

# What Determines the Structure of Debt Issues?

Brandon Julio

University of Illinois at Urbana-Champaign and London Business School

Woojin Kim

KDI School of Public Policy and Management

Michael S. Weisbach

University of Illinois at Urbana-Champaign and NBER

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## Abstract

Publicly-traded debt securities differ on a number of dimensions, including quality, maturity, seniority, security, and convertibility. Finance research has provided a number of theories as to why firms should issue debt with different features; yet, there is very little empirical work testing these theories. We consider a sample of 14,867 debt issues in the U.S. between 1971 and 2004. Our goal is to test the implications of these theories, and, more generally, to establish a set of stylized facts regarding the circumstances under which firms issue different types of debt. Our empirical results suggest that there are three main types of factors that determine debt issues: First, firm-specific factors such as leverage, growth opportunities and cash holdings are related with the convertibility, maturity and security structure of issued bonds. Second, economy-wide factors, in particular the state of the macroeconomy affect the quality distribution of securities offered; in particular, during recessions, firms issue far less poor quality bonds than in good times but the issuance of high-quality bonds is relatively unaffected. Specifically, junk and non-rated bonds account for 51.8% of total debt issuance during economic expansions but only 34.7% of total issuance during recessions. Finally, controlling for firm characteristics and economy-wide factors, project specific factors appear to influence the types of securities that are issued. Consistent with commonly stated ‘maturity-matching’ arguments, long-term bonds are more likely to be issued by firms investing in fixed assets, while convertible and short-term bonds are more likely to finance investment in R&D.

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\* Contact information: Brandon Julio, 340 Wohlers Hall, 1206 South Sixth Street, Champaign, IL 61820, email: [julio@uiuc.edu](mailto:julio@uiuc.edu); Woojin Kim, KDI School of Public Policy and Management #615, 207-43 Cheongnyangri2-dong, Dongdaemoon-gu, Seoul 130-868, Korea, email: [wjkim@kdischool.ac.kr](mailto:wjkim@kdischool.ac.kr); Michael S. Weisbach, 340 Wohlers Hall, 1206 South Sixth Street, Champaign, IL 61820, email: [weisbach@uiuc.edu](mailto:weisbach@uiuc.edu).

Firms face a complex menu of choices when making financing decisions. Managers must decide whether to finance investment projects with retained earnings, outside equity, or many different types of debt. Prior research related to the choice of financing has focused mostly on the broad choice between debt and equity in general such as theories based on optimal leverage ratios, asymmetric information, and market timing. However, firms most often use debt rather than equity to finance projects; Bolton and Scharfstein (1996) observe that from 1946 to 1987, 85 percent of total U.S. external financing was raised through debt offerings, compared to only 7 percent through equity offerings. Therefore, to understand how firms finance investments, the choice between alternative types of debt financing is likely to be equally, or even more important, than the choice between equity and debt.

Debt contracts differ on a number of dimensions, including maturity, security, seniority, covenants, and different types of embedded options such as convertible features and call options. These features vary both across different firms' debt issues and over time within the same firm's issues, even when institutions, regulations, taxation, and market conditions remain relatively constant. While there are many theories discussing the possible reasons why firms structure debt in particular ways, there has been surprisingly little empirical work testing the implications of these theories.

This paper attempts to fill this void, by empirically investigating the structure of debt financing. We rely on the Mergent database, which provides detailed information on the bond contracts of 14,915 publicly-traded U.S. debt issues between 1971 and 2004. We focus on five specific characteristics of bond contracts: convertibility, maturity, security, callability, and credit quality. In doing so, we have two main goals. First, we hope to establish a set of stylized facts on the use of various types of bonds by U.S. corporations over time. Second, we wish to test the predictions of theories that provide explanations for why firms will use alternative types of debt.

The explanations we focus on for observed differences in debt contracts fall into three categories.

First, corporate finance theory has argued that certain firm characteristics are likely to affect the structure of debt contracts. In particular, firm size, the nature of its growth options, cash flows and cash holdings are all potential determinants of the type of features included in a bond contract. In addition, the state of the macroeconomy can also influence the characteristics of observed debt offerings. Financial constraints are likely to be exacerbated during a recession, limiting firms' ability to issue anything but the highest quality debt. Finally, holding firm characteristics and economic conditions constant, firms also potentially issue different types of debt over time as a function of the type of project the debt is used to finance. Thus, theory suggests that the properties of debt issues should be a function of firm-level, economy-level, and project-level factors.

We first summarize the various characteristics of public debt issues, and document how they have changed over time. The overall quantity of public debt issues has increased dramatically over time. The \$2.003 trillion in the 2000-2004 period represents almost a six-fold increase in total issuance relative to the sub-period beginning only ten years earlier, 1990 to 1994. In addition, recent debt issues have become shorter-term, more likely to be convertible, and less likely to be callable than they were in the 1971-1984 period.

The main focus of the paper is on the factors that cause firms to use alternative kinds of debt. We first perform univariate comparisons of the characteristics of firms issuing different kinds of debt. These comparisons are suggestive, but do not control for other factors that are correlated with both the issuance's type and firm-level factors. We therefore use a multivariate approach to estimate the marginal effect of firm characteristics on security choice. This problem is complicated by the fact that firms can choose when and whether to issue a security at all, and by the fact that they can substitute for some security features with other characteristics. Because of these statistical issues, we use a variety of multivariate approaches, including a multinomial logit, a probit model with an explicit correction for

selection bias, and a logit model that allows for firm fixed effects. The results, nonetheless, are largely consistent across the univariate specification and the alternative multivariate ones. Thus, we are relatively confident that our conclusions come from the actual economics of security choice rather than econometric mismeasurement.

We establish patterns of security issuance over a number of dimensions over which securities can differ. We first consider the quality, or rating of the issue. Not surprisingly, firms issuing higher rated debt tend to be larger, with higher cash flow and market to book, and with lower stock price volatility than firms issuing lower quality debt. Perhaps more surprisingly, firms issuing higher quality debt hold more cash and are more likely in good economic times than firms issuing lower quality debt. This pattern is consistent with the ‘financial constraints’ view, in which potential financial constraints induce firms to hold a more liquid balance sheet and in lower quality firms are shut out from the capital markets during recessions.

Firms issuing convertible debt tend to be smaller, have higher growth opportunities, more likely to be in a recession, and are more likely to use the proceeds for R&D than firms issuing nonconvertible debt. In addition, firms issuing convertible debt are less likely to use the proceeds for capital expenditures than are firms issuing nonconvertible debt. This pattern is consistent with the arguments of Stein (1992) and Mayers (1998), suggesting that convertible debt is somewhat ‘equity-like’, in that it is preferable for financing projects with embedded real options, particularly in situations in which asymmetric information is likely to be high.

The maturity of the debt issue is also an important consideration in the choice of security. Perhaps the most commonly heard argument by practitioners is that firms should ‘match maturities’, in that the maturity of the security should match the maturity of the investment it finances. This argument has been formalized by Myers (1977), Diamond (1991), and Hart and Moore (1994), but to our

knowledge, has not been tested. Our results do support this finding, in that short-maturity debt is more likely to be used to finance R&D, while long-maturity debt is more likely to finance capital expenditures. Another commonly heard argument is that firms pick the maturity of the security they issue to take advantage of the shape of the yield curve to lower future interest expenses. We test this hypothesis and find that indeed firms are less likely to issue short-term debt when the yield curve slopes upward more steeply.

Another choice firms face when they issue debt is whether the debt should be secured or unsecured. Theoretically, it is not clear what kinds of firms we should observe using secured debt. They could be high quality firms seeking to avoid investment inefficiencies associated with unsecured debt, as argued by Smith and Warner (1979), Stulz and Johnson (1985), and Berkovich and Kim (1990). Alternatively, as emphasized in the banking literature (Berger and Udell (1990)), secured debt could be primarily used by low-quality firms who cannot otherwise raise capital without providing security. Our results are consistent with the arguments from the banking literature. Firms that issue secure debt tend to be much more highly levered than firms issuing unsecured debt. In addition, firms tend to issue secured debt after periods of low cash flows and poor stock performance.

A final dimension over which debt contracts differ is callability of the debt. A callable bond contains an option allowing the issuer to redeem the bond at specific periods of time at prices that are specified at the time of issuance. This option allows firms to redeem bonds at below market prices if interest rates drop significantly. As such, one advantage of callability is to provide a natural hedge against interest rate risk. In addition, the corporate finance literature has argued that one potential motive for issuing callable debt is to minimize potential underinvestment/overinvestment distortions arising from the agency costs of debt. Our evidence is consistent with this view, as callable issuers tend to have more growth opportunities relative to non-callable issuers.

The remainder of this paper is organized as follows: Section I summarizes some related literature and develops the main hypotheses to be tested. Section II describes the data employed in this paper and reports summary statistics. Section III presents univariate results linking debt characteristics to firm characteristics, macroeconomic conditions and different uses of funds. Section IV presents our multivariate analysis of debt structure choice. Section V concludes.

## **I. Hypothesis Development and Related Literature**

The literature related to financing choices is vast. We focus here on prior research dealing with the specifics of debt contract design. This literature can be classified into two broad groups. The first strand of literature focuses on the demand side as a determinant of debt contract design. This research has focused mainly on firm characteristics, such as size, growth opportunities, degree of asymmetric information, and firm risk as the primary determinants in the choice of financing. The second and more recent strand of literature focuses on the supply of debt financing as a factor in financing choice. We briefly review here some of the relevant literature on debt financing from both the demand and supply sides. The first three subsections summarize literature on how firm characteristics determine the maturity, seniority and exchangeability features of debt contracts. The last subsection discusses some papers on the impact of credit supply and macroeconomic conditions on debt financing.

### **A. Maturity Structure**

Myers (1977) originally proposed that risky debt can induce suboptimal investment incentives when a firm has valuable growth options. Managers acting in behalf of shareholders will not exercise valuable growth options if the returns to investment accrue primarily to risky debt holders. Myers argues that one way to avoid this underinvestment incentive is to issue short-term debt that matures prior to the exercise of growth options. The empirical prediction coming from this argument is that firms with high

growth opportunities will tend to use shorter term debt than firms whose value is made up primarily of fixed assets.

Flannery (1986) argues that the debt maturity choice signals inside information about firm quality to outside investors when insiders are better informed. In the presence of transactions costs, lower-quality firms will tend to avoid short-term debt because they cannot afford the costs of frequently rolling over their debt. Diamond (1991) also presents a model of debt maturity based on private information. In his model, short-term debt exposes a firm to liquidity risk and loss of control rents. The main empirical prediction of Diamond (1991) is that borrowers with a low credit rating have no choice but to borrow short-term via private placements and banks. Firms with intermediate credit quality will borrow long-term publicly traded debt because they face relatively high liquidity risks. Firms with high credit quality will be issuers of short-term debt, such as commercial paper. Thus, the theory predicts that firms with very high or very low credit will borrow short term (with different contracts), with long-term debt being issued by firms with credit quality somewhere in the middle.

Myers (1977), Diamond (1991) and Hart and Moore (1994) suggest that the maturity of debt will match the timing of cash flow from assets. In the case of Myers (1977), this helps alleviate the underinvestment incentive, while in Diamond (1991) it helps mitigate risk of inefficient liquidation. The matching of debt maturity to that of assets in the Hart and Moore model comes from the threat of the entrepreneur to withdraw his human capital from the financed project. This “matching maturity principle” predicts that debt maturity will be directly correlated with asset maturity. Thus, we expect that investment in long-term tangible assets will be financed primarily with long-term debt, while R&D and other short-term investments will be financed with short-term debt securities.

Several papers have studied at the relation between debt maturity and firm characteristics empirically. Barclay and Smith (1995b) and Stohs and Mauer (1996) find that larger, less risky firms

tend to have debt with longer maturity. Using a proxy for asset maturity, they also find that firms with longer asset maturity tend to have longer debt maturity, consistent with the notion that firms match the maturities of their assets and liabilities. These papers find mixed support for the hypothesis that debt maturity is inversely related to growth opportunities. Guedes and Opler (1996) find that larger firms with investment grade credit tend to borrow at both the long and short term of the maturity spectrum, while risky firms tend to issue debt with more intermediate maturities. This finding is consistent with Diamond's (1991) prediction that risky firms do not issue short term debt because of the risk of inefficient liquidation.

## **B. Seniority/Security Structure**

Debt contracts also differ by levels of seniority or priority. At the bottom of the priority ladder is common stock, which as a residual claim is paid only when all other claimants have been paid in full. Above common stock is preferred stock, then subordinated debt, then ordinary debt, and finally secured debt. Theoretically, Stulz and Johnson (1985) argued that issuing secured debt allows a firm to undertake some projects that would be rejected if financed by equity or other form of debt. Berkovitch and Kim (1990) show that the issuance of secured debt can decrease underinvestment, but increase overinvestment. Smith and Warner (1979) argue that including higher seniority provisions in the debt contract limits the firm's ability to engage in asset substitution. The empirical prediction of these models is that highly indebted firms with relatively good growth options are more likely to have a large proportion of senior claims in their capital structures. Barclay and Smith (1995a) examine this empirically and find results largely consistent with this view.

## **C. Exchangeability**

Another dimension upon which debt contracts differ is the degree to which the issue can be

exchanged or converted for a different security. These bonds are typically associated with an option given either to the issuer or bondholder to exchange the debt for another security. For example, callable debt gives the issuer the option to exchange cash for the outstanding debt at a pre-specified price. Convertible debt gives the bondholder the option to convert a bond into a certain number of common shares at a pre-specified conversion ratio. Putable debt gives the bondholder the option to sell the bond back to the issuer. The literature has argued that these exchangeability features of debt to mitigate information asymmetries with convertible debt (Stein 1992) and agency costs with callable debt (Barnea, Huagen and Senbet (1990)). In addition, convertibility can lead to more efficient investment in situations in which a substantial fraction of a firm's investment is in the form of future investment options (Mayers 1998).

#### **D. Macroeconomic Conditions and Financial Constraints**

Some of the more recent work in capital structure choice has focused on the supply of credit as a determinant of firms' observed capital structures, arguing that frictions in the credit markets limit the ability of firms to achieve their desired level of debt, particularly during periods of recession in the economy. Faulkender and Petersen (2006) show that firms which have access to debt markets, proxied by whether a firm has a credit rating, have significantly more leverage than firms without credit ratings.<sup>1</sup> Korajczyk and Levy (2003) argue that the issuing decision of firms is affected by their access to capital and the state of the economy, and find evidence supporting this view. Lamont (1995) suggests another channel through which financial constraints can become exacerbated during times of recession. As the economy moves into a recession, debt overhang becomes more binding as growth options tend to diminish and agency costs may hinder access to financing for firms with higher probabilities of default.

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<sup>1</sup> In a related paper, Sufi (2007) finds that the introduction of syndicated bank loan ratings in 1995 leads firms to increase their use of syndicated debt, and ultimate increase investment and acquisitions financed with this debt. Leary (2007) studies the emergence of the CD market in 1961 (credit expansion) and the 1966 credit crunch (credit contraction) and finds that the leverage ratios of bank-dependent firms increase following the expansion and decrease following the contraction.

Figure 1 summarizes the empirical predictions for firm characteristics, economic conditions, and uses of funds for the design of debt contracts.

## **II. Data Sources and Sample Description**

### **A. Data Sources**

We obtain data on public debt issues in the United States from the 2005 version of the Mergent Fixed Income Securities Database (FISD). This database provides comprehensive information for US corporate debt, including characteristics such as seniority, maturity and convertibility as well as total proceeds raised. Macroeconomic data are obtained from two sources. Recession/expansion dates are from the National Bureau of Economic Research (NBER) and GDP growth rates are obtained from the US Bureau of Economic Analysis (BEA).

We obtain financial information on the issuing firms by matching each issue with its corresponding firm in Compustat based on fiscal year ends and keep only those with accounting information available before and after the issue date. Accounting variables, with the exception of total assets, are winsorized at the 1% and 99% of the sample distribution for each variable. Since cash flow statement items are available in Compustat only after 1971, we set our sample period to start from then. In addition, we eliminate all debt issues from financial firms (SIC 6000-6999). After applying these filters, we end up with 14,867 debt issues, each occurring between 1971 and 2004.

### **B. Characteristics of Total Debt Issues over Time**

Table I presents descriptive statistics of our public debt issuance sample. To provide a rough idea of the time-series variation the design of debt contracts, we divide the sample into five sub-periods. For each sub-period, we report the number of issues (Panel A) and value of the proceeds raised (Panel B) for

all issued bonds, as well as by each type of issue, sorted by convertibility, initial maturity, security, callability, and credit rating. The overall pattern shows an increasing trend in the use of publicly traded bonds over time. Our sample contains 947 total debt issues over the 1971 to 1984 subperiod, compared to 4,498 total issues in the much shorter 2000 to 2004 sub-period. The total proceeds raised over the sample period was \$3.66 trillion, with just over 80% of that total amount raised since 1995. Overall, our sample firms raised on average \$246 million per each debt issue throughout the sample period, with a corresponding median value is \$125 million. As a comparison, the magnitudes of debt issues are somewhat larger than average amount raised through seasoned equity offerings.<sup>2</sup>

### **C. Debt Issues by Type and Quality**

Public debt issues vary along a number of dimensions, including convertibility, maturity, security level, callability, and other features. Table I summarizes the use of these various features over time. There has been an upward trend in the use of convertible bonds over time, both in terms of the proportion of total bonds issued and the proportion of proceeds raised. While about 9% of total bonds (5% of the proceeds) issued during 1971 to 1984 were convertible, 24% of total bonds (19% of the proceeds) issued between 2000 and 2004 were convertible. A similar trend emerges in the use of short-term debt over time. If we define an issue as short term if it has a maturity of five years or fewer, none of the issues in our sample were classified as short-term in the 1971 to 1984 sub-period. Using this definition, the proportion of total issued debt classified as short term increased rapidly, reaching 30% of all issues and 39% of total proceeds raised by the 2000 to 2004 sub-period.<sup>3 4</sup>

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<sup>2</sup> The mean and median proceeds raised through seasoned equity offerings in US between 1990 to 2003 are \$100.3 million and \$45.5 million, respectively, according to Thomson Financial's SDC New Issues database.

<sup>3</sup> The typical classification of short-term vs. long-term debt is different for publicly traded bonds. For bank debt, contracts with less than one year to maturity are usually classified as short-term. For publicly traded debt, the short-term cutoff is typically considered to be five years or fewer.

<sup>4</sup> To ensure that the lack of short-term bonds during the 1971 to 1984 period is not a data issue, we consult the SDC database as well, and do not find that this alternative database does not contain any short term bonds in this period either.

Table I also demonstrates that the vast majority of public debt issues are unsecured. Secured debt makes up only 3% of total issued bonds over the entire sample period. This proportion has remained relatively stable over time. In terms of total proceeds raised, secured debt made up 2% of the total over the sample period. In contrast, callable debt is much more common. However, the incidence of callability varies substantially over the sample period. During the 1971 to 1984 period, 83% of all issued bonds were callable. This figure dropped to 28% of issued bonds during 1990 to 1994. The most recent sub-period, 2000 to 2004, has seen a resurgence in the popularity of callable bonds, with these bonds making up 73% of total issues and 56% of total proceeds raised.

The last five columns of Table I summarize the number of issues and proceeds raised by bonds of various credit quality. We group bonds into five different quality categories: non-rated bonds, C-rated bonds, speculative B-rated bonds (Moody's B3 to Ba1 ratings), investment grade B-rated bonds (Moody's Baa3 to Baa1 ratings), and A-rated bonds. Compared to the variation of bond types issued over time, the distribution of credit quality seems relatively stable over each of the five sub-periods.<sup>5</sup> There has been a slight upward trend in the use of speculative and non-rated bonds over the sample period. Approximately 40% of all issued bonds and 29% of total proceeds raised were from speculative and non-rated bonds in the 1971 to 1984 sub-period. During 2000 to 2004, these bonds made up 55% of total issued bonds and 40% of total proceeds raised through public debt financing.

Table II provides cross-tabulations of debt issue type for all issues during the sample period to examine patterns in the bivariate distribution of debt issues. The table provides observed two-way frequencies, percentages, and the expected frequency of bonds in each category we should observe if the two classifications were independent of each other. Looking first at convertibility and maturity, we see that of the 12,817 straight debt issues, 20.7% are short-term and 79.3% are long-term. Among the convertibles, 18.4% of the bonds are classified as short term. A chi-square test of independence between

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<sup>5</sup> Credit ratings are based on Moody's.

maturity and convertibility rejects the assumption that maturity and convertibility are unrelated. Specifically, convertible bonds are more likely to have initial maturities of more than five years compared to straight bonds.

Convertibility and security level also appear to be correlated, as only four secured bonds in our sample are also convertible. Thus, almost all secured debt issues are straight debt, which seems plausible, since holders of secured, convertible debt would lose their security upon conversion. However, there does not appear to be a significant relationship between security level and initial maturity, as the initial maturity of secured bonds appears to have a similar distribution to that of unsecured bonds. In terms of callability, secured bonds appear to be more likely to have a callable feature than unsecured bonds. Slightly more than 80% of the secured bonds in our sample are also callable, compared to 57.3% of the unsecured issues.

One surprising finding is that only 80.8% of convertible bonds in the sample have a callable feature. It is generally thought that almost all convertible bonds are callable, as this provides the issuer with the opportunity to force conversion of the bond prior to maturity. Convertible bonds are, however, much more likely to be callable than straight debt issues. The relationship between initial maturity and callability are also related. The observed frequency of short-term, callable bonds is much lower than that expected if the two categories were independent. 820 of the short-term debt issues are callable, while the expected frequency in this category under independence is 1,750. Thus, most callable debt issues have long-term initial maturities.

### **III. Univariate Analysis**

#### **A Firm Characteristics and Debt Structure**

Different types of firms tend to issue different types of debt. Table III provides summary

statistics for different firm characteristics by type of bond issued to examine how firms differ by size, growth opportunities and financial condition at the time of issuance for various types of bonds.

Since 40% of the firm-fiscal year pairs in the sample have more than one issue during a fiscal year, we assign a given firm-year to a certain type of bond as follows: We define a given firm-fiscal year as convertible if there is at least one convertible bond issued during that year. Out of all firm-years classified as convertibles, 65% had only one issue during that year and 22% had more than one issue where all of them were convertibles.<sup>6</sup> For maturities, we take the weighted average of the initial maturities of all debt issues during that year where the weights are the proceeds raised through each issue. Firm-years with aggregated maturity of less than or equal to 5 years are classified as short term.<sup>7</sup> For the purposes of defining secured debt, we first recode the FISD's codes into numeric codes as follows: subordinate or no classification as 1, junior subordinate as 2, senior subordinate as 3, senior as 4, and senior secured as 5. We take the proceeds-weighted average of the security level and define firm-years with aggregate security level of greater than 4 as secured.

Panel A reports firm characteristics across the various types of debt issues offered in our sample. The first column compares firm-years in which any type of debt was offered to firm-years in which debt was not issued. Firms tend to be larger, have more growth opportunities and better financial performance leading up to the debt issue. For this sample of issuing firms, the average annual stock return for the year just prior to the debt issuance is 26.4%, compared to 19.7% for non-issuing firm-years.<sup>8</sup> Stock return volatility is slightly less prior to issuing years and equity issuance tends to be lower in years when firms issue debt.

The remaining columns in Panel A summarize differences in firm characteristics across different debt structures. Convertible issuers tend to be smaller, high growth firms with lower leverage ratios and

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<sup>6</sup> Since the percentage of convertible firm-years that is mixed with straight debt issues is only 13% of the sample, we expect the noise from these observations to be minimal.

<sup>7</sup> Credit ratings are aggregated in a similar manner.

<sup>8</sup> Prior stock returns in this sample of firms are higher than the long-term average of typical stocks for two reasons. First, Table III summarizes characteristics only for firms that have issued public debt and firms tend to issue after periods of good returns. Second, a large proportion of the debt issues in the sample were issued between the 1996 to 2001 time period when the stock market in general had unusually high returns.

lower fixed asset ratios compared with straight-debt issuers. Convertible issuers also tend to issue after periods of high stock returns and high return volatility. They also are likely to issue equity during the same year. Firms issuing short-term debt appear to be systematically different from firms that issue long-term debt. Short-term issuers tend to be larger, have greater growth opportunities, and hold more cash on their balance sheets. This pattern is consistent with Myers (1997) in that firms with more growth opportunities are more likely to choose short-term debt to avoid potential underinvestment problems.

Firms issuing secured debt appear to be relatively financially distressed. These firms are smaller and have an average leverage to total capital ratio of 0.81. They also have very weak cash flows leading up to issuance compared with non-secured issuers. These comparisons are consistent with the idea that debt investors require more security when lending to financially distressed borrowers. Callable debt appear to be similar to issuers of non-callable debt. Callable issuers are slightly smaller, have higher cash balances, and have experienced higher stock returns in the year prior to debt issuance than non-callable issuers.

Panel B of Table III reports mean firm characteristics by credit quality of the issued bonds. We divide the bonds into five categories according to their ratings: non-rated, C-rated bonds, speculative B-rated bonds, investment grade B-rated bonds, and A-rated bonds. Some very clear patterns emerge from Panel B. First, there is a monotonic relationship between firm size and credit rating. Highly rated firms tend to be significantly larger than firms with high-yield ratings. They also tend to have more collateral, measured by the ratio of fixed assets to total assets. High-rated issuers have strong cash flows and lower stock return volatility compared to lower rated issuers. A consistent pattern is that firms issuing investment grade bonds have significantly lower cash holdings as a proportion of total assets than do the issuers of junk bonds. While the direct effect of cash holdings should be to increase credit quality by enhancing the amount and liquidity of collateral to the bondholders, an indirect effect appears to be more

important: More financially constrained firms hold more cash to mitigate these constraints, as suggested by Almeida, Campello and Weisbach (2004). These constraints also cause firms to have lower bond ratings, leading to a correlation between cash holdings and bond ratings.

## **B. Macroeconomic Conditions and Debt Structure**

One of the goals of this paper is to determine whether macroeconomic conditions have any effect on the design of public debt issues. As a first pass at this issue, we consider how the relative share of total debt issuance by various bond types changes over the business cycle. We classify economic conditions in two separate ways. The first is based on annual growth rates in US GDP. “Low Growth” years are defined as years in which the GDP growth rate was less than 2%. “Medium Growth” years are those with GDP growth between 2% and 3.5%, while “High Growth” years are those with growth larger than 3.5%. As a second classification, we rely on the NBER business cycle dating, using the NBER measure of when the economy is in a recession or expansion.

Table IV reports the proportion of total bond issuance made up of various types of bonds over different economic conditions. Convertible bonds are relatively more likely to be issued during times of slow economic growth or recessions. During high growth periods, 7.7% of total issuances came from convertibles, increasing to 11.7% during periods low growth periods. A stronger pattern emerges for the issuance of short-term debt: 9% of all bonds issued during high growth periods were short term, compared to 22.2% during low growth periods. There is a similar pattern if we do the comparison using the NBER-defined recessions as our measure of economic activity.

The strongest correlations between economic conditions and bond types are found in the variation in credit quality across economic conditions. Investment grade bonds make up 44.1% of all issuance during high-growth years, increasing to 68.9% of the total during low growth periods. The results are

similar if we look at the NBER expansion/recession classifications. Junk and non-rated bonds account for 51.8% of total debt issuance during economic expansions but only 34.7% of total issuance during recessions. This pattern is consistent with the idea that perhaps financial constraints are exacerbated during economic recessions, leaving only the highest quality firms with access to public debt markets.

Figure 2 illustrates this pattern in debt issuance. The vertical axis measures the natural logarithm of proceeds raised (in \$US millions) for each year from 1971 to 2004. Time periods classified as a recession are noted on the chart. This figure illustrates the overall upward trend in the use of public debt financing in all levels of credit quality. It also points out the differential impact of a recession on different types of issues. The quantity of capital raised by low-rated and non-rated debt issues drops significantly during recession periods, while highly-rated bonds remain relatively constant through a recession or even rise in the case of the 1989-1991 recession. It also appears that the volatility of proceeds raised over time is higher for lower-rated bonds than for highly-rated bonds.

### **C. Univariate Analysis of Post-Issuance Changes in Accounting Variables**

Presumably, there are a number of reasons why firms differ in the type of debt securities they offer. We have seen that bond structures are correlated with certain firm characteristics and overall economic conditions. In addition, we consider the hypothesis that the type of debt issued depends on how the funds are expected to be used. Specifically, we conjecture that more equity-like debt such as convertibles and short term debt are more likely to be used for intangible investment such as R&D whereas less equity like debt such as secured debt are more likely to be used to finance tangible investment such as CAPEX or to replace the existing debt.

A difficulty in testing whether the expected uses of funds matter for debt design is that we cannot directly observe management's investment plans at the time of issuance. While firms typically are

required to disclose the purpose for the debt issue in the prospectus, the description of “general purpose” is most common and does not help us identify whether the firm is going to invest in physical assets or R&D. We proxy for the intended uses of funds from a debt issue by estimating the actual uses of the funds raised in the issue during the two years following the debt issue. This approach presumes that the realized post-issuance expenditures reflect management’s investment plans prior to issuance.

We consider several accounting variables that are likely to capture potential uses of funds raised through debt issues: capital expenditures, R&D, acquisitions, changes in cash holdings, reduction in long-term debt, acquisitions and payouts to shareholders.<sup>9</sup> The first two variables, capital expenditures and R&D are the focus of the analysis and are meant to capture possible ways in which the capital could be invested in real assets. The remaining four uses, changes in cash holdings, reductions in long-term debt, acquisitions and payouts, measure possible uses of the funds other than direct investment.

To minimize the impact of outliers, we focus on a logarithmic transformation of each variable. For income statement and cash flow statement items (capital expenditure, R&D, reduction in long-term debt, acquisitions and payouts), we consider the log of one plus the *accumulation* in each variable since the issue, normalized by total assets prior to the issue:  $\ln[(\sum_{i=1}^t V_i / \text{total assets}_0) + 1]$ , where  $V$  is the variable being measured, and years are normalized so that year 0 is the fiscal year end just prior to the issue and year  $t$  denotes number of years after year 0.<sup>10</sup> For cash, which is a balance sheet item, we calculate the log of one plus the *change* in the variable normalized by total assets prior to the debt issue:  $\ln[((V_t - V_0) / \text{total assets}_0) + 1]$ . As a consequence of this transformation, the resulting distribution of each variable is more symmetric than it is without the transformation.

Table V reports the means and medians of this normalized increase for capital expenditures and R&D, broken down by debt issue type. Also included are t-statistics for comparisons of means between

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<sup>9</sup> Payouts are defined as the sum of cash dividends and purchase of common and preferred stock. Capital expenditures, acquisitions, reduction in long-term debt and payouts are directly taken from the cash flow statement, and reflect cash outflows from investing and financing activities. The “reduction in long-term debt” variable simply reflects the quantity spent to retire long-term debt during that fiscal period, and is not offset by issues of new debt.

<sup>10</sup> R&D values are often missing in Compustat. Following the previous literature, we have replaced missing R&D values with zeros.

the various types of debt issues in the sample, as well as Mann-Whitney z-statistics for comparing medians. The first row compares changes in capital expenditures and R&D over the two years after issuance for issuing firm-years compared to non-issuing firm years. Capital expenditures are higher following a debt issue, but expenditures on R&D tend to be higher when debt is not issued, suggesting that a substantial quantity of R&D may be financed by equity or retained earnings.

The remainder of Table V compares post-issuance capital expenditures and R&D expenses for different types of debt issues. Consistent with the uses of funds hypothesis, R&D expenditures are significantly higher for firms issuing convertibles relative to firms issuing straight debt. Capital expenditures are higher after long-term debt issuance, while R&D expenditures are higher following short-term issues. Post-issuance R&D expenditures for secured debt issuers are significantly lower than those following unsecured issues. Capital expenditures are slightly higher following callable issues, but R&D expenses are statistically indistinguishable between callable and non-callable debt. Lower-rated firms tend to have higher levels of capital expenditures than highly rated firms. Finally, post-issuance R&D expenses appear to be similar across the credit ratings spectrum with the notable exception of non-rated issues, which have significantly higher post-issuance R&D than the others.

These univariate results are suggestive of the hypothesis that project characteristics help explain the design of debt contracts. However, that different types of firms issue different types of debt, and these differences in firm characteristics could potentially explain differences in the types of post-issuance expenditures. Therefore, we utilize a multivariate approach that permits us to allow for a number of potential factors that could affect the structure of debt issues.

#### **IV. Multivariate Analysis of Changes in Accounting Variables across Debt Issue Types**

##### **A. Basic Specification**

We employ various multivariate discrete-choice models to estimate the impact of various firm, economic, and project characteristics on the choice to debt structure. A complication in the econometric modeling occurs because the firms are essentially making a number of decisions simultaneously. First, the firm decides whether or not to issue a debt security in a given year. Then, given the decision to issue debt, the firm decides how to structure the issue in terms of maturity, convertibility, security, and callability. Thus, when we estimate the probability of using a particular type of debt, we model the probability of issuing a convertible *given* that the firm has chosen to issue debt that year to avoid confounding these effects. The general specification for our analysis has the form:

$$\Pr(Y = j \mid \text{Debt Issue}) = F(\text{Firm Characteristics}_{it}, \text{Economy}_t, \text{Uses of Funds}_{it,t+2}) \quad (1)$$

where  $j = 0, 1, 2, \dots$  indicates the type of debt being issued,  $F$  is a cumulative distribution function, whose arguments consist of current firm characteristics, economic conditions at the time of issuance, and the post-issuance measures of the uses of funds. Firm characteristics include firm size, leverage, market-to-book ratio, fixed asset ratio, cash flow, and cash holdings. We also control for the net issuance of equity, since other sources of funds may enter the firm during the same year as the debt issuance. Economic conditions are captured by a recession dummy variable that takes the value of one during any time period designated by the NBER as being in a recession. Year effects are added to control for year-specific characteristics such as the general level of interest rates in the economy. Industry effects are included in most specifications. All variables, except the dummy variables, are standardized to have zero mean and unit variance. As such, the estimated marginal effects will reflect expected changes in the probability of choosing one type of debt over the other given a one standard deviation change in the particular explanatory variable. We estimate the general form in equation (1) using three different approaches: probit model with selection, multinomial logit regression, and conditional logit with firm fixed-effects.<sup>11</sup>

### A. Convertibility

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<sup>11</sup> See Appendix A (to be written) for a detailed description of each approach.

Table VI presents the estimation results for the choice between convertible and straight debt. We focus our discussion on the probit model with selection, as it facilitates the estimation of marginal effects ( $dF/dX$ ). However, the results are similar across specifications, suggesting that the observed results are generated by the underlying economic relationships and not by errors in econometric specifications. The continuous firm characteristics are standardized to have a mean of zero and unit standard deviation. Thus, the estimates in Table VI in the probit with selection columns can be interpreted as the change in the predicted probability of observing a convertible issue relative to a straight issue given a one standard deviation change in that particular variable. The estimates for the recession dummy variable represent that change in predicted probabilities if the economy goes from an expansion to a recession. Only firm age and the slope of the yield curve remain in their original units.

Table VI confirms that convertible issuers tend to be younger, smaller firms with relatively low leverage ratios. Convertibles tend to be issued by firms with high market-to-book ratios, consistent with the idea that growth firms tend to choose convertible bonds to help avoid potential agency conflicts between bondholders and shareholders. The results among the firm characteristics are also consistent with the prediction of Stein's (1992) model of "back-door" equity financing, in which relatively smaller firms issue convertibles to minimize the information-induced pricing impact from issuing equity.

Controlling for firm and project characteristics, high prior stock returns do not significantly increase the probability of issuing a convertible bond. This is a surprising finding, as it is commonly argued that convertible bond issuance follow a market-timing pattern similar to that in equity issues. Unconditionally, firms tend to issue convertible debt after periods of high returns. However, controlling for the decision to issue any kind of public debt issue, prior returns do not have significant predictive power in explaining the choice between convertible and straight debt in the cross-section of US firms.

Conditional on the decision to issue debt, firms are more likely to issue convertible debt during

times of recession. The occurrence of a recession increases the predicted probability that a firm will choose a convertible issue by almost 3%, controlling for firm and project characteristics.

The project characteristics variables provide evidence consistent with the “real-options matching” arguments of Mayers (1998). Firms that subsequently increase expenditures in fixed assets are less likely to issue convertibles. A one-standard deviation in the subsequent measure of capital expenditures decreases the probability of issuing a convertible by 5.6%. Firms that subsequently engage in R&D spending are more likely to issue convertibles. A one standard deviation increase in the subsequent R&D spending variable increases the probability of issuing a convertible by 13.8%. This is a very large effect considering the fact that the unconditional probability that a firm issues a convertible bond is 13.7%. It is also interesting to note that firms are more likely to issue a convertible bond when they subsequently increase their cash holdings. This pattern suggests that firms save cash from convertible issues and spend it over several years, similar to the findings for seasoned equity offers documented by Kim and Weisbach (2007).

The second column in Table VI presents the marginal effects when we include a measure of the slope of the yield curve, as defined by the difference between the yield on 10-year and 6-month treasury securities during the year of the issue. Including this year-specific variable requires us to omit the year fixed-effects that were included in the first specification. We find marginal evidence that firms are more likely to issue convertibles when the yield curve is upward sloping. Specifically, an increase of 1% (100 basis points) in the slope of the yield curve increases the expected probability of issuing a convertible by 7.4%.

## **B. Maturity**

Table VII reports the estimates for the choice between short- and long-term debt issues. Consistent with the Diamond (1991) liquidity risk arguments, we find that short-term debt issuers tend to

be larger, have lower debt levels, stronger growth opportunities, and less cash on the balance sheet than firms that choose to issue long-term debt. The large effect of growth opportunities, as measured by the market-to-book ratio, is also consistent with Myers (1977) and Barnea, Haugen and Senbet (1980) in which firms with better growth opportunities issue on shorter term maturities to help minimize potential agency conflicts. Specifically, a one standard deviation in the market-to-book ratio increases the predicted probability of a short-term issue by 7.4%.

As with convertible debt, we find marginal evidence that a recession increases the probability that a firm will issue short-term. A recession increases the probability that a firm issues a short-term bond by 3.7%, with a somewhat marginal t-statistic of 1.73. The results on project characteristics are consistent with the commonly discussed “maturity-matching” arguments, formalized by Diamond (1991), Myers (1977), and Hart and Moore (1994). Firms are less likely to issue short-term bonds when they subsequently engage in capital expenditures, but are more likely to issue short-term when subsequent R&D expenditures are high. Specifically, a one standard deviation increase in post-issuance capital expenditures decreases the probability of issuing short-term debt by 5.4%, while a one standard deviation increase in subsequent R&D spending increases the probability of issuing short-term debt by 13.8%.

The second column of Table VII reports results from omitting yearly fixed effects and including a measure of the slope of the yield curve. Firms are less likely to issue on the short end of the maturity spectrum when the yield curve is upward sloping. The marginal effect suggests that an increase in the slope of 100 basis points decreases the probability that a firm issues a short-term security by 3.4%. This finding confirms the common view that firms choose maturities to minimize interest costs given whatever yield curve they face at the time of issuance.

### **C. Security Level**

Table VIII reports the results of the binary choice models when the firm is choosing between

secured and unsecured debt. We find evidence consistent with the “banking” view of secured debt (Berger and Udell (1990)), which argues that poor quality firms have little choice but to issue secured debt as investors are more likely to require direct collateral when the firm is nearing bankruptcy. These results are in contrast with the “corporate finance” view, in which high quality firms issue secured debt to avoid underinvestment problems associated with the priority of existing debt claims. In particular, we find that firms issuing secured debt tend to be smaller and much more highly levered than unsecured issuers. Firms also tend to issue secured debt after periods of low cash flows and stock returns. Finally, our results suggest that firms tend to issue secured debt when growth options are low. The estimated parameters imply that a one-standard deviation increase in the market-to-book ratio decreases the predicted probability of issuing secured debt over unsecured debt by 2.8%. Finally, it does not appear that a recession affects the probability of a firm’s issuing secured debt.

The coefficients on the uses of funds variables indicate that firms that subsequently engage in R&D spending are less likely to issue secured debt. The marginal effect on the R&D measure is -6.2%, which represents a very large change in the predicted probability of issuing secured compared to the unconditional probability of 2.7%.

#### **D. Callability**

Table IX summarizes the estimation results for the choice between callable and non-callable debt. Firms are thought to issue callable debt to mitigate agency costs (Barnea, Haugen and Senbet (1980)) and to hedge against interest rate risk (Guntay, Prabhala and Unal (2003)). We find some evidence consistent with the view that firms issue callable debt to hedge against underinvestment risk, as suggested by Barnea, Haugen and Senbet (1980). Specifically, firms that issue callable debt have higher market-to-book ratios and stock return volatility. Our estimates imply that a one standard deviation increase in the market-to-book ratio increases the probability of issuing callable debt by 1%. Our results also imply that

callable issuers tend to be smaller, lower-levered firms, consistent with the arguments of Guntay, Prabhala and Unal (2003), who suggest that it is precisely the smaller firms which are most likely to hedge against interest rate risk using call provisions.

## **V. The Effect of Debt Issuance on Post Issuance Investment Expenditures**

To investigate the uses of funds hypothesis further, we employ the approach of Kim and Weisbach (2007) to the issuance of debt to measure the effect of debt issuance on subsequent uses of the funds raised. This approach allows us to estimate the dollar change in various uses of funds given a \$1 increase in debt financing. This method regresses various uses of funds on debt issuance amount variables and interaction terms involving the various types of debt, controlling for credit ratings, year effects and industry effects. We then estimate the dollar changes in the various uses of funds implied by the regression coefficients for one and four years following the debt issue.

Table X reports the estimates. Panel A summarizes the results for convertible issuers, in which we see significant differences in the way funds are allocated across various uses. The estimates imply that convertible issuers spend \$0.11 in capital expenditures for each dollar in debt financing in the first year following issuance, and \$0.20 per dollar after four years. This compares to \$0.21 after one year and \$0.50 after four years for straight debt issuers. Firms issuing convertible debt tend to allocate more towards R&D financing and cash holdings than do straight debt issuers. Compared to Panel E, which summarizes dollar changes in uses of funds following SEOs from Kim and Weisbach (2007), we see that convertible debt behaves much more like equity in terms of subsequent uses of funds. The implied dollar changes for R&D spending in the year after issuance are \$0.02 for straight debt, \$0.15 for convertible debt, and \$0.18 for equity issues. Increases in cash holdings follow a similar pattern, where the implied dollar changes for the year after issuance are \$0.20, \$0.42, and \$0.53 for straight debt, convertible debt, and equity respectively.

Panel B summarizes the allocation of funds for short- and long-term debt. Again, we see evidence of maturity matching with long term issuers increasing capital expenditures by \$0.19 and \$0.47 per dollar of debt raised in one and four years after issuance, compared to \$0.11 and -\$0.13 for convertible issues. Like convertibles, larger shares of debt issuance tend to go to R&D expenditures and increases in cash holdings. Panel C reports the results for the secured debt sample. We see that secured debt issuers allocate less financing to R&D compared to unsecured issuers, and tend to save less cash out of issuance in both the one-year and four-year post issuance periods.

Finally, Panel D summarizes the implied dollar changes in uses of funds following the issuance of callable debt. We do not find any significant differences in the post issuance uses of funds between callable debt and non-callable debt.

## **VI. Multivariate Analysis of the Determinants of Credit Quality**

Table XI reports coefficient estimates from equations predicting the credit quality of a firm's bond issue. We estimate these equations using a multinomial logit setup, in which the dependent variable has 5 levels of credit quality: non-rated, C-rated, speculative B-rated, investment grade B-rated, and A-rated bonds. The baseline corresponds to the firm choosing not to issue any kind of debt.<sup>12</sup>

The estimates in Table XI paint a very clear picture of the determinant of credit ratings. Some of the results are not particularly surprising: Larger firms are much more likely to issue high-rated debt. The relation between the effects of size on the probability of issuing high quality debt is monotonic across credit rating groups. Firms with higher growth opportunities and stronger cash flows are also more likely to issue investment grade debt. Also, lower return volatility increases the probability of issuing a highly-rated bond.

A somewhat counterintuitive finding is that there is a negative relationship between cash holdings

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<sup>12</sup> An alternative specification would be an ordered probit, which would take advantage of the natural ordering of the bond ratings. We do not use this approach because it would not be clear where non-rated debt would fall into this ordering.

and the probability of issuing investment grade debt. This finding is consistent with the logic of Almeida, Campello and Weisbach (2004), who argue that more constrained firms are likely to a higher percentage of cash from their cash flows. Since firms with low bond ratings are more likely to face financial constraints, they will tend to save more cash, leading to a negative relation between firms' cash holdings and the ratings of the bonds they issue.

The other striking finding from Table XI concerns the impact of recessions on bond ratings. They clearly indicate a recession clearly increases the quality of bonds that are issued. Consistent with the commonly discussed arguments of practitioners, during bad financial times, poor quality borrowers appear to be shut out of the bond market, so that the only bonds that are issued are highly rated.

## **VII. Conclusion**

When issuing securities, firms choose from a broad spectrum of contractual features, obligations, and payoff structures. One year a firm may choose financing from the long-term, straight, secured end of the spectrum, then subsequently choose to issue relatively short-term convertible debt, even if firm characteristics have not changed significantly. This paper adds to our understanding of financial contracting by examining three major factors which determine the structure of debt issues: firm characteristics, economic conditions, and the characteristics of planned investment projects. Changing firm characteristics, recessions, and intended uses of funds help explain the heterogeneity in debt financing within firms and industries over time. We have documented evidence that small, growth oriented firms with large R&D expenditures are more likely to issue convertible or short-term debt, while large, established firms with large investment in fixed assets are more likely to issue long-term, straight debt. We have also documented that recessions exacerbate financial constraints in that controlling for other determinants of credit quality, firms are more likely to issue highly-rated debt during a recession.

A novel contribution of this paper is to relate post-issuance expenditures on various uses of funds to test theories suggesting that the characteristics of the firm's marginal investment opportunities have implications for the type of debt the firm will choose to issue. When a firm acquires fixed assets with steady expected cash flow streams, firms will have a tendency to issue relatively long-term, senior debt. When intangible assets are acquired, especially those with option-like payoffs, the firm is more likely to issue relatively short-term convertible debt securities.

To our knowledge, this is the first paper to empirically link variation in debt financing with various types of investment spending. Our findings are consistent with the notion that financing and real investment policies are not separable. Different assets create different types of potential agency problems, and hence the design of debt contracts meant to mitigate these conflicts of interest will vary with the firm's marginal investment choices. These results suggest that future research in financing choices should address the influence of the firm's dynamic investment policy on the financial structure of the company.

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**Table I**  
**Sample Descriptive Statistics**

The sample includes all public debt issued in US by non-financial firms between 1971 and 2004. We divide the sample into 5 sub-periods. The first row in each sub-period presents the means and the second row provides the relative proportions in each category for each sub period. Credit ratings are based on Moody's. Panel A reports the number of debt issues by type and Panel B reports total dollar amounts raised in \$US billions.

Panel A: Number of Debt Issues by Type														
sub period	Total Number	Convertible		Maturity		Secured		Callable		Quality				
		No	Yes	Long	Short	No	Yes	Yes	No	Non Rated	C to Caa1	B3 to Ba1	Baa1	A3 to Aaa
1971-84	947	864	83	947	0	909	38	789	158	171	48	157	120	451
		(91)	(9)	(100)	0	(96)	(4)	(83)	(17)	(18)	(5)	(17)	(13)	(48)
1985-89	1,570	1,317	253	1,438	132	1,530	40	1,121	499	286	144	385	311	444
		(84)	(16)	(92)	(8)	(97)	(3)	(71)	(29)	(18)	(9)	(25)	(20)	(28)
1990-94	3,041	2,820	221	2,563	478	2,972	69	846	2,195	400	123	679	698	1,141
		(93)	(7)	(84)	(16)	(98)	(2)	(28)	(72)	(13)	(4)	(22)	(23)	(38)
1995-99	4,811	4,417	394	3,736	1,075	4,699	112	2,578	2,233	945	274	1,205	985	1,402
		(92)	(8)	(78)	(22)	(98)	(2)	(54)	(46)	(20)	(6)	(25)	(20)	(29)
2000-04	4,498	3,403	1,095	3,156	1,342	4,353	145	3,268	1,233	968	163	1,302	867	1,198
		(76)	(24)	(70)	(30)	(97)	(3)	(73)	(27)	(22)	(4)	(29)	(19)	(27)
Total	14,867	12,821	2,046	11,840	3,027	14,463	404	8,602	6,318	2,770	752	3,728	2,981	4,636
		(86)	(14)	(80)	(20)	(97)	(3)	(60)	(40)	(19)	(5)	(25)	(20)	(31)

  

Panel B: Total Proceeds by Type(\$US bil.)														
sub period	Total Amount	Convertible		Maturity		Secured		Callable		Quality				
		No	Yes	Long	Short	No	Yes	Yes	No	Non Rated	C to Caa1	B3 to Ba1	Baa3 to Baa1	A3 to Aaa
1971-84	97.9	92.8	5.0	97.9	0.0	95.1	2.8	91.0	6.9	10.5	3.6	13.3	15.2	55.3
		(95)	(5)	(100)	0	(97)	(3)	(93)	(7)	(11)	(4)	(14)	(16)	(56)
1985-89	230.1	200.7	29.5	210.3	19.8	226.3	3.8	165.9	64.2	30.8	15.6	65.1	51.2	67.4
		(87)	(13)	(91)	(9)	(98)	(2)	(72)	(28)	(13)	(7)	(28)	(22)	(29)
1990-94	344.9	296.5	48.4	295.6	49.3	334.3	10.6	135.8	209.0	50.0	11.7	84.3	82.9	116.0
		(86)	(14)	(86)	(14)	(97)	(3)	(39)	(61)	(14)	(3)	(24)	(24)	(34)
1995-99	985.9	891.5	94.4	784.9	201.0	961.0	24.9	594.4	391.5	246.9	63.8	257.4	208.7	209.2
		(90)	(10)	(80)	(20)	(97)	(3)	(60)	(40)	(25)	(6)	(26)	(21)	(21)
2000-04	2,002.7	1,627.5	375.2	1,223.4	779.3	1,971.6	31.1	1,127.5	871.4	362.5	41.0	399.6	397.4	802.1
		(81)	(19)	(61)	(39)	(98)	(2)	(56)	(44)	(18)	(2)	(20)	(20)	(40)
Total	3,661.4	3,109.0	552.4	2,612.0	1,049.4	3,588.3	73.1	2,114.6	1,543.0	700.6	135.6	819.7	755.5	1,250.1
		(85)	(15)	(71)	(29)	(98)	(2)	(58)	(42)	(19)	(4)	(22)	(21)	(34)

**Table II**  
**Cross-Tabulation of Debt Issues – 1971 to 2004**

This table reports two-way classification tables of US public debt issues by type over the 1971 to 2004 period. Each cross-tabulation contains three statistics; first, the number of bonds falling within each two-way category. Second, we report the percentage of bonds having a particular column characteristic relative to the row total. For example, 20.7% in the ‘short-term’ column and ‘straight’ row means that 20.7% of straight bonds are short-term. Third, we report the number of bonds in each category we would expect to observe if the two characteristics were independent. Finally, we include p-values from chi-square tests of independence.

		Short-Term	Long-Term	Secured	Unsecured	Callable	Noncallable	Row Total
Straight	Frequency	2,649	10,168	399	12,418	6,951	5,866	12,817
	Percent	20.7%	79.3%	3.1%	96.9%	54.2%	45.8%	
	Expected Frequency	2,608.25	10,208.75	347.59	12,469.41	7,419.37	5,397.63	
Convertible	Frequency	375	1,668	4	2,039	1,651	392	2,043
	Percent	18.4%	81.6%	0.2%	99.8%	80.8%	19.2%	
	Expected Frequency	415.75	1,627.25	55.41	1,987.59	1,182.63	860.37	
p-value		0.016		0.000		0.000		
Short-Term	Frequency			83	2,941	820	2,204	3,024
	Percent			2.7%	97.3%	27.1%	72.9%	
	Expected Frequency			82.01	2,941.99	1,750.50	1,273.50	
Long-Term	Frequency			320	11,516	7,782	4,054	11,836
	Percent			2.7%	97.3%	65.7%	34.3%	
	Expected Frequency			320.99	11,515.00	6,851.50	4,984.50	
p-value				0.901		0.000		
Secured	Frequency					324	79	403
	Percent					80.4%	19.6%	
	Expected Frequency					233.28	169.72	
Unsecured	Frequency					8,278	6,179	14,457
	Percent					57.3%	42.7%	
	Expected Frequency					8,368.72	6,088.28	
p-value						0.000		
Column Total		3,024	11,836	403	14,457	8,602	6258.000	

**Table III**  
**Firm Characteristics**

This table presents summary statistics of firm characteristics for firm-years in which various types of bonds were issued in US over the period 1971 to 2004. The sample represents all non-financial firms with sufficient data in the Compustat database over the sample period.

<b>Panel A: Firm Characteristics by Issue Type</b>															
	All Debt Issues			Convertible			Maturity			Secured			Callable		
	Issuing Years	Non-Issuing Years	Diff.	Yes	No	Diff.	Short	Long	Diff.	Yes	No	Diff.	Yes	No	Diff.
N	6,828	34,755		1,577	5,251		753	6,075		264	6,564		5,070	1,758	
ln[Total Assets]: \$US mil	7.074	5.888	<b>1.186</b>	6.048	7.382	<b>-1.334</b>	7.368	7.038	<b>0.331</b>	6.271	7.106	<b>-0.835</b>	6.842	7.744	<b>-0.903</b>
Leverage	0.634	0.608	<b>0.026</b>	0.546	0.661	<b>-0.115</b>	0.630	0.635	<b>-0.005</b>	0.810	0.627	<b>0.183</b>	0.630	0.645	<b>-0.015</b>
Fixed Asset Ratio	0.401	0.362	<b>0.038</b>	0.296	0.433	<b>-0.137</b>	0.333	0.409	<b>-0.076</b>	0.512	0.396	<b>0.116</b>	0.394	0.420	<b>-0.025</b>
Market-to-Book	2.800	2.268	<b>0.532</b>	3.370	2.615	<b>0.755</b>	3.718	2.684	<b>1.033</b>	2.249	2.816	<b>-0.567</b>	2.809	2.773	0.036
Cash	0.092	0.109	<b>-0.018</b>	0.192	0.061	<b>0.131</b>	0.136	0.086	<b>0.050</b>	0.083	0.092	<b>-0.009</b>	0.097	0.075	<b>0.022</b>
Cash Flow	0.070	0.064	<b>0.006</b>	0.031	0.082	<b>-0.051</b>	0.041	0.074	<b>-0.032</b>	0.006	0.073	<b>-0.067</b>	0.067	0.081	<b>-0.014</b>
Prior 12-Month Stock Return	0.264	0.197	<b>0.067</b>	0.443	0.205	<b>0.238</b>	0.206	0.271	<b>-0.065</b>	0.071	0.269	<b>-0.198</b>	0.287	0.199	<b>0.087</b>
Return Volatility	0.421	0.441	<b>-0.021</b>	0.569	0.372	<b>0.197</b>	0.506	0.410	<b>0.096</b>	0.612	0.416	<b>0.196</b>	0.443	0.359	<b>0.083</b>
Net Equity Issuance	0.022	0.028	<b>-0.006</b>	0.067	0.009	<b>0.058</b>	0.024	0.021	0.002	0.037	0.021	0.016	0.026	0.010	<b>0.016</b>
<b>Panel B: Firm Characteristics by Issue Credit Quality</b>															
	Non-Rated	C to Caa1	B3 to Ba1	Baa3 to Baa1	A	Invest. Grade	Junk Bonds	Diff.							
Net Equity Issuance	1,437	671	2,042	1,224	1,454	2,678	2,707								
ln[Total Assets]: \$US mil	5.636	6.216	6.789	8.069	8.455	8.278	6.647	<b>1.631</b>							
Leverage	0.584	0.709	0.679	0.633	0.586	0.607	0.687	<b>-0.079</b>							
Fixed Asset Ratio	0.311	0.397	0.399	0.435	0.465	0.451	0.399	<b>0.052</b>							
Market-to-Book	3.102	2.510	2.298	2.794	3.342	3.078	2.348	<b>0.730</b>							
Cash	0.196	0.098	0.069	0.052	0.052	0.052	0.076	<b>-0.024</b>							
Cash Flow	0.013	0.031	0.072	0.100	0.118	0.109	0.062	<b>0.048</b>							
Prior 12-Month Stock Return	0.361	0.390	0.287	0.184	0.160	0.172	0.311	<b>-0.139</b>							
Return Volatility	0.584	0.533	0.444	0.325	0.274	0.299	0.465	<b>-0.166</b>							
Net Equity Issuance	0.066	0.046	0.019	-0.005	-0.008	-0.006	0.026	<b>-0.032</b>							

\*Differences shown in bold face type are significantly different from zero at the 95% confidence level.

**Table IV****Macroeconomic Conditions and Debt Design**

This table summarizes the proportion of total debt proceeds by bond characteristic over various states of the economy. High GDP growth is defined as years in which GDP growth exceeded 3.5%. Medium growth is defined as years in which the GDP growth rate was between 2% and 3.5%. Low growth is defined as years in which the annual rate of GDP growth was less than 2%. Time periods are classified as being in either an expansion or a recession based on NBER business cycle dating procedures. The sample period is from 1971 to 2004.

GDP Growth	Proportion of Total Proceeds Raised			Proportion of Total Proceeds Raised	
	High Growth	Medium Growth	Low Growth	Expansion	Recession
<u>Issue Characteristics</u>					
<u>Convertibility</u>					
Straight	0.923	0.888	0.883	0.887	0.871
Convertible	0.077	0.112	0.117	0.116	0.129
<u>Security Level</u>					
Secured	0.030	0.046	0.037	0.038	0.012
Unsecured	0.970	0.954	0.963	0.962	0.988
<u>Maturity</u>					
Less than 5 Years	0.090	0.119	0.222	0.191	0.311
More than 5 Years	0.910	0.881	0.778	0.809	0.689
<u>Callability</u>					
Callable	0.628	0.534	0.609	0.574	0.623
Noncallable	0.372	0.466	0.391	0.426	0.377
<u>Credit Quality</u>					
Investment Grade	0.441	0.511	0.689	0.481	0.662
Junk	0.352	0.330	0.189	0.327	0.236
Not Rated	0.194	0.147	0.116	0.189	0.101

**Table V**  
**Project Characteristics and Types of Debt Issues**

This table presents summary statistics for post-issuance capital expenditures and R&D expenditures by issue type. The expenditure variables are calculated as the natural logarithm of the sum of the respective expenditure over the two years following the debt issuance, scaled by total assets. Test statistics for testing differences in the mean and median expenditure amounts across bond types are included. Differences shown in bold face type are significantly different from zero at the 95% confidence level. The sample period is from 1971 to 2004.

		ln[(CAP EX over next 2 years / Total Assets)+1]			ln[(R & D over next 2 years / Total Assets)+1]		
		N	mean	median	N	mean	median
Non Issuing Firm-Years		32,316	0.19	0.13	17,074	0.12	0.05
Debt Issuing Firm-Years		6,150	0.20	0.14	3,186	0.09	0.04
testing the difference	t-stat/z-stat		<b>4.09</b>	<b>5.55</b>		<b>-7.86</b>	<b>-7.04</b>
	Straight	4,839	0.20	0.14	2,382	0.05	0.03
	Convertibles	1,311	0.22	0.14	804	0.18	0.11
testing the difference	t-stat/z-stat		<b>2.78</b>	0.31		<b>25.01</b>	<b>15.81</b>
	Long Term	5,501	0.21	0.14	2,788	0.08	0.04
	Short Term	649	0.15	0.11	398	0.13	0.06
testing the difference	t-stat/z-stat		<b>-5.27</b>	<b>-7.69</b>		<b>7.03</b>	<b>6.78</b>
	Unsecured	5,911	0.20	0.14	3,083	0.09	0.04
	Secured	239	0.23	0.14	103	0.04	0.01
testing the difference	t-stat/z-stat		1.76	-1.02		<b>-3.61</b>	<b>-5.44</b>
	Noncallable	1,623	0.17	0.14	881	0.08	0.04
	Callable	4,528	0.21	0.14	2,305	0.09	0.04
testing the difference	t-stat/z-stat		<b>5.72</b>	<b>2.31</b>		1.49	-1.88
	Non Rated	1,240	0.22	0.13	692	0.17	0.08
	C's(C to Caa1)	608	0.27	0.15	232	0.06	0.01
	Speculative B's (B3 to Ba1)	1,807	0.20	0.13	853	0.05	0.02
	Investable B's (Baa3 to Baa1)	1,125	0.17	0.13	547	0.06	0.04
	A's (A3 to Aaa)	1,370	0.18	0.16	862	0.07	0.05
C's vs. Speculative B's	t-stat/z-stat		<b>-4.75</b>	<b>-4.93</b>		-0.82	<b>2.44</b>
Speculative B's vs. Investable B's	t-stat/z-stat		<b>-3.61</b>	0.62		0.02	<b>4.74</b>
Investable B's vs. A's	t-stat/z-stat		<b>2.31</b>	<b>6.04</b>		<b>4.01</b>	<b>4.89</b>

**Table VI**

**Multivariate Analysis: Convertible Issues**

This table reports coefficient estimates and marginal effects for two-stage probit models with selection. In the first stage, the probability of issuing any type of debt is modeled as a function of firm size, leverage, fixed asset ratio, cash, cash flow, net issuance of equity, stock return volatility, and year dummies. This table reports estimates from the second-stage debt design probit regressions where the dependent variable equals one if the debt is convertible, short term, secured, or callable. T-statistics are reported in parentheses. The sample period is from 1971 to 2004.

	Probit with Selection		Multinomial Logit						Firm Fixed-Effects	
	Convertible vs. Straight	Convertible vs. Straight	Straight vs. No Issue	Convertible vs. No Issue	Convertible vs. Straight	Straight vs. No Issue	Convertible vs. No Issue	Convertible vs. Straight	Convertible vs. Straight	Convertible vs. Straight
	dF/dX	dF/dX	coefficient	coefficient	coefficient	coefficient	coefficient	coefficient	coefficient	coefficient
Firm Age	-0.002 (3.00)	-0.003 (3.96)	0.019 (15.45)	0.005 (2.12)	-0.014 (-5.10)	0.017 (14.48)	0.002 (0.89)	-0.015 (-5.71)	0.035 (1.73)	0.041 (1.82)
ln[Total Assets]	-0.192 (-10.94)	-0.212 (-9.47)	0.913 (36.26)	0.586 (14.88)	-0.327 (-7.29)	0.973 (39.97)	0.721 (18.95)	-0.252 (-5.80)	-1.159 (-4.24)	-1.129 (-3.23)
Leverage	-0.036 (-1.65)	-0.039 (-1.77)	0.302 (11.21)	0.257 (6.87)	-0.045 (-1.01)	0.304 (11.27)	0.224 (5.96)	-0.080 (-1.79)	0.207 (1.28)	0.249 (1.77)
Fixed Asset Ratio	-0.028 (-2.84)	-0.029 (-2.87)	0.038 (1.21)	-0.243 (4.34)	-0.281 (-4.52)	0.032 (1.02)	-0.268 (4.79)	-0.300 (-4.83)	0.032 (0.24)	0.019 (0.15)
Market-to-Book Ratio	0.037 (3.97)	0.031 (3.10)	0.042 (2.28)	0.071 (4.16)	0.029 (2.17)	0.088 (5.72)	0.168 (5.22)	0.080 (2.55)	0.007 (0.08)	0.039 (0.78)
Cash Flow	-0.062 (-2.59)	-0.059 (-2.55)	-0.058 (1.50)	-0.185 (4.52)	-0.127 (-2.35)	-0.051 (2.35)	-0.171 (5.53)	-0.120 (-2.53)	-0.162 (-1.10)	-0.063 (0.97)
Cash	0.067 (4.40)	0.070 (4.84)	-0.619 (11.59)	0.054 (1.33)	0.673 (10.19)	-0.668 (12.28)	0.062 (1.50)	0.730 (10.87)	0.299 (1.66)	0.321 (1.78)
12-Month Stock Return	0.016 (0.92)	0.015 (0.89)	0.089 (3.29)	0.124 (4.48)	0.035 (1.00)	0.087 (3.25)	0.113 (1.08)	0.026 (0.97)	0.256 (3.16)	0.251 (3.02)
Return Volatility	0.093 (9.02)	0.079 (7.28)	-0.033 (0.97)	0.097 (3.32)	0.130 (2.98)	-0.022 (0.67)	0.173 (6.34)	0.195 (4.73)	0.169 (1.67)	0.241 (2.22)
Equity Issuance	0.047 (3.69)	0.041 (3.97)	0.019 (0.36)	0.089 (2.99)	0.070 (1.21)	0.037 (0.73)	0.121 (4.04)	0.084 (1.46)	0.064 (1.64)	0.080 (2.02)
Offer Size	0.005 (0.84)	0.012 (1.22)							0.214 (6.49)	0.199 (3.59)
Recession Dummy	0.028 (1.22)	0.176 (2.32)	0.216 (2.13)	0.359 (6.10)	0.143 (1.93)	0.224 (2.62)	0.377 (7.74)	0.153 (2.02)	0.532 (3.10)	0.628 (5.77)
CAPEX <sub>t,t+2</sub>	-0.056 (-2.69)	-0.055 (-1.99)	0.389 (9.68)	0.218 (4.49)	-0.171 (-3.36)	0.342 (11.94)	0.200 (7.46)	-0.142 (-2.79)	-0.334 (-2.23)	-0.330 (-2.41)
R&D <sub>t,t+2</sub>	0.138 (2.80)	0.140 (3.01)	-0.098 (1.85)	0.108 (3.20)	0.206 (3.33)	-0.123 (2.28)	0.085 (2.51)	0.208 (3.33)	0.753 (2.11)	0.696 (1.90)
Debt Reduction <sub>t,t+2</sub>	0.004 (0.63)	0.004 (0.56)	0.108 (5.60)	0.106 (3.67)	-0.002 (-0.06)	0.144 (7.65)	0.162 (5.79)	0.018 (0.54)	0.028 (0.26)	0.029 (0.47)
Acquisitions <sub>t,t+2</sub>	-0.008 (-0.41)	-0.000 (-0.02)	0.239 (13.59)	0.251 (10.88)	0.012 (0.43)	0.256 (14.54)	0.266 (11.58)	0.010 (0.39)	0.094 (0.94)	0.096 (1.03)
Total Payout <sub>t,t+2</sub>	-0.058 (-2.79)	-0.058 (-2.56)	0.090 (4.08)	-0.082 (2.06)	-0.172 (-3.89)	0.082 (3.67)	-0.108 (2.61)	-0.190 (-4.15)	-0.368 (-3.34)	-0.378 (-3.25)
Cash Holdings <sub>t,t+2</sub>	0.063 (3.51)	0.068 (3.51)	0.410 (1.37)	0.996 (4.53)	0.586 (1.66)	0.543 (1.77)	1.225 (5.46)	0.682 (1.87)	0.263 (0.44)	0.386 (1.45)
Yield Curve Slope		0.074 (1.94)				0.062 (3.39)	0.304 (9.53)	0.242 (6.76)		0.258 (6.85)
Year Fixed Effects	Yes	No	Yes	Yes	Yes	No	No	No	Yes	No
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
N	28,434	28,434		23,092			23,092		1,379	7914

**Table VII**

**Multivariate Analysis: Debt Maturity**

This table reports coefficient estimates and marginal effects for two-stage probit models with selection. In the first stage, the probability of issuing any type of debt is modeled as a function of firm size, leverage, fixed asset ratio, cash, cash flow, net issuance of equity, stock return volatility, and year dummies. This table reports estimates from the second-stage debt design probit regressions where the dependent variable equals one if the debt is convertible, short term, secured, or callable. T-statistics are reported in parentheses. The sample period is from 1971 to 2004.

	Probit with Selection		Multinomial Logit						Firm Fixed-Effects	
	Short-Term vs. Long-Term	Short-Term vs. Long-Term	Long-Term vs. No Issue	Short-Term vs. No Issue	Short-Term vs. Long-Term	Long-Term vs. No Issue	Short-Term vs. No Issue	Short-Term vs. Long-Term	Short-Term vs. Long-Term	Short-Term vs. Long-Term
	dF/dX	dF/dX	coefficient	coefficient	coefficient	coefficient	coefficient	coefficient	coefficient	coefficient
Firm Age	0.001 (0.16)	0.008 (1.19)	0.024 (8.79)	0.016 (14.34)	0.008 (2.63)	0.021 (7.78)	0.015 (12.98)	0.006 (2.34)	0.147 (3.20)	0.123 (7.28)
ln[Total Assets]	0.046 (2.28)	0.098 (2.28)	0.899 (16.05)	0.803 (35.75)	0.096 (1.64)	1.066 (19.47)	0.874 (40.11)	0.192 (3.36)	0.466 (2.22)	0.498 (2.38)
Leverage	-0.059 (-5.51)	-0.063 (-3.21)	0.216 (3.72)	0.298 (12.72)	-0.082 (-2.35)	0.211 (3.62)	0.292 (12.43)	-0.081 (-2.33)	-0.265 (-2.39)	-0.248 (-2.24)
Fixed Asset Ratio	-0.035 (3.24)	-0.024 (-1.94)	-0.078 (0.94)	0.025 (0.88)	-0.103 (-1.21)	-0.114 (1.36)	0.016 (0.57)	-0.130 (-1.50)	-0.276 (-1.29)	-0.193 (0.92)
Market-to-Book Ratio	0.074 (3.44)	0.113 (7.95)	0.312 (6.90)	0.027 (1.04)	0.285 (5.74)	0.437 (10.11)	0.118 (4.74)	0.319 (6.76)	0.299 (4.33)	0.259 (3.77)
Cash Flow	-0.047 (-2.34)	-0.058 (-3.97)	-0.365 (5.61)	-0.156 (5.16)	-0.209 (-3.00)	-0.441 (6.74)	-0.185 (6.12)	-0.256 (-3.67)	-0.268 (-2.65)	-0.270 (-2.70)
Cash	-0.037 (-2.37)	-0.042 (-2.59)	-0.167 (2.34)	-0.266 (4.80)	-0.099 (-1.91)	-0.172 (2.36)	-0.262 (5.32)	-0.090 (1.89)	-0.117 (-0.57)	-0.435 (3.23)
12-Month Stock Return	-0.043 (-2.72)	-0.049 (-3.16)	-0.072 (1.08)	0.102 (3.65)	-0.174 (-2.48)	-0.136 (1.90)	0.071 (2.47)	-0.207 (-2.76)	-0.043 (-0.54)	-0.037 (-0.49)
Return Volatility	0.057 (5.02)	0.071 (5.72)	0.144 (3.61)	0.027 (1.05)	0.117 (2.57)	0.207 (5.31)	0.064 (2.63)	0.143 (3.30)	0.080 (0.98)	0.066 (0.83)
Equity Issuance	0.003 (0.36)	0.003 (0.44)	0.109 (2.10)	0.104 (3.52)	0.005 (0.08)	0.129 (2.49)	0.122 (4.12)	0.007 (0.13)	0.033 (0.51)	0.025 (0.39)
Offer Size	0.005 (0.93)	0.006 (0.76)							0.024 (0.72)	0.021 (0.65)
Recession Dummy	0.037 (1.73)	0.042 (1.84)	0.143 (4.76)	0.286 (5.25)	0.143 (2.54)	0.151 (1.21)	0.263 (2.66)	0.112 (2.11)	0.758 (4.65)	0.488 (3.27)
CAPEX <sub>t,t+2</sub>	-0.054 (-3.23)	-0.062 (-3.64)	0.268 (4.03)	0.324 (14.31)	-0.056 (-2.82)	0.148 (1.97)	0.285 (12.58)	-0.137 (-2.79)	-0.047 (-0.40)	-0.022 (-0.19)
R&D <sub>t,t+2</sub>	0.138 (2.79)	0.191 (2.58)	0.173 (3.20)	0.100 (3.23)	0.073 (3.22)	0.155 (2.79)	0.086 (2.73)	0.069 (3.13)	0.161 (1.91)	0.172 (2.03)
Debt Reduction <sub>t,t+2</sub>	-0.017 (-0.77)	-0.046 (1.40)	0.059 (1.15)	0.110 (6.31)	-0.051 (-0.97)	0.139 (2.86)	0.151 (8.78)	-0.012 (0.23)	0.154 (1.66)	0.158 (1.69)
Acquisitions <sub>t,t+2</sub>	-0.008 (-0.43)	-0.013 (0.53)	0.237 (5.79)	0.248 (15.85)	-0.011 (-0.26)	0.276 (6.90)	0.263 (16.83)	0.013 (0.32)	0.150 (2.40)	0.156 (2.49)
Total Payout <sub>t,t+2</sub>	-0.012 (-1.20)	-0.016 (1.60)	-0.037 (0.69)	0.060 (2.99)	-0.097 (1.74)	-0.039 (0.70)	0.049 (2.39)	-0.088 (-1.52)	-0.169 (-2.15)	-0.165 (-2.13)
Cash Holdings <sub>t,t+2</sub>	0.054 (0.81)	0.060 (0.78)	0.769 (2.04)	0.912 (3.78)	0.143 (1.41)	0.799 (2.76)	0.973 (4.68)	0.174 (1.72)	0.275 (0.60)	0.234 (0.51)
Yield Curve Slope		-0.034 (3.27)				-0.010 (0.24)	0.128 (7.61)	-0.138 (3.00)		-0.266 (-3.48)
Year Fixed Effects	Yes	No	Yes	Yes	Yes	No	No	No	Yes	No
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
N	28,434	28,434		28,434			28,434			1,467

**Table VIII**

**Multivariate Analysis: Security Level**

This table reports coefficient estimates and marginal effects for two-stage probit models with selection. In the first stage, the probability of issuing any type of debt is modeled as a function of firm size, leverage, fixed asset ratio, cash, cash flow, net issuance of equity, stock return volatility, and year dummies. This table reports estimates from the second-stage debt design probit regressions where the dependent variable equals one if the debt is convertible, short term, secured, or callable. T-statistics are reported in parentheses. The sample period is from 1971 to 2004.

	Probit with Selection		Multinomial Logit						Firm Fixed-Effects	
	Secured vs. Unsecured	Secured vs. Unsecured	Unsecured vs. No Issue	Secured vs. No Issue	Secured vs. Unsecured	Unsecured vs. No Issue	Secured vs. No Issue	Secured vs. Unsecured	Secured vs. Unsecured	Secured vs. Unsecured
	dF/dX	dF/dX	coefficient	coefficient	coefficient	coefficient	coefficient	coefficient	coefficient	coefficient
Firm Age	0.000 (0.44)	-0.000 (0.14)	0.017 (15.74)	0.017 (2.80)	0.000 (0.04)	0.016 (14.28)	0.014 (2.27)	-0.002 (-0.24)	0.045 (0.48)	0.061 (2.02)
ln[Total Assets]	-0.092 (-2.76)	-0.104 (-4.15)	0.819 (37.80)	0.588 (5.04)	-0.231 (-1.96)	0.900 (42.82)	0.693 (6.18)	-0.207 (-1.82)	0.306 (0.76)	0.349 (0.84)
Leverage	0.059 (2.51)	0.046 (2.12)	0.269 (11.87)	0.787 (7.62)	0.518 (4.94)	0.262 (11.53)	0.757 (7.33)	0.495 (4.72)	0.132 (0.68)	0.121 (0.64)
Fixed Asset Ratio	-0.011 (-0.91)	-0.007 (-0.95)	0.007 (0.23)	0.320 (2.47)	0.313 (2.39)	-0.004 (0.15)	0.313 (2.42)	0.317 (2.42)	0.367 (0.94)	0.325 (0.82)
Market-to-Book Ratio	-0.028 (-2.58)	-0.025 (-2.97)	0.090 (3.83)	-0.457 (1.89)	-0.547 (-2.26)	0.183 (8.17)	-0.284 (1.24)	-0.467 (-2.04)	-0.448 (1.16)	-0.498 (1.34)
Cash Flow	-0.021 (-5.02)	-0.019 (-2.79)	-0.191 (6.69)	-0.503 (3.83)	-0.312 (-2.35)	-0.224 (7.88)	-0.515 (3.90)	-0.291 (-2.18)	-0.522 (-2.10)	-0.487 (-1.98)
Cash	0.052 (0.63)	0.063 (0.86)	-0.176 (5.47)	0.266 (1.60)	0.442 (2.36)	-0.196 (6.00)	0.245 (1.48)	0.441 (2.63)	0.640 (1.69)	0.635 (1.69)
12-Month Stock Return	-0.041 (-1.49)	-0.015 (-1.24)	0.083 (3.10)	0.083 (0.61)	0.000 (0.00)	0.048 (1.74)	0.049 (0.34)	0.001 (0.01)	0.009 (0.05)	0.020 (0.12)
Return Volatility	0.014 (3.45)	0.013 (2.78)	0.042 (1.75)	0.182 (3.31)	0.140 (2.42)	0.087 (3.94)	0.217 (4.10)	0.130 (2.40)	0.156 (1.39)	0.138 (1.25)
Equity Issuance	-0.007 (-0.95)	-0.007 (0.91)	0.106 (3.93)	0.039 (0.22)	-0.067 (-0.37)	0.124 (4.60)	0.061 (0.35)	-0.063 (-0.36)	0.125 (0.48)	0.095 (0.36)
Offer Size	0.002 (0.36)	0.007 (0.37)							-1.405 (5.03)	-1.358 (4.85)
Recession Dummy	0.002 (0.22)	0.017 (0.12)	0.338 (6.43)	-0.091 (0.31)	-0.429 (-1.42)	0.141 (2.99)	-0.071 (0.25)	-0.212 (-0.74)	-0.137 (0.36)	0.250 (0.71)
CAPEX <sub>t,t+2</sub>	0.009 (0.01)	0.004 (0.11)	0.325 (14.50)	0.248 (3.08)	-0.077 (-0.94)	0.280 (12.46)	0.206 (2.54)	-0.074 (-0.91)	0.196 (1.43)	0.189 (1.39)
R&D <sub>t,t+2</sub>	-0.062 (-2.07)	-0.064 (2.07)	0.125 (4.48)	-0.314 (1.25)	-0.439 (-1.75)	0.109 (3.84)	-0.359 (1.37)	-0.468 (-1.78)	-0.222 (-1.24)	-0.101 (-1.11)
Debt Reduction <sub>t,t+2</sub>	0.003 (0.85)	0.003 (0.78)	0.102 (5.91)	0.191 (2.92)	0.089 (1.35)	0.146 (8.65)	0.237 (3.73)	0.091 (1.40)	0.326 (2.39)	0.324 (2.40)
Acquisitions <sub>t,t+2</sub>	-0.005 (-1.49)	-0.046 (1.31)	0.250 (16.42)	0.147 (1.86)	-0.103 (-1.31)	0.267 (17.51)	0.154 (1.97)	-0.113 (-1.43)	-0.121 (1.06)	-0.134 (1.17)
Total Payout <sub>t,t+2</sub>	-0.016 (-1.93)	-0.019 (1.86)	0.052 (2.68)	-0.493 (2.02)	-0.545 (-2.23)	0.042 (2.14)	-0.618 (2.41)	-0.660 (-2.57)	-0.116 (0.43)	-0.194 (0.72)
Cash Holdings <sub>t,t+2</sub>	0.014 (0.38)	0.013 (0.36)	0.734 (3.86)	1.683 (1.90)	0.949 (1.06)	0.950 (4.90)	1.886 (2.10)	0.936 (1.03)	0.882 (0.70)	0.825 (0.67)
Yield Curve Slope		0.007 (0.17)				0.110 (6.79)	0.243 (2.72)	0.133 (1.47)		0.211 (1.83)
Year Fixed Effects	Yes	No	Yes	Yes	Yes	No	No	No	Yes	No
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
N	28,434	28,434		23,092			23,092		258	258

**Table IX**

**Multivariate Analysis: Callable Issues**

This table reports coefficient estimates and marginal effects for two-stage probit models with selection. In the first stage, the probability of issuing any type of debt is modeled as a function of firm size, leverage, fixed asset ratio, cash, cash flow, net issuance of equity, stock return volatility, and year dummies. This table reports estimates from the second-stage debt design probit regressions where the dependent variable equals one if the debt is convertible, short term, secured, or callable. T-statistics are reported in parentheses. The sample period is from 1971 to 2004.

	Probit with Selection		Multinomial Logit						Firm Fixed-Effects	
	Call vs. No Call	Call vs. No Call	No Call vs. No Issue	Call vs. No Issue	Call vs. No Call	No Call vs. No Issue	Call vs. No Issue	Call vs. No Call	Call vs. No Call	
	dF/dX	dF/dX	coefficient	coefficient	coefficient	coefficient	coefficient	coefficient	coefficient	
Firm Age	0.003 (1.07)	-0.008 (-0.31)	0.013 (2.61)	0.013 (10.04)	0.000 (0.00)	0.012 (2.50)	0.010 (8.30)	-0.002 (-0.35)	-0.025 (-1.42)	-0.035 (-1.81)
ln[Total Assets]	-0.027 (-4.90)	-0.037 (-4.32)	0.971 (9.69)	0.687 (28.50)	-0.284 (-2.79)	1.031 (10.66)	0.780 (33.73)	-0.251 (-2.55)	-0.601 (-2.21)	-0.741 (-2.91)
Leverage	-0.015 (-2.33)	-0.017 (-2.30)	0.514 (5.49)	0.281 (11.38)	-0.233 (-2.44)	0.508 (5.36)	0.256 (10.41)	-0.252 (-2.61)	-0.358 (-3.22)	-0.354 (-3.31)
Fixed Asset Ratio	0.003 (1.76)	0.002 (1.26)	-0.044 (0.35)	-0.008 (0.27)	0.036 (0.28)	-0.045 (0.36)	-0.029 (0.95)	0.016 (0.12)	0.013 (0.18)	-0.064 (0.88)
Market-to-Book Ratio	0.010 (6.64)	0.012 (6.47)	0.027 (0.22)	0.094 (5.93)	0.067 (2.19)	0.075 (0.66)	0.191 (5.68)	0.116 (2.57)	0.149 (2.38)	0.079 (2.01)
Cash Flow	-0.003 (-0.57)	-0.002 (-0.25)	-0.267 (2.08)	-0.177 (5.75)	0.090 (0.68)	-0.287 (2.23)	-0.201 (6.54)	0.086 (0.66)	-0.036 (0.77)	0.008 (0.18)
Cash	0.008 (1.49)	0.009 (1.38)	-0.030 (0.20)	-0.124 (3.56)	-0.094 (-0.63)	-0.040 (0.27)	-0.133 (3.78)	-0.093 (-0.61)	-0.079 (-0.85)	-0.025 (-0.81)
12-Month Stock Return	0.003 (0.57)	0.003 (0.68)	0.034 (0.28)	0.071 (2.53)	0.037 (0.30)	0.032 (0.27)	0.017 (0.57)	-0.015 (-0.12)	0.015 (0.41)	-0.026 (0.70)
Return Volatility	0.005 (2.61)	0.009 (4.90)	0.139 (1.94)	0.159 (2.54)	0.020 (1.05)	0.161 (1.98)	0.197 (6.94)	0.036 (3.05)	0.722 (2.13)	0.113 (3.29)
Equity Issuance	0.005 (0.39)	0.003 (0.11)	0.155 (1.44)	0.094 (3.30)	-0.061 (-0.56)	0.164 (1.53)	0.115 (4.05)	-0.049 (-0.45)	0.069 (0.99)	0.075 (1.14)
Offer Size	0.003 (0.34)	0.008 (0.56)							-0.019 (-0.77)	-0.002 (-0.84)
Recession Dummy	0.016 (2.20)	0.012 (1.62)	0.252 (1.07)	0.331 (5.55)	0.079 (0.33)	0.290 (1.35)	0.347 (2.10)	0.057 (0.81)	-0.110 (-0.87)	-0.400 (-0.92)
CAPEX <sub>t,t+2</sub>	-0.006 (0.50)	-0.011 (0.72)	0.280 (3.50)	0.279 (11.65)	-0.001 (-0.01)	0.250 (3.08)	0.232 (9.71)	-0.018 (-0.21)	-0.133 (-0.93)	-0.174 (-0.73)
R&D <sub>t,t+2</sub>	-0.018 (1.43)	0.009 (0.97)	0.120 (0.93)	0.093 (2.96)	-0.027 (-0.21)	0.108 (0.84)	0.057 (1.82)	-0.051 (-0.39)	-0.123 (-1.16)	-0.082 (-1.45)
Debt Reduction <sub>t,t+2</sub>	0.008 (4.76)	0.007 (3.70)	0.124 (1.69)	0.134 (7.46)	0.010 (0.13)	0.156 (2.17)	0.172 (9.81)	0.016 (0.21)	-0.040 (-0.042)	0.024 (0.86)
Acquisitions <sub>t,t+2</sub>	-0.003 (0.40)	0.001 (0.12)	0.236 (3.81)	0.236 (14.60)	0.000 (0.01)	0.255 (4.11)	0.250 (15.45)	-0.005 (-0.09)	0.108 (0.74)	0.103 (0.63)
Total Payout <sub>t,t+2</sub>	-0.007 (0.78)	0.021 (1.59)	-0.005 (0.05)	0.052 (2.39)	0.057 (0.54)	-0.009 (0.08)	0.042 (1.94)	0.051 (0.47)	0.026 (0.94)	0.021 (0.77)
Cash Holdings <sub>t,t+2</sub>	0.007 (0.61)	0.009 (0.74)	1.056 (1.36)	0.772 (3.79)	-0.284 (-0.36)	1.174 (1.50)	1.015 (4.94)	-0.159 (-0.20)	0.469 (0.37)	0.574 (0.50)
Yield Curve Slope		-0.003 (-2.99)				0.107 (1.41)	0.061 (3.38)	-0.046 (-0.59)		-0.052 (-1.43)
Year Fixed Effects	Yes	No	Yes	Yes	Yes	No	No	No	Yes	No
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
N	28,434	28,434		23,091			23,092		2,266	2,266

**Table X**

**The Effects of Debt Issuance on Subsequent Increases in Assets and Expenditures**

The dependent variable for asset-based variables (total assets, inventory, cash) is  $Y = \ln[(V_t - V_0)/A_0 + 1]$ , and for expenditures (CAPEX, acquisition, R&D, reduction in long-term debt) is  $Y = \ln[(\sum_{i=1}^t V_i/A_0) + 1]$ .

Independent variables are primary capital, other sources of funds - both of which are normalized by total assets - and  $\ln[total\ assets]$ . All regressions include year and industry fixed effects. Dollar changes are the implied change in the dependent variable when primary capital is increased by one dollar. Bold letters indicate statistical significance at the 5% level, using heteroskedasticity-consistent standard errors clustered by industry (two-digit SIC). The sample period is from 1971 to 2004.

Dependent Variable:				Explanatory Variables					
$\ln[(V_t - V_0)/Asset + 1]$	$t=1,4$	N	$\ln[(Fdebt/Asset)+1]$		$\ln[(Fdebt/Asset)+1]$		Dollar Changes	R-Squared	
					*Debt Type Dummy		Debt		
Panel A: Straight vs. Convertible Debt Issues									
$\ln[(\sum V_t/Asset)+1]$			Coef	t stat	Coef	t stat	Straight	Convertible	
$\sum CAPEX$	1year	3,602	<b>0.217</b>	<b>4.11</b>	<b>-0.110</b>	<b>-2.21</b>	0.21	0.11	0.38
	4years	1,614	<b>0.444</b>	<b>5.44</b>	<b>-0.290</b>	<b>-2.78</b>	0.50	0.20	0.59
$\sum R \& D$	1year	1,801	0.017	1.48	<b>0.143</b>	<b>6.44</b>	0.02	0.15	0.53
	4years	754	0.036	0.82	<b>0.583</b>	<b>5.55</b>	0.04	0.63	0.66
$\Delta Cash$	1year	3,144	<b>0.241</b>	<b>4.45</b>	<b>0.283</b>	<b>3.76</b>	0.20	0.42	0.38
	4years	1,361	0.121	1.69	0.174	1.77	0.11	0.25	0.37
Panel B: Long-Term vs. Short-Term Debt Issues									
$\ln[(\sum V_t/Asset)+1]$			Coef	t stat	Coef	t stat	Long-Term	Short-Term	
$\sum CAPEX$	1year	3,596	<b>0.193</b>	<b>4.34</b>	<b>-0.086</b>	<b>-2.09</b>	0.19	0.11	0.37
	4years	1,613	<b>0.404</b>	<b>5.35</b>	<b>-0.512</b>	<b>-3.69</b>	0.47	-0.13	0.59
$\sum R \& D$	1year	1,799	<b>0.071</b>	<b>5.02</b>	<b>0.112</b>	<b>4.17</b>	0.07	0.17	0.51
	4years	754	<b>0.394</b>	<b>4.21</b>	0.147	1.01	0.38	0.53	0.59
$\Delta Cash$	1year	3,138	<b>0.289</b>	<b>6.21</b>	<b>0.286</b>	<b>3.06</b>	0.24	0.45	0.37
	4years	1,360	<b>0.138</b>	<b>2.10</b>	<b>0.239</b>	<b>2.46</b>	0.12	0.32	0.32
Panel C: Unsecured vs. Secured Debt Issues									
$\ln[(\sum V_t/Asset)+1]$			Coef	t stat	Coef	t stat	Unsecured	Secured	
$\sum CAPEX$	1year	3,602	<b>0.182</b>	<b>4.42</b>	-0.009	-0.12	0.18	0.17	0.37
	4years	1,614	<b>0.362</b>	<b>4.55</b>	0.048	0.55	0.42	0.50	0.58
$\sum R \& D$	1year	1,801	<b>0.103</b>	<b>5.75</b>	<b>-0.042</b>	<b>-2.09</b>	0.10	0.06	0.47
	4years	754	<b>0.408</b>	<b>4.51</b>	-0.237	-1.84	0.39	0.17	0.59
$\Delta Cash$	1year	3,144	<b>0.343</b>	<b>7.09</b>	<b>-0.128</b>	<b>-2.99</b>	0.28	0.17	0.33
	4years	1,361	<b>0.146</b>	<b>2.31</b>	<b>0.229</b>	<b>2.24</b>	0.13	0.33	0.32
Panel D: Non-Callable vs. Callable Debt Issues									
$\ln[(\sum V_t/Asset)+1]$			Coef	t stat	Coef	t stat	Non-Callable	Callable	
$\sum CAPEX$	1year	3,019	<b>0.130</b>	<b>2.28</b>	0.058	0.89	0.13	0.18	0.38
	4years	1,350	<b>0.088</b>	<b>0.51</b>	0.316	1.75	0.10	0.48	0.59
$\sum R \& D$	1year	1,504	<b>0.128</b>	<b>3.31</b>	-0.026	-0.64	0.12	0.10	0.48
	4years	633	<b>0.446</b>	<b>2.36</b>	-0.085	-0.43	0.43	0.38	0.61
$\Delta Cash$	1year	2,605	<b>0.333</b>	<b>2.76</b>	0.005	0.04	0.27	0.27	0.33
	4years	1,110	0.111	0.60	0.030	0.16	0.10	0.13	0.32
Panel E: Seasoned Equity Offerings									
$\ln[(V_t - V_0)/Asset + 1]$	$t=1,2,3,4$	N	$\ln[(Fcap/Asset)+1]$		$\ln[(Other\ Sources/A)+1]$		Fresh	Other	R sqr
$\ln[(\sum V_t/Asset)+1]$			Coef	t stat	Coef	t stat	Equity	Sources	
$\sum CAPEX$	1year	6,890	<b>0.081</b>	<b>3.88</b>	<b>0.108</b>	<b>3.88</b>	0.080	0.091	0.20
	4years	3,539	<b>0.136</b>	<b>4.18</b>	<b>0.370</b>	<b>6.99</b>	0.190	0.179	0.54
$\sum R \& D$	1year	3,669	<b>0.192</b>	<b>4.98</b>	-0.019	-1.28	0.178	-0.015	0.35
	4years	1,739	<b>0.523</b>	<b>5.63</b>	<b>0.094</b>	<b>2.98</b>	0.643	0.040	0.49
$\Delta Cash$	1year	6,889	<b>0.594</b>	<b>23.34</b>	<b>0.077</b>	<b>3.68</b>	0.534	0.058	0.42
	4years	3,540	<b>0.327</b>	<b>6.12</b>	<b>0.176</b>	<b>8.20</b>	0.322	0.060	0.25

**Table XI**  
**Determinants of Debt Quality**

This table reports estimated coefficients from a multinomial logit regression. The dependent variable has five categories, non rated, C-rated bonds, speculative B-rated bonds, investment grade B-rated bonds, and A-rated bonds where the baseline case is no debt issues. Year fixed-effects and other uses of funds are also included in the specification but omitted from the table for brevity. T-statistics are reported in parentheses. The sample period is from 1971 to 2004.

Explanatory Variables	Not Rated	C to Caa1	B3 to Ba1	Baa3 to Baa1	A3 to Aaa	Investment Grade vs. Junk Bonds
Firm Age	-0.016 (5.56)	-0.027 (5.29)	-0.006 (3.15)	0.001 (0.38)	0.008 (4.59)	0.042 (7.05)
ln[Total Assets]	0.048 (0.82)	0.463 (5.72)	0.661 (14.90)	1.349 (23.74)	1.705 (28.39)	1.93 (15.69)
Leverage	-0.113 (2.19)	0.231 (4.09)	0.055 (1.38)	-0.017 (0.24)	-0.451 (5.21)	-0.754 (-5.68)
Market-to-Book Ratio	0.046 (1.45)	-0.020 (0.37)	-0.049 (1.45)	0.057 (1.18)	0.317 (7.24)	0.443 (4.92)
Fixed Asset Ratio	-0.030 (0.63)	0.094 (1.47)	0.033 (0.85)	0.053 (1.07)	-0.172 (3.12)	-0.246 (-2.38)
Cash Flow	-0.058 (1.48)	-0.118 (1.98)	0.033 (0.77)	0.246 (2.79)	0.176 (1.83)	0.507 (3.37)
Cash	0.171 (4.43)	0.039 (0.54)	-0.154 (2.86)	-0.488 (4.25)	-1.008 (7.68)	-1.381 (-6.88)
Prior 12-Month Stock Return	0.033 (1.01)	0.112 (2.82)	0.166 (6.30)	0.140 (2.87)	-0.019 (0.24)	-0.157 (-1.53)
Return Volatility	0.097 (3.00)	0.105 (2.40)	-0.048 (1.31)	-0.413 (5.38)	-0.602 (6.22)	-1.072 (-7.69)
Recession Dummy	-0.583 (5.06)	-0.514 (2.45)	-0.163 (1.84)	0.284 (2.81)	0.414 (4.44)	1.375 (5.21)
CAPEX <sub>t,t+2</sub>	0.160 (3.40)	0.308 (5.05)	0.279 (5.81)	0.326 (5.00)	0.662 (9.16)	0.401 (3.46)
R&D <sub>t,t+2</sub>	-0.054 (1.57)	-0.546 (3.31)	-0.331 (4.11)	-0.337 (2.94)	0.070 (0.72)	0.61 (2.55)
Observations	23,092					
Pseudo R-Squared	0.191					

**Figure I**

**Hypotheses and Empirical Predictions**

This table summarizes the major empirical predictions for this paper. The predicted column gives the predicted sign of the coefficient estimate in the multinomial logit regressions, and the actual column provides the direction of the actual sign of the estimated coefficients. Acronym explanations: BW (2002) refers to Baker and Wurgler (2002), KL (2003) refers to Korajczyk and Levy (2003), BK (1980) refers to Berkovitch and Kim (1980), BHS refers to Barnea, Haugen and Senbet (1980), and SJ (1985) refers to Stulz and Johnson (1985).

	Convertible Debt		Maturity Structure Short- vs Long-Term		Secured Debt		Callable Debt		
	Predicted	Actual	Predicted	Actual	Predicted	Actual	Predicted	Actual	
<b>Firm Characteristics</b>									
<i>Size</i>	Stein (1992)	↓	↓	Diamond	↑	↑			
<i>Leverage</i>				(1991,1993)	↓	↓	Myers (1977),	↑	↑
<i>Growth Opportunities</i>	Mayers	↑	↑	Myers (1977),	↑	↑			
<i>Fixed Asset Ratio</i>	(1998),	↓	↓	BHS (1980)			BK (1980),		
<i>Cash</i>									
<i>Cash Flow</i>				Diamond	↑	↓	SJ (1985)	↓	↓
<i>Stock Return</i>	BW (2002)	↑	-	(1991,1993)					
<i>Return Volatility</i>									
<b>Economic Conditions</b>									
<i>Expansion</i>									
<i>Recession</i>	KL (2003)	↑	↑	KL (2003)	↑	↑			
<b>Project Characteristics</b>									
<i>R&amp;D</i>				Myers (1997)	↑	↑	Myers (1998)	↓	↓
<i>Capital Expenditures</i>	Mayers (1998)	↑	↑	Diamond (1991)	↓	↓			
		↓	↓				↑	-	

Figure II

Time-Series Distribution of Debt Issues by Credit Rating

This figure presents the log of proceeds raised (in \$US millions) by debt issues with various credit ratings for each year from 1971 to 2004.

