantages born by debt and bankruptcy and transaction costs induced by debt[20]. Changes in interest rates, however, can distort tax shields and distress costs[21]. Since the induced distortions of tax shields and distress costs can differ from each other, the net benefit of debt, and hence the firm's financing decisions, are influenced by interest rates. By issuing debt, a firm can also distort the tax shields and distress costs. The extant literature has not addressed the impact of choice characteristics (i.e. tax shields and bankruptcy costs of the new debt issue) on the firm's financing decisions. Hence, I examine the influence of interest rates on tax shields and distress costs, controlling for the impact of tax shields and distress costs of the new debt issue.

The analysis indicates that an increase in the short–rate may have a strong positive correlation with the increase in future profitability of all assets. As short–rate rises, the financial distress cost decreases, increasing the likelihood of debt financing[22]. On the other hand, as suggested by Fischer et al (1989), an increase in the risk-free rate can lead to higher tax savings. Since most corporate bonds are sold at par, the time series pattern of the coupon payments of the corporate bonds closely mimics the movements of the Treasury term structure. This implies that as interest rates increase, so do coupon payments, creating more tax benefits. However, given a known distribution of cash flows, as interest rates increase, the likelihood of financial distress also

[20] Though existing theories of capital structure contend that agency problems, asymmetric information and corporate control incentives may play significant roles in financing decisions [for a comprehensive review see Harris and Raviv (1990)], recent studies [Leland (1998), and Parrino and Weisbach (1999)] have shown that indeed the economic magnitudes of the aforementioned factors are negligible, when compared to those of taxes, bankruptcy costs and floatation costs.

[21] Merton (1974) shows that in the absence of frictions such as taxes and bankruptcy costs even with a stochastic interest rate, the Modigliani and Miller irrelevancy hypothesis holds. However, he *does* allude to possible effects of interest rates on taxes and distress costs. Having assumed a flat term structure of interest rates, Fischer et al (1989) and Leland (1994 and 1998) show that an increase in the risk–free rate increases the value of debt tax shields. Leland (1994 and 1998), and Longstaff and Schwartz (1995) demonstrate that as the risk–free rate rises, the likelihood of bankruptcy drops. As such, one postulates that changes of interests can cause distortions in the net benefit of debt, affecting the firm's capital structure.

[22] To some extent, this conforms to the arguments presented by Longstaff and Schwartz (1995) that as risk-free rate increases the rate of return on all assets in a risk-neutral world also increases. Though my analysis provides some support of the proposition that, even under the real measure, the risk-free rate can be positively correlated with an increase in rate return of assets in the economy, the actual causality between the two is yet to be discovered.

increases.[23] Thus, *ex ante*, it is not clear how an increase in short–rate affects the net benefit of debt, the difference between the marginal tax shields and distress costs.

To explore possible tax effects, I include the interaction between changes in Treasury term structure and inflation variables with the firm's marginal tax rate in model (1). In other words, I estimate a Probit model such as the following:

$$\Pr(y^* = 1 | \mathbf{X}_f, \mathbf{X}_c, \mathbf{X}_m, \mathbf{X}_\tau) = \Phi(\mathbf{X}_f \beta_f + \mathbf{X}_c \beta_c + \mathbf{X}_m \beta_m + \mathbf{X}_\tau \beta_\tau) \qquad (5)$$

and, alternatively, I estimate a linear model such as:

$$\Delta DR = \alpha_0 + \mathbf{X}_f \alpha_f + \mathbf{X}_c \alpha_c + \mathbf{X}_m \alpha_m + \mathbf{X}_\tau \alpha_\tau + \varepsilon \qquad (6)$$

where y* is a dichotomous variable that equals one if the firm issues external debt, and zero if the firm issues external equity. ΔDR is the change in debt ratio. The determinants of financing are; $\mathbf{X}_f$, the firm's characteristics; $\mathbf{X}_c$, the choice variables, more specifically tax and bankruptcy effects of debt issue; $\mathbf{X}_m$, the vector of macroeconomic variables; and, $\mathbf{X}_\tau$, the vector of tax effects. The arguments of the vector $\mathbf{X}_\tau$ are the product of the change in term structure–inflation variables and the firm's marginal tax rate.

As is obvious from Table X, only the volatility of the yield curve have a significant negative impact on tax savings. As the interest rates become more volatile, the value of debt tax shields drops, leading to less debt financing. As shown in Table X, the tax effects of the real short–rate and the term spread are negative, but not significant. Having compared the results of my analysis in model (1), one can posit that indeed beyond the previously discussed effects of the interest rate variables, these macroeconomic factors may have some tax implications as well.

To examine the possible impact of interest rates on financial distress, I include the interaction between term structure–inflation variables and the firm's current liabilities. It is my hope that this approach controls any unforeseen impact of the macroeconomic variables in the short–run which has not been captured by the choice variables. In essence, I estimate the following Probit model:

[23] Leland (1994 and 1998) studies parallel shifts of a flat term structure on optimal capital structure. He demonstrates that an increase in the risk–free rate leads to higher debt capacity. This is mostly attributed to the increase in tax savings, despite the increase of bankruptcy costs.

$$\Pr(y^*=1|\mathbf{X}_f,\mathbf{X}_c,\mathbf{X}_m,\mathbf{X}_b)=\Phi(\mathbf{X}_f\beta_f+\mathbf{X}_c\beta_c+\mathbf{X}_m\beta_m+\mathbf{X}_b\beta_b) \quad (7)$$

and, alternatively, I estimate the following linear model:

$$\Delta DR=\alpha_0+\mathbf{X}_f\alpha_f+\mathbf{X}_c\alpha_c+\mathbf{X}_m\alpha_m+\mathbf{X}_b\alpha_b+\varepsilon \quad (8)$$

where y* is a dichotomous variable that equals one if the firm issues external debt, and zero if the firm issues external equity. ΔDR is the change in the debt ratio. The determinants of financing are; $\mathbf{X}_f$, the firm's characteristics; $\mathbf{X}_c$, the choice variables, more specifically tax and bankruptcy effects of debt issue; $\mathbf{X}_m$, the vector of macroeconomic variables; and, $\mathbf{X}_b$, the vector of distress cost effects. The arguments of the vector $\mathbf{X}_b$ include products of the changes in term structure–inflation variables and the firm's current liabilities, and the product of the term structure–inflation variables and the change in the firm's current liabilities.

The results (Table XI) indicate that only real short–rate may have some impact on the financial distress costs. As the short–rate rises, cost of short–term borrowing increases, leading to less debt financing. Similarly, the long–rate, evident from the term spread, negatively but not significantly affects the likelihood of debt financing. From the results, it appears that inflation has a negative impact on financial distress costs, but the impact is countercyclical.

C. Interest Rates and Maturity Structure

The term structure of interest rates affects the debt maturity. Brick and Ravid (1985 and 1990) assert that a firm may select the debt maturity to maximize the value of its tax shields. They posit that when the yield curve is positively sloped a firm may issue long–term debt to yield greater tax benefits. Though the existing body of evidence indicates otherwise[24], the extant literature agrees that the term structure of interest rates *does* affects the maturity structure of the firm. Hence, I examine whether the debt maturity confounds the impact of term structure of interest rates on the debt–equity choice.

[24] Barclay and Smith (1995), and Guedes and Opler (1996) find that the slope of the yield curve affects the debt maturity negatively.

Since both the debt maturity and the debt–equity choice are influenced by the term structure of interest, one conceivably posits that estimating parameters of underlying models for either the debt maturity or financing decisions are not mutually exclusive tasks. Indeed, the relationship between the two models can be represented in form of a system of simultaneous equations. Such system of equation can be written as:

$$\begin{cases} \Delta DR = \gamma_1 M + \mathbf{X}^1{}_f \ \boldsymbol{\psi}^1{}_f + \mathbf{X}_c \ \boldsymbol{\psi}^1{}_c + \mathbf{X}_m \ \boldsymbol{\psi}^1{}_m + \mathbf{X}_P \ \boldsymbol{\psi}_P + \mathbf{X}_\tau \ \boldsymbol{\psi}_\tau + \mathbf{X}_b \ \boldsymbol{\psi}_b + \varsigma_1 \\ M = \gamma_2 \ \Delta DR + \mathbf{X}^2{}_f \ \boldsymbol{\psi}^2{}_f + \mathbf{X}_m \ \boldsymbol{\psi}^2{}_m + \varsigma_2 \end{cases} \tag{9}$$

where, ΔDR is the change in debt ratio, and M is the log of the years-to-maturity[25]. The determinants of financing are $\mathbf{X}^i{}_f$, the firm's characteristics; $\mathbf{X}_c$, the choice variables, more specifically tax and bankruptcy effects of debt issue; $\mathbf{X}_m$, is the vector of macroeconomic variables; $\mathbf{X}_P$, the vector of macroeconomic prosperity measures; $\mathbf{X}_\tau$, the vector of tax effects, and; $\mathbf{X}_b$, the vector of distress cost effects .

I estimate the parameters of both model simultaneously, using iterated 3–step least square (IT3SLS) and full information maximum likelihood (FIML) methods. As is evident (Table XII), although financing decisions strongly affect the debt maturity, the effect of maturity on financing choices is not as significant. When accounted for the confounding impact of maturity, the effect of term structure of interest rates on the debt–equity choice decreases materially[26]. FIML results indicate that the change in the term spread, inflation cyclicality, the AAA–bond credit spread, the mortgage spread and the personal tax rate influence financing decisions.

These results also indicate that the debt maturity is strongly affected by the term structure of interest rates. I find that the real short–rate, the term spread, credit spreads and their changes, the mortgage spread and the personal tax rate significantly influence the maturity structure. In contrary to Barclay and Smith (1995) and Geudes and Opler (1996), I find that indeed both the real short–rate and the term spread affect the debt maturity significantly positively. This suggests that indeed the tax hypothesis [Brick and Ravid (1985 and 1990)] may after all be true. In fact, the

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[25] For equity issues, M is set to be log(1000). This indicates that equity is an infinitely live instrument, i.e. equity can be thought of as a perpetual debt with uncertain flow of cash.

[26] The results from IT3SLS and FIML methods are contradictory. However, as it appears both real short–rate and term spread loose (partially in IT3SLS and fully in FIML) their influence.

significant positive impact of the mortgage rate can also be attributed to an increasingly valuable tax timing option which in turn encourages firms to issue longer maturity instruments.

VI. Conclusion

This paper is merely the first step toward a deeper understanding of the macroeconomics of financing decisions. Since interest rates are the most visible and widely measured indicators of macroeconomic conditions, I focus my attention on examining the effects of the term structure of interest rates on a firm's financing decisions.

My analyses show that, as the Treasury bill yield rises, firms have more incentive to issue bonds than seasoned equity. Yet, as the yield on Treasury bonds increases, or as the yield curve becomes more volatile, the likelihood that a firm will issue debt decreases. I contend that these effects are mainly due to the signaling effect of interest rates with respect to future macroeconomic prosperity and the confounding effect of the debt maturity. As the Treasury bill yield rises, economic agents may infer that the outlook of the economy is improving and, therefore, may prefer to borrow more. The term structure of interest rate may more affect the debt maturity rather than the debt–equity choice per se. I also find that an increase in the volatility of interest rates dissuades borrowing regardless of the predictive content of the yield curve. My analysis also shows that interest rates have some impact on the tax benefits of the firm. Less visibly though, the interest rates also affect the distress costs of the firm.

I also find that the choice itself has significant impact on the firm's financing decisions. The analysis reveals that static trade–off distortions, i.e. changes in tax shields and distress costs, that are induced by a new debt issue, significantly affect financing choices. While the induced tax benefits of the new debt issue encourage borrowing, the induced increase of distress costs dissuades debt financing. Not surprisingly, I find that the impact of the change in default risk is highly nonlinear. Good quality firms access the bond market openly, while less fortunate firms are subjected to credit rationing and extreme scrutiny.

Additionally, I find that the inflation seasonality, the corporate term structure, mortgage rates and personal tax rates affect firms' financing decisions. Corporate debt financing is countercyclical to inflation. As the credit (quality) spread (i.e. the difference between AAA- and BAA-bond yields) increases, the level of corporate borrowing drops. Firms issue less debt when the value of embedded options in debt contracts (proxied by mortgage rates) are high. I also find that as personal tax rates rise, the likelihood of corporate debt financing drops.

As mentioned earlier, this paper is a first attempt to understand the macroeconomics of corporate financing. The very complex nature of the problem, particularly the endogeneity among different corporate financial policies, creates a high degree of subtlety. One possible extension of this work would be to account for structural dependencies of a multitude of corporate financial decisions, concentrating on the impact of macroeconomic factors. Since corporate financing decisions are closely related to a firm's quality, it would be worthwhile to study the financing patterns of different quality–size classes of firms over time, accounting for macroeconomic variables. On the analytical side, more comprehensive theories of corporate decisions seem necessary. Since existing theories of capital structure assume that the term structure of interest rates is stationary and stable over time, a possible line of future research would be to concentrate on relaxing such assumptions.

Appendix:

The firms characteristics are constructed based on variables reported in COMPUSTAT annual primary, secondary, tertiary, and research tapes. Any firm without a valid value of Total Book Value of Assets and Total Sales is dropped. For all other variables, except S&P Ratings and S&P Ratings Squared, any missing value is replaced by a zero.

A. Firms Characteristics:

Dividend Payout Ratio = $\frac{\text{Dividends}}{\text{Total Sales}}$

Book–to–Market = $\frac{\text{Total Book Value of Assets}}{\text{Total Book Value of Liabilities} + \text{Total Market Value of Equity}}$, where the Total Market Value of Equity = Number of Outstanding Shares $\times$ Price per Share at Year–End

Profitability Ratio = $\frac{\text{Operating Income}}{\text{Total Sales}}$

Fixed Asset Ratio = $\frac{\text{Property, Plant and Equiment}}{\text{Total Assets}}$

Depreciation Ratio = $\frac{\text{Depreciation Expenses}}{\text{Total Sales}}$

Size = log (Total Book Value of Liabilities + Total Market Value of Equity)

Business Risk = $\text{Stdev}\left(\frac{\text{Operating Income}_T}{\text{Total Sales}_T}, \cdots, \frac{\text{Operating Income}_{T-5}}{\text{Total Sales}_{T-5}}\right)$; where T is the year of issue

R&D Ratio = $\frac{\text{R \& D Expenses}}{\text{Total Sales}}$

Advertising Ratio = $\frac{\text{Advertising Expenses}}{\text{Total Sales}}$

Working Capital Ratio = $\frac{\text{Current Assets} - \text{Current Liabilities}}{\text{Total Assets}}$

Retained Earnings Ratio = $\frac{\text{Retained Earnings}}{\text{Total Assets}}$

Capital Expenditures = $\dfrac{\text{Capital Expenditures}}{\text{Total Sales}}$

Cash Flows = $\dfrac{\text{Total Net Cash Flow}}{\text{Total Sales}}$

Regulation = a dummy variable indicating if the issuing firm belongs to either of the regulated industries [MacKie-Mason (1990), Barclay and Smith (1995) and Guedes and Opler (1996)].

Repurchases = $\dfrac{\text{Stock Repurchases}}{\text{Total Assets}}$

S&P Rating = COMPUSTAT numerical equivalent for Standard and Poors credit rating. For private debt issue, this variable is coded 30. If this variable is missing in SDC, it is replaced by the valid corresponding variable from COMPUSTAT. Otherwise, a missing value is coded 28.

%Δ Stock Price = $\dfrac{\text{Price}_T}{\text{Price}_{T-1}} - 1$; where *T* is the year of issue

Long-term Debt = $\dfrac{\text{Total Book Value of Long-term Debt}}{\text{Total Book Value of Assets}}$

Δ Long–term Debt = $\text{Long-term Debt}_T - \text{Long-term Debt}_{T-1}$; where *T* is the year of issue

Non–Debt Tax Shields = $\dfrac{\text{Investment Credits} + \text{Tax Loss Carryforwards}}{\text{Total Book Value of Assets}}$

B. Issue Characteristics

Issue Size = log (Total Proceeds of Issue)

Issue Tax Effect = Issue Size $\times$ Graham's Marginal Tax Rate

Issue Default Effect 1 = Issue Size $\times$ S&P Rating

Issue Default Effect 2 = Issue Size $\times$ S&P Rating Squared

Issue–to–Firm Size = $\dfrac{\text{Issue Size}}{\text{Size}}$

C. Macroeconomic Variables

In Table V, the macroeconomic variables are computed for the most recent year prior to the issue. In all other tables, the frequency of the data are defined as following.

Short–Rate = $\text{Avg. of}\left(\text{TB}_t,\cdots,\text{TB}_{t-11}\right)$; where *t* is the month of issue and TB denotes the 3–month Treasury Bill Yield.

Δ Short–Rate = $\text{TB}_t - \text{TB}_{t-11}$; where *t* is the month of issue and TB denotes the 3–month Treasury Bill Yield.

Long–Rate = $\text{Avg. of}\left(\text{BD}_t,\cdots,\text{BD}_{t-11}\right)$; where *t* is the month of issue and BD denotes the constant maturity 30–year Treasury Bond Yield.

Δ Long–Rate = $\text{BD}_t - \text{BD}_{t-11}$; ; where *t* is the month of issue and BD denotes the constant maturity 30–year Treasury Bond Yield.

Volatility of Yields = $\text{Stdev. of}\left(\Delta\text{YD}_t,\cdots,\Delta\text{YD}_{t-11}\right)$; where *t* is the month of issue. ΔYD_t = $\text{BD}_t - \text{TB}_t$; where BD denotes the constant maturity 20–year Treasury Bond Yield, if available. Otherwise, BD denotes the average of the yields of constant maturity 10– and 20–year Treasury Bonds. TB denotes the 3–month Treasury Bill Yield.

Inflation (adjusted) = $\text{Avg. of}\left(\text{INF}_t,\cdots,\text{INF}_{t-11}\right)$; where *t* is the month of issue and INF denotes the monthly changes of seasonally adjusted Consumer Price Index.

Δ Inflation (Adj.) = $\text{INF}_t - \text{INF}_{t-11}$; where *t* is the month of issue and INF denotes the monthly changes of seasonally adjusted Consumer Price Index.

Inflation (non–adj.) = $\text{Avg. of}\left(\text{INFN}_t,\cdots,\text{INFN}_{t-11}\right)$; where *t* is the month of issue and INFN denotes the monthly changes of non–seasonally adjusted Consumer Price Index.

Δ Inflation (non–adj.) = $\text{INFN}_t - \text{INFN}_{t-11}$; where *t* is the month of issue and INFN denotes the monthly changes of non–seasonally adjusted Consumer Price Index.

AAA–Bonds Yield = $\text{Avg. of}\left(\text{YA}_t,\cdots,\text{YA}_{t-11}\right)$; where *t* is the month of issue and YA denotes the AAA–rated corporate bond.

Δ AAA–Bonds Yield = $\text{YA}_t - \text{YA}_{t-11}$; where *t* is the month of issue and YA denotes the AAA–rated corporate bond.

BAA–Bonds Yield = $\text{Avg. of}\left(\text{YB}_t,\cdots,\text{YB}_{t-11}\right)$; where *t* is the month of issue and YB denotes the BAA–rated corporate bond.

Δ BAA–Bonds Yield = $\text{Avg. of}\left(\Delta\text{YB}_t,\cdots,\Delta\text{YB}_{t-11}\right)$; where *t* is the month of issue. ΔYB_t = $\text{YB}_t - \text{YB}_{t-1}$; where and YA denotes the BAA–rated corporate bond.

Mortgage Rate = $\text{Avg. of }\left(\text{YM}_t,\cdots,\text{YM}_{t-11}\right)$; where *t* is the month of issue and YM denotes the conventional mortgage rates.

Δ Mortgage Rate = $\text{YM}_t - \text{YM}_{t-11}$; where *t* is the month of issue and YM denotes the conventional mortgage rates.

Personal Tax Rate = $\text{Avg. of }\left(\text{PT}_t,\cdots,\text{PT}_{t-11}\right)$; where *t* is the month of issue and PT denotes the deduced personal tax rates. Following Buser and Hess (1986), the personal tax rates are deduced monthly; using monthly values of AAA–rated corporate bond yields and municipal bond yields.

Δ Personal Tax Rate = $\text{PT}_t - \text{PT}_{t-11}$; where *t* is the month of issue and PT denotes the deduced personal tax rates.

GDP = $\text{Avg. of }\left(\ln(\text{G}*_Q+1),\cdots,\ln(\text{G}*_{Q-4}+1)\right)$; where *Q* is the quarter of issue and $\text{G}* = \min\left(\text{G}_Q,\cdots,\text{G}_{Q-4}\right)$; where G denotes the detrended Gross Domestic Product.

Growth of GDP = $\text{Avg. of }\left(\text{GG}_Q,\cdots,\text{GG}_{Q-4}\right)$; where *Q* is the quarter of issue. GG = $\text{G}_Q/\text{G}_{Q-1}-1$; where G denotes the detrended Gross Domestic Product.

Δ Growth of GDP = $\text{Avg. of }\left(\text{DGG}_Q,\cdots,\text{DGG}_{Q-4}\right)$; where *Q* is the quarter of issue. DGG = $\text{GG}_Q/\text{GG}_{Q-1}-1$ and GG = $\text{G}_Q/\text{G}_{Q-1}-1$; where G denotes the detrended Gross Domestic Product.

Proportional Profitability Ratio (Prop. Prof. Ratio) = $\dfrac{\text{Firm's Profitability Ratio}}{\text{Industry's Profitability Ratio}}$; where industry classifications are defined by French and Fama (1996).

Standard Deviation of Proportional Profitability (Std. Prop. Prof.) =

$$\text{Stdev}\left(\frac{\text{Firm's Profitability Ratio}_T}{\text{Industry's Profitability Ratio}_T},\cdots,\frac{\text{Firm's Profitability Ratio}_{T-5}}{\text{Industry's Profitability Ratio}_{T-5}}\right)$$

Industrial Production = $\text{Avg. of }\left(\ln(\text{IP}*_t+1),\cdots,\ln(\text{IP}*_{t-11}+1)\right)$; where *t* is the month of issue and $\text{IP}* = \min\left(\text{IP}_t,\cdots,\text{IP}_{t-11}\right)$;where IP denotes the detrended Total Industrial Production.

Growth in Industrial Production = $\text{Avg. of }\left(\text{GIP}_t,\cdots,\text{GIP}_{t-11}\right)$; where *t* is the month of issue. GIP = $\text{IP}_t/\text{IP}_{t-1}-1$; where IP denotes the detrended Total Industrial Production.

Δ Growth in Industrial Production = $\text{Avg. of }\left(\text{DGIP}_t,\cdots,\text{DGIP}_{t-11}\right)$; where *t* is the month of issue. DGIP = $\text{GIP}_t/\text{GIP}_{t-1}-1$and GIP = $\text{IP}_t/\text{IP}_{t-1}-1$; where IP denotes the detrended Total Industrial Production.

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Table I
Summary Statistics: Issue and Firm Characteristics

The table provides a summary of statistics for issue and firm characteristics in the final sample of 7477 firms from which 5266 issued debt and the remaining 2211issued seasoned equity offering in the period of 1980 – 1995. The issuance data is gathered from Security Data Corporation (SDC) and Opler's Debt Issuance databases. The firms characteristics are obtained from COMPUSTAT database. The final sample only includes industrial firms with Standard Industrial Classification (SIC) codes from 1000 – 5999 or 7000 – 9999. *t*-statistics in *italics*.

	All Issues		Debt Issues		SEOs		
Variable	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std Dev	*t*-statistics
Issue Characteristics:							
Total Proceed ($m)			164.9349	276.6912	83.36031	312.4442	
Price ($)			96.83	14.25	23.47	14.26	
Maturity (Years)			13.66	8.89			
Coupon (%)			8.91	2.76			
Firm Characteristics:							
Short–term Debt	0.227	0.118	0.224	0.114	0.235	0.125	*– 3.58*
Long–term Debt	0.251	0.138	0.257	0.129	0.236	0.156	*5.60*
Dividend Payout Ratio	0.052	0.077	0.057	0.072	0.042	0.089	*6.97*
Book–to–Market Ratio	0.812	0.436	0.832	0.433	0.766	0.438	*5.95*
Profitability Ratio	0.175	0.114	0.177	0.110	0.172	0.123	*1.44*
Fixed Assets Ratio	0.599	0.292	0.617	0.283	0.558	0.309	*7.72*
Depreciation Ratio	0.059	0.069	0.059	0.059	0.061	0.087	*– 0.97*
R&D Expenditure Ratio	0.016	0.038	0.014	0.027	0.022	0.054	*– 6.16*
Advertising Expenditures Ratio	0.013	0.027	0.015	0.028	0.010	0.024	*7.78*
Size	7.486	2.013	8.053	1.805	6.134	1.831	*41.54*
Business Risk	0.044	0.035	0.038	0.030	0.057	0.040	*– 20.26*
Abnormal Earnings	4.270	149.989	5.433	178.305	1.503	18.695	*1.58*
S&P Credit Rating	1.944	1.110	1.659	1.104	2.621	0.781	*– 42.72*
S&P Credit Rating Squared	5.287	4.056	4.366	4.064	7.481	3.077	*– 36.16*
Graham's Marginal Tax Rate	0.314	0.159	0.319	0.154	0.303	0.168	*3.79*
% Δ Stock Price	43.5	554.1	27.3	444	82	752.9	*– 3.19*
Non–Debt Tax Shields	0.008	0.023	0.008	0.024	0.007	0.020	*1.24*
Proceeds of Issue	3.986	1.209	4.186	1.137	3.510	1.242	*22.00*
Proceed–to–Size Ratio	0.548	0.158	0.534	0.153	0.582	0.162	*– 12.04*
Number of Observation	7477		5266		2211		

Table II
Summary of Statistics: Macroeconomic Variables

The table provides a summary of statistics for macroeconomic variables used in models (1) – (5) in the period of 1980 – 1995. The data is gathered from Federal Reserve Board of Governors database and Federal Reserve Economic Database (FRED) at Federal Reserve Bank – St. Louis.

Variable	Mean	Median
Short–Rate	7.483	7.318
Δ Short–Rate	-0.286	-0.430
Long–Rate	9.538	8.823
Δ Long–Rate	-0.148	-0.308
Volatility of Yields	0.397	0.349
Inflation (Adjusted)	4.357	3.767
Δ Inflation (Adjusted)	-0.622	-0.180
Inflation (Non–Adjusted)	-0.007	0.002
Δ Inflation (Non–Adjusted)	-0.006	-0.002
AAA–Bond Yield	10.226	9.595
Δ AAA–Bond Yield	-0.127	-0.330
Spread between Corporate AAA– and Treasury 20–year Bond Yields	1.715	1.952
BAA–Bond Yield	11.476	10.737
Δ BAA–Bond Yield	-0.156	-0.390
Spread between BAA–bond and AAA–Bond	1.251	1.177
Mortgage Rate	11.154	10.350
Δ Mortgage Rate	-0.202	-0.365
Spread between Mortgage Rates and AAA–Bond	1.048	1.031
Spread between 3 –month LIBOR and Treasury Bill Yields	1.296	1.024
Δ Spread between 3 –month LIBOR and Treasury Bill Yields	-0.010	0.000
Personal Tax Rate	-0.027	-0.153
Δ Personal Tax Rate	-0.027	-0.007
Industrial Production (detrended)	2.215	2.290
Growth in Industrial Production	0.197	0.233
Δ Growth in Industrial Production	0.009	-0.001
GDP (detrended)	6.087	6.385
Growth of GDP	0.676	0.760
Δ Growth of GDP	0.012	-0.003
Real State and Local Expenditure and Gross Investment	3.754	4.049
Real Private Residential Fixed Investment	4.192	4.429
Real Private Non–Residential Fixed Investment	3.969	4.200
Real Import Goods and Services	4.577	4.942
Real Gross Domestic Private Investment	5.023	5.210
Real Government Expenditure and Gross Investment	4.076	4.667
Real Change in Private Inventories	4.039	4.125
Money Supply – M1	4.267	4.930
Money Supply – M2	5.659	6.105
Money Supply – M3	6.033	6.244
Total Outstanding Debt	6.313	7.455
Money Market Retail	4.310	4.350
Money Market Institutions	2.762	2.552
Money Market Repurchases	3.193	3.422
Euro-Dollar	3.660	4.115
Federal Debt	5.553	6.261
Private Debt	6.123	7.126

Table III
Probit Model of Financing Decision with Macroeconomic Variables

Estimated coefficients of a Probit model of firm choices between debt and seasoned equity. A positive coefficient indicates a higher probability of debt financing. Each of these variables is defined in details in the appendix. Sample: 7477 firms, 5266 debt issuers and 2211 seasoned equity issuers, from Security Data Corporation (SDC) and Opler's Debt Issue databases, which have valid corresponding accounting data in COMPUSTAT database, during the period 1980 and 1995 with Standard Industrial Classification (SIC) codes from 1000 – 5999 or 7000 – 9999. The regressions also include 18 industry dummies which are reported. *Chi–Square* statistics in *italics*.

	Treasury Term Structure and Inflation			Treasury Term Structure , Inflation, and Corporate Term Structure		
Variable	Parameter	*Chi–Square*	Marginal Effect	Parameter	*Chi–Square*	Marginal Effect
A. Firm Characteristics:						
Intercept	5.1566	*25.325*		24.3747	*109.553*	
Div. Payout Ratio	-0.0410	*0.021*	-0.15	0.0429	*0.023*	0.08
Book–to–Market	0.2731	*17.641*	5.48	0.2727	*16.349*	2.81
Profitability Ratio	0.1762	*0.428*	0.93	0.1100	*0.162*	0.30
Fixed Asset Ratio	0.2496	*8.077*	3.36	0.2397	*7.292*	1.66
Depreciation Ratio	-0.7503	*3.285*	-2.37	-0.8024	*3.661*	-1.30
Size	0.4280	*156.036*	39.63	0.4424	*165.204*	21.05
Business Risk	-2.3153	*14.959*	-3.68	-1.7431	*8.161*	-1.42
R&D Ratio	-1.8637	*9.315*	-3.22	-2.3233	*14.005*	-2.06
Advertising Ratio	2.6657	*11.162*	3.28	2.4364	*9.106*	1.54
S&P Rating	0.4692	*21.980*	23.95	0.5057	*24.829*	13.26
S&P Rating Squared	-0.2810	*110.228*	-52.43	-0.2658	*94.998*	-25.48
Graham's Tax Rate	-0.4900	*1.730*	-3.58	-0.3160	*0.701*	-1.19
%Δ Stock Price	-0.0021	*0.446*	-0.53	-0.0015	*0.244*	-0.20
Δ Long–term Debt	0.4950	*6.901*	2.01	0.3885	*4.111*	0.81
Non–Debt Tax Shields	1.6700	*4.056*	1.76	1.3181	*2.454*	0.71
B. Issue Characteristics:						
Issue Size	-0.4073	*32.917*	-22.65	-0.3700	*26.974*	-10.57
Issue Tax Effect	0.2149	*5.490*	7.25	0.1546	*2.761*	2.68
Issue Default Effect 1	-0.2046	*74.611*	-38.04	-0.2177	*81.771*	-20.80
Issue Default Effect 2	0.0620	*98.601*	46.01	0.0612	*92.522*	23.34
Issue–to–Firm Size	2.2356	*37.241*	16.21	2.1907	*35.285*	8.16
Year of Issue	-0.0610	*42.862*	-12.61	-0.2179	*142.677*	-23.15
C. Term Structure Variables:						
Short–Rate	0.0429	*5.838*	5.36	0.1574	*35.311*	10.11
Δ of Short–Rate				0.0241	*2.821*	1.21
Long–Rate	-0.1594	*35.914*	-16.17	0.3760	*4.430*	19.60
Δ Long–Rate				0.0219	*0.115*	0.83
Volatility of Yields	-0.3064	*8.151*	-2.72	-0.2746	*3.174*	-1.25
Inflation (adjusted)				0.0355	*4.153*	2.34
Δ Inflation (Adj.)				-0.0246	*1.600*	-2.29
Inflation (non–adj.)				-0.0148	*1.201*	-1.07
Δ Inflation (non–adj.)				0.0098	*0.263*	0.90
AAA–Bonds Yield				-0.0264	*0.005*	-1.33
Δ AAA–Bonds Yield				-0.0424	*0.168*	-1.38
Δ BAA–Bonds Yield				-0.0001	*0.000*	0.00
BAA–Bonds Yield				-0.3814	*4.144*	-23.12
Mortgage Rate				-0.4289	*46.262*	-27.47
Δ Mortgage Rate				0.1825	*14.403*	6.93
Personal Tax Rate				-9.3663	*27.298*	-3.65
Δ Personal Tax Rate				2.4768	*11.264*	2.16
Number of Debt Issues / SEOs	5266 / 2211			5266 / 2211		
Log Likelihood	6558.05			6407.59		
MacFadden ρ^2	0.2747			0.2943		
Chi-square p value	0.0001			0.0001		
% Predicted Correctly	84.1			84.9		
% Predicted Correctly in / out Sample – Time Series	84.7 / 82.8			85.3 / 83.1		
% Predicted Correctly in / out Sample – Holdout	84.1 / 83.5			84.9 / 84.5		

Table IV

Analysis of Correlation: Term Structure and Inflation Variables

The table provides a summary of the analysis of the correlation structure between different term structure and inflation measures. The data is gathered from Federal Reserve Board of Governors database and Federal Reserve Economic Database (FRED) at Federal Reserve Bank – St. Louis.

	Δ Short–rate	Real Short–rate	Long-rate	Δ Long-rate	D Real Short–rate	Term Spread	Δ Term Spread	Volatility (Curvature)	Inflation (Adj.)	Δ Inflation (Adj.)	Inflation (non-Adj.)	Inflation Cyclicality
Short–rate	-0.1032	0.7447	0.9162	0.0747	0.2088	-0.4826	0.2582	0.5174	0.6973	-0.2642	0.2335	-0.0570
Δ Short–rate		-0.3540	-0.2289	0.6626	0.2887	-0.2537	-0.5863	0.0486	0.2341	0.2567	0.2590	-0.0921
Real Short–rate			0.8067	-0.3737	0.0709	-0.1843	0.0831	0.2101	0.0444	-0.2570	-0.1264	-0.0794
Long-rate				-0.0696	0.1570	-0.1116	0.2377	0.4318	0.5035	-0.2829	0.1193	-0.0298
Δ Long-rate					0.1380	-0.2741	0.1723	-0.0002	0.5222	0.2196	0.3995	-0.1110
Δ Real Short-rate						-0.1752	-0.2484	0.3631	0.2425	-0.8163	-0.3078	-0.0818
Term Spread							-0.0264	-0.2869	-0.5279	0.0354	-0.2657	0.0663
Δ Term Spread								-0.0565	0.2958	-0.0695	0.1264	0.0026
Volatility (Curvature)									0.5475	-0.3333	0.1377	-0.0142
Inflation (Adj.)										-0.1134	0.4728	-0.0868
Δ Inflation (Adj.)											0.4185	-0.0561
Inflation (non-Adj.)												0.1285

Table V

Robustness Analysis: Specifications and Sample Selection

Estimated coefficient of a probit model of firm choices between debt and seasoned equity. A positive coefficient indicates a higher probability of debt financing. Each of these variables is defined in details in appendix A. Sample: 7477 firms, 5266 debt issuers and 2211 seasoned equity issuers, in Security Data Corporation (SDC) and Opler's Debt Issue databases which have valid corresponding accounting data in COMPUSTAT database, for the period of 1980 and 1995 with Standard Industrial Classification (SIC) codes from 1000 – 5999 or 7000 – 9999. The regressions also include 18 industry dummies which are reported. *Chi–Square* statistics in *italics*.

	Full Sample			Sub-Sample of Firms with Fund Deficit		
Variable	Parameter	*Chi–Square*	Marginal Effect	Parameter	*Chi–Square*	Marginal Effect
A. Firm Characteristics:						
Intercept	20.0342	*88.874*	0.00	20.0996	*75.916*	0.00
Div. Payout Ratio	0.0798	*0.082*	0.12	0.1005	*0.129*	0.16
Book–to–Market	0.2662	*15.858*	2.24	0.2279	*10.560*	1.81
Profitability Ratio	0.0905	*0.110*	0.20	0.0351	*0.015*	0.08
Fixed Asset Ratio	0.2264	*6.486*	1.28	0.2027	*4.793*	1.17
Depreciation Ratio	-0.7884	*3.531*	-1.05	-0.7326	*2.955*	-1.01
Size	0.4488	*167.356*	17.44	0.4716	*149.254*	17.96
Business Risk	-1.6572	*7.347*	-1.11	-2.2980	*12.057*	-1.48
R&D Ratio	-2.0920	*11.536*	-1.52	-2.1491	*10.692*	-1.54
Advertising Ratio	2.3107	*8.255*	1.19	2.6201	*8.567*	1.32
S&P Rating	0.4836	*22.754*	10.36	0.5937	*30.425*	12.71
S&P Rating Squared	-0.2607	*91.419*	-20.41	-0.2729	*88.028*	-21.44
Graham's Tax Rate	-0.3729	*0.978*	-1.14	-0.1898	*0.200*	-0.57
%Δ Stock Price	-0.0012	*0.144*	-0.12	-0.0012	*0.144*	-0.13
Δ Long–term Debt	0.3752	*3.830*	0.64	0.2056	*1.029*	0.35
Non–Debt Tax Shields	1.5085	*3.202*	0.67	1.4921	*2.962*	0.68
B. Issue Characteristics:						
Issue Size	-0.3836	*28.777*	-8.95	-0.3823	*24.738*	-8.78
Issue Tax Effect	0.1734	*3.472*	2.45	0.1246	*1.474*	1.75
Issue Default Effect 1	-0.2127	*78.283*	-16.60	-0.2271	*79.253*	-17.90
Issue Default Effect 2	0.0596	*88.030*	18.57	0.0609	*80.484*	19.05
Issue–to–Firm Size	2.2147	*35.564*	6.74	2.4127	*33.775*	7.32
Year of Issue	-0.1862	*121.627*	-16.16	-0.1929	*108.946*	-16.29
C. Term Structure Variables:						
Real Short–Rate	-0.0736	*2.570*	-2.78	-0.0829	*2.786*	-3.03
Δ of Real Short–Rate	-0.0170	*1.341*	-1.29	-0.0224	*1.986*	-1.63
Term Spread	-0.3968	*39.280*	-5.82	-0.3710	*30.537*	-5.51
Δ Term Spread	-0.0076	*0.053*	-0.14	0.0053	*0.023*	0.10
Volatility of Yields	-0.1416	*0.782*	-0.53	-0.1463	*0.741*	-0.51
Inflation (Seasonally Adjusted)	-0.0093	*0.068*	-0.33	-0.0261	*0.457*	-0.84
Δ Inflation (Seasonally Adjusted)	-0.0173	*1.374*	-1.31	-0.0289	*3.276*	-2.11
Inflation Cyclicality	-0.3529	*6.996*	-1.08	-0.3681	*6.762*	-1.13
AAA–Bonds Credit Spread	-0.1081	*0.323*	-0.44	-0.1499	*0.553*	-0.59
Δ AAA–Bonds Credit Spread	0.1859	*7.955*	1.41	0.1123	*2.523*	0.82
BAA–Bonds Credit Spread	-0.1075	*0.277*	-0.99	-0.2980	*1.838*	-2.61
Δ BAA–Bonds Credit Spread	0.0833	*1.135*	0.59	0.0783	*0.833*	0.51
Mortgage Spread	-1.1784	*50.601*	-14.82	-0.9943	*32.613*	-11.91
Δ Mortgage Spread	0.0964	*4.711*	1.03	0.1139	*5.012*	1.11
Personal Tax Rate	-12.0006	*29.585*	-3.82	-10.4968	*19.564*	-3.05
Δ Personal Tax Rate	1.8831	*6.944*	1.34	1.9457	*6.571*	1.31
Number of Debt Issues / SEOs	5266 / 2211			4796 / 1880		
Log Likelihood	6406.56			5701.56		
MacFadden ρ^2	0.2944			0.2817		
Chi-square *p* value	0.0001			0.0001		
% Predicted Correctly	84.9			84.3		
% Predicted Correctly in / out Sample – Time Series	85.3 / 82.3			84.2 / 82.7		
% Predicted Correctly in / out Sample – Holdout	84.9 / 84.4			84.3 / 84.0		

Table VI

Robustness Analysis: On the Effect of External Financing

Estimated coefficient of a simultaneous system of equation involving financing form and source decisions form is presented. Simultaneous Probit models of financing source, external and non–external financing, and financing form, debt–equity choice, is estimated using simultaneous Probit techniques [Maddala (1999)]. A positive coefficient indicates a higher probability of external or debt financing. Each of these variables is defined in details in appendix A. Sample: 57734 firms, of which 8876 sought external financing, in COMPUSTAT, Security Data Corporation (SDC) and Opler's Debt Issue databases for the period of 1980 and 1995 with Standard Industrial Classification (SIC) codes from 1000 – 5999 or 7000 – 9999. *Chi–Square* statistics in *italics*.

	Probit Model of Financing Source External vs. Non–External			Simultaneous Probit Models of Financing Source and Form					
				Probit Model of Financing Source External vs. Non–External			Probit Model of Financing Source External vs. Non–External		
Variable	Parameter	*Chi-Square*	Marginal Effect	Parameter	*Chi-Square*	Marginal Effect	Parameter	*Chi-Square*	Marginal Effect
Intercept	-24.11090	*588.262*	0.00	15.34720	*161.409*	0.00	16.30650	*84.209*	0.00
Financing Source, y^*_1							-1.08710	*15.776*	-6.23
Financing Form, y^*_2				13.87070	*5259.107*	38.07			
Dividend Payout							0.00014	*0.000*	0.00
Profitability							0.02770	*0.014*	0.05
Fixed Assets							0.21230	*7.316*	6.62
Business Risk							-2.70830	*22.457*	-1.70
R&D							-1.79740	*11.255*	-1.30
Advertising							1.33170	*3.842*	0.71
Altman's ZPROB	0.00888	*11.446*	2.16	0.02260	*128.265*	3.14			
Short–term Debt	-0.41900	*32.198*	-1.39	-0.19490	*5.191*	-0.37			
Δ Short–term Debt	0.10730	*1.083*	0.24	-0.71360	*29.745*	-0.91			
Long–term Debt	-1.11660	*314.564*	-4.32	-0.44780	*37.564*	-0.99			
Regulation Dummy	-0.27780	*0.657*	-0.14	-1.51330	*16.980*	-0.42			
Δ Retained Earnings in One Year	-0.09720	*29.471*	-1.16	-0.18550	*90.725*	-1.26			
Δ Operating Cash Flow in One Year	0.09510	*1.784*	0.30	-0.23210	*11.079*	-0.41			
Δ Stock Repurchases in One Year	-0.79900	*10.636*	-0.72	-3.73540	*182.525*	-1.90			
Δ Dividend Paid in One Year	-0.14670	*2.974*	-0.46	-0.07920	*0.472*	-0.14			
Δ R&D in One Year	-0.42460	*3.777*	-0.47	2.84070	*164.060*	1.78			
Δ Advertising in One Year	0.16870	*0.432*	0.14	-2.10720	*95.607*	-0.97			
Δ Fixed Assets in One Year	0.21580	*31.608*	1.19	-0.43000	*99.198*	-1.35			
Δ Working Capital in One Year	0.25190	*25.049*	1.38	1.57930	*665.533*	4.91			
Δ Capital Expenditures from Previous Year	-0.03350	*0.359*	-0.12	-0.01190	*0.035*	-0.02			
Capital Expenditures	-0.23410	*25.401*	-1.08	-0.55230	*91.825*	-1.45			
Δ Capital Expenditures in One Year	0.18390	*11.867*	0.70	0.96770	*235.966*	2.11			

Δ Capital Expenditures in Two Years	-0.17200	*6.710*	-0.52	0.21630	*7.679*	0.37			
Δ Capital Expenditures in Three Years	-0.30290	*15.985*	-0.83	-0.45660	*27.099*	-0.71			
YEAR	0.23470	*753.438*	30.80	-0.29710	*640.759*	-22.23	-0.17240	*121.149*	-14.86
Book–to–Market	0.15120	*51.392*	5.30	1.00000	*1067.984*	19.98	0.23580	*16.387*	5.43
Firm Size	-0.23100	*2310.407*	-12.50	0.54910	*2174.652*	16.96	0.23690	*413.483*	8.43
Graham's Marginal Tax Rate	-0.57220	*109.844*	-2.29	0.80090	*161.635*	1.83	0.31180	*6.714*	0.82
S&P Credit Rating	-0.77800	*166.825*	-8.31	4.11670	*2433.579*	25.05	1.45830	*119.717*	10.22
S&P Credit Rating Squared	0.49990	*137.186*	7.61	-2.40180	*2112.507*	-20.83	-0.89320	*93.225*	-8.93
Δ Stock Price	-0.00035	*2.577*	-0.24	-0.00323	*76.425*	-1.28	-0.00267	*0.969*	-1.22
Δ Long–term Debt	0.15100	*3.207*	0.38	0.67070	*38.616*	0.96	0.42600	*6.479*	0.71
Depreciation	0.08870	*0.528*	0.21	-0.39960	*10.165*	-0.55	-0.25520	*0.530*	-0.40
Non–Debt Tax Shields	-0.77710	*17.986*	-0.70	3.87580	*174.631*	1.98	2.05440	*7.415*	1.21
Issue–to–Firm Size							0.69550	*43.482*	2.44
Real Short–Rate	0.55880	*431.527*	26.40	0.54500	*346.124*	14.66	-0.01140	*0.056*	-0.35
Δ of Real Short–Rate	0.29900	*861.911*	10.90	0.23640	*505.952*	4.90	-0.00340	*0.060*	-0.08
Term Spread	-1.05070	*465.618*	-19.80	-1.34400	*619.540*	-14.44	-0.12820	*1.404*	-1.59
Δ Term Spread	0.43660	*282.440*	3.96	-0.03650	*1.672*	-0.19	-0.14460	*10.008*	-0.86
Volatility of Yields	-0.48810	*43.359*	-2.94	-1.95010	*539.488*	-6.70	-0.42280	*10.219*	-1.67
Inflation (Seasonally Adjusted)	0.78400	*556.116*	46.10	0.54490	*223.207*	18.23	-0.06800	*1.517*	-2.62
Δ Inflation (Seasonally Adjusted)	0.36150	*1233.954*	13.30	0.31870	*882.446*	6.70	0.00264	*0.034*	0.06
Inflation Cyclicality	1.55590	*285.269*	3.29	0.61130	*39.363*	0.74	-0.28140	*5.196*	-0.39
AAA–Bonds Credit Spread	2.91630	*599.477*	45.40	2.21990	*289.143*	19.67	-0.16500	*0.599*	-1.68
Δ AAA–Bonds Credit Spread	0.13720	*34.724*	2.11	0.59970	*526.475*	5.25	0.15010	*5.773*	1.51
BAA–Bonds Credit Spread	-0.88870	*54.470*	-10.50	-1.06380	*72.818*	-7.18	-0.08620	*0.234*	-0.67
Δ BAA–Bonds Credit Spread	0.08690	*3.250*	0.63	1.02480	*384.577*	4.22	0.31460	*25.193*	1.49
Mortgage Spread	-0.10870	*1.945*	-1.79	-2.60130	*830.567*	-24.42	-0.68540	*16.539*	-7.41
Δ Mortgage Spread	0.50460	*189.251*	4.79	0.46560	*152.055*	2.52	-0.00474	*0.013*	-0.03
Personal Tax Rate	3.68820	*637.591*	12.90	0.02510	*0.021*	0.05	-1.02190	*8.242*	-2.34
Δ Personal Tax Rate	5.43210	*662.738*	4.54	4.07520	*310.295*	1.94	-0.43190	*2.719*	-0.24
Number of Non-External / External Financing	48858 / 8876								
Number of Debt Issues / SEOs	5266 / 2211								
Log Likelihood	35635.55			27664.05			8141.14		
McFadden ρ^2	0.28085			0.44172			0.27748		
% Predicted Correctly - Full Sample	83.3			91.1					
% Predicted Correctly in / out Sample – Time Series	84.0 / 82.4			88.5 / 86.3					
% Predicted Correctly in / out Sample – Holdout	83.1 / 81.5			87.2 / 85.9					

Table VII

Macroeconomic Conditions and Financing Decisions – Change in Debt Ratio Perspective

Estimated coefficients are from an OLS and a Heckit models of the change in firm's debt ratio, correcting for sample selection bias due to the likelihood of raising external capital. Each of these variables is defined in details in appendix A. Sample: 7477 firms, 5266 debt issuers and 2211 seasoned equity issuers, in Security Data Corporation (SDC) and Opler's Debt Issue databases which have valid corresponding accounting data in COMPUSTAT database, for the period of 1980 and 1995 with Standard Industrial Classification (SIC) codes from 1000 – 5999 or 7000 – 9999. The regressions also include 18 industry dummies which are reported. *t–ratio* statistics in *italics*.

Variable	OLS Model of Δ Debt Ratio		Heckit Model of Δ Debt Ratio	
	Parameter	*t-ratio*	Parameter	*t-ratio*
A. Firm Characteristics:				
Intercept	2.17695	*6.89*	6.52159	*10.76*
Dividend	0.01472	*0.16*	0.01871	*0.20*
Book-to-Market	0.11361	*8.48*	0.09850	*7.30*
Profitability	-0.06234	*-0.72*	-0.11395	*-1.32*
Fixed Assets	0.01695	*0.63*	0.01558	*0.59*
Depreciation	-0.13832	*-1.02*	-0.12063	*-0.90*
Size	0.05173	*12.65*	0.06687	*10.43*
Business Risk	-0.84570	*-4.39*	-0.65243	*-3.41*
R&D	-0.85652	*-4.83*	-0.89629	*-5.09*
Advertising	0.66289	*2.83*	0.55311	*2.38*
S&P Credit Rating	-0.13434	*-21.25*	-0.13110	*-20.83*
S&P Credit Rating Squared	-0.00809	*-4.03*	-0.00901	*-3.74*
Graham's Marginal Tax Rate	0.06464	*1.63*	0.05024	*1.27*
Δ Stock Price	-0.00069	*-0.70*	-0.00029	*-0.30*
Δ Long-term Debt	0.19944	*3.23*	0.20178	*3.26*
Non-Debt Tax Shields	0.66376	*2.44*	0.76117	*2.81*
YEAR	-0.02095	*-6.96*	-0.05853	*-11.91*
Inverse Mills Ratio			-0.05835	*-2.81*
B. Macroeconomic Variables:				
Real Short–Rate	-0.02475	*-3.77*	0.00335	*0.25*
Δ of Real Short–Rate	-0.00540	*-1.48*	-0.00735	*-1.67*
Term Spread	-0.03513	*-3.06*	-0.06579	*-3.49*
Δ Term Spread	-0.02547	*-2.99*	0.00368	*0.37*
Volatility of Yields	-0.12555	*-3.25*	0.01015	*0.21*
Inflation (Seasonally Adjusted)	-0.01395	*-1.98*	0.01053	*0.99*
Δ Inflation (Seasonally Adjusted)	-0.00244	*-0.68*	-0.00624	*-1.42*
Inflation Cyclicality	-0.16720	*-4.55*	-0.08670	*-2.22*
AAA–Bonds Credit Spread			0.07300	*1.29*
Δ AAA–Bonds Credit Spread			0.04393	*2.24*
BAA–Bonds Credit Spread			-0.16504	*-2.66*
Δ BAA–Bonds Credit Spread			0.02065	*0.88*
Mortgage Spread			-0.30438	*-6.20*
Δ Mortgage Spread			0.03488	*2.53*
Personal Tax Rate			-3.21387	*-5.09*
Δ Personal Tax Rate			0.59046	*2.76*
Adjusted R^2		*0.2409*		*0.2584*

Table VIII

Why Interest Rates Matter: Aggregate Prosperity

Estimated coefficients are from Heckit models of the change in firm's debt ratio, choice-based and annual-based, as well as a Probit model of choices between debt and seasoned equity, Model (5), accounting for distortions in bankruptcy costs. In the Probit, a positive coefficient indicates a higher probability of debt financing. Each of these variables is defined in details in appendix A. Sample: 7477 firms, 5266 debt issuers and 2211 seasoned equity issuers, in Security Data Corporation (SDC) and Opler's Debt Issue databases which have valid corresponding accounting data in COMPUSTAT database, for the period of 1980 and 1995 with Standard Industrial Classification (SIC) codes from 1000 – 5999 or 7000 – 9999. The regressions also include 18 industry dummies which are reported. Additionally, the results for firm and choice characteristics are similar to those of Table III and V, hence not reported. *t–ratio* statistics in *italics*.

	OLS Choice-based		OLS Annual		Probit Choice-based		
Variable	Parameter	*t-ratio*	Parameter	*t-ratio*	Parameter	*t-ratio*	Marginal Effect
C. Term Structure Variables:							
Real Short–Rate	0.00759	*0.53*	-0.00006	*0.00*	-0.06910	*-1.42*	-2.43
Δ of Real Short–Rate	-0.00489	*-1.06*	-0.00754	*-0.88*	-0.00829	*-0.54*	-0.59
Term Spread	-0.05462	*-2.27*	-0.12478	*-2.89*	-0.37420	*-4.64*	-5.11
Δ Term Spread	0.00487	*0.48*	0.00826	*0.45*	0.00038	*0.01*	0.01
Volatility of Yields	-0.00253	*-0.05*	-0.05137	*-0.56*	-0.17280	*-1.07*	-0.60
Inflation (Seasonally Adjusted)	0.01060	*0.98*	0.00618	*0.32*	-0.01150	*-0.31*	-0.38
Δ Inflation (Seasonally Adjusted)	-0.00350	*-0.76*	-0.00516	*-0.59*	-0.00844	*-0.54*	-0.60
Inflation Cyclicality	-0.06835	*-1.73*	-0.06192	*-0.82*	-0.31610	*-2.33*	-0.90
AAA–Bonds Credit Spread	0.04124	*0.69*	-0.00115	*-0.01*	-0.18470	*-0.91*	-0.70
Δ AAA–Bonds Credit Spread	0.03474	*1.65*	0.04368	*1.12*	0.15370	*2.18*	1.09
BAA–Bonds Credit Spread	-0.11394	*-1.64*	-0.21846	*-1.72*	0.00413	*0.02*	0.04
Δ BAA–Bonds Credit Spread	-0.00974	*-0.37*	0.02962	*0.60*	-0.00525	*-0.06*	-0.03
Mortgage Spread	-0.29014	*-5.74*	-0.49712	*-5.55*	-1.09960	*-6.44*	-12.87
Δ Mortgage Spread	0.03483	*2.45*	0.03437	*1.38*	0.09650	*2.11*	0.96
Personal Tax Rate	-3.11538	*-4.66*	-4.61236	*-3.78*	-11.65110	*-5.04*	-3.45
Δ Personal Tax Rate	0.75427	*3.28*	0.97607	*2.29*	2.39650	*3.11*	1.59
D. Prosperity Measures:							
Proportional Profitability Ratio	0.02479	*1.56*	0.07333	*2.62*	0.12590	*2.33*	1.24
Std. Dev. of Proportional Profitability Ratio	-0.08672	*-2.92*	-0.10964	*-2.24*	-0.24290	*-2.63*	-1.10
Industrial Production	-0.04819	*-0.80*	-0.01075	*-0.10*	-0.14770	*-0.74*	-0.93
Growth in Industrial Production	-0.13848	*-2.64*	-0.10786	*-1.12*	-0.32350	*-1.86*	-1.65
Δ Growth in Industrial Production	-0.00096	*-0.18*	-0.00398	*-0.40*	-0.01260	*-0.71*	-0.28
GDP	1.00000	*0.04*	1.00000	*0.08*	0.18680	*1.35*	2.38
Growth of GDP	0.07530	*2.61*	0.05749	*1.09*	0.20790	*2.16*	2.16
Δ Growth of GDP	-0.00183	*-0.28*	0.00775	*0.62*	-0.01270	*-0.60*	-0.27
Number of Debt Issues / SEOs	5266 / 2211						
Adjusted R^2 (for Probit MacFadden ρ^2)	0.2582		0.3309		0.2952		
Chi-square *p* value	0.0001		0.0001		0.0001		
% Predicted Correctly	84.9				82.0		
% Predicted Correctly in / out of sample – Time Series	85.3 / 82.0				85.5		
% Predicted Correctly in / out of sample – Holdout	85.5 / 83.0				83.0		

Table IX

Why Interest Rates Matter: Aggregate Prosperity and Monetary Conditions

Estimated coefficients are from Heckit models of the change in firm's debt ratio, choice-based and annual-based, as well as a Probit model of choices between debt and seasoned equity, Model (5), accounting for distortions in bankruptcy costs. In the Probit, a positive coefficient indicates a higher probability of debt financing. Each of these variables is defined in details in appendix A. Sample: 7477 firms, 5266 debt issuers and 2211 seasoned equity issuers, in Security Data Corporation (SDC) and Opler's Debt Issue databases which have valid corresponding accounting data in COMPUSTAT database, for the period of 1980 and 1995 with Standard Industrial Classification (SIC) codes from 1000 – 5999 or 7000 – 9999. The regressions also include 18 industry dummies which are reported. Additionally, the results for firm and choice characteristics are similar to those of Table III and V, hence not reported. *t–ratio* statistics in *italics*.

	OLS Choice-based		OLS Annual		Probit Choice-based		
Variable	Parameter	*t-ratio*	Parameter	*t-ratio*	Parameter	*t-ratio*	Marginal Effect
C. Term Structure Variables:							
Real Short–Rate	0.03346	*1.79*	0.00598	*0.18*	0.02180	*0.35*	0.51
Δ of Real Short–Rate	-0.00507	*-0.95*	-0.01272	*-1.26*	-0.01380	*-0.75*	-0.65
Term Spread	-0.02183	*-0.65*	-0.07908	*-1.32*	-0.25850	*-2.30*	-2.36
Δ Term Spread	-0.01143	*-0.86*	-0.01247	*-0.51*	-0.04140	*-0.93*	-0.48
Volatility of Yields	-0.04868	*-0.91*	-0.10994	*-1.11*	-0.28660	*-1.60*	-0.66
Inflation (Seasonally Adjusted)	0.04600	*2.59*	0.02550	*0.81*	0.08460	*1.44*	1.85
Δ Inflation (Seasonally Adjusted)	-0.00373	*-0.70*	-0.01033	*-1.02*	-0.01070	*-0.58*	-0.50
Inflation Cyclicality	-0.04694	*-1.11*	-0.08903	*-1.09*	-0.22620	*-1.54*	-0.43
AAA–Bonds Credit Spread	0.07777	*0.97*	0.00609	*0.04*	-0.06800	*-0.25*	-0.17
Δ AAA–Bonds Credit Spread	-0.00951	*-0.39*	0.00695	*0.16*	-0.00369	*-0.04*	-0.02
BAA–Bonds Credit Spread	0.04445	*0.52*	0.10944	*0.72*	0.53030	*1.91*	3.03
Δ BAA–Bonds Credit Spread	0.02659	*0.89*	0.09326	*1.71*	0.13690	*1.38*	0.60
Mortgage Spread	-0.05004	*-0.76*	-0.16358	*-1.40*	-0.43000	*-1.94*	-3.37
Δ Mortgage Spread	0.01645	*1.02*	0.02107	*0.73*	0.04130	*0.78*	0.27
Personal Tax Rate	-1.12303	*-1.40*	-2.09280	*-1.43*	-5.48960	*-1.98*	-1.09
Δ Personal Tax Rate	0.24705	*0.99*	0.21464	*0.46*	0.79380	*0.94*	0.35
3–month LIBOR Spread	0.00691	*0.59*	-0.01641	*-0.78*	0.00501	*0.13*	0.15
Δ 3–month LIBOR Spread	-0.00544	*-1.32*	-0.01154	*-1.49*	-0.01810	*-1.34*	-0.73
D. Prosperity Measures:							
Proportional Profitability Ratio	0.02519	*1.59*	0.07370	*2.65*	0.13390	*2.45*	0.88
Std. Dev. of Proportional Profitability Ratio	-0.09301	*-3.14*	-0.11718	*-2.40*	-0.26730	*-2.88*	-0.81
Industrial Production	-0.35963	*-1.97*	-0.39308	*-1.19*	-1.07920	*-1.76*	-4.56
Growth in Industrial Production	0.15583	*1.78*	0.31711	*1.92*	0.53480	*1.81*	1.82
Δ Growth in Industrial Production	-0.01622	*-2.57*	-0.02833	*-2.34*	-0.05830	*-2.67*	-0.87
Real State and Local Exp. and Gross Investment	-0.09456	*-1.62*	-0.04486	*-0.41*	-0.22650	*-1.15*	-2.32
Real Private Residential Fixed Investment	0.13939	*1.78*	0.16920	*1.16*	0.47970	*1.86*	3.82
Real Private Non–Residential Fixed Investment	0.18900	*3.19*	0.31321	*2.79*	0.53840	*2.72*	4.54
Real Import Goods and Services	0.05743	*0.91*	0.07558	*0.66*	0.29630	*1.41*	2.99
Real Gross Domestic Private Investment	-0.48718	*-3.36*	-0.79902	*-2.97*	-1.60290	*-3.37*	-9.97
Real Government Exp. and Gross Investment	-0.01648	*-0.31*	-0.00347	*-0.04*	-0.14410	*-0.82*	-2.19
Real Change in Private Inventories	0.17581	*2.89*	0.26012	*2.33*	0.56940	*2.84*	2.72
Money Market Retail	-0.04333	*-0.78*	-0.03000	*-0.30*	-0.09670	*-0.53*	-0.74
Money Market Institutions	0.03541	*1.23*	-0.00844	*-0.16*	0.10690	*1.07*	1.31
Money Market Repurchases	0.04792	*2.56*	0.08412	*2.52*	0.18360	*2.99*	1.97
Euro-Dollar	0.00582	*0.31*	0.02419	*0.74*	0.00672	*0.11*	0.08
Federal Debt	-0.00576	*-0.16*	-0.03854	*-0.57*	-0.03590	*-0.30*	-0.75
Private Debt	0.18692	*3.11*	0.18788	*1.71*	0.58520	*2.90*	11.86
Number of Debt Issues / SEOs	5266 / 2211						
Adjusted R^2 (for Probit MacFadden ρ^2)	0.2659		0.3382		0.3045		
% Predicted Correctly / Chi-square *p* value	85.4 / 0.0001						
% Predicted Correctly in / out of sample – Time Series	85.7 / 80.9						
% Predicted Correctly in / out of sample – Holdout	86.0 / 83.5						

Table X

Why Interest Rates Matter: Distortions in Tax Shield

Estimated coefficients are from Heckit models of the change in firm's debt ratio, choice-based and annual-based, as well as a Probit model of choices between debt and seasoned equity, Model (5), accounting for distortions in tax shields. In the Probit, a positive coefficient indicates a higher probability of debt financing. Each of these variables is defined in details in appendix A. Sample: 7477 firms, 5266 debt issuers and 2211 seasoned equity issuers, in Security Data Corporation (SDC) and Opler's Debt Issue databases which have valid corresponding accounting data in COMPUSTAT database, for the period of 1980 and 1995 with Standard Industrial Classification (SIC) codes from 1000 – 5999 or 7000 – 9999. The regressions also include 18 industry dummies which are reported. Additionally, the results for firm and choice characteristics, term structure variables and prosperity measures are similar to those of Table VIII and IX, hence not reported. *t–ratio* statistics in *italics*.

	OLS Choice-based		OLS Annual		Probit Choice-based		
Variable	Parameter	*t-ratio*	Parameter	*t-ratio*	Parameter	*t-ratio*	Marginal Effect
. . .							
E. Tax Effects:							
Real Short–Rate × marginal tax rate	-0.01700	*-0.89*	-0.04239	*-1.29*	-0.08030	*-1.31*	-2.25
Term Spread × marginal tax rate	-0.01930	*-0.43*	-0.05589	*-0.73*	-0.06050	*-0.41*	-0.39
Volatility of Yields × marginal tax rate	-0.40487	*-1.92*	-0.43356	*-1.21*	-1.47520	*-2.17*	-2.77
Inflation × marginal tax rate	-0.02442	*-1.32*	-0.03894	*-1.21*	-0.11380	*-1.91*	-3.22
Inflation Cyclicality × marginal tax rate	0.00256	*0.11*	0.02830	*0.68*	-0.03200	*-0.42*	-0.23
Number of Debt Issues / SEOs	5266 / 2211						
Adjusted R^2 (for Probit MacFadden ρ^2)	0.2582		0.3309		0.2961		
Chi-square *p* value	0.0001		0.0001		0.0001		
% Predicted Correctly	84.9						
% Predicted Correctly in / out of sample – Time Series	85.4 / 81.1						
% Predicted Correctly in / out of sample – Holdout	85.6 / 82.9						

Table XI

Why Interest Rates Matter: Distortions in Financial Distress Costs

Estimated coefficients are from Heckit models of the change in firm's debt ratio, choice-based and annual-based, as well as a Probit model of choices between debt and seasoned equity, Model (5), accounting for distortions in bankruptcy costs. In the Probit, a positive coefficient indicates a higher probability of debt financing. Each of these variables is defined in details in appendix A. Sample: 7477 firms, 5266 debt issuers and 2211 seasoned equity issuers, in Security Data Corporation (SDC) and Opler's Debt Issue databases which have valid corresponding accounting data in COMPUSTAT database, for the period of 1980 and 1995 with Standard Industrial Classification (SIC) codes from 1000 – 5999 or 7000 – 9999. The regressions also include 18 industry dummies which are reported. Additionally, the results for firm and choice characteristics, term structure variables and prosperity measures are similar to those of Table VIII and IX, hence not reported. *t–ratio* statistics in *italics*.

	OLS Choice-based		OLS Annual		Probit Choice-based		
Variable	Parameter	*t-ratio*	Parameter	*t-ratio*	Parameter	*t-ratio*	Marginal Effect
. . .							
E. Default Effects:							
Δ Profitability	-0.19800	*-1.59*	-0.06327	*-0.31*	-0.06400	*-0.17*	-0.05
Real Short–Rate × Δ Current Liab. Ratio	0.00084	*0.20*	0.00084	*0.13*	-0.00227	*-0.11*	-0.15
Δ real Short–Rate × Current Liab. Ratio	0.01484	*1.13*	0.03018	*1.24*	0.03410	*0.68*	0.60
Term Spread × Δ Current Liab. Ratio	-0.00852	*-0.80*	-0.01131	*-0.72*	-0.01280	*-0.31*	-0.47
Δ Term Spread × Current Liab. Ratio	0.06211	*1.28*	0.08275	*0.94*	-0.01590	*-0.10*	-0.07
Volatility of Yields × Δ Current Liab. Ratio	-0.01569	*-4.06*	-0.00237	*-0.25*	-0.05020	*-3.18*	-1.42
Inflation (adjusted) × Δ Current Liab. Ratio	0.41906	*0.22*	0.70750	*0.25*	23.84350	*1.01*	3.28
Δ Inflation (adjusted) × Current Liab. Ratio	5.40959	*1.52*	4.14079	*0.79*	42.89120	*1.13*	2.04
Inflation Cyclicality × Δ Current Liab. Ratio	-0.09955	*-2.83*	-0.10947	*-2.13*	-0.04420	*-0.25*	-0.21
Number of Debt Issues / SEOs							
Adjusted R^2 (for Probit MacFadden ρ^2)	0.26190		0.33160		0.29682		
Chi-square *p* value	0.0001		0.0001		0.0001		
% Predicted Correctly	85.5						
% Predicted Correctly in / out of sample – Time Series	85.5 / 81.8						
% Predicted Correctly in / out of sample – Holdout	85.6 / 83.1						

Table XII

Models of Maturity and Capital Structure with Macroeconomic Variables: Simultaneous Estimation

Estimated coefficients of a system of simultaneous equations of the debt maturity and the change in debt ratio, correcting for firm choices between external and non–external financing, and firm choices between debt and equity financing. Each of these variables is defined in details in appendix A. Sample: 7477 firms, 5266 debt issuers and 2211 seasoned equity issuers, in Security Data Corporation (SDC) and Opler's Debt Issue databases which have valid corresponding accounting data in COMPUSTAT database, for the period of 1980 and 1995 with Standard Industrial Classification (SIC) codes from 1000 – 5999 or 7000 – 9999. The regressions also include 18 industry dummies which are reported. *t–ratio* statistics in *italics*.

Panel A. Estimated coefficients for the change in debt ratio from a simultaneous equation involving change in the debt ratio and the maturity is reported. For equity, the maturity is assumed to be 200 years. The coefficient for measures of aggregate prosperity, tax distortions and distress costs distortions are not reported.

	IT3SLS		FIML		IT3SLS with Prosperity, Tax, and Distress Effects	
Variable	Parameter	*t-ratio*	Parameter	*t-ratio*	Parameter	*t-ratio*
A. Firm Characteristics:						
Intercept	3.52932	*1.55*	8.95828	*7.75*	1.22725	*1.48*
Year–to–Maturity	-0.25879	*-1.34*	0.20498	*3.32*	0.35219	*2.78*
Dividend	0.00372	*0.05*	0.03068	*0.25*	0.00675	*0.18*
Book-to-Market	0.03652	*0.82*	0.13422	*5.60*	0.04751	*2.67*
Profitability	-0.04364	*-1.01*	-0.22637	*-1.92*	-0.05481	*-0.86*
Fixed Assets	0.01233	*0.51*	0.04907	*1.25*	-0.03877	*-1.36*
Depreciation	-0.00012	*0.00*	-0.23363	*-1.20*	-0.05016	*-0.76*
Size	-0.00758	*-0.15*	0.12126	*6.32*	0.02318	*1.42*
Business Risk	-0.29595	*-0.71*	-1.20697	*-4.22*	-0.20211	*-2.02*
R&D	-0.37379	*-0.90*	-1.29153	*-4.75*	-0.37739	*-1.62*
Advertising	0.20999	*0.45*	0.51483	*1.63*	0.25790	*2.09*
S&P Credit Rating	-0.10882	*-6.60*	-0.14847	*-13.80*	-0.01201	*-0.28*
S&P Credit Rating Squared	0.00230	*0.26*	-0.02076	*-4.50*	-0.00477	*-2.93*
Graham's Marginal Tax Rate	0.04174	*1.89*	0.05898	*1.01*	0.00042	*0.01*
Δ Stock Price	-0.00015	*-0.23*	-0.00001	*-0.01*	0.00005	*0.13*
Δ Long-term Debt	0.08457	*0.91*	0.26313	*3.02*	0.07910	*2.46*
Non-Debt Tax Shields	0.29229	*0.86*	1.19715	*2.89*	0.34381	*1.56*
Year	-0.02269	*-0.85*	-0.08729	*-7.74*	-0.01570	*-1.65*
Inverse Mill's Ratio	-0.02815	*-1.06*	-0.11735	*-3.87*	-0.03731	*-2.46*
B. Macroeconomic Variables:						
Real Short–Rate	0.00782	*0.90*	0.00022	*0.01*	0.01561	*1.48*
Δ of Real Short–Rate	-0.00658	*-2.55*	-0.00883	*-1.35*	0.00442	*1.06*
Term Spread	-0.00562	*-0.12*	-0.10794	*-3.46*	0.00330	*0.20*
Δ Term Spread	-0.00796	*-0.82*	0.01388	*0.93*	0.00022	*0.02*
Volatility of Yields	0.03398	*1.02*	-0.00674	*-0.09*	0.05950	*1.56*
Inflation (Seasonally Adjusted)	0.00110	*0.13*	0.01669	*1.05*	0.02763	*2.46*
Δ Inflation (Seasonally Adjusted)	-0.00573	*-2.26*	-0.00711	*-1.08*	0.00637	*1.79*
Inflation Cyclicality	-0.01448	*-0.26*	-0.14062	*-2.32*	-0.01229	*-0.51*
AAA–Bonds Credit Spread	0.09988	*2.59*	0.05809	*0.69*	0.04766	*1.08*
Δ AAA–Bonds Credit Spread	0.01146	*0.45*	0.07334	*2.42*	-0.01168	*-1.00*
BAA–Bonds Credit Spread	-0.15941	*-4.52*	-0.15794	*-1.71*	-0.02053	*-0.39*
Δ BAA–Bonds Credit Spread	-0.01669	*-0.53*	0.05254	*1.45*	0.02326	*1.43*
Mortgage Spread	-0.02779	*-0.14*	-0.52857	*-5.35*	-0.05067	*-1.58*
Δ Mortgage Spread	0.01475	*0.88*	0.05333	*2.51*	0.00492	*0.45*
Personal Tax Rate	-0.43757	*-0.21*	-5.26047	*-4.61*	-1.38992	*-3.36*
Δ Personal Tax Rate	0.16150	*0.48*	0.90774	*2.72*	0.30218	*2.31*

Panel B. Estimated coefficients for the maturity from a simultaneous equation involving change in the debt ratio and the maturity is reported. For equity, the maturity is assumed to be 200 years. The coefficient for measures of aggregate prosperity, tax distortions and distress costs distortions are not reported.

	IT3SLS		FIML		IT3SLS with Prosperity, Tax and Distress Effects	
Variable	Parameter	*t-ratio*	Parameter	*t-ratio*	Parameter	*t-ratio*
A. Firm Characteristics:						
Intercept	1.31392	*0.94*	-1.96427	*-1.45*	-0.81287	*-0.84*
Δ Debt Ratio	-2.18270	*-13.79*	-1.89896	*-12.23*	1.79017	*21.79*
Book–to–Market	-0.03256	*-1.23*	-0.08021	*-3.09*	-0.05204	*-2.67*
Earning Growth	-0.00001	*-0.24*	0.00004	*0.88*	0.00004	*0.94*
Fixed Assets	0.01629	*0.43*	0.03554	*0.91*	0.17298	*5.07*
Depreciation	0.25001	*1.62*	0.29357	*1.87*	-0.00647	*-0.05*
Non–Debt Tax Shields	-0.21771	*-0.59*	-0.48245	*-1.29*	-0.17171	*-0.53*
Size	-0.10817	*-11.56*	-0.09617	*-9.37*	0.02818	*4.46*
Graham's Marginal Tax	0.10317	*1.84*	0.11449	*2.00*	0.16045	*3.21*
S&P Credit Rating	-0.16587	*-7.23*	-0.09183	*-4.30*	-0.07590	*-5.56*
S&P Credit Rating Squared	0.01941	*6.23*	0.01489	*4.55*	-0.00065	*-0.24*
Regulation Dummy	0.38173	*1.24*	0.66253	*2.15*	-0.10612	*-0.47*
Issue–to–Firm Size	0.66253	*14.39*	1.36994	*20.99*	0.55150	*15.36*
Year	0.01588	*1.32*	0.03795	*3.23*	0.01001	*1.23*
B. Macroeconomic Variables:						
Real Short–Rate	0.03183	*1.63*	0.03895	*1.96*	-0.00630	*-0.36*
Δ of Real Short–Rate	-0.00987	*-1.54*	-0.00495	*-0.76*	-0.00769	*-1.34*
Term Spread	0.11097	*3.75*	0.15838	*5.36*	-0.01647	*-0.66*
Δ Term Spread	-0.03577	*-2.52*	-0.03525	*-2.44*	-0.03821	*-3.00*
Volatility of Yields	0.09310	*1.34*	0.06792	*0.96*	-0.11122	*-1.78*
Inflation (Seasonally Adjusted)	-0.00457	*-0.30*	0.00117	*0.07*	-0.02875	*-2.08*
Δ Inflation (Seasonally Adjusted)	-0.00927	*-1.44*	-0.00529	*-0.81*	-0.00848	*-1.48*
Inflation Cyclicality	0.08252	*1.42*	0.10519	*1.78*	-0.02597	*-0.51*
AAA–Bonds Credit Spread	0.25424	*3.11*	0.22923	*2.76*	-0.06283	*-0.86*
Δ AAA–Bonds Credit Spread	-0.03784	*-1.32*	-0.05754	*-1.97*	0.03766	*1.47*
BAA–Bonds Credit Spread	-0.32408	*-3.45*	-0.25254	*-2.65*	0.11507	*1.41*
Δ BAA–Bonds Credit Spread	-0.10269	*-3.00*	-0.11071	*-3.18*	-0.03369	*-1.10*
Mortgage Spread	0.45558	*5.32*	0.59440	*6.99*	0.10495	*1.53*
Δ Mortgage Spread	-0.00420	*-0.20*	-0.01500	*-0.71*	0.00112	*0.06*
Personal Tax Rate	4.09983	*3.86*	5.55951	*5.23*	2.96224	*3.42*
Δ Personal Tax Rate	-0.39565	*-1.22*	-0.61021	*-1.85*	-0.67659	*-2.39*
System of Equation R^2	0.27060				0.27920	

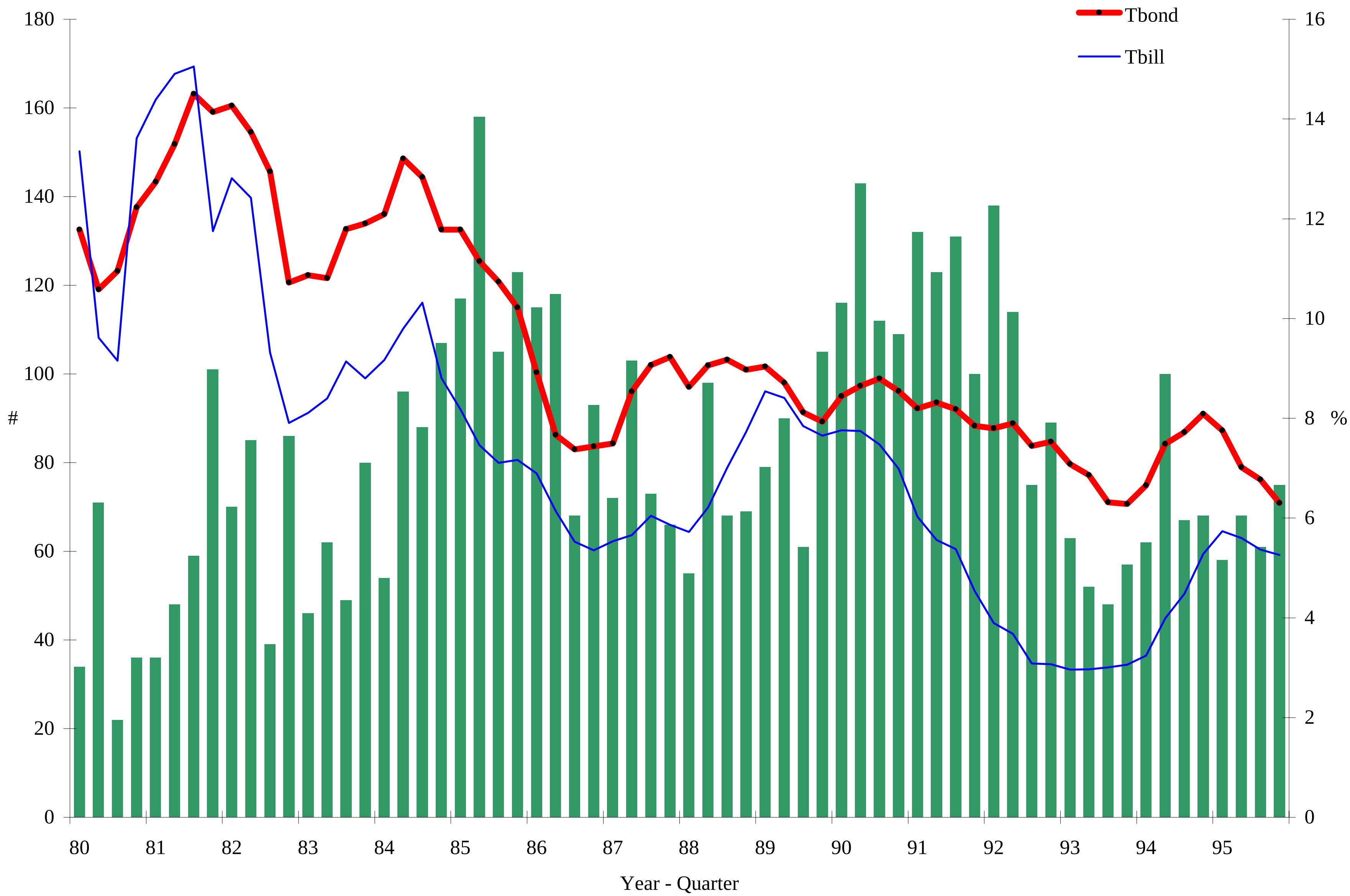

Figure 1.A. Number of Debt Issues: The aggregate number of debt issues for all issuing firms is plotted, using quarterly data. Source: SDC and Opler's Debt Issues for the period of 1980 - 1995. The issuing firms are industrial firms with SIC codes of 1000 - 5999 or 7000 - 9999.

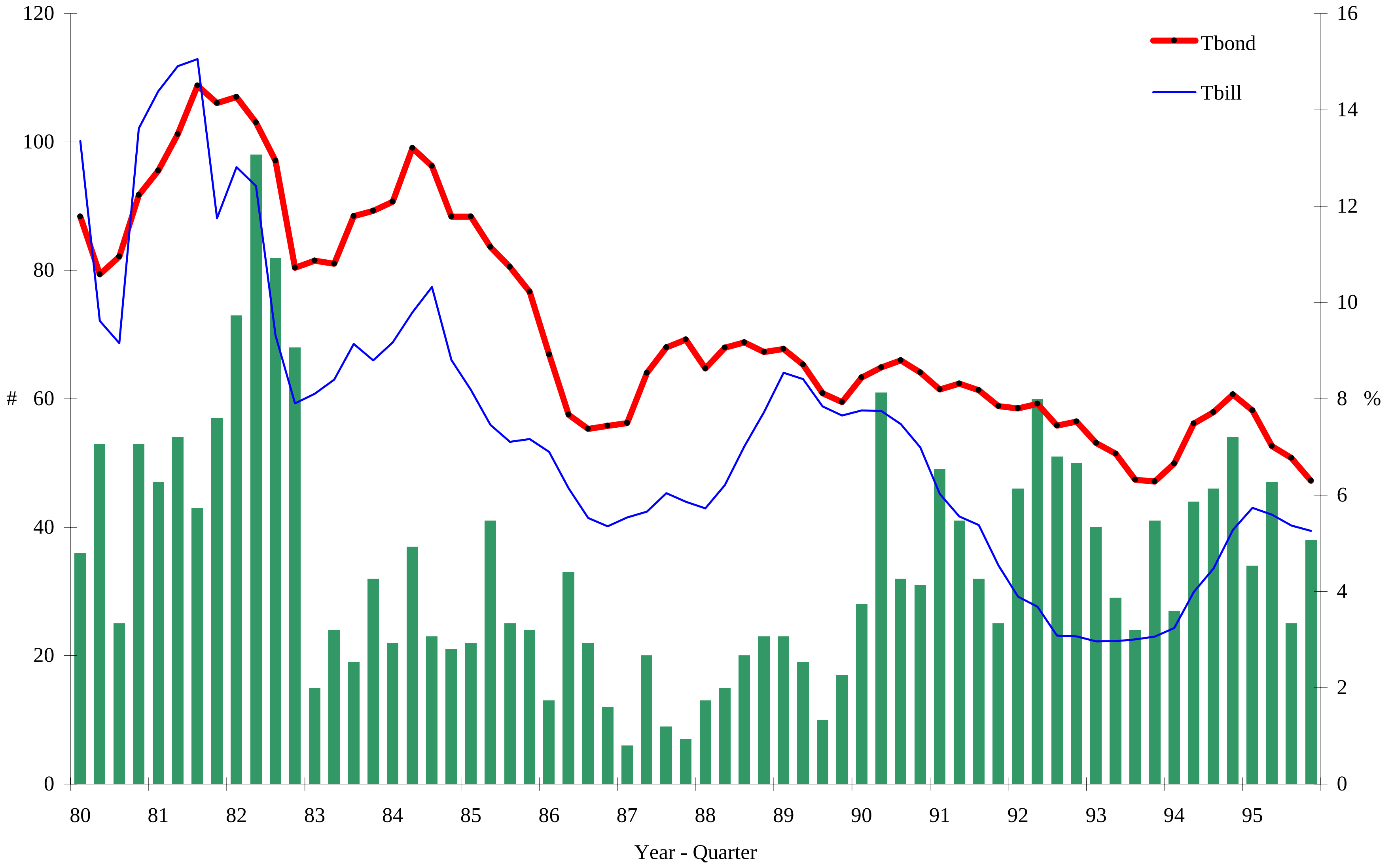

Figure 1.B. Number of Seasoned Equity Offerings: The aggregate number of seasoned equity offerings for all issuing firms is plotted, using quarterly data. Source: SDC and Opler's Debt Issues for the period of 1980 - 1995. The issuing firms are industrial firms with SIC codes of 1000 - 5999 or 7000 - 9999.

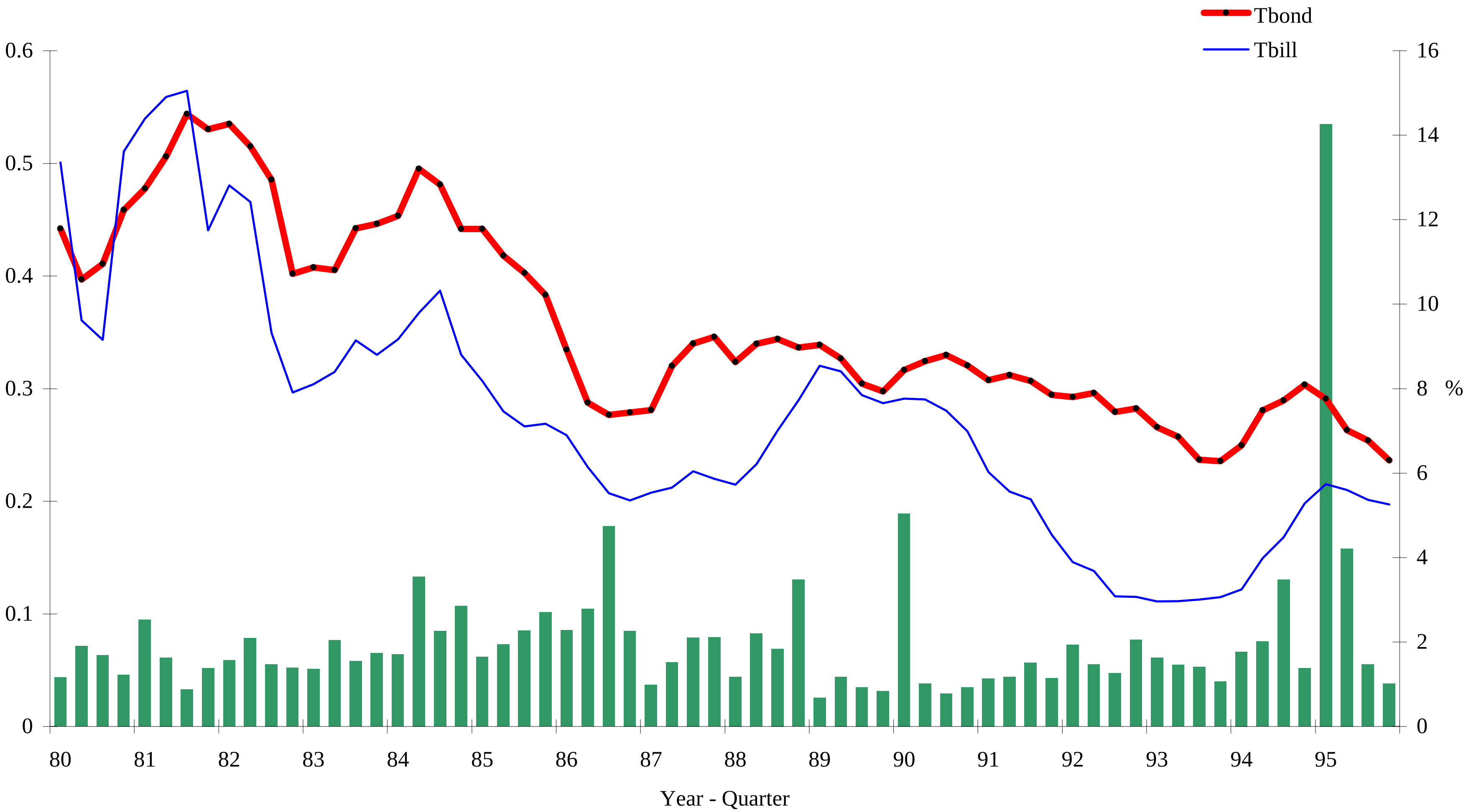

Figure 2.A. Debt Issue Proceeds as a Percentage of Firm's Market Value: The average ratio of debt issue proceed to the issuing firm's market value is plotted, using quarterly data. Source: SDC and Opler's Debt Issues for the period of 1980 - 1995. The issuing firms are industrial firms with SIC codes of 1000 - 5999 or 7000 - 9999.

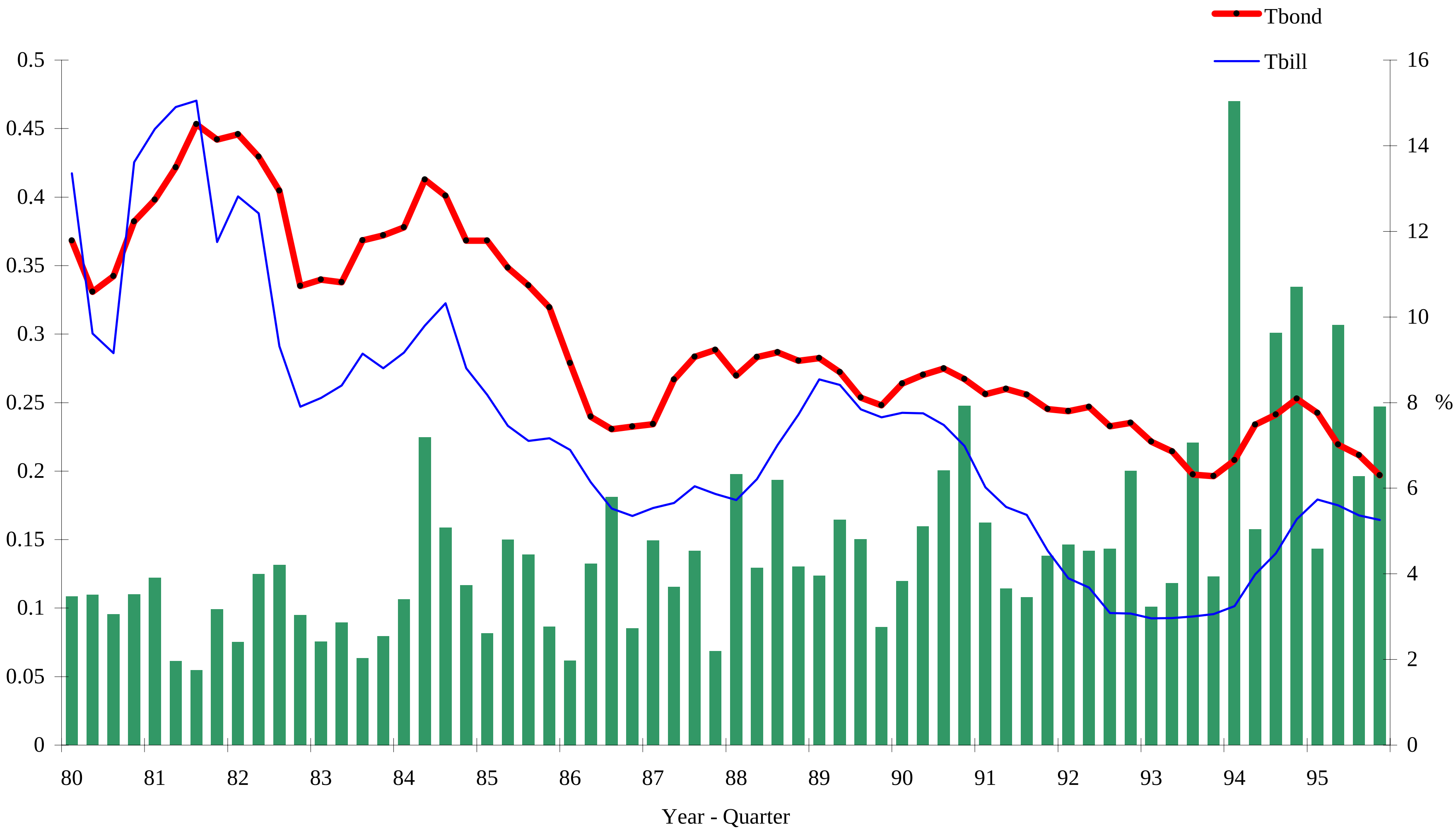

Figure 2.B. SEO Proceeds as a Percentage of Firm's Market Value: The average ratio of seasoned equity offering proceed to the issuing firm's market value is plotted, using quarterly data. Source: SDC and Opler's Debt Issues for the period of 1980 - 1995. The issuing firms are industrial firms with SIC codes of 1000 - 5999 or 7000 - 9999.

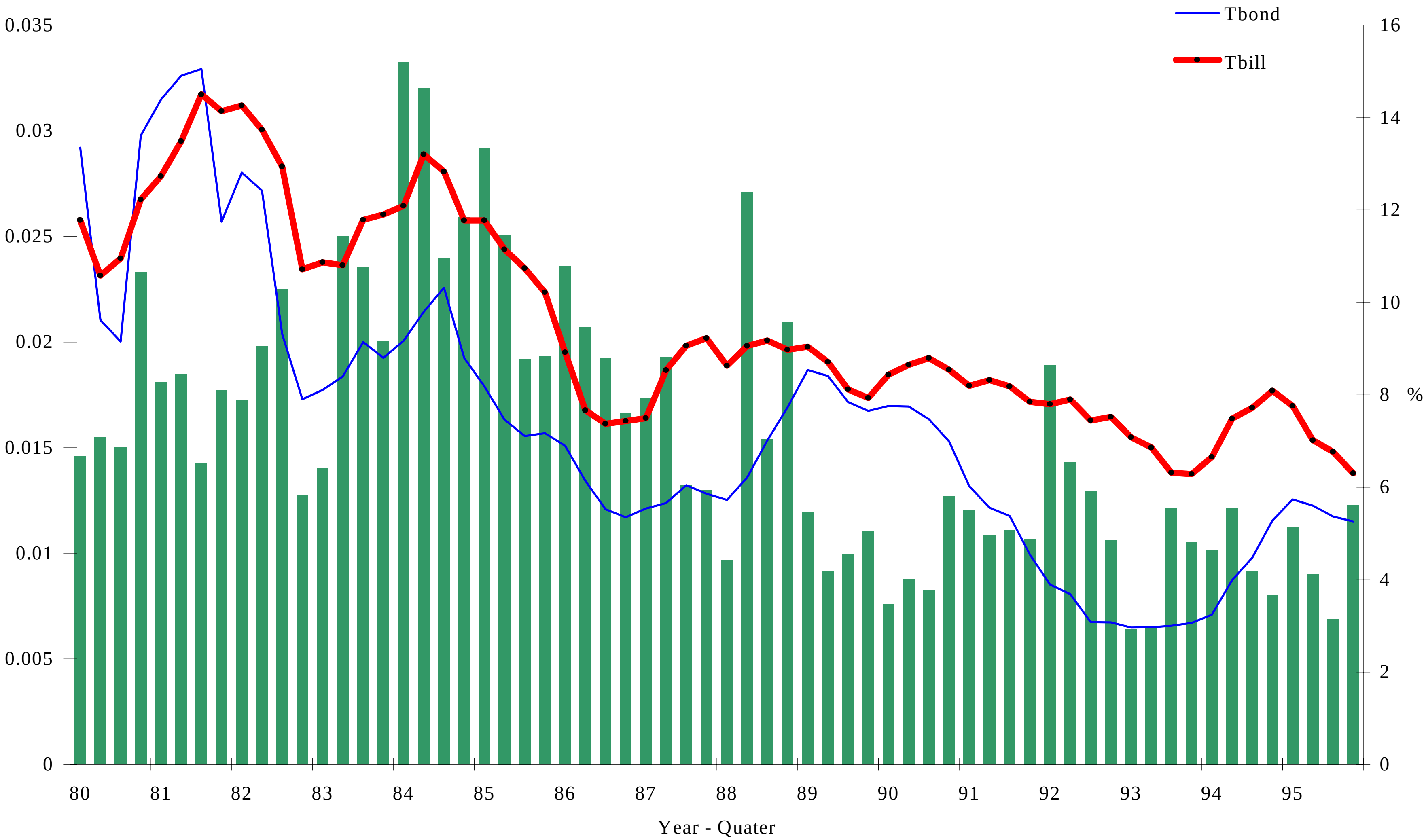

Figure 3.A. Aggregate Debt Issue Proceeds as a Percentage of Aggregate Firm's Market Value: The average ratio of aggregate debt issue proceeds to the total market value of all issuing firms is plotted, using quarterly data. Source: SDC and Opler's Debt Issues for the period of 1980 - 1995. The issuing firms are industrial firms with SIC codes of 1000 - 5999 or 7000 - 9999.

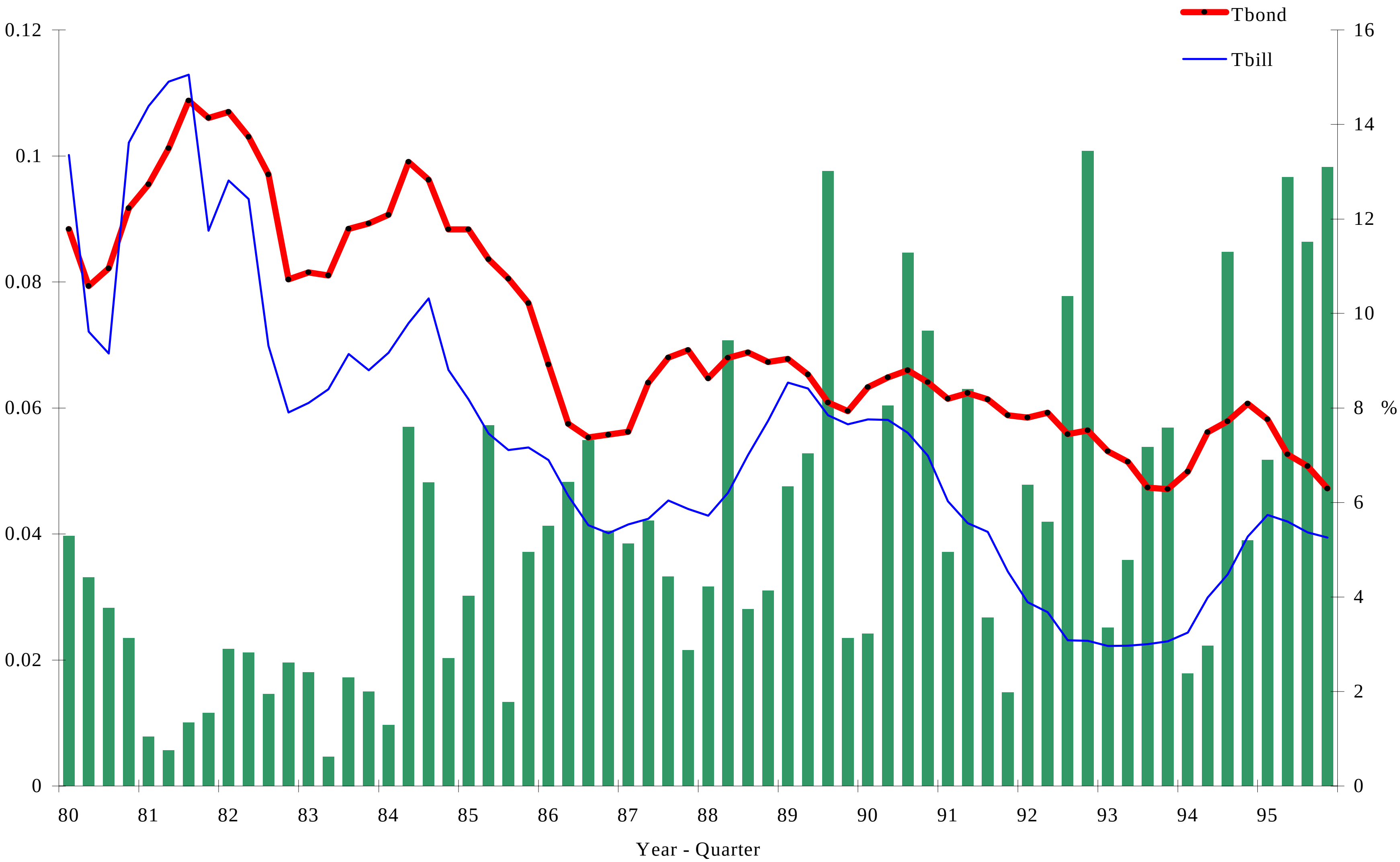

Figure 3.B. Aggregate SEO Issue Proceeds as a Percentage of Aggregate Firm's Market Value: The average ratio of aggregate seasoned equity offering proceeds to the total market value of all issuing firms is plotted, using quarterly data. Source: SDC and Opler's Debt Issues for the period of 1980 - 1995. The issuing firms are industrial firms with SIC codes of 1000 - 5999 or 7000 - 9999.

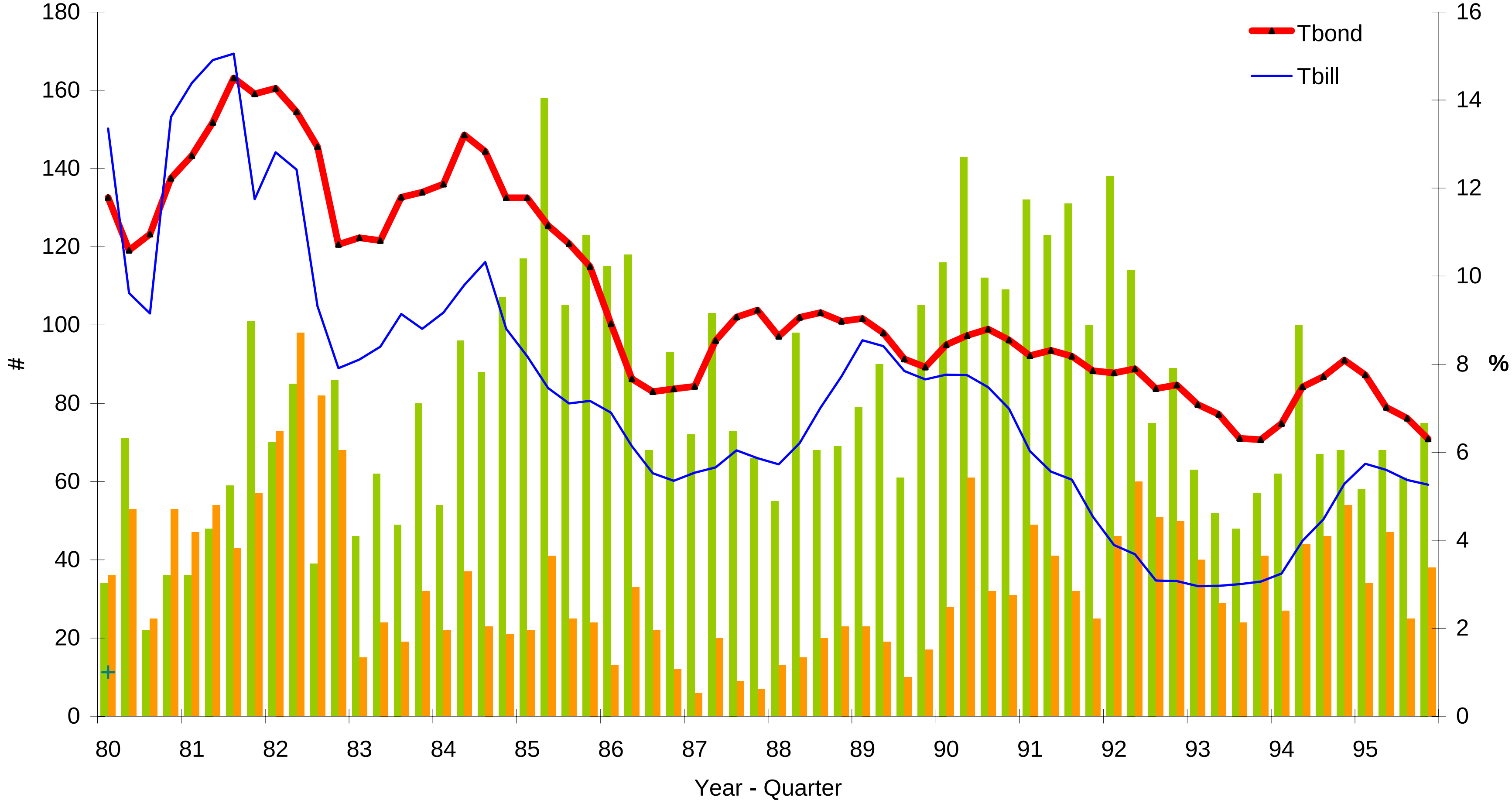

Figure 5. Quareterly Debt Issues vs. Seasoned Equity Offerings: The number of debt issues and seasoned equity offerings of all issuing firms is plotted, using quarterly data. Source: SDC and Opler's Debt Issues for the period of 1980 - 1995. The issuing firms are industrial firms with SIC codes of 1000 - 5999 or 7000 - 9999.

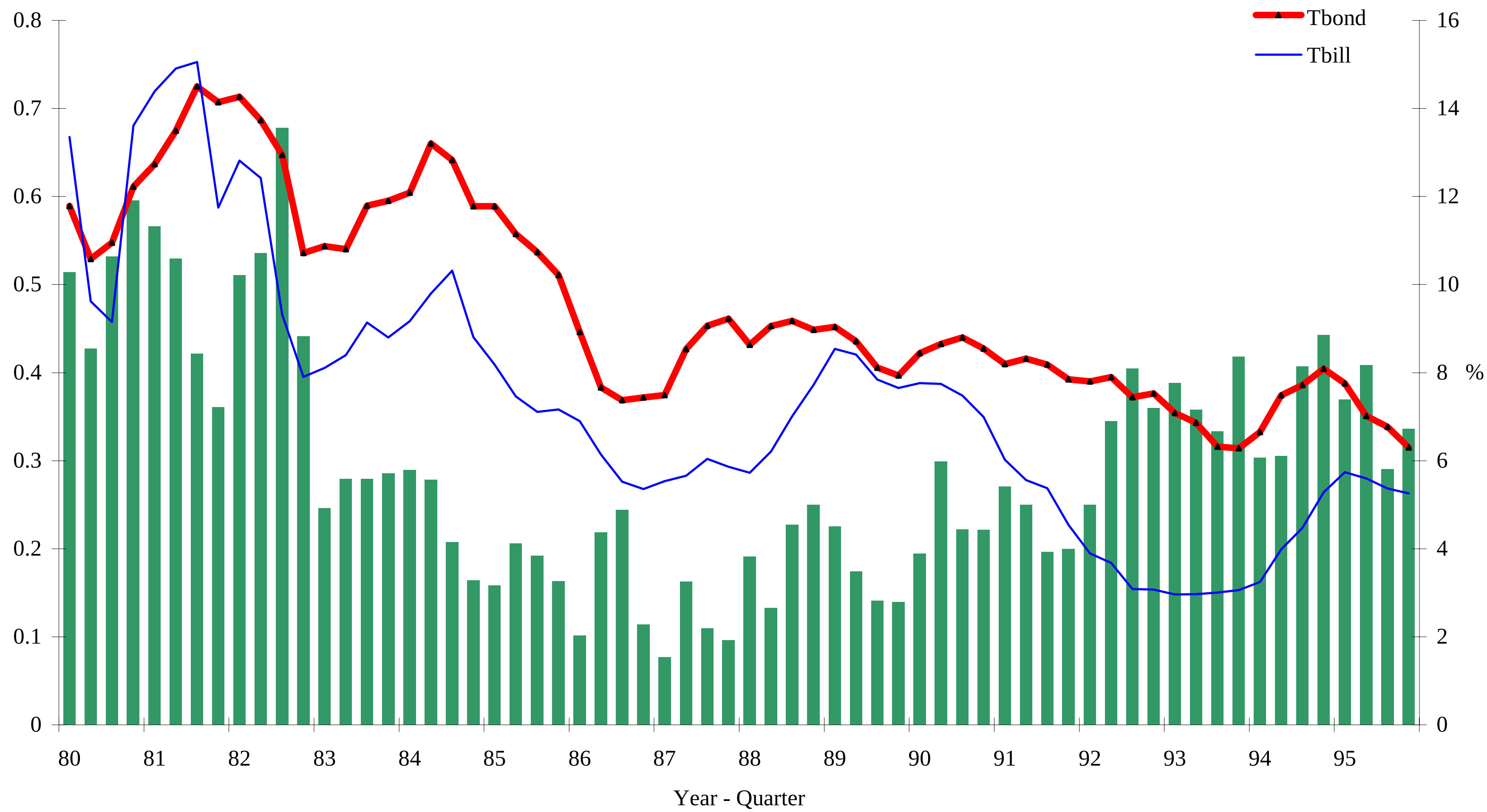

Figure 6. Number of Seasoned Equity Offerings As a Proportion of All External Financing: The number of seasoned equity offerings as a proportion of all debt and seasoned equity offerings of all issuing firms is plotted, using quarterly data. Source: SDC and Opler's Debt Issues for the period of 1980 - 1995. The issuing firms are industrial firms with SIC codes of 1000 - 5999 or 7000 - 9999.

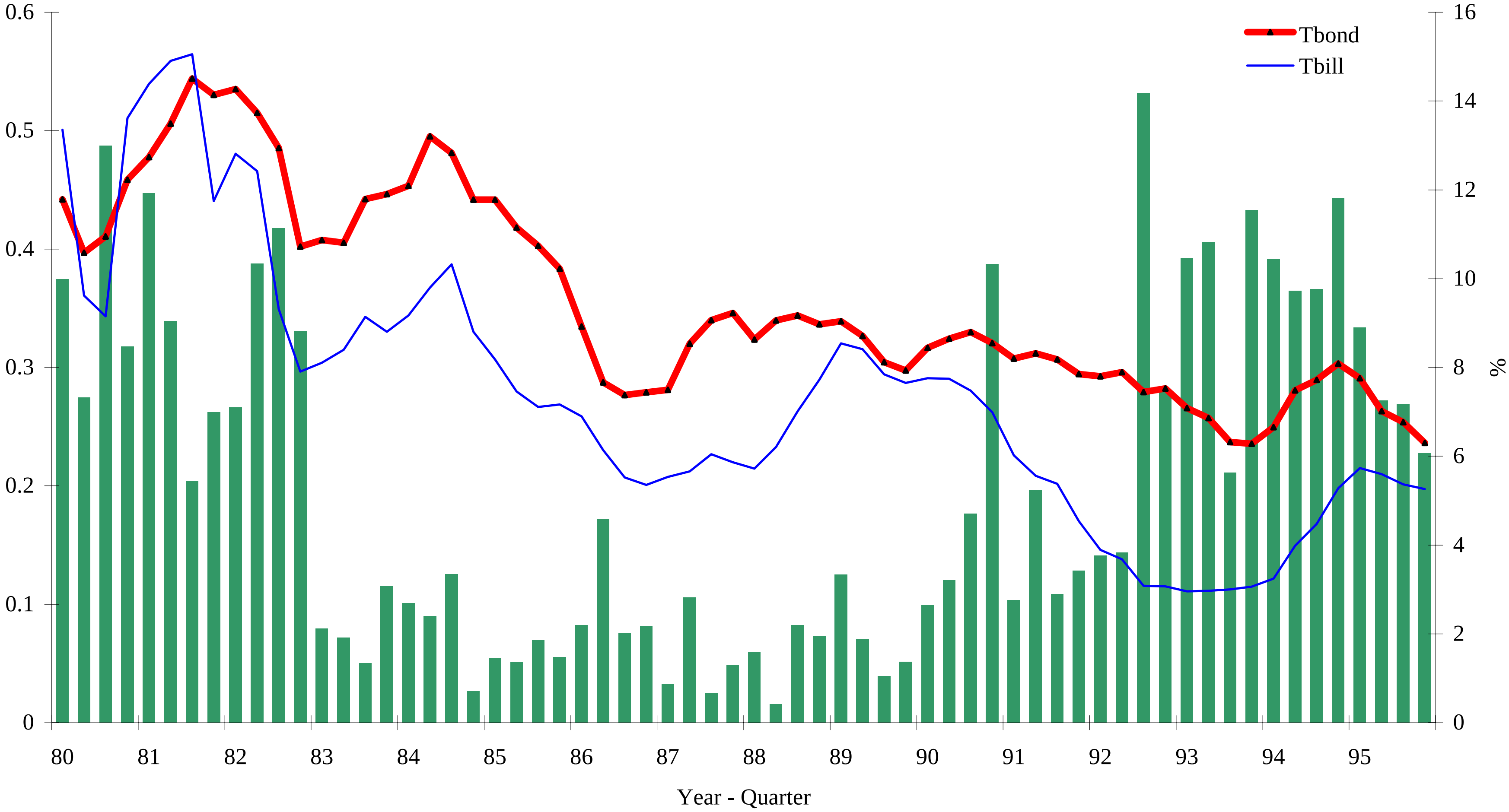

Figure 7. Aggregate Dollar Proceeds of Seasoned Equity Offerings As a Proportion of All External Financing Proceeds: The aggregate proceeds of seasoned equity offerings as a proportion of all debt and seasoned equity offering proceeds of all issuing firms is plotted, using quarterly data. Source: SDC and Opler's Debt Issues for the period of 1980 - 1995. The issuing firms are industrial firms with SIC codes of 1000 - 5999 or 7000 - 9999.

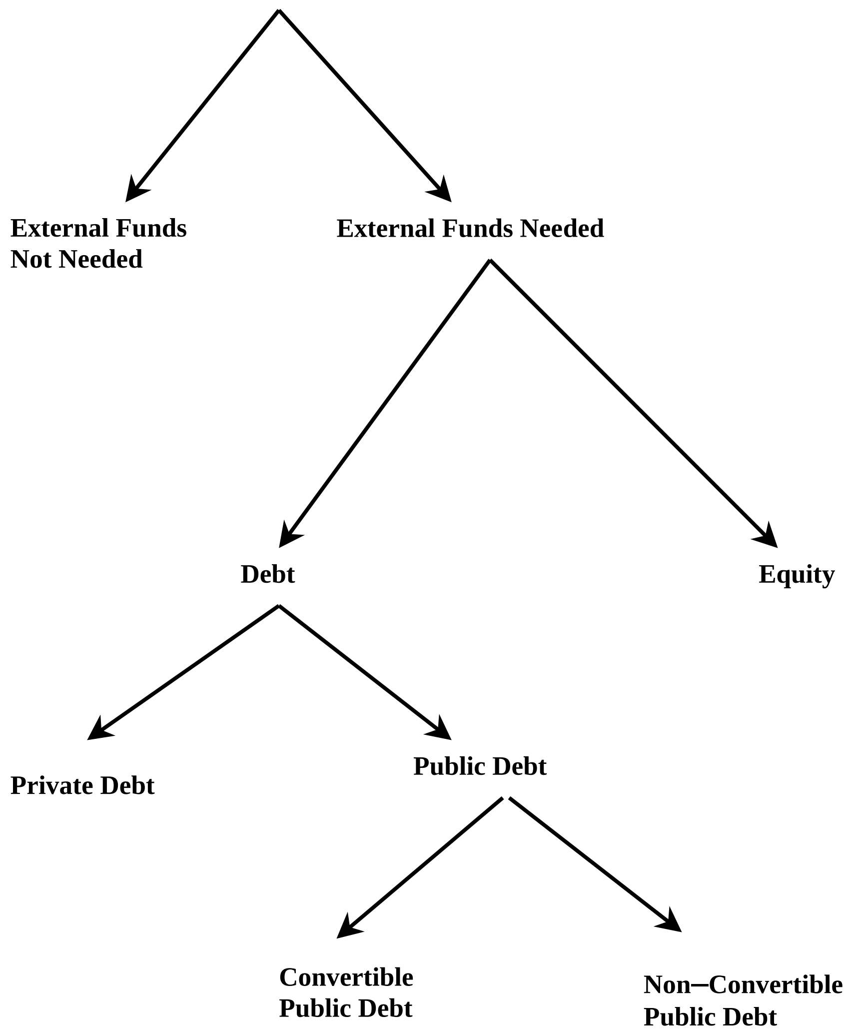

Figure 4. A possible process for financing decisions. If the firm requires additional (i.e. external) funds, it then chooses either debt or equity. Debt can be raised from public or private sources. Public debt is either convertible or non−convertible.