Why Are U.S. Firms Using More Short-Term Debt?

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Abstract

We document a secular decrease in corporate debt maturity of US firms from 1976 to 2008. This decrease in debt maturity is driven by the smallest firms for which the average percentage of debt maturing in more than three years decreases from 49% in 1976 to 28% in 2008. For large firms, however, the decrease in average debt maturity is small. Firms with higher degree of information asymmetry play an important role in explaining the decrease in debt maturity. Agency costs of debt or agency problems between managers and shareholders do not seem to contribute to the decrease. Our results challenge the existing theories as changes in known determinants of debt maturity cannot account for most of the decrease in the use of long-term debt.

JEL Classification: G30, G32

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1. Introduction

Capital structure is one the most studied topics in finance. The research has mainly focused on what are the determinants of the debt-equity mix. Another important issue is the maturity's structure of corporate debt or the decision about when to pay out to debtholders. In particular, the choice between short-term versus long-term debt can have important implications on investment spending in the presence of credit and liquidity shocks, such as the 2007-2008 financial crisis. A firm that uses more short-term debt has to face more frequent renegotiations and therefore is more likely to be affected by a credit supply shock and to face financial constraints.

We study the evolution of corporate debt maturity of U.S. firms from 1976 to 2008. We document a secular decrease in the debt maturity of the typical firm. This evolution is economically significant. The average percentage of debt maturing in more than three years decreases from 57% in 1976 to 46% in 2008. Over the 1976-2008, the average percentage of debt maturing in more than three years has hit record low levels of 34% in 2000 and never has been above the level of 57% at the start of the sample period. The decrease in debt maturity is even stronger if we look at the median firm, with the percentage of debt maturing in more than three years decreasing from 64% in 1976 to 50% in 2008, with a minimum of 21% in 2000. If we look at longer debt maturities, we also find a larger drop. The average percentage of debt maturing in more than five years decreased from 42% in 1976 to 22% in 2008. Another way to understand this negative trend is that the time trend coefficient is negative and highly significant in a regression of the percentage of debt maturing in more than three years on a constant and a time trend. The estimated time trend coefficient implies that the average percentage of debt maturing in more than three years has decreased 0.38% per year. This trend is unique to the maturity structure of corporate debt as the level of debt (leverage) has been quite stable over the same period with a percentage around 27% (average total debt-to-assets ratio).

After documenting a sharp decrease in debt maturity despite the constant level of leverage, we investigate why this decrease in debt maturity has taken place. We study whether this evolution in corporate debt maturity can be explained by changes in known determinants of debt maturity. There are several theories which aim to explain corporate debt maturity: agency costs, asymmetric information, signalling and liquidity risk, taxes, and maturity matching.

Myers (1977) argues that debt maturity can be set to reduce underinvestment problems. Firms with risky debt outstanding may reject projects with positive NPV if enough of the projects' payoffs accrue to debtholders ("debt overhang"). The use of short-term debt minimizes the underinvestment problem by making renegotiation more frequent and therefore allowing debt to be repriced so that gains from new projects do not accrue to debtholders. Consistent with this agency hypothesis, Barclay and Smith (1995), Guedes and Opler (1996), and others find that debt maturity is negatively related to growth opportunities and positively related to firm size. Another view is that short-term debt can be a mechanism to discipline managers reducing agency conflicts between managers and shareholders. Consistent with this prediction, Datta, Iskandar-Datta and Raman (2005) find that firms where managers have more stock ownership, and therefore better incentive alignment with shareholder interests, hold a larger fraction of short-term debt.

Another set of hypotheses that has been proposed to explain debt maturity choice is signalling and liquidity risk. Firm's choice of debt maturity can signal private information held by borrowers to outside investors (Flannery (1986)). In the presence of transaction costs, there is a separating equilibrium in which high-quality firms signal their type by issuing short-term debt, while low-quality firms issue long-term debt. Diamond (1991) argues that short-term debt allows for a reduction of borrowing costs when good news are announced, but exposes the firm to liquidity risk (i.e., the risk of inefficient liquidation because refinancing is not possible, or the possibility of refinancing at a higher cost). Thus, liquidity risk creates an incentive for firms to borrow long-term. This trade-off between signalling and liquidity risk implies that both very low-quality firms and very-high quality firms issue more short-term debt, while medium-quality firms issue more long-term debt. The existent evidence does seem to support that firms use debt maturity structure to signal information to the market (Barclay and Smith (1995)), but there is strong support for the non-monotonic relation between firm's quality and debt maturity as predicted by liquidity risk hypothesis (Guedes and Opler (1996), Stohs and Mauer (1996)).

Asymmetric information has also been used to explain corporate debt maturity. In adverse selection models, private information is not revealed, and debt maturity is chosen to minimize the effects of private information on the cost of financing. The prediction is that firms with higher level of information asymmetry will issue short-term debt to avoid locking in their cost of

financing with long-term debt since they expect to borrow at more favourable terms later. Consistent with the asymmetric information hypothesis, Barclay and Smith (1995) and others find that firms with higher information asymmetry (smaller firms, non-rated firms, R&D-intensive firms, high asset volatility firms, and non-NYSE firms) issue more short-term debt.

Finally, taxes and asset matching have been also proposed to explain firms' debt maturity choices. There is some evidence that firms match the maturity of their debt to that of their assets. The evidence in favour of taxes explaining debt maturity is modest.

We examine the evolution of corporate debt maturity for different subsamples of firms to study the drivers of the decline in debt maturity. We find that the secular decrease in debt maturity is driven by small firms. For small firms, the average percentage of debt maturing in more than three years decreases from 49% in 1976 to 28% in 2008, while for large firms it is about 65% both in 1976 and 2008 (there is however still some cyclical behavior of debt maturity for large firms). More striking, the median debt maturity for small firms falls from 53% to 3% over the sample period, while for large firms debt maturity it stays flat at 72%. This heterogeneity of debt maturity across small and large firms suggests that both agency costs and asymmetric information can play a role in explaining the trend in debt maturity.

We first investigate the role played by agency costs. When we divide the firms in our sample by leverage and book-to-market, we find that firms with lower leverage and lower book-to-market experience the largest decrease in debt maturity. When we divide firms by proxies of managerial agency costs (governance index, board independence and managerial ownership) we do not see differences in patterns that explain the decrease in debt maturity. Thus, the evidence is inconsistent with the notion that the decrease in debt maturity over time can be explained by agency costs of debt or conflicts of interest between managers and shareholders..

We then investigate the role played by asymmetric information. We divide firms in our sample by proxies of information asymmetry such as tangibility, R&D expenditures, rating, S&P 500 dummy, NYSE dummy and high-tech dummy. We find that debt maturity falls substantially for low tangibility firms, R&D-intensive firms, non-rated firm, non-members of the S&P 500, firms not listed in the NYSE, and high-tech firms. This evidence supports that the decrease in debt maturity is driven by firms with higher level of information asymmetry, since the evolution for firms with lower information asymmetry is markedly different. We confirm this finding using

microstructure measures of adverse selection. We find that the decrease in debt maturity is driven by firms with high illiquidity (or price impact) measure of Amihud (2002) and by firms with high probability of informed trading (PIN) measure of Easley, Kiefer, and O'Hara (1996). On the other hand, there is no evidence that signalling (proxied by abnormal earnings) explains the decline in debt maturity.

The decline in corporate debt maturity does not seem to be related to the disappearing dividends and new listings phenomena documented by Fama and French (2001, 2004). Firms that do not pay dividends use, on average, more short-term debt than firms that do pay dividends, but we observe a negative time trend of debt maturity in both groups. We also do observe a time trend in both IPO (firms that have listed in the prior five year period) and non-IPO firms. There is also no evidence that the documented time trend is different if we divide firms based on profitability.

We further investigate whether the decrease in corporate debt maturity results from changes in firm characteristics, changes in the elasticities between debt maturity and firm characteristics, or changes in the debt maturity that are not explained by firm characteristics. We use regression models to perform this analysis, where the firm characteristics are taken from the existing theories of debt maturity, as explained above. We study whether allowing the intercepts and slopes to change in the 1990s and 2000s helps to explain the cross section of debt maturity. We find that the intercepts for the 1990s and 2000s are significantly lower than for the 1980s (i.e., the change is negative and strongly significant). This implies that the decrease in debt maturity in the 1990s and 2000s is explained by a shift in target debt maturity that is unrelated to firm characteristics. There is some evidence of changes in slopes, but these changes have limited explanatory power to explain the variation in debt maturity.

We proceed to quantify the effect of the change in firm characteristics on debt maturity. Following Fama and French (2001) and Bates, Kahle, and Stulz (2009), we estimate the target debt maturity with firm characteristics using data from the 1980s and then apply the estimated coefficients to the samples of firm characteristics observed in subsequent years (1990-2008). We find that changes in firm characteristics do not help to explain why the debt maturity has decreased. Indeed, not only the existing models systematically overestimate the actual debt maturity but they also fail to predict the downward trend in long term debt, predicting a positive

change instead. When the average regression function for the 1980s is applied to the sample of firm characteristics for the year 1990, the predicted debt maturity is 47.5%, while the actual debt maturity is lower at 38%. The predicted debt maturity increases after 1990, reaching 56.4% in 2008. For small firms, the predicted debt maturity increases from 34.3% in 1990 to 47.7% in 2008. Over the same period (1990-2008), the average debt maturity for small firms has decreased to a minimum of 20.4% in 2002 and reached 27.5% in 2008.

Overall, we conclude that firms with higher information asymmetry are the responsible for the decrease in debt maturity. However, changes in firm characteristics or changes in correlations between debt maturity and firm characteristics do not account for most of the documented trend. The decline of debt maturity of U.S. firms from 1980 to 2006 represents a substantive puzzle that cannot be explained by existing theories of the determinants of debt maturity.

The remainder of the paper is organized as follows. Section 2 describes our sample construction and variables. In Section 3 we analyze subsamples to understand whether the trend is driven by certain types of firms. In Section 4 we estimate regression models of debt maturity and investigate whether the intercepts and slopes of these models change in the 1990s and 2000s. We also try to identify changes in firm characteristics that explain the decrease in debt maturity. Section 5 concludes.

2. Sample and Data Description

We draw our sample of U.S. firms from the Compustat Industrial Annual database. The sample period ranges from 1976 to 2008. We exclude financial firms (SIC codes 6000-6999) and utilities (SIC codes 4900-4999). Financial and utility firms are excluded because they tend to have significantly different capital structures due to regulation.. American Depositary Receipts (ADRs) are also excluded. Firms included in our sample are required to have positive book value of total assets.. The final panel has a total of 94,615 observations from 12,645 unique firms.

2.1. Debt Maturity Structure

To analyze the debt maturity structure of the firms in our panel we start by defining some debt related variables. The debt variables are defined as follows (Compustat data items are in parenthesis):

1. *Total leverage*. The ratio of the book value of total debt (TD) over the book value of assets (AT).
2. *Long term leverage*. The ratio of the long term debt (DLTT) over the book value of total debt (TD).
3. *Debt maturity 1*. The ratio of the long-term debt (DLTT) over the book value of total debt (TD).
4. *Debt maturity 2*. The proportion of debt with a maturity over two years, defined by the ratio of the difference between the total long term debt and the debt maturing in two years (DLTT – DD2) over total debt (TD).
5. *Debt maturity 3*. The proportion of debt with a maturity over three years, defined by the ratio of the difference between the total long term debt and the debt maturing in two and three years (DLTT – DD2 – DD3) over total debt (TD).
6. *Debt maturity 4*. The proportion of debt with a maturity over four years, defined by the ratio of the difference between the total long term debt and the debt maturing in two, three and four years (DLTT – DD2 – DD3 – DD4) over total debt (TD).
7. *Debt maturity 5*. The proportion of debt with a maturity over five years, defined by the ratio of the difference between the total long term debt and the debt maturing in two, three, four and five years (DLTT – DD2 – DD3 – DD4 – DD5) over total debt (TD).

We winsorize total leverage and long-term leverage at the top and bottom 1% level. To minimize the impact of data coding errors, all debt maturity variables take the value one if over one and zero when negative. Following Barclay and Smith (1995) and others, we use the debt maturing in more than three years (*Debt maturity 3*) as our main debt maturity variable.

Panel A of Table 1 provides summary statistics for all the debt variables for the full sample. On average, total debt represents 21.3% of total assets while the median value is only 17.5%. The debt due in more than one year represents, on average, 68.5% of total debt, while the debt that matures in more than three years is 43.9%. On average, only 28% of debt matures in more than five years. Overall, approximately half of the long term debt matures before the fifth year. The median values show a stronger decrease than the mean values across the debt maturity

variables, starting with relative higher values than the mean for the debt maturing in more than one, two and three years, but ending with lower values for the debt maturing in more than four or five years.

2.2. Firm Characteristics

The explanatory variables that we use follow the debt maturity literature (Barclay and Smith (1995), Guedes and Opler (1996), Johnson (2003)) and are motivated by several theories (agency costs, signaling and liquidity risk, asymmetric information, maturity matching, and taxes) described above. The variables in use (Compustat data items are in parenthesis) are as follows:

1. *Size:* Firm size can be correlated with debt maturities for different reasons: economies of scale, foreign operations, and information asymmetries. We define size as the logarithm of the market value of the firm defined as the sum of the book value of total assets (AT) and the market value of equity (CSHO × PRCC_F) minus the book value of common equity (CEQ).
2. *Size squared*: The square of firm size. Johnson (2003), Datta, Iskandar-Datta and Raman (2005), and Brockman, Martin, and Unlu (2009) find a non linear relationship between debt maturity and firm size. The nonlinear relation is predicted by Diamond (1991) and implies that the square of firm size is expected to have a negative coefficient.
3. *Market-to-book*: This is a proxy for investment opportunities. Myers (1977) suggests that the underinvestment problem is more severe for firms with greater investment opportunities. We expect firms with more growth options to have more short term debt, since this alleviates the underinvestment problem. Market-to-book is defined as the ratio of the market value of assets (AT+CSHO × PRCC_F - CEQ) over the book value of total assets (AT).
4. *Abnormal earnings*: According to the signaling hypothesis firms with better quality projects are more likely to issue short term debt (Flannery (1986), Kale and Noe (1990) and Diamond (1991, 1993)). Abnormal earnings are defined as the ratio of the difference between the income before extraordinary items adjusted for common stock (capital) and equivalents (IBADJ) for time t and t-1, over the market value of equity used to calculate earnings per share (PRCC_F × CSHPRI).

5. *Assets maturity*: We expect a positive relationship between assets maturity and debt maturity if the firm matches the maturity of its liabilities with the maturity of its assets (Myers (1977)). Following Stohs and Mauer (1996) assets maturity is measured as the ratio of property, plant and equipment (PPEGT) over depreciation and amortization (DP) times the proportion of property, plant and equipment in total assets (PPEGT/AT), plus the ratio of current assets (ACT) over the cost of goods sold (COGS) times the proportion of current assets in total assets (ACT/AT).
6. *Assets volatility*: We expect assets maturity to be negatively correlated with debt maturity. Firms with more assets volatility have higher probability of default and therefore might be screened out of the long term debt market. This variable is defined as the standard deviation of stock return during the fiscal year times the market value of equity (CSHO × PRCC_F) divided by market value of assets (AT+CSHO × PRCC_F-CEQ).
7. *Rating dummy*: Firms with rating notation are expected to be subject to less information asymmetry and therefore to hold more short term debt according to the information asymmetry hypothesis. This variables assumes the value of one for firms with S&P domestic long term issuer credit rating (CPLTICRM), and zero otherwise.
8. *R&D*: Firms with more R&D expenses are also expected to hold more short term debt according to the information asymmetry hypothesis. This is defined as the ratio of research and development expense (XRD) over the book value of total assets (AT).
9. *Term Spread*: The tax hypothesis suggests a positive correlation between the term spread and debt maturity (see Brick and Ravid (1985) and Barclay and Smith (1995) for a discussion). However, firms might also strategically issue debt of different maturities timing the market or in a way to manage accounting earnings (Faulkender (2005) and Chernenko and Faulkender (2008)). The term spread is measured as the difference between the month-end yield on the 10-year government bonds and the month-end yield on the 1-year government bonds.

We report summary statistics for the main explanatory variables in Panel B of Table 1. We winsorize all variables defined as ratios at the top and bottom 1% levels. Firms, on average, have higher market value of assets (about 80% more) than the book value of assets and show negative

future abnormal earnings. On average, about 23% of firms have a credit rating and 37.1% pay common dividends..

3. The Decrease in Debt Maturity and Firm Characteristics

Table 2 shows the evolution of the debt maturity structure of U.S. firms from 1976 to 2008. The second column of Table 2 shows the aggregate *debt maturity 3* ratio. In aggregate terms there is no clear trend in long term debt. The proportion of long term debt that matures in more than 3 years in total debt is 73% in 1976 and the value is approximately the same in 2007. The third column of Table 2 reports the average *debt maturity 3* ratio. This ratio is 57% in 1976 and drops to 46% in 2008, with a minimum of 34% in 2000. The median ratio, reported in the next column, shows a similar pattern: between 1976 and 2000 the proportion of long term debt gradually drops from 64% to 21%, and then there is an increase up to 50% in the 2000s. The difference in trends between the aggregated measure and the average ratio is consistent with the smaller firms being responsible for this trend, since they account with the same weight as large firms in the average ratio, but with relatively less weight in the aggregated measure. We further address this issue in Table 3.

Columns five and six report the mean and median *debt maturity 5* ratio, respectively. We observe a stronger decrease in *debt maturity 5* than the one observed for *debt maturity 3*: the mean ratio drops from 42% in 1976 to 22% in 2008, while the median ratio drops even more: from 45% in 1976 to only 1% in 2008. Figure 1 illustrates the negative trend for both *debt maturity 3* and *5* using the average ratios. The evidence suggests that the declined in debt maturity has mainly taken place at longer maturities. In the remaining of our analysis we use *debt maturity 3* as our main dependent variable following the majority of the papers on the determinants of debt maturity, but the results would be even stronger using *debt maturity 5*.

Interestingly, the average and median total leverage ratios reported in columns seven and eight of Table 2 remain quite stable during the sample period, suggesting that the continuing shift from long term to short term debt is not related to a structural change in the leverage ratios.

3.1. Debt Maturity Trend and Firm Size

We check for a cross sectional variation of this time trend across firms of different sizes. We split the sample in two groups of firms according to firm size measured using the market value of assets. A firm is defined to be large (small) if its market value of assets is above (below) the overall median in each year. Table 3 reports the mean and median ratios for *debt maturity 3* ratio per year for small and large firms. On the cross section, both the mean and the median ratios of debt maturity are significantly lower for small firms. The average percentage of debt maturing in more than three years for small firms is 30%, while for large firms is 58%. This difference is even bigger if we compare the median ratios: 19% for small firms and 66% for large firms. Figure 2 illustrates the trend in mean debt maturity for the two groups of firms based on size. The documented downward trend in debt maturity is stronger for small firms. The percentage of debt maturing in more than three years drops from 50% in 1976 to less than half of this value by 2002. There is some increase in the debt maturity of small firms between 2002 and 2008, but the value in 2008 of 28% is well below the values of 50% in 1976. Large firms exhibit a decrease in debt maturity until 1992: the long term debt ratio drops from 65% to 51%, but we observe an increase in debt maturity especially in 2000s. Thus, there is no clear trend in debt maturity for large firms.

3.2. Debt Maturity Trend, Dividends, New Listings, and Profitability

Table 4 shows additional cross sectional variation of debt maturity over time with respect to other firm characteristics. We first investigate whether the decrease in debt maturity is related to the disappearing dividends and new listings phenomena documented by Fama and French (2001, 2004). We measure firm age using the CRSP listing date and classify firms as IPO firms if they have listed in the prior five year period, and as non-IPO otherwise. Columns two and three of Table 4 show the average long term debt ratio for young (IPO) and old firms (non-IPO). On the cross-section, we find that IPO firms have lower debt maturity. However, we can observe a decrease in debt maturity both in IPO and non-IPO firms. Between 1976 and 2000, debt maturity falls from 50% to 42% for IPO firms, while for non-IPO firms debt maturity drops falls from 61% to 41%. We conclude the decline in debt maturity does not seem to be related to a particular group of firms in terms of firm age.

Columns four and five show the results for non-dividend and dividend paying firms. Fama and French (2001) document a decrease in dividends over part of our sample period. Firms that do not pay dividends are more likely to be financially constrained and less likely to be able to issue long term debt. Non-dividend payers have on average lower debt maturity relative to dividend-paying firms (36% and 57%, respectively), but we do not observe a clear difference in the evolution over time between the two groups of firms. The debt maturity of non-dividend payers debt falls from 47% in 1976 to 30% in 2000, while the debt maturity of dividend payers falls from 61% in 1976 to less than 50% in 2000. Additionally, profitability also does not seem to explain our findings. When we split the sample into firms with positive and negative net earnings, we observe that firms with accounting losses have a significantly lower debt maturity than firms with accounting profits. But again, there is no clear difference in the observed evolution of debt maturity between the two groups based on net income. The debt maturity for negative net income firms falls from 42% in 1976 to 38% in 2008, while debt maturity for positive net income firms falls from 58% in 1976 to 52% in 2008.

Overall, we conclude that the disappearing dividends, new listings, and profitability decline phenomena documented in the literature do not seem to be associated with the declined in corporate debt maturity observed for U.S. firms.

3.3. Debt Maturity Trend and Agency Costs

Short term debt alleviates the underinvestment problem identified in Myers (1977) because it makes the renegotiation an easier process. These agency costs of debt are expected to be higher in highly levered firms with bigger investment opportunities. Columns eight and nine in Table 4 show the average debt maturity for high and low leveraged firms, and columns ten and eleven the same ratio for firms with high and low market-to-book ratio of assets, which proxies for firm's growth options. We do not find consistent evidence that the mitigation of the agency costs regarding the underinvestment problem helps to explain the declined in debt maturity. In fact, with respect to leverage, we find that more levered firms are the ones holding more long term debt on average, and we do not observe a clear trend in debt maturity for this group of firms. Debt maturing in more than three years represents on average 53% of total debt in highly leveraged firms and only 35% in low leveraged firms. Low leveraged firms' average debt maturity ratio drops from 56% in 1976 to 35% in 2008, while for high leveraged firms it remains

at 57%. The results from splitting the sample according to growth options are also inconsistent with the underinvestment hypothesis. High market-to-book firms show a higher proportion of long term debt (46% on average) while low market-to-book firms show a lower proportion (41%). There is no clear difference across these two groups with respect to the trend in long term debt.

Recent research finds a link between corporate governance and the structure of debt maturity. Harford, Li, and Zhao (2006) argue that firms with better corporate governance hold more short term debt, namely firms with more independent boards. Datta, Iskandar-Datta, and Raman (2005) and Brockman, Martin, and Unlu (2009) find evidence that managerial compensation affects the choice of corporate debt maturity. Firms with high managerial ownership tend to use more short-term debt. This is consistent with the notion that when the interests of managers and shareholders are not properly aligned, managers use more long term debt than they are supposed to. In short, managerial agency costs affect the choice of debt maturity structures.

We test if agency costs can explain the trend in debt maturity by looking at the corporate governance characteristics. Figure 3 reports the trend in debt maturity for firms with high and low governance index (Gompers, Ishii, and Metric (2003), GIM), as a measure of managerial entrenchment. The governance index is a cumulative index of 24 antitakeover provisions obtained from RiskMetrics. The governance index is available from 1990 to 2008, but not for all the years, therefore, we assume that the index remains the same until a new index is reported. We split the sample in high (above the yearly median) and low (below the yearly median) governance index and plot debt maturity for the two groups. On the cross section, our results are consistent with firms with better governance (low governance index) using more short term debt, as predicted by the agency costs hypothesis of debt maturity. However, we find no clear difference in the debt maturity trends across these two groups. The evidence does not support that firms with fewer agency problems drive down debt maturity.

We find similar results using managerial ownership to construct groups of firms. We construct a measure of managerial ownership using data from Execucomp. Managerial onwership data is only available since 1992, therefore our sample period is restricted to 1992-2008. The managerial ownership measure is defined as the percentage of shares held by the five highest paid executives in the firm. We split the sample into high and low managerial ownership

firms using the yearly median. Figure 4 shows the average debt maturity per year for the two groups. On the cross section, we find that firms with more managerial ownership, therefore where the interests between managers and shareholders are better aligned, hold more short term debt. This result is consistent with the findings in Datta, Iskandar-Datta, and Raman (2005). However, we do not observe a difference in the evolution of debt maturity between the two groups.

Finally, we use board independence as a measure of governance. We construct a board independence measure, using data from RiskMetrics, defined as the percentage of independent directors in the board. This data is only available since 1996, therefore our sample size is restricted to the period between 1996 and 2008. We define two firm groups: high and low board independence. A firms is assigned to the high (low) board independence group if its percentage of independent directors is above (below) the yearly median. Consistent with the results on the governance index and managerial ownership, we do not find a significant trend in any of the groups. Surprisingly, we do not find a negative relationship between board independence and debt maturity, which is contrary to the findings in Harford, Li, and Zhao (2006).

In summary, we do not find consistent evidence with the agency costs hypothesis explaining the decline corporate debt maturity. This is true for conflicts of interest between debtholders and shareholders as well as for conflicts of interest between managers and shareholders. A caveat is the fact that governance measures are only available for a sub-sample of large firms (essentially S&P 1500 firms) and years, restricting our sample in both dimensions, which limits our analysis. This explains why we do not find a clear decline in debt maturity using governance measures.

3.4. Debt Maturity Trend, Signaling, and Asymmetric Information

The asymmetric information hypothesis predicts firms with greater information asymmetry to have less long term debt. Flannery (1986) and Diamond (1991) both suggest that debt maturity is reduced in the presence of information asymmetry. We investigate if firms with higher information asymmetry explain the observed trend.

We first test the signaling hypothesis using abnormal earnings as proxy. Columns twelve and thirteen in Table 4 report the average debt maturity per year for the groups of firms with high and low abnormal earnings. According to the signaling hypothesis of debt maturity, firms that generate higher abnormal earnings because they have better projects, are expected to issue short

term debt as a signal of good quality (Flannery (1986), Kale and Noe (1990)). We do not find cross sectional variation that is consistent with this hypothesis. Debt maturity averages 43% in the group of low abnormal earnings and 45% in the group of high abnormal earnings. If signaling explains the decline in debt maturity, we should see that debt maturity of firms with high abnormal earnings should decrease more than the debt maturity of firms with low abnormal earnings. We observe the opposite. There is a clearer downward trend in the group of firms with low abnormal earnings than in the group of high abnormal earnings.

We next investigate the role of adverse selection in explaining our findings. We first use tangibility as a proxy for the degree of information asymmetry between insiders and outside investors. The last two columns of Table 4 show the average debt maturity for firms with high and low PPE-to-assets ratio. We find that firms with a lower proportion of tangible assets use more short term debt. Low PPE firms contribute more to the downward trend in debt maturity than high PPE firms. The debt maturity of low PPE firms falls from 51% in 1976 to 25% in 2000 and it is well below the 1976 values in 2008 (38%). In contrast, the drop in the debt maturity of high PPE firms is less pronounced.

So far, we find that smaller firms and firms with less tangible assets display a stronger decline in debt maturity. These firm characteristics are positively correlated with information asymmetry, therefore we run similar tests using alternative proxies: R&D, PIN, Amihud iliquidity measure, rating dummy, NYSE dummy, S&P dummy, and high-technology dummy. The goal is to confirm that indeed firms with higher information asymmetry drive the decline in debt maturity.

Figures 6-12 plot the average percentage of debt maturing in more than three years for firms with different levels of information asymmetry. Figure 6 shows the evolution in debt maturity for high and low R&D firms. We classify high (low) R&D firms as the ones with above (below) the yearly 75th percentile of the R&D-to-assets ratio. The change in debt maturity structure is dramatically different between these two groups over the 1976-2008 period. In 1976, there was no significant difference in debt maturity between the two groups. However, the high R&D group experiences a striking decrease in debt maturity in the following years. The debt maturity falls from 56% in 1976 to 18% in 2000 for more R&D-intensive firms, while for less R&D-

intensive firms it drops only from 57% to 40% in the same years. In 2008, R&D intensive firms are still using much less long-term debt (33%) than they used to back in 1976.

Figure 7 shows similar results for subsamples of firms with high and low stock probability of informed trading (PIN). Firms with higher PIN have a higher degree of information asymmetry between insiders and outside investors. PIN is constructed based on data from Easley, Hvidkjaer, and O'Hara (2002), and it is only available since 1983, for a sub-sample of firms which restricts our sample size to 22,324 firm-years.[1] High and low PIN groups are defined using the yearly medians as a threshold. We find that the drop in debt maturity is mainly explained by firms with high PIN and therefore high information asymmetry. The percentage of long term debt averages 55% in 1983 for high PIN firms, and drops to 40% in 2001. Low PIN firms do not show a similar trend: long term debt accounts approximately with the same weight in 1983 (63%) and in 2001 (61%).

The results for Amihud (2002) illiquidity (or price impact) measure are presented in Figure 8. Stocks' illiquidity is expected to be positively correlated with information asymmetry: more illiquid stocks are traded less frequently and by a smaller number of investors, which might be both a cause and an effect of the level of information available for the firm. We split our sample in high and low illiquidity firms using the Amihud's measure. The criterion to split the sample is again based on the yearly median. Amihud illiquidity measure data is based on Hasbrouck (2009) data, and it is only available until 2005, which restricts our sample size for these tests to 69,098 firm-years observations. On the cross section, we find a significant difference between the average debt maturity between the two groups: the debt maturity of the more illiquid firms is 36%, while more liquid firms have a debt maturity of 55%. Consistent with the asymmetric information hypothesis, we see a stronger decline in debt maturity in the group of high illiquidity firms.

Firms with no rating are expected to have a higher degree of information asymmetry. Results for the rating dummy are reported in Figure 9. Rating information is only available since 1986. We split the sample of non-missing observations between firms with and without rating. We expect firms with rating to show lower levels of short term debt, due to less information

[1] The estimates of PIN are obtained from Soeren Hvidkjaer's website: http://www.smith.umd.edu/faculty/hvidkjaer/data.htm.

asymmetry. Indeed, the average debt maturity is more than double for the firms with rating (70%) than for firms without rating (32%). In addition, we document no trend in debt maturity for firms with rating. For firms with no rating, we observe a downward trend between 1986 and 2000: the average debt maturity drops from 37% to 25%. This trend has been reverted after 2000. In 2007, average debt maturity of non-rated firms is at the level of 1986.

Figures 10 and 11 suggest that the decrease in debt maturity is mainly driven by firms not listed in NYSE and firms that are not part of the S&P 500 index. Debt maturity drops by about 23 percentage points between 1976 and 2001 for non-NYSE firms and for non-S&P500 firms. We also find that NYSE firms have 61% of debt maturing in more than three years, while non-NYSE firms have only 36%. A similar pattern can be found for S&P500 and non-S&P 500 firms. The first group has on average 60% of debt maturing in more than three years, while the second group has only 43%.

Finally, Figure 12 shows the cross sectional variation across firms in high-tech and low-tech industries. High tech firms are defined as in Loughran and Ritter (2004). We expect firms in high-tech industries to have more information asymmetry and therefore to use more short term debt. This is indeed what we find. Debt maturing in less than three years represents 67% of the total debt for firms in the high technology industries, but 53% for firms in the low technology industries. Although both groups experience a downward trend in debt maturity, the trend is more pronounced for the high technology group of firms.

Brown and Kapadia (2007) find that the idiosyncratic risk of newly listed firms has increased over time. These are also firms which are less likely to pay dividends and also the ones that contribute to the documented increase in cash holdings (Bates, Kahle, and Stulz (2009)). Bates, Kahle, and Stulz (2009) find that these are mainly high-tech firms: between 1980 and 2000 the proportion of firms classified as high-tech increased from 28% to 45%. We follow their methodology to test if these firms can also explain the decrease in the debt maturity. We define cohorts of firms according to their listing date. The first cohort (<1975) includes all the firms listed before 1975. The second cohort (1975) includes all the firms listed between 1975 and 1980, and so forth. We then analyze the long term debt ratio of the cohorts, dropping the first 5 years of data for each of them. Figure 13 shows the results. We find that each successive cohort, with the

exception of the 1990s and the 2000s cohorts, have a lower long term debt ratio than the previous one. This difference between cohorts is particularly large between the <1975s and 1985s cohorts.

Within each cohort there is no clear trend in debt maturity except for the first (<1975s) and second (1975s) cohorts, until the 1990s. Debt maturing in more than three years decreases from 57% to 48% for the first cohort and from 39% to 32% for the second one. This evidence is consistent with the overall downward trend being mainly generated by the decrease in the use of long term debt ratio by firms in the newer cohorts, or in other words, by the new firms entering the panel. On the other hand, the overall increase in the ratio after 2000 is observed in all cohorts.

The information asymmetry hypothesis predicts that firms with more information asymmetry use more short term debt. We find consistent cross sectional variation with this hypothesis. Moreover, the trend in debt maturity for groups of firms with high information asymmetry seems to suggest that these firms play a major role in explaining the decline in corporate debt maturity.

3.5. Is There a Significant Trend in Debt Maturity?

In this section, we test whether there is a significant time trend in debt maturity and whether this time trend is different across small and large firms. Table 5 shows the results of regressions of debt maturity (*debt maturity 3*) on an intercept, a time trend, and macro-level control variables in some specifications. Columns (1)-(3) report the results of a regression of debt maturity on an intercept and a time trend for the full sample, and small firms and large firms groups. We find a statistically significant downward trend in the proportion of debt maturing in more than three years. The coefficient for the full sample indicates a decrease in debt maturity of 0.4% per year. This time trend is stronger for small firms: the coefficient of the time trend is 0.7% per year for the subsample of small firms and 0.1% per year for the subsample of large firms. The time trend coefficient is statistically significant in both subsamples.

Greenwood, Hanson, and Stein (2010) argue that there is a substitution effect between corporate debt and government debt maturities and suggest that the time variation in the maturity of corporate debt arises because firms act as macro liquidity providers, issuing more long term debt when the government issues more short term debt and vice-versa. In columns (4)-(6) we add Greenwood, Hanson, and Stein (2010) variable of long-term government share and additional macro-economic variables as explanatory variables to see if these variables explain the trend in corporate debt maturity. Government share is the fraction of government debt with a maturity of

one year or more as defined in Greenwood, Hanson, and Stein (2010).[2] We expect this variable to have a negative correlation with our dependent variable due to the substitution effect between government and corporate debt maturity. We also add the short term rate and the term spread as additional macro variables, as the firm might react to changes in short term interest rates and in the slope of the term structure of interest rates. The coefficient of government share is negative and statistically significant, which is consistent with the predictions and results of Greenwood, Hanson, and Stein (2010). Surprisingly, the government share coefficient is higher in the subsample of small firms, suggesting that small firms also act as macro liquidity providers as an alternative to the government. Short term rate is not statistically significant in any of the models. Term spread coefficient is negative and statistically significant in columns (4)-(6). Nevertheless, the coefficients of the time trend remain unchanged for all the models that include macro-economic variables, suggesting that these variables do not explain the time variation of corporate debt maturity.

4. Did the Determinants of Debt Maturity Change?

In this section, we make use of the existing models on the determinants of corporate debt maturity to analyze if the decrease in debt maturity can be attributed to a change in firm characteristics or to a change in the sensitivities of debt maturity to its determinants. We first address the question whether firm characteristics have changed over time by running a set of regressions that relate debt maturity to firm characteristics.

Following Barclay and Smith (1995) and others, we use the percentage of debt maturing in more than three years (*debt maturity 3*) as dependent variable in all regression models. The explanatory variables are taken from the literature on debt maturity (e.g., Barclay and Smith (1995), Johnson (2003)).

Table 6 shows panel regressions of the determinants of debt maturity. Model 1 shows the estimates of an OLS regression. The coefficients of all the variables have the predicted sign, with the exception of the term spread. All coefficients are statistically significant at the 5% level. Although the term spread is not positive as expected, the sign of this variable is consistent with

[2] Greenwood et al (2009) follow the definition of government long term share in Greenwood and Vayanos (2008).

the previous findings by Barclay and Smith (1995) and Datta, Iskandar-Datta, and Raman (2005). Model 2 re-estimates model 1 using yearly changes in the variables. This approach allows us to eliminate the impact of constant unobserved firm characteristics in debt maturity. The coefficient results are similar to model 1 except for *size squared* and *R&D*, which change sign, even though the coefficient of *R&D* is not statistically significant. Model 3 re-estimates model 1 including firm fixed effects. The results are similar to model 1 except for *assets maturity*, which is not statistically significant in this model.

Models 4-6 replicate models 1-3, but including two dummy variables that allow the intercept to shift in the 1990s and the 2000s relative to the 1980s (i.e., 1976-1989). This enables us to test if the intercepts of the model change in a significant way over time and also to tell if the changes in debt maturity ratio are explained by the changes in the variables included in the regression model. Both dummies are negative and highly significant in models 1-3 which is consistent with the changes in firm variables in the regression model not explaining the decrease in debt maturity. In models 4-6, the coefficient of the 2000s is higher than the 1990s, suggesting that during the 2000s there is a bigger part of debt maturity decrease that is not explained by the model variables. In Model 5, the opposite is true: the 1990s dummy is higher than the 2000s dummy, suggesting that the changes in characteristics do a better job explaining debt maturity changes in the years 2000s than in the 1990s.

In models 7-9 of Table 6, we add year dummies to the models 1-3. Although the results are not reported, in models 7 and 9, except for years 1977 and 1978, all the year dummies are negative and statistically significant suggesting, again, that the changes in the explanatory variables do not capture the downward trend in debt maturity. In unreported results, we also include industry dummies and find that results are not affected.

The results are consistent with the changes in determinants not explaining the decrease in debt maturity. We further investigate if there is instead a change in the sensitivities of debt maturity to these variables. To account for this possibility we estimate Fama-MacBeth regressions for three different sub-periods: 1976-1989 (1980s), 1990-1999 (1990s), and 2000-2008 (2000s). Table 7 shows the results. Model 1 corresponds to the first sub-period, model 2 to the second sub-period, and model 3 to the most recent sub-period. Model 4 presents the estimates of the Fama-MacBeth regression for the full sample period. The results in all

specifications are consistent with the previous OLS and FE regressions, and all the variables have the expected impact on debt maturity. The only exception is *abnormal earnings* that show a positive and statistically significant coefficient, while in the previous regressions is negative. All the coefficients maintain the same sign across the sub-periods suggesting that there are not dramatic changes in the sensitivities of debt maturity to its determinants. In terms of the magnitude of the coefficients, both *assets volatility* and *R&D* become more negative during the 1990s, which is consistent with the decrease in debt maturity during this period. *Assets volatility* changes from -0.11 to -0.153, while *R&D* drops from -0.129 to -0.222. During the years 2000s the sensitivity of debt maturity to *R&D* decreases, but its sensitivity to *assets volatility* is unchanged.

Table 8 shows the results of a similar analysis. In Model 1 we replicate model 4 in Table 6, but we interact the 1990s and 2000s dummies with the explanatory variables allowing the slopes of these variables to change over time. The interaction terms with the 1990s and 2000s periods are reported in columns (2) and (3), respectively. For the first sub-period there are significant changes in the slopes of the coefficient for *size*, *market-to-book*, *abnormal earnings*, *rating dummy* and *term spread*. However, only the changes in *size* and *abnormal earnings* explain the decrease in debt maturity in this period. Even though both *size* and *abnormal earnings* have a positive impact in debt maturity, their sensitivity drops during the 1990s. This might explain the inconsistent results between the OLS and Fama MacBeth models in Tables 6 and 7, with respect to *abnormal earnings*. Nevertheless, the model is not able to fully explain the decrease in debt maturity since the intercepts are still negative and highly statistically significant. The improvement in the R-square from model 4 in Table 6 to these models that allow for changes in slopes is also small (less than one percentage point).

In model 2 of Table 8, we introduce several additional explanatory variables that are used less often in the debt maturity literature: *profitability* (measured by positive net income dummy), Taxes, Cash holdings (measured as cash and equivalents over assets), *tangibility* (measured by the PPE-to-assets ratio), market leverage (measured by the ratio of total debt to the market value of assets) and a dividend dummy (takes the value of one if a firms pays common dividends, zero otherwise). We find significant changes in the slopes of this variables that are consistent with the decrease in debt maturity, with the exception of *market leverage*. In the case of *taxes*, *cash* and

the *dividend dummy* there is even a change of the sensitivity sign over time. In the 1970s and 1980s there is a positive relationship between these three variables and debt maturity that changes to negative during the most recent sub-sample period. The positive slopes of the profitability and tangibility proxies, although still positive in the 1990s and 2000s, decrease significantly over time. These variables, however, are not enough to fully explain the downward trend in debt maturity as the 1990s and 2000s as intercepts are again, still negative and highly significant.

The results in Table 9 give further support to the finding that the changes in firm characteristics do not explain the observed negative time trend in corporate debt maturity. We proceed in two steps. First, we estimate models 1 and 2 of Table 8 for the 1976-1989 period. Then, we compute how the actual debt maturity in the 1990s and 2000s differ from the debt maturity predicted by the models. Panel A shows the results for model 1 and Panel B for model 2. The second column of Panel A shows that the predicted debt maturity increases over time for the full sample. The fifth and eighth columns show the same for small and large firms, respectively. The remaining columns report the differences between the actual and predicted debt maturity. Model 1 predicts not only a systematically higher level of debt maturity during the 1990s and the 2000s, but it also predicts an upward trend in corporate debt maturity. For instance, for the year 2000 the difference between the actual and predicted long term debt ratio is 17% with a t-statistic of 30.79. The model performs particularly poorly in the subsample of small firms. On average, the difference between the actual and the predicted long term debt ratio is 17 percentage points, with a peak of 22 percentage points in 2002. The model performs better in the sub-sample of large firms, although it also over-estimates the debt maturity for most of the years. In the most recent period, particularly after 2002, the model performs fairly well in predicting the debt maturity structure of large firms.

We repeat the same exercise using model 2 of Table 8. The results are reported in Panel B. This model also over-estimates debt maturity in the full sample, although the differences between the actual and predicted long term debt ratios are smaller than in Panel A. For the sub-sample of small firms the model over-estimates debt maturity, but the average difference between actual and predicted ratio is slightly lower than in Panel A: 12.6 percentage points. In the sub-sample of large firms the model performs much better, and the average difference

between the actual and predicted ratio is only 1.3 percentage points. There is no systematic upward bias in model 2 in the case of large firms. Still, none of the models seem to do a good job explaining the overall trend in debt maturity, and in particular for small firms.

In Table 10 we go one step further to analyse how the determinants of debt maturity change over time and how these changes affect debt maturity. For instance, average R&D increases from 2.5% to 5.5% between the 1980s and the 2000s. The coefficient of R&D is -0.23 in the 1980s regression, therefore we expect debt maturity to drop by $-0.23 \times (0.055 - 0.025) = -0.007$ between the two periods. In model 1 it is mainly *size squared* that contributes to a drop in debt maturity, followed by *assets volatility*. The over-estimation of debt maturity in model 1 reported in previous table is mainly driven by *size*. In model 2, the negative trend in long term debt is mainly explained by *size squared*. *Profitability*, *tangibility*, *market leverage* and *dividend dummy* also contribute to a decrease in corporate debt. However, the total predicted change in debt maturity is positive in both models and inconsistent with the actual trend in debt maturity.

5. Conclusion

We document a secular decrease in corporate debt maturity of US firms from 1976 to 2008. We show that this decrease in corporate debt maturity is concentrated among small firms. The average percentage of debt maturing in more than three years decreases from 49% in 1976 to 28% in 2008 for small firms. For large firms, however, the decrease in average debt maturity is small.

We further investigate why there is a decrease in debt maturity using subsamples of firms. We find that firms with higher degree of information asymmetry are responsible for the observed decrease in debt maturity. Agency costs of debt and agency problems between managers and shareholders do not contribute to explain the decrease in corporate debt maturity. Maturity matching and taxes considerations also do not explain the decrease in debt maturity.

Finally, we investigate whether changes in firm characteristics or changes in the correlations between debt maturity and its firm-level determinants explain the documented trend in long term debt. We find that the decrease in debt maturity cannot be explained by changes in firm characteristics or by changes in the correlations between debt maturity and firm characteristics. Thus, we conclude that the decline of debt maturity of U.S. firms from 1980 to 2006 represents a

substantive puzzle that cannot be explained by existing theories of the determinants of debt maturity.

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Table 1
Summary Statistics

The sample includes all US Compustat firm-year observations from 1976 to 2008 with positive values for the book value of total assets. We exclude from the sample financial firms (SIC one digit 6) and utilities (SIC two digits 49), yielding a total of 94,615 observations for 12,645 unique firms. Panel A includes the measures of debt and debt maturity. Panel B includes the main explanatory variables. Variables definitions are provided in the Appendix.

Panel A: Debt maturity structure

	Mean	Median	Standard Deviation	Min	Max	N
Total leverage	0.213	0.175	0.178	0	0.749	94615
Long term leverage	0.685	0.815	0.322	0	1.000	94615
Debt maturity 1	0.685	0.815	0.322	0	1.000	94615
Debt maturity 2	0.547	0.633	0.345	0	1.000	94615
Debt maturity 3	0.439	0.462	0.344	0	1.000	94615
Debt maturity 4	0.355	0.315	0.327	0	1.000	94390
Debt maturity 5	0.280	0.179	0.301	0	1.000	92885

Panel B: Firm Characteristics

	Mean	Median	Standard Deviation	Min	Max	N
Size	1995	141	11330	0	624560	94615
Market-to-book	1.839	1.309	1.964	0.533	30.980	94615
Abnormal earnings	-0.029	0.007	0.499	-3.075	3.192	94615
Assets maturity	9.192	6.592	9.354	0.348	75.293	94615
Assets volatility	0.302	0.227	0.250	0.024	1.465	94615
Rating dummy	0.231	0.000	0.421	0.000	1.000	68066
R&D	0.040	0.000	0.096	0.000	0.784	94615
Term spread	1.044	0.940	1.156	-3.160	3.310	94615
Positive net income	0.680	1.000	0.467	0.000	1.000	94615
Taxes	0.260	0.348	0.269	-0.916	1.034	94605
Cash	0.131	0.061	0.173	0.000	0.921	94607
PPE	0.318	0.269	0.220	0.000	0.917	94614
Market leverage	0.213	0.175	0.178	0.000	0.745	94615
Dividend dummy	0.371	0.000	0.483	0.000	1.000	94615
Age	13.466	9.000	14.421	0.000	83.000	94615
PIN	0.209	0.199	0.078	0.024	0.910	22324
Amihud	6.307	0.219	39.365	0.000	2810.021	69098

Table 2
Average and Median Debt Maturity and Leverage by Year

The sample includes all US Compustat firm-year observations from 1976 to 2008 with positive values for the book value of total assets. We exclude from the sample financial firms (SIC one digit 6) and utilities (SIC two digits 49), yielding a total of 94,615 observations for 12,645 unique firms. Variables definitions are provided in the Appendix.

Year	Aggregate debt maturity 3	Average debt maturity 3	Median debt maturity 3	Average debt maturity 5	Median debt maturity 5	Average leverage	Median leverage	N
1976	0.733	0.569	0.637	0.420	0.447	0.264	0.246	2,320
1977	0.724	0.572	0.635	0.421	0.442	0.271	0.256	2,359
1978	0.717	0.563	0.624	0.405	0.427	0.279	0.268	2,487
1979	0.692	0.536	0.596	0.386	0.398	0.284	0.271	2,536
1980	0.704	0.531	0.594	0.380	0.388	0.277	0.256	2,567
1981	0.693	0.511	0.570	0.358	0.357	0.270	0.246	2,683
1982	0.697	0.505	0.566	0.348	0.347	0.277	0.249	2,711
1983	0.714	0.488	0.548	0.336	0.333	0.258	0.223	2,929
1984	0.666	0.460	0.498	0.308	0.277	0.268	0.233	2,983
1985	0.689	0.456	0.483	0.316	0.271	0.283	0.248	2,974
1986	0.696	0.443	0.465	0.308	0.246	0.288	0.259	3,061
1987	0.700	0.439	0.461	0.299	0.217	0.292	0.266	3,174
1988	0.682	0.422	0.435	0.280	0.183	0.294	0.266	3,052
1989	0.649	0.406	0.403	0.268	0.162	0.300	0.272	2,906
1990	0.615	0.384	0.354	0.243	0.120	0.297	0.265	2,889
1991	0.630	0.381	0.347	0.234	0.090	0.279	0.249	2,911
1992	0.633	0.374	0.333	0.228	0.073	0.261	0.228	3,086
1993	0.651	0.381	0.327	0.238	0.074	0.249	0.220	3,230
1994	0.653	0.384	0.322	0.233	0.065	0.253	0.227	3,409
1995	0.651	0.384	0.318	0.229	0.050	0.258	0.231	3,521
1996	0.679	0.396	0.327	0.233	0.046	0.250	0.215	3,715
1997	0.691	0.410	0.345	0.241	0.036	0.262	0.226	3,702
1998	0.677	0.409	0.353	0.233	0.029	0.286	0.249	3,571
1999	0.637	0.379	0.303	0.220	0.016	0.279	0.248	3,336
2000	0.615	0.344	0.206	0.200	0.007	0.263	0.231	3,196
2001	0.652	0.362	0.247	0.209	0.005	0.266	0.226	2,864
2002	0.665	0.381	0.309	0.217	0.009	0.264	0.228	2,635
2003	0.668	0.423	0.421	0.252	0.051	0.248	0.214	2,399
2004	0.681	0.458	0.484	0.274	0.065	0.237	0.200	2,384
2005	0.697	0.481	0.520	0.285	0.067	0.237	0.198	2,341
2006	0.708	0.506	0.584	0.291	0.079	0.244	0.208	2,295
2007	0.726	0.499	0.565	0.265	0.022	0.256	0.219	2,256
2008	0.684	0.457	0.496	0.223	0.007	0.281	0.241	2,133
Total	0.674	0.439	0.462	0.280	0.179	0.269	0.240	94,615

Table 3
Average and Median Debt Maturity by Firm Size and Year

The sample includes all US Compustat firm-year observations from 1976 to 2008 with positive values for the book value of total assets. We exclude from the sample financial firms (SIC one digit 6) and utilities (SIC two digits 49), yielding a total of 94,615 observations for 12,645 unique firms. A firm is considered to be large if it has a market value of assets greater than the yearly median and is considered to be small otherwise. Variables definitions are provided in the Appendix.

	Small		Large	
Year	Average debt maturity 3	Median debt maturity 3	Average debt maturity 3	Median debt maturity 3
1976	0.491	0.529	0.648	0.715
1977	0.489	0.530	0.654	0.717
1978	0.476	0.511	0.650	0.701
1979	0.447	0.478	0.624	0.682
1980	0.438	0.465	0.624	0.680
1981	0.405	0.408	0.618	0.666
1982	0.400	0.410	0.610	0.660
1983	0.375	0.368	0.600	0.655
1984	0.339	0.312	0.580	0.637
1985	0.324	0.280	0.588	0.649
1986	0.299	0.225	0.587	0.652
1987	0.294	0.196	0.585	0.652
1988	0.277	0.165	0.567	0.623
1989	0.266	0.140	0.547	0.610
1990	0.243	0.110	0.526	0.568
1991	0.246	0.114	0.517	0.580
1992	0.238	0.104	0.510	0.560
1993	0.229	0.095	0.532	0.592
1994	0.228	0.108	0.539	0.604
1995	0.230	0.095	0.538	0.622
1996	0.234	0.088	0.558	0.653
1997	0.240	0.095	0.579	0.690
1998	0.243	0.067	0.574	0.674
1999	0.242	0.065	0.516	0.599
2000	0.205	0.019	0.483	0.541
2001	0.205	0.014	0.519	0.599
2002	0.204	0.007	0.558	0.650
2003	0.252	0.056	0.594	0.692
2004	0.281	0.098	0.635	0.728
2005	0.308	0.123	0.654	0.760
2006	0.330	0.122	0.682	0.789
2007	0.320	0.085	0.679	0.790
2008	0.275	0.026	0.639	0.715
Total	0.298	0.192	0.580	0.656

Table 4
Average Debt Maturity by Firm Characteristics

The sample includes all US Compustat firm-year observations from 1976 to 2008 with positive values for the book value of total assets. We exclude from the sample financial firms (SIC one digit 6) and utilities (SIC two digits 49), yielding a total of 94,615 observations for 12,645 unique different firms. A firm is assigned to the IPO subsample if it has gone public in the last 5 years and to the non-IPO subsample otherwise. A firm that paid common dividends in the year is assigned to the Dividend payers subsample otherwise is classified as Non-Dividend payer. Firms that have positive (negative) net income in a given year are defined as *Positive (negative) net income*. All high *versus* low splits are performed against the yearly median for each variable. A firm is classified in the high (low) subsamples when it has a value above (equal or below) the median. Variables definitions are provided in the Appendix

Year	IPO	Non-IPO	Non-dividend payers	Dividend payers	Negative net income	Positive net income	Low leverage	High leverage	Low market-to-book	High market-to-book	Low abnormal earnings	High abnormal earnings	Low PPE	High PPE
1976	0.520	0.607	0.471	0.612	0.419	0.584	0.561	0.577	0.559	0.579	0.566	0.572	0.509	0.629
1977	0.521	0.610	0.455	0.616	0.409	0.589	0.553	0.590	0.568	0.575	0.558	0.585	0.502	0.641
1978	0.479	0.573	0.448	0.611	0.413	0.577	0.537	0.589	0.559	0.566	0.546	0.580	0.496	0.630
1979	0.410	0.555	0.427	0.589	0.370	0.558	0.511	0.560	0.540	0.531	0.507	0.564	0.470	0.601
1980	0.400	0.558	0.422	0.591	0.401	0.554	0.487	0.575	0.552	0.510	0.519	0.543	0.467	0.595
1981	0.377	0.551	0.407	0.586	0.371	0.543	0.459	0.564	0.534	0.489	0.484	0.539	0.453	0.570
1982	0.366	0.552	0.398	0.598	0.380	0.549	0.464	0.546	0.533	0.477	0.491	0.519	0.451	0.559
1983	0.365	0.546	0.386	0.600	0.371	0.531	0.439	0.537	0.531	0.444	0.468	0.507	0.430	0.546
1984	0.354	0.520	0.370	0.572	0.312	0.513	0.415	0.504	0.485	0.434	0.432	0.487	0.389	0.530
1985	0.357	0.521	0.372	0.572	0.347	0.510	0.408	0.505	0.479	0.434	0.442	0.471	0.387	0.525
1986	0.352	0.510	0.364	0.574	0.327	0.506	0.380	0.506	0.482	0.404	0.426	0.461	0.373	0.513
1987	0.361	0.497	0.363	0.581	0.322	0.500	0.383	0.496	0.469	0.410	0.421	0.458	0.348	0.531
1988	0.348	0.478	0.349	0.564	0.304	0.478	0.353	0.491	0.448	0.396	0.411	0.432	0.325	0.518
1989	0.327	0.456	0.333	0.551	0.300	0.466	0.340	0.473	0.435	0.377	0.402	0.411	0.317	0.496
1990	0.308	0.432	0.320	0.518	0.279	0.443	0.322	0.447	0.406	0.363	0.380	0.388	0.294	0.475
1991	0.304	0.428	0.310	0.537	0.304	0.427	0.306	0.456	0.409	0.354	0.388	0.374	0.287	0.476
1992	0.306	0.414	0.311	0.517	0.308	0.412	0.287	0.461	0.410	0.338	0.354	0.394	0.275	0.473
1993	0.328	0.415	0.322	0.522	0.305	0.421	0.280	0.482	0.420	0.342	0.356	0.406	0.288	0.474
1994	0.332	0.422	0.329	0.521	0.276	0.432	0.278	0.489	0.427	0.340	0.369	0.398	0.290	0.477
1995	0.334	0.424	0.328	0.531	0.282	0.438	0.280	0.488	0.430	0.338	0.382	0.385	0.285	0.483
1996	0.336	0.451	0.341	0.551	0.309	0.442	0.273	0.518	0.448	0.343	0.383	0.408	0.286	0.505
1997	0.352	0.464	0.362	0.553	0.309	0.468	0.283	0.537	0.454	0.365	0.400	0.420	0.301	0.518
1998	0.345	0.464	0.359	0.561	0.335	0.458	0.278	0.540	0.433	0.385	0.419	0.399	0.313	0.505
1999	0.301	0.436	0.327	0.556	0.287	0.442	0.259	0.500	0.429	0.330	0.359	0.400	0.277	0.482
2000	0.278	0.392	0.302	0.497	0.252	0.422	0.242	0.446	0.347	0.341	0.304	0.385	0.250	0.439
2001	0.279	0.410	0.316	0.532	0.285	0.441	0.250	0.474	0.368	0.356	0.353	0.371	0.287	0.437
2002	0.289	0.419	0.329	0.565	0.310	0.449	0.268	0.494	0.378	0.384	0.410	0.351	0.296	0.466
2003	0.360	0.441	0.381	0.540	0.338	0.477	0.264	0.582	0.485	0.361	0.456	0.390	0.332	0.514
2004	0.407	0.473	0.412	0.566	0.357	0.503	0.300	0.616	0.510	0.406	0.451	0.465	0.377	0.539
2005	0.474	0.483	0.426	0.595	0.378	0.527	0.328	0.635	0.526	0.437	0.467	0.496	0.383	0.579
2006	0.514	0.504	0.441	0.638	0.377	0.562	0.366	0.646	0.542	0.470	0.472	0.540	0.405	0.607
2007	0.489	0.502	0.439	0.622	0.379	0.558	0.349	0.650	0.530	0.468	0.501	0.497	0.402	0.597
2008	0.424	0.467	0.406	0.562	0.378	0.517	0.346	0.568	0.438	0.476	0.427	0.486	0.378	0.535
Total	0.356	0.483	0.360	0.572	0.321	0.494	0.352	0.526	0.411	0.466	0.427	0.451	0.354	0.524

Table 5
Panel Regressions of Debt Maturity using Macroeconomic Variables and Trend

We model the average debt maturity ratio (*Debt maturity 3*) against a time (year) variable to test for the existence of a trend (results in columns 1, 2 and 3). We then perform a similar regression with the addition of three macroeconomic variables – *Government share*, *Short term rate* and *Term spread* (results given in columns 4, 5 and 6).The sample includes all US Compustat firm-year observations from 1976 to 2008 with positive values for the book value of total assets. We exclude from the sample financial firms (SIC one digit 6) and utilities (SIC two digits 49), yielding a total of 94,615 observations for 12,645 unique firms. A firm is considered to be large if it has a market value of assets greater than the yearly median and is considered to be small otherwise. Variables definitions are provided in the Appendix. Standard errors are robust and clustered by firm. T-test values are reported in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)
	All	Big	Small	All	Big	Small
Trend	-0.004	-0.001	-0.007	-0.004	-0.001	-0.007
	(-15.90)	(-3.24)	(-22.98)	(-13.52)	(-3.46)	(-16.65)
Government share				-0.005	-0.004	-0.006
				(-19.65)	(-12.93)	(-18.60)
Short term rate				-0.001	-0.000	0.000
				(-1.32)	(-0.28)	(0.08)
Term spread				-0.007	-0.005	-0.007
				(-5.25)	(-2.64)	(-3.63)
Intecept	0.504	0.595	0.413	0.832	0.866	0.783
	(111.39)	(110.62)	(73.96)	(57.26)	(47.41)	(40.31)
Observations	94615	47298	47317	87931	43957	43974
R-squared	0.010	0.001	0.038	0.032	0.015	0.075

Table 6
Panel Regressions of Debt Maturity

We perform OLS, first differences and fixed effects on the average debt maturity ratio (*Debt maturity 3*) against the main explanatory variables (columns 1, 2 and 3). We perform similar regressions with two time dummy variables: *Dummy 1990s* takes the value of "1" for observations with a fiscal year end from 1990 to 1999, and "0" otherwise; *Dummy 2000s* takes the value of "1" for observations with a fiscal year end from 2000 to 2008, and "0" otherwise (columns 4,5 and 6). In columns 7, 8 and 9 we report the results of all three regressions including year dummies. The sample includes all US Compustat firm-year observations from 1976 to 2008 with positive values for the book value of total assets. We exclude from the sample financial firms (SIC one digit 6) and utilities (SIC two digits 49), yielding a total of 94,615 observations for 12,645 unique firms. Variables definitions are provided in the Appendix. Standard errors are robust and clustered by firm. T-test values are reported in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OLS	Changes	FE	OLS	Changes	FE	OLS	Changes	FE
Size	0.106	0.045	0.068	0.121	0.041	0.074	0.122	0.040	0.089
	(29.50)	(8.13)	(11.94)	(33.49)	(7.56)	(13.25)	(33.64)	(7.20)	(16.12)
Size squared	-0.006	0.002	-0.004	-0.007	0.003	-0.002	-0.007	0.003	-0.003
	(-18.44)	(4.29)	(-8.27)	(-19.51)	(4.82)	(-4.74)	(-20.11)	(4.93)	(-5.04)
Market-to-book	-0.011	-0.010	-0.008	-0.012	-0.010	-0.012	-0.012	-0.011	-0.013
	(-14.93)	(-12.65)	(-8.84)	(-16.91)	(-12.62)	(-12.25)	(-16.13)	(-13.36)	(-13.18)
Abnormal earnings	0.026	0.009	0.018	0.022	0.009	0.017	0.024	0.010	0.017
	(13.56)	(6.95)	(9.28)	(12.24)	(6.91)	(9.16)	(12.35)	(6.63)	(9.08)
Assets maturity	0.004	0.000	0.000	0.003	0.000	0.001	0.003	0.000	0.001
	(16.88)	(1.92)	(0.30)	(16.96)	(1.89)	(3.01)	(17.33)	(2.08)	(4.25)
Assets volatility	-0.222	-0.023	-0.048	-0.162	-0.022	-0.052	-0.143	-0.022	-0.054
	(-36.36)	(-5.29)	(-7.51)	(-26.91)	(-4.90)	(-8.09)	(-22.80)	(-4.82)	(-8.35)
Rating dummy	0.183	0.146	0.105	0.206	0.145	0.117	0.230	0.153	0.152
	(32.27)	(22.51)	(15.40)	(35.68)	(22.24)	(17.34)	(38.83)	(22.75)	(21.90)
R&D	-0.273	0.011	-0.089	-0.204	0.012	-0.026	-0.208	0.010	0.014
	(-17.32)	(0.67)	(-3.51)	(-12.98)	(0.73)	(-1.04)	(-12.47)	(0.55)	(0.54)
Lagged debt maturity		-0.253			-0.257			-0.261	
		(-79.05)			(-79.01)			(-79.19)	
Term Spread	-0.019	-0.003	-0.012	-0.008	-0.002	-0.007			
	(-21.47)	(-4.06)	(-13.65)	(-9.49)	(-3.32)	(-7.31)			
Dummy 1990s				-0.126	-0.023	-0.099			
				(-35.47)	(-14.03)	(-20.60)			
Dummy 2000s				-0.155	-0.012	-0.131			
				(-32.66)	(-5.98)	(-19.21)			
Intercept	0.141	0.103		0.131	0.116				
	(14.38)	(60.56)		(13.44)	(57.54)				
Year dummies	No	No	No	No	No	No	Yes	Yes	Yes
Observations	94615	76541	94615	94615	76541	94615	94615	76541	94615
R-squared	0.274	0.140	0.590	0.306	0.142	0.597	0.320	0.147	0.605

Table 7
Fama-MachBeth Regressions of Debt Maturity

We estimate the Fama-MacBeth regression coefficients on the average debt maturity ratio (*Debt maturity 3*) against the main explanatory variables for four sample periods. Column 1 reports the results for observations with a fiscal year end prior to 1990. Columns 2 and 3 report the results for observations with a fiscal year end in the nineties and afterwards, respectively. The last column shows the results for the complete sample period. All subsamples include US Compustat firm-year observations with positive values for the book value of total assets. We exclude from all subsamples financial firms (SIC one digit 6) and utilities (SIC two digits 49). Variables definitions are provided in the Appendix. T-test values are reported in parentheses.

	(1)	(2)	(3)	(4)
	1976-1989	1990-1999	2000-2008	1976-2008
Size	0.133	0.136	0.176	0.146
	(55.90)	(26.36)	(8.83)	(22.58)
Size squared	-0.008	-0.009	-0.010	-0.009
	(-36.28)	(-21.84)	(-8.09)	(-23.88)
Market-to-book	-0.016	-0.014	-0.013	-0.015
	(-9.99)	(-8.37)	(-5.59)	(-13.84)
Abnormal earnings	0.031	0.018	0.022	0.025
	(7.18)	(5.71)	(2.26)	(7.23)
Assets maturity	0.004	0.003	0.004	0.004
	(10.88)	(28.92)	(14.35)	(21.93)
Assets volatility	-0.110	-0.153	-0.163	-0.137
	(-9.68)	(-20.03)	(-8.32)	(-16.30)
Rating dummy	0.102	0.242	0.232	0.180
	(4.23)	(24.58)	(15.27)	(11.08)
R&D	-0.129	-0.222	-0.104	-0.150
	(-4.55)	(-9.28)	(-6.15)	(-8.99)
Observations	38742	33370	22503	94615
R-squared	0.246	0.322	0.328	0.291

Table 8
Panel Regressions of Debt Maturity with 1990s and 2000s Interactions

We regress the average debt maturity ratio (*Debt maturity 3*) against the main explanatory variables (Model 1) and additional explanatory variables (Model 2). Both models include separate slopes and intercepts for firm-year observations from the 1990s and from 2000 through 2008. The sample includes all US Compustat firm-year observations from 1976 to 2008 with positive values for the book value of total assets. We exclude from the sample financial firms (SIC one digit 6) and utilities (SIC two digits 49), yielding a total of 94,615 observations for 12,645 unique different firms. Variables definitions are provided in the Appendix. Standard errors are robust and clustered by firm. T-test values are reported in parentheses.

	(1)			(2)		
	Estimate 1976-1989	Interaction 1990s	Interaction 2000s	Estimate 1976-1989	Interaction 1990s	Interaction 2000s
Size	0.137	-0.014	0.018	0.108	-0.001	0.033
	(28.25)	(-2.15)	(2.10)	(22.08)	(-0.19)	(3.85)
Size squared	-0.009	0.001	0.000	-0.007	0.001	0.000
	(-18.57)	(1.79)	(0.23)	(-15.16)	(1.84)	(0.23)
Market-to-book	-0.016	0.004	0.005	-0.011	0.003	0.003
	(-12.33)	(2.15)	(2.33)	(-9.51)	(2.12)	(1.94)
Abnormal earnings	0.028	-0.011	-0.005	0.020	-0.002	0.010
	(8.28)	(-2.24)	(-1.09)	(5.57)	(-0.30)	(2.06)
Assets maturity	0.002	-0.000	0.000	-0.000	0.000	0.001
	(8.04)	(-0.26)	(1.01)	(-1.14)	(0.45)	(2.33)
Assets volatility	-0.130	-0.017	-0.004	-0.030	-0.020	-0.019
	(-11.67)	(-1.25)	(-0.24)	(-2.56)	(-1.39)	(-1.18)
Rating dummy	0.105	0.140	0.126	0.110	0.090	0.069
	(14.52)	(13.21)	(9.99)	(15.42)	(8.50)	(5.45)
R&D	-0.157	0.005	0.117	-0.041	-0.076	0.006
	(-4.11)	(0.11)	(2.58)	(-1.10)	(-1.83)	(0.14)
Term spread	-0.010	0.009	0.001	-0.005	0.005	-0.006
	(-8.47)	(3.78)	(0.55)	(-4.60)	(2.42)	(-2.86)
Positive net income				0.078	-0.033	-0.031
				(16.43)	(-5.05)	(-3.86)
Taxes				0.059	-0.029	-0.049
				(8.71)	(-2.82)	(-4.43)
Cash				0.220	-0.129	-0.166
				(10.52)	(-5.18)	(-5.80)
PPE				0.255	-0.018	-0.079
				(15.82)	(-0.87)	(-3.13)
Market leverage				0.295	0.087	0.107
				(16.80)	(3.67)	(3.67)
Dividend dummy				0.081	-0.057	-0.082
				(13.87)	(-6.78)	(-8.04)
Intercept	0.111	-0.111	-0.299	-0.104	-0.076	-0.225
	(8.50)	(-6.24)	(-11.34)	(-7.48)	(-4.12)	(-8.51)
Observations		94615			94596	
R-squared		0.328			0.354	

Table 9
Predicted Debt Maturity and their Deviations from Actual Debt Maturity by Year

We analyze the differences between the predicted values for the average debt maturity ratio and the actual values, from 1990 to 2008. In Panel A, the predicted values are obtained using the coefficients of the explanatory variables of Model 1 of Table 8 for the sample period prior to 1990. In Panel B, the predicted values are obtained using the coefficients of the explanatory variables of Model 2 of Table 8 for the sample period prior to 1990. We report the t-statistics on the differences in the averages of the actual *versus* predicted debt maturity ratios. The sample includes all US Compustat firm-year observations from 1976 to 2008 with positive values for the book value of total assets. We exclude from the sample financial firms (SIC one digit 6) and utilities (SIC two digits 49), yielding a total of 94,615 observations for 12,645 unique firms. A firm is considered to be large if it has a market value of assets greater than the yearly median and is considered to be small otherwise.

Panel A: Firm Characteristics of Model (1) of Table 8									
	All firms			Small firms			Large firms		
Year	Predicted	Actual - Predicted	t-statistic	Predicted	Actual - Predicted	t-statistic	Predicted	Actual - Predicted	t-statistic
1990	0.475	-0.091	-17.417	0.343	-0.100	-13.720	0.608	-0.082	-10.953
1991	0.468	-0.087	-16.699	0.347	-0.102	-13.959	0.589	-0.072	-9.715
1992	0.472	-0.098	-19.291	0.356	-0.117	-16.488	0.589	-0.079	-10.910
1993	0.492	-0.111	-22.302	0.382	-0.152	-22.782	0.603	-0.070	-9.658
1994	0.509	-0.125	-25.522	0.397	-0.168	-25.640	0.621	-0.083	-11.513
1995	0.517	-0.133	-27.178	0.416	-0.185	-28.858	0.619	-0.082	-11.289
1996	0.512	-0.117	-23.756	0.412	-0.178	-27.471	0.613	-0.056	-7.815
1997	0.516	-0.106	-20.834	0.411	-0.171	-25.744	0.620	-0.041	-5.524
1998	0.514	-0.105	-20.143	0.409	-0.166	-23.963	0.619	-0.044	-5.851
1999	0.508	-0.129	-24.056	0.426	-0.183	-25.671	0.590	-0.074	-9.576
2000	0.513	-0.169	-30.794	0.422	-0.217	-30.863	0.604	-0.121	-14.653
2001	0.491	-0.129	-22.016	0.386	-0.181	-23.801	0.596	-0.077	-8.823
2002	0.530	-0.149	-24.375	0.424	-0.220	-28.095	0.635	-0.078	-8.669
2003	0.542	-0.119	-18.362	0.446	-0.194	-22.612	0.638	-0.044	-4.749
2004	0.570	-0.112	-16.747	0.484	-0.202	-22.280	0.655	-0.021	-2.301
2005	0.588	-0.107	-15.348	0.506	-0.198	-20.402	0.671	-0.017	-1.801
2006	0.596	-0.090	-12.630	0.515	-0.185	-18.088	0.678	0.004	0.469
2007	0.592	-0.093	-12.790	0.515	-0.195	-18.864	0.669	0.009	0.998
2008	0.564	-0.108	-14.654	0.477	-0.202	-19.552	0.652	-0.013	-1.340
Panel B: Firm Characteristics of Model (2) of Table 8									
	All firms			Small firms			Large firms		
Year	Predicted	Actual - Predicted	t-statistic	Predicted	Actual - Predicted	t-statistic	Predicted	Actual - Predicted	t-statistic
1990	0.456	-0.072	-14.109	0.318	-0.075	-10.722	0.595	-0.068	-9.276
1991	0.449	-0.067	-13.194	0.326	-0.081	-11.428	0.571	-0.054	-7.327
1992	0.446	-0.072	-14.469	0.330	-0.091	-13.209	0.563	-0.053	-7.419
1993	0.455	-0.074	-15.168	0.343	-0.114	-17.555	0.567	-0.035	-4.813
1994	0.466	-0.082	-17.208	0.349	-0.121	-19.174	0.583	-0.044	-6.200
1995	0.469	-0.085	-17.707	0.364	-0.134	-21.611	0.574	-0.036	-5.050
1996	0.468	-0.072	-14.997	0.365	-0.131	-20.809	0.572	-0.014	-1.943
1997	0.470	-0.060	-11.941	0.364	-0.123	-19.060	0.576	0.004	0.509
1998	0.477	-0.068	-13.339	0.369	-0.126	-18.935	0.585	-0.010	-1.337
1999	0.473	-0.094	-17.979	0.387	-0.145	-21.091	0.559	-0.043	-5.577
2000	0.476	-0.131	-24.542	0.380	-0.175	-25.809	0.572	-0.088	-10.804
2001	0.462	-0.100	-17.229	0.362	-0.157	-21.563	0.562	-0.042	-4.849
2002	0.482	-0.101	-16.968	0.379	-0.174	-23.356	0.585	-0.028	-3.124
2003	0.490	-0.067	-10.508	0.391	-0.139	-16.737	0.589	0.006	0.629
2004	0.506	-0.048	-7.290	0.415	-0.133	-15.042	0.597	0.037	4.120
2005	0.515	-0.034	-4.923	0.426	-0.117	-12.450	0.605	0.050	5.280
2006	0.520	-0.014	-1.975	0.430	-0.100	-10.057	0.609	0.072	7.808
2007	0.520	-0.021	-2.919	0.434	-0.114	-11.371	0.606	0.073	7.803
2008	0.518	-0.061	-8.395	0.422	-0.147	-14.730	0.613	0.026	2.634

Table 10
Determinants of Changes in Predicted Debt Maturity between 2000 and 2008

We analyze the determinants of the change in the predicted debt maturity ratio between 2000 and 2008. The change in the debt maturity ratio is measured as the difference between the average debt maturity ratio from 2000 through 2008 and the average debt maturity ratio from 1976 through 1989. In Panel A we follow Model (1) of Table 8 using the coefficients of the explanatory variables for the sample period prior to 1990. In Panel B we follow Model (2) of Table 8 using the coefficients of the explanatory variables for the sample period prior to 1990. The sample includes all US Compustat firm-year observations from 1976 to 2008 with positive values for the book value of total assets. We exclude from the sample financial firms (SIC one digit 6) and utilities (SIC two digits 49). A firm is considered to be large if it has a market value of assets greater than the median value (by year) and is considered to be small otherwise.

Panel A: Firm Characteristics of Model (1) of Table 8				
	All Firms	Small Firms	Large Firms	Difference
Size	0.243	0.227	0.258	0.032
Size squared	-0.170	-0.113	-0.227	-0.115
Market-to-book	-0.006	-0.004	-0.008	-0.004
Abnormal earnings	-0.001	0.000	-0.001	-0.001
Assets maturity	-0.003	-0.001	-0.005	-0.003
Assets volatility	-0.012	-0.014	-0.011	0.003
Rating dummy	0.024	0.004	0.044	0.041
R&D	-0.007	-0.011	-0.003	0.009
Term spread	-0.005	-0.005	-0.005	0.000
Panel B: Firm Characteristics of Model (2) of Table 8				
	All Firms	Small Firms	Large Firms	Difference
Size	0.189	0.177	0.201	-0.025
Size squared	-0.136	-0.090	-0.182	0.092
Market-to-book	-0.005	-0.003	-0.006	0.003
Abnormal earnings	-0.001	0.000	-0.001	0.000
Assets maturity	0.000	0.000	0.001	0.000
Assets volatility	-0.003	-0.003	-0.002	-0.001
Rating dummy	0.025	0.004	0.047	-0.043
R&D	-0.001	-0.002	0.000	-0.002
Term spread	-0.003	-0.003	-0.003	0.000
Positive net income	-0.012	-0.015	-0.010	-0.005
Taxes	-0.008	-0.008	-0.007	-0.002
Cash	0.015	0.020	0.010	0.010
PPE	-0.019	-0.018	-0.020	0.002
Market leverage	-0.016	-0.021	-0.010	-0.011
Dividend dummy	-0.019	-0.014	-0.024	0.010

Figure 1
Average Debt Maturity

The sample includes all U.S. Compustat firm-year observations from 1976 to 2008 with positive values for the book value of total assets. We exclude from the sample financial firms (SIC one digit 6) and utilities (SIC two digits 49). We measure the *debt maturity*$_t$ ratio as the proportion of debt that matures in more than *t* years.

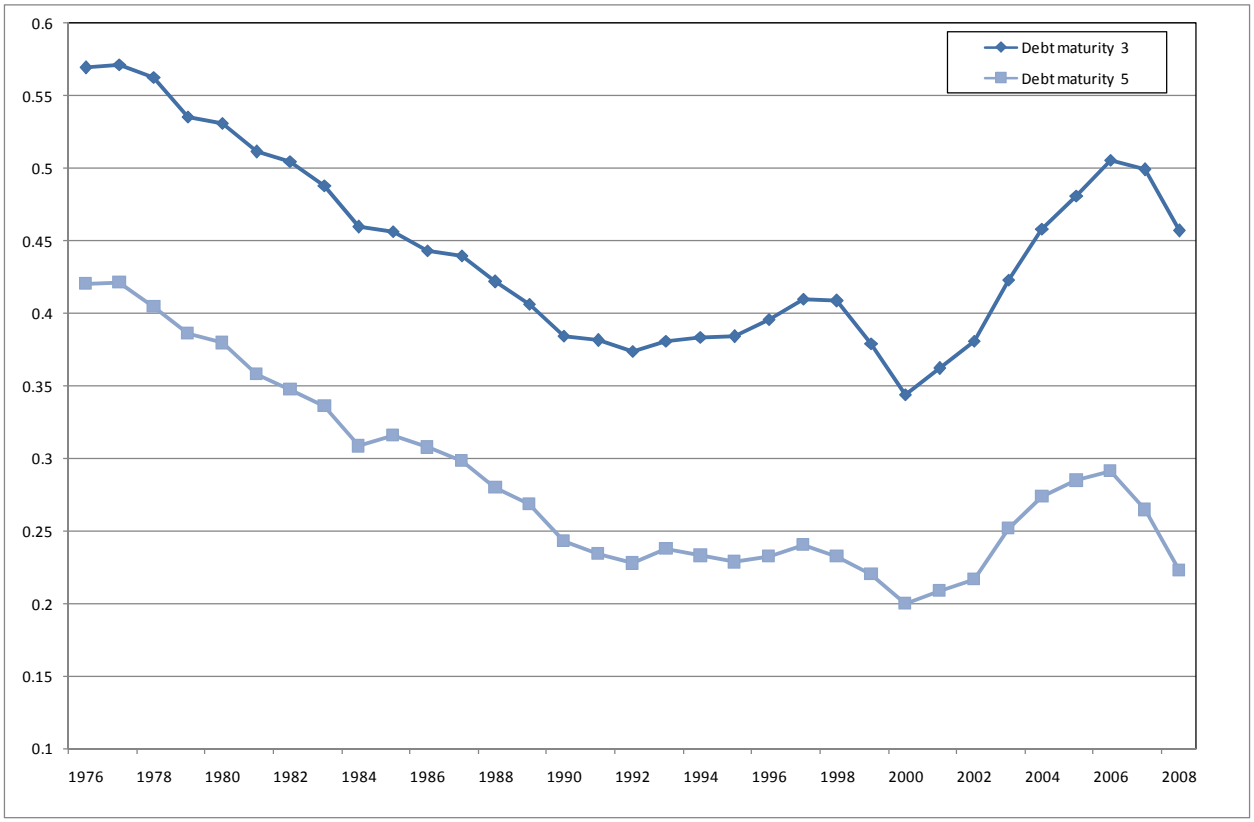


Figure 2
Average Debt Maturity by Firm Size

The sample includes all US Compustat firm-year observations from 1976 to 2008 with positive values for the book value of total assets. We exclude from the sample financial firms (SIC one digit 6) and utilities (SIC two digits 49). We measure the debt maturity ratio as the proportion of debt that matures in more than 3 years (*debt maturity 3*). A firm is considered to be large if it has a market value of assets greater than the yearly median and is considered to be small otherwise.

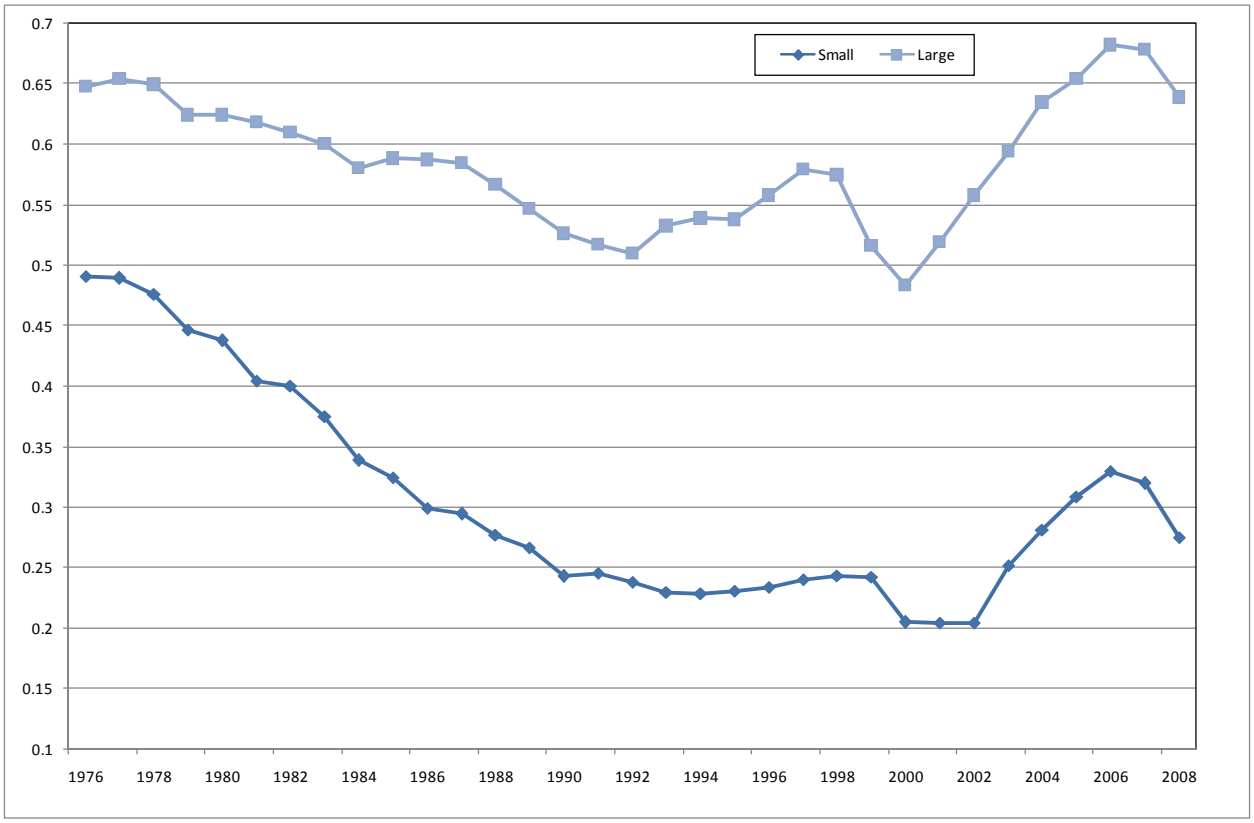


Figure 3
Average Debt Maturity by Governance (GIM) Index

The sample includes all US Compustat firm-year observations from 1990 to 2008 with positive values for the book value of total assets. We exclude from the sample financial firms (SIC one digit 6) and utilities (SIC two digits 49). We measure the debt maturity ratio as the proportion of debt that matures in more than 3 years (*debt maturity 3*). *GIM* is the Gompers, Ishii and Metrick (2003) index. A firm belongs to the High GIM subsample if *GIM* is greater than the yearly median and is classified in the Low GIM group otherwise.

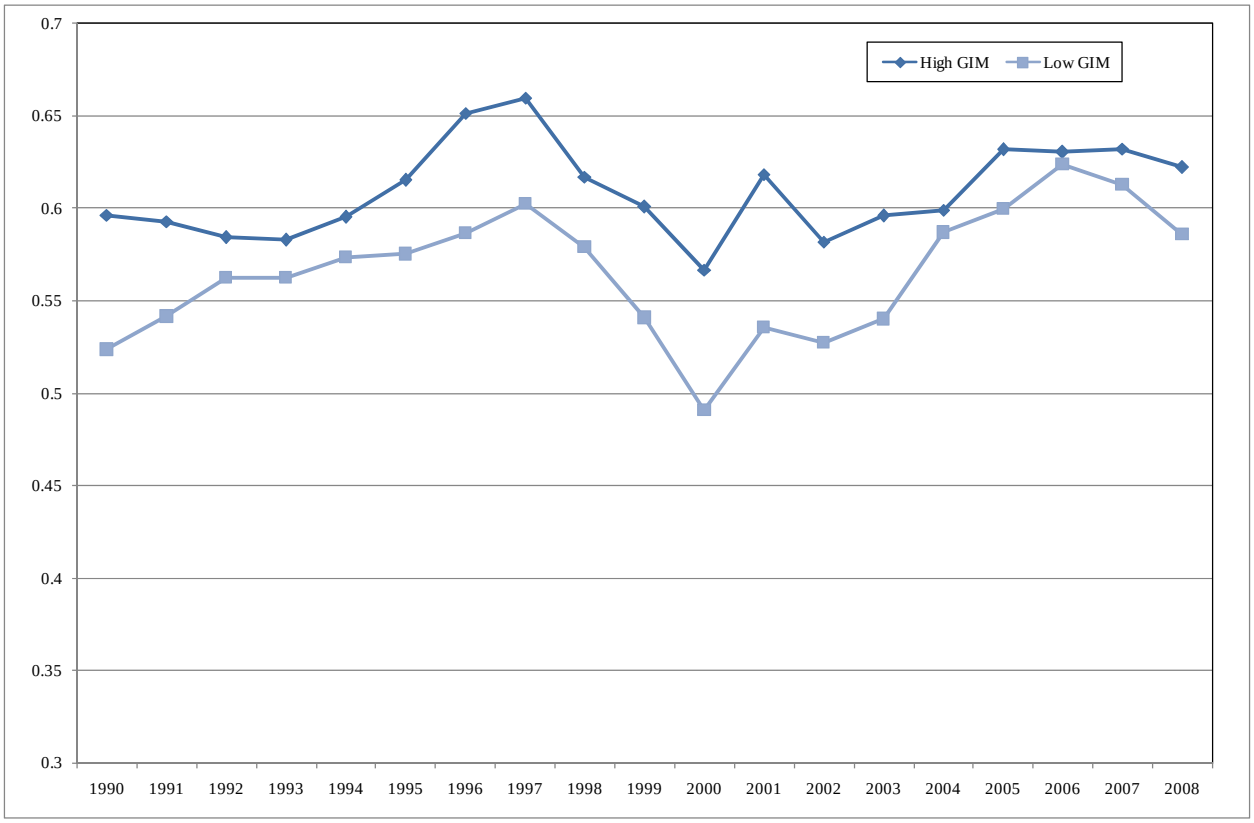


Figure 4
Average Debt Maturity by Managerial Ownership

The sample includes all US Compustat firm-year observations from 1992 to 2008 with positive values for the book value of total assets. We exclude from the sample financial firms (SIC one digit 6) and utilities (SIC two digits 49) firm-year observations. We measure the debt maturity ratio as the proportion of debt that matures in more than 3 years (*debt maturity 3*). We measure managerial ownership as the percentage of shares held by the five highest paid executives in the firm. A firm is considered in the High managerial ownership group if managerial ownership is higher than the yearly median and in the Low managerial ownership group otherwise.

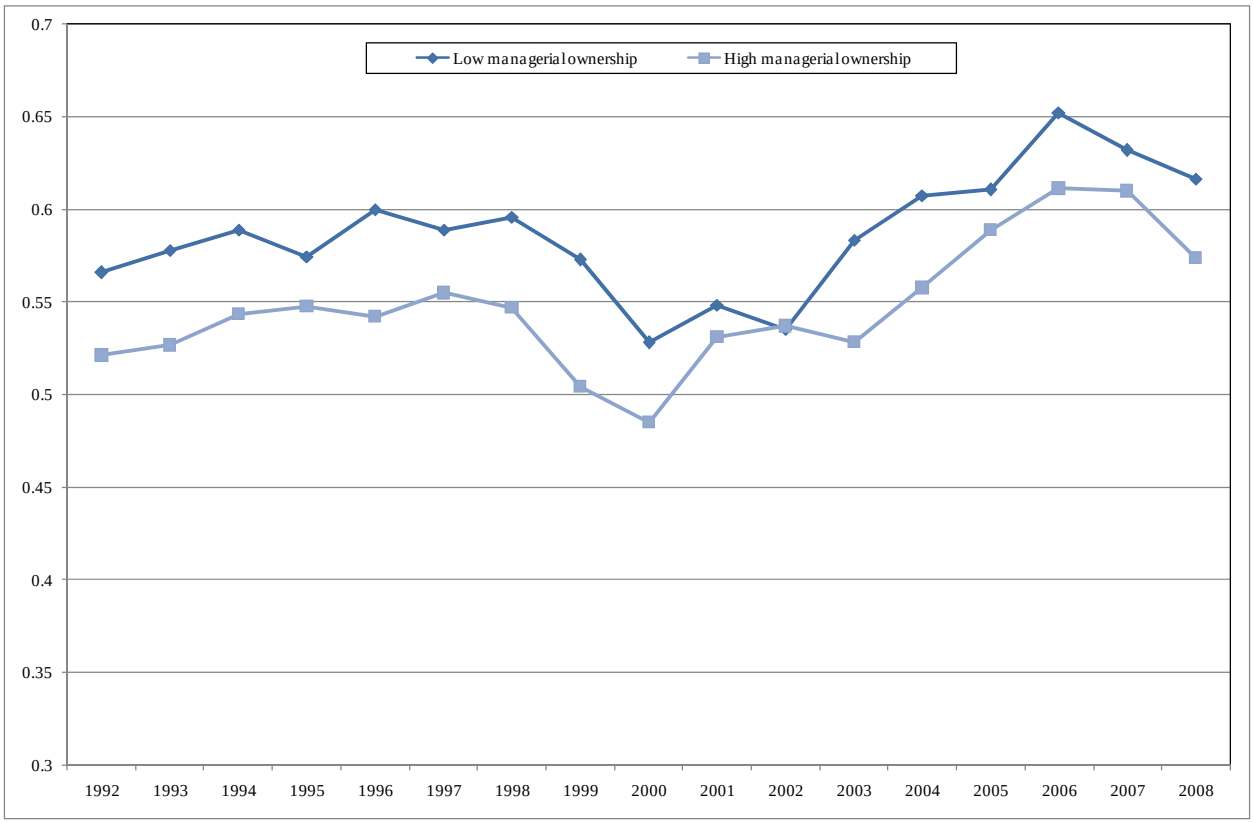


Figure 5
Average Debt Maturity by Board Independence

The sample includes all US Compustat firm-year observations from 1996 to 2008 with positive values for the book value of total assets. We exclude from the sample financial firms (SIC one digit 6) and utilities (SIC two digits 49). We measure the debt maturity ratio as the proportion of debt that matures in more than 3 years (*debt maturity 3*). We measure board independence as the percentage of independent board members. A firm is considered in the High board independence group if board independence is higher than the yearly median and in the Low board independence group otherwise.

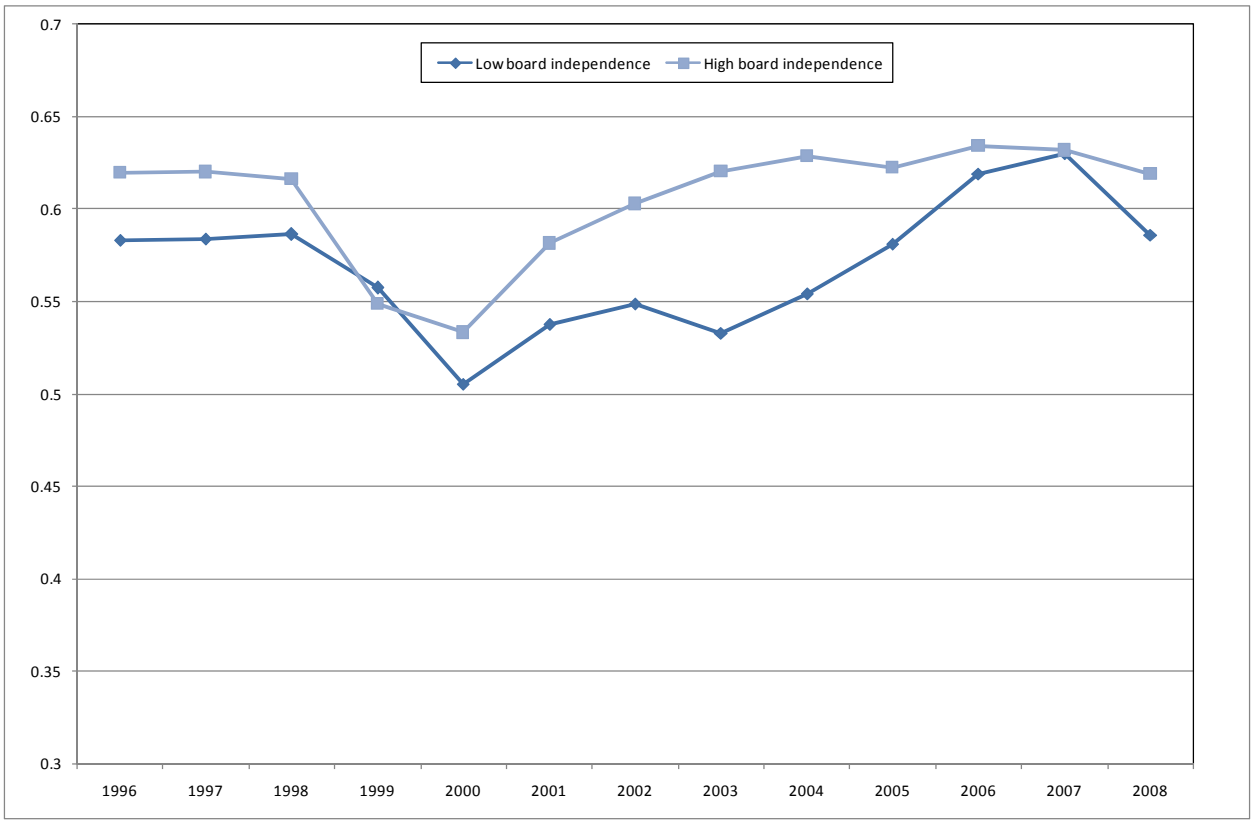


Figure 6
Average Debt Maturity by R&D Expenditures

The sample includes all US Compustat firm-year observations from 1976 to 2008 with positive values for the book value of total assets. We exclude from the sample financial firms (SIC one digit 6) and utilities (SIC two digits 49). We measure the debt maturity ratio as the proportion of debt that matures in more than 3 years (*debt maturity 3*). *R&D* is the proportion of R&D expenses in the book value of total assets. A firm belongs to the High R&D subsample if it has *R&D* in the top quartile for that year and is classified in the Low R&D group otherwise.

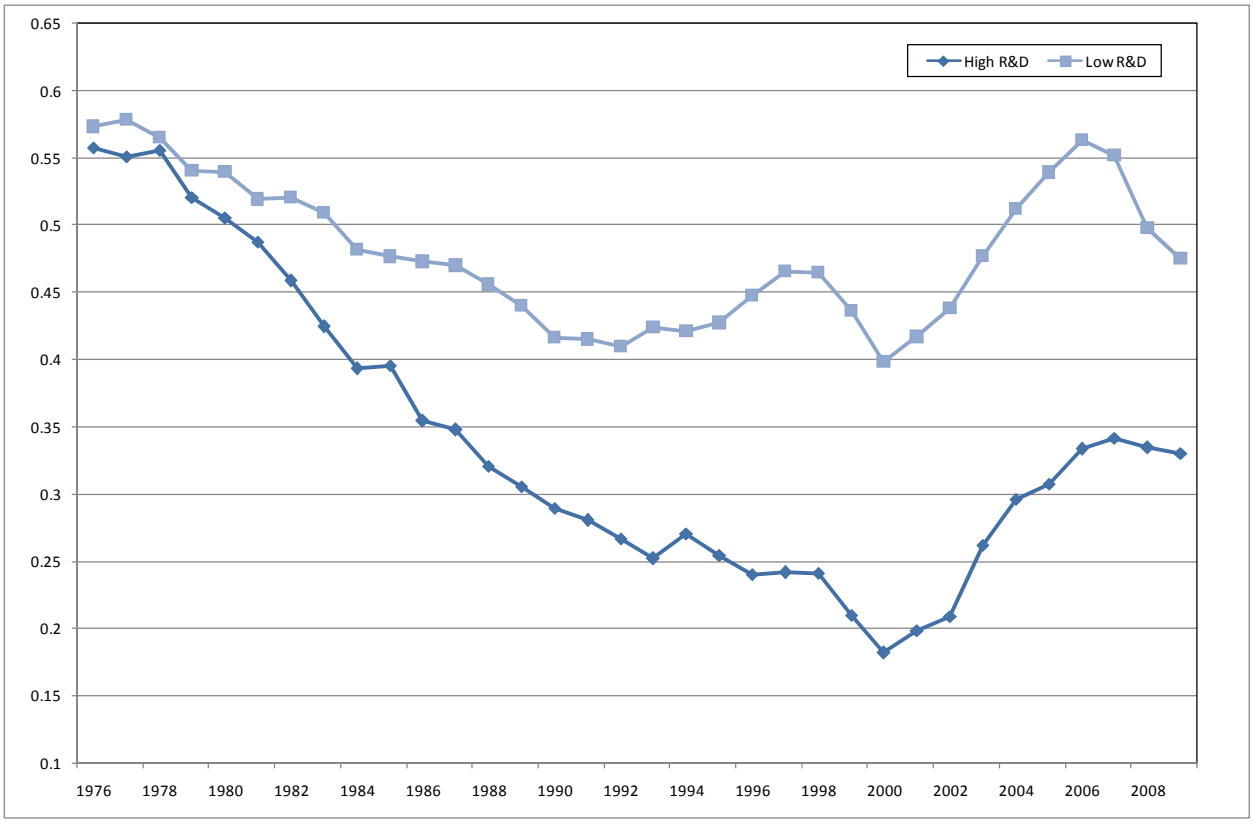


Figure 7
Average Debt Maturity by Probability of Informed Trading (PIN)

The sample includes all US Compustat firm-year observations from 1983 to 2001 with positive values for the book value of total assets. We exclude from the sample financial firms (SIC one digit 6) and utilities (SIC two digits 49). We measure the debt maturity ratio as the proportion of debt that matures in more than 3 years (*debt maturity 3*). *PIN* is the ratio of the expected number of informed trades over the expected total number of trades. A firm belongs to the High PIN subsample if *PIN* is greater than the yearly median and is classified in the Low PIN group otherwise.

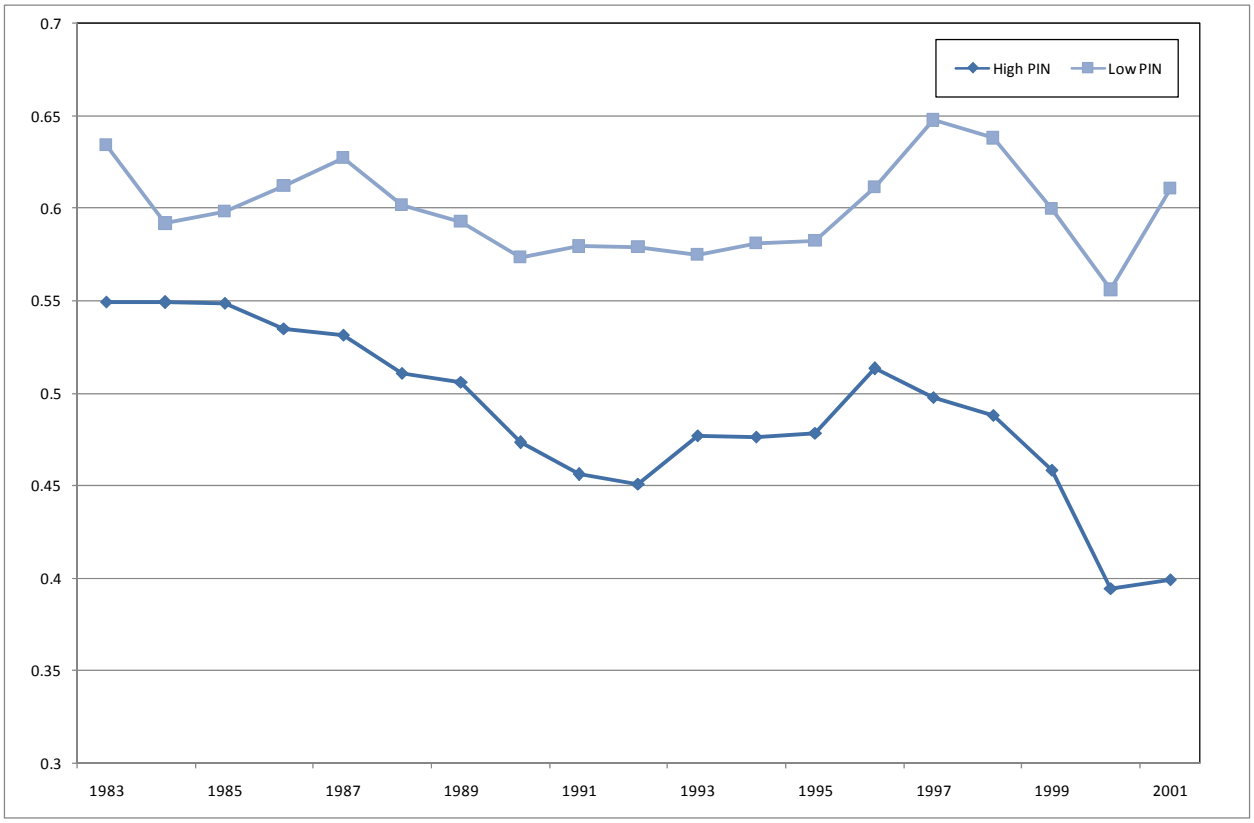


Figure 8
Average Debt Maturity by Amihud Illiquidity

The sample includes all US Compustat firm-year observations from 1976 to 2004 with positive values for the book value of total assets. We exclude from the sample financial firms (SIC one digit 6) and utilities (SIC two digits 49). We measure the debt maturity ratio as the proportion of debt that matures in more than 3 years (*debt maturity 3*). *Amihud* is the average ratio of the absolute stock return over the dollar traded volume. A firm belongs to the High Amihud subsample if *Amihud* is greater than the yearly median and is classified in the Low Amihud group otherwise.

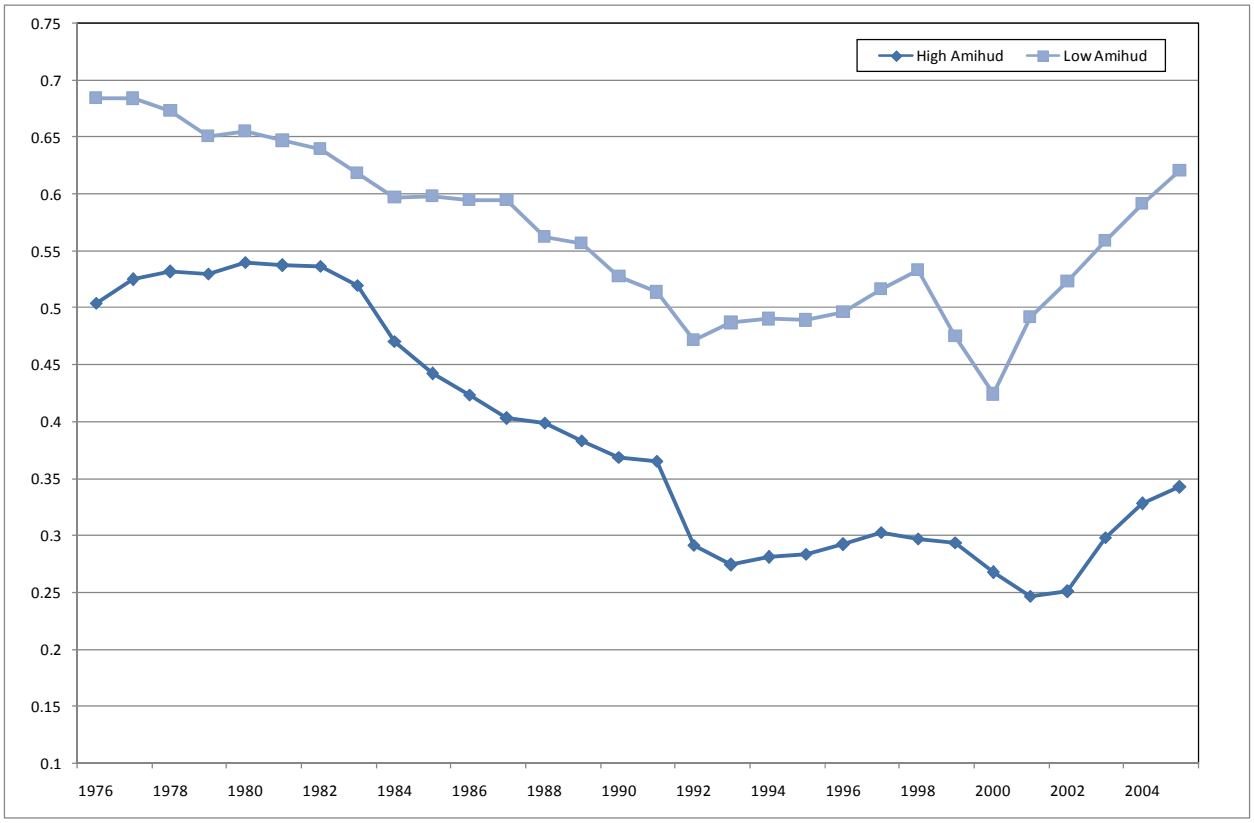


Figure 9
Average Debt Maturity by Rating Dummy

The sample includes all US Compustat firm-year observations from 1986 to 2008 with positive values for the book value of total assets. We exclude from the sample financial firms (SIC one digit 6) and utilities (SIC two digits 49). We measure the debt maturity ratio as the proportion of debt that matures in more than 3 years (*debt maturity 3*). Firms with S&P domestic long-term issuer credit rating are considered in the Rating subsample. Firms with no rating are classified in the No rating subsample.

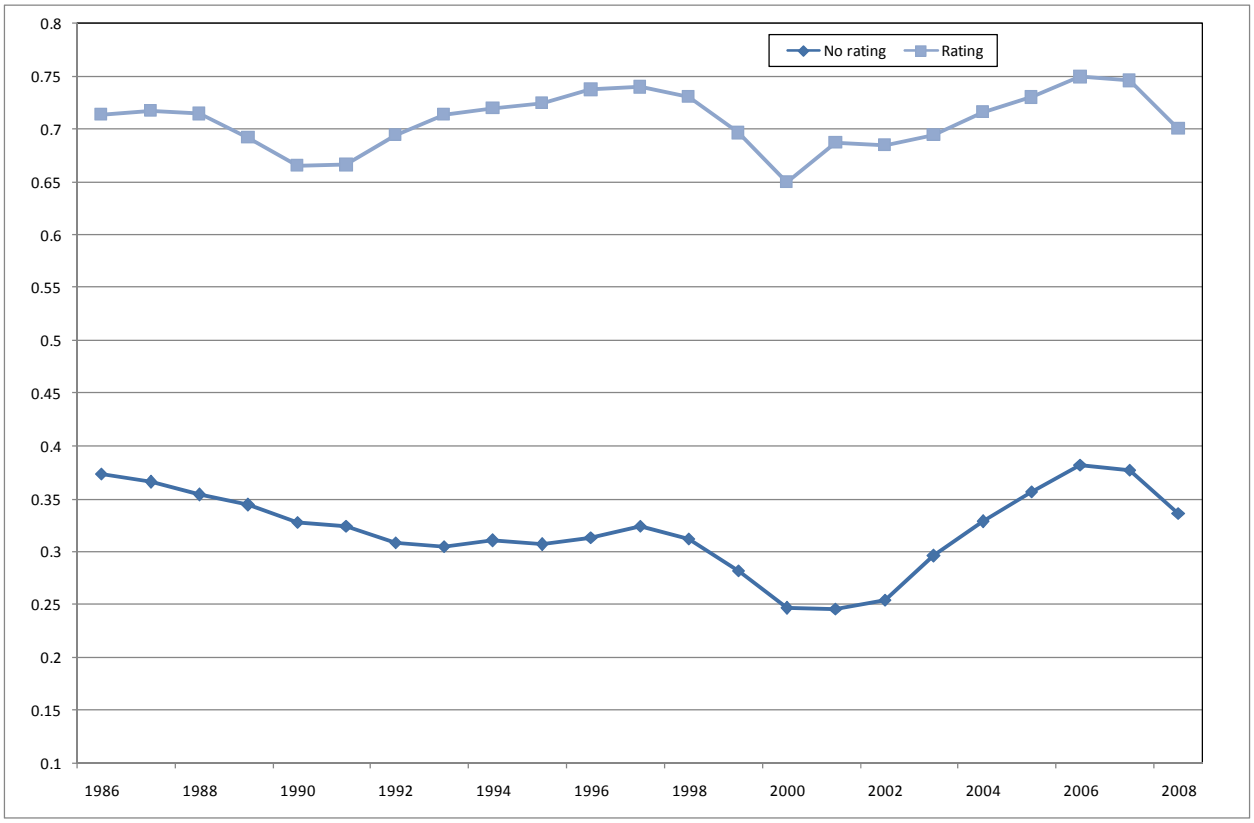


Figure 10
Average Debt Maturity by NYSE Dummy

The sample includes all US Compustat firm-year observations from 1976 to 2008 with positive values for the book value of total assets. We exclude from the sample financial firms (SIC one digit 6) and utilities (SIC two digits 49). We measure the debt maturity ratio as the proportion of debt that matures in more than 3 years (*debt maturity 3*). Firms are split in two subsamples dependent on being listed in the NYSE or not (Non-NYSE).

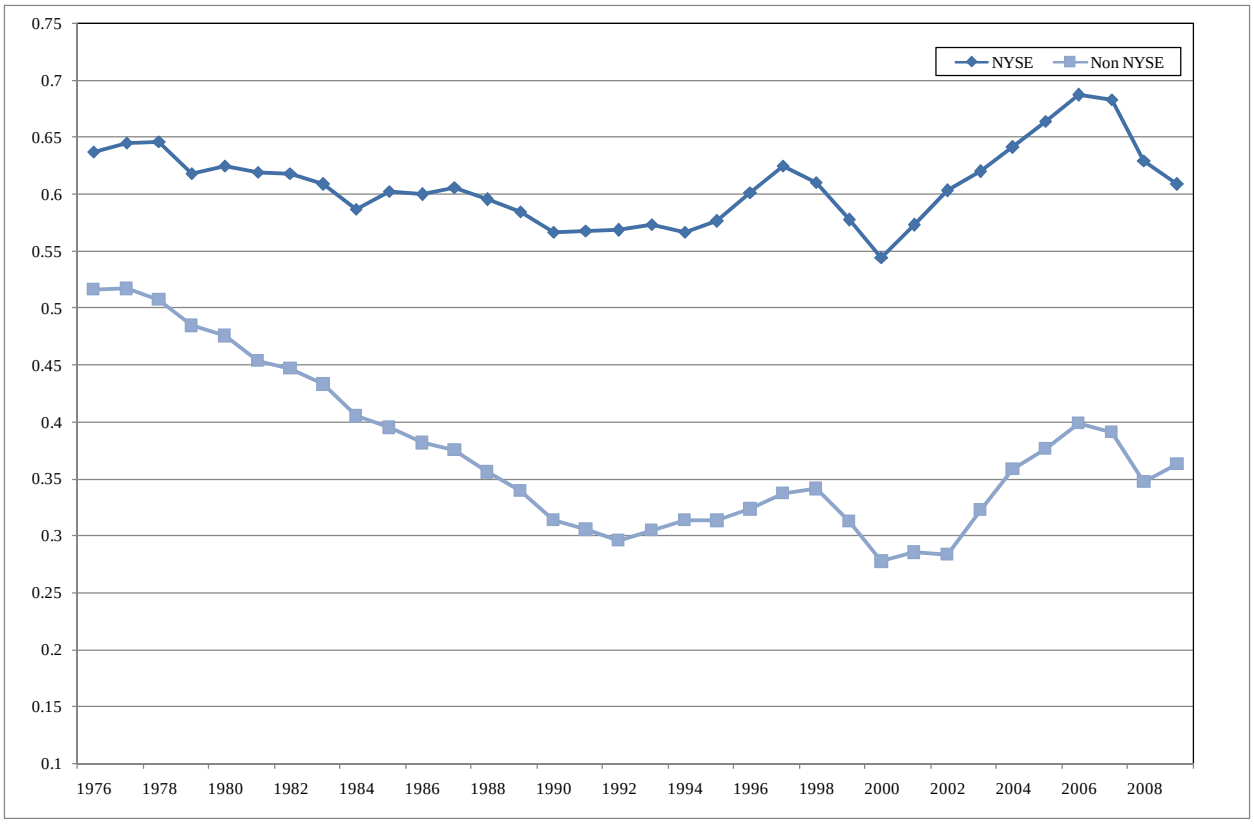


Figure 11
Average Debt Maturity S&P 500 Dummy

The sample includes all US Compustat firm-year observations from 1976 to 2006 with positive values for the book value of total assets. We exclude from the sample financial firms (SIC one digit 6) and utilities (SIC two digits 49). We measure the debt maturity ratio as the proportion of debt that matures in more than 3 years (*debt maturity 3*). Firms are split in two subsamples dependent on being on the S&P 500 index or not (Non S&P 500).

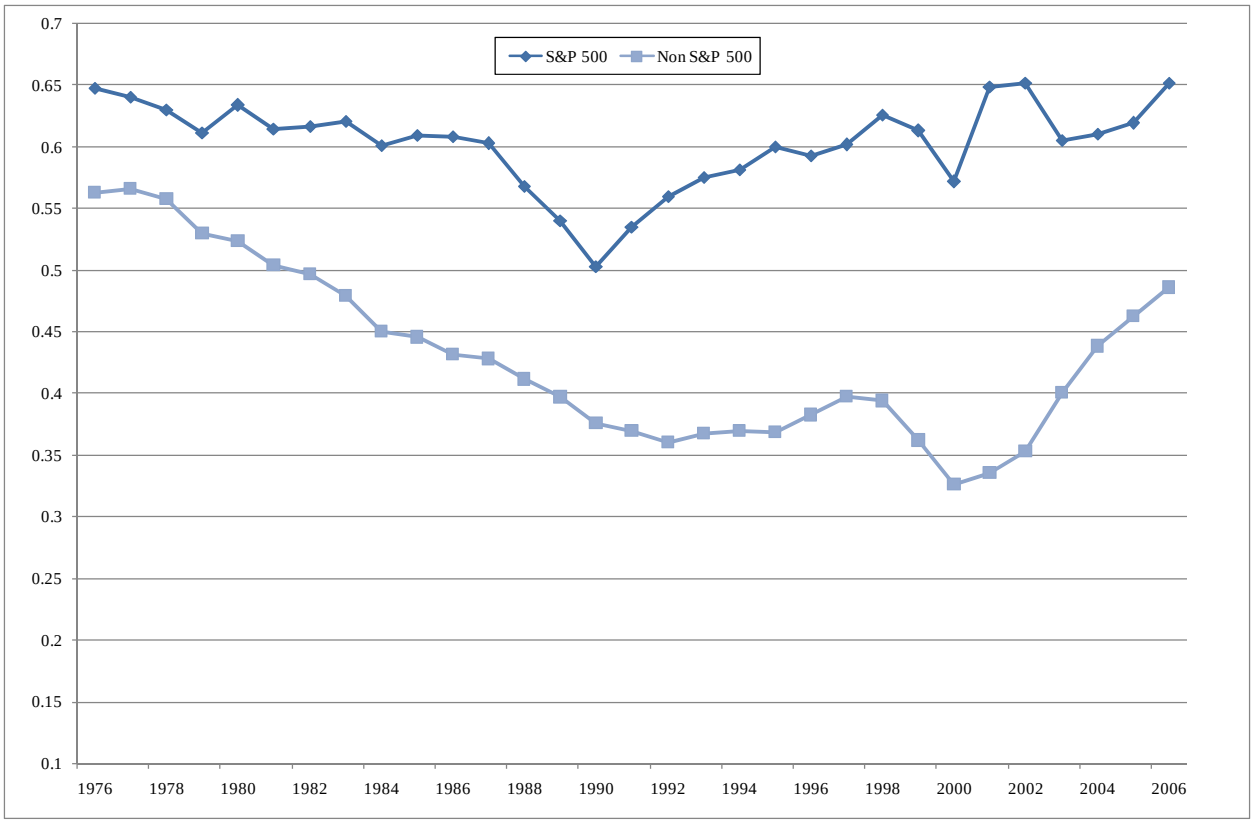


Figure 12
Average Debt Maturity by Technology Industry Dummy

The sample includes all US Compustat firm-year observations from 1976 to 2008 with positive values for the book value of total assets. We exclude from the sample financial firms (SIC one digit 6) and utilities (SIC two digits 49). We measure the debt maturity ratio as the proportion of debt that matures in more than 3 years (*debt maturity 3*). A firm is considered in the High tech group or the Low tech group according to the Loughran and Ritter (2003) classification.

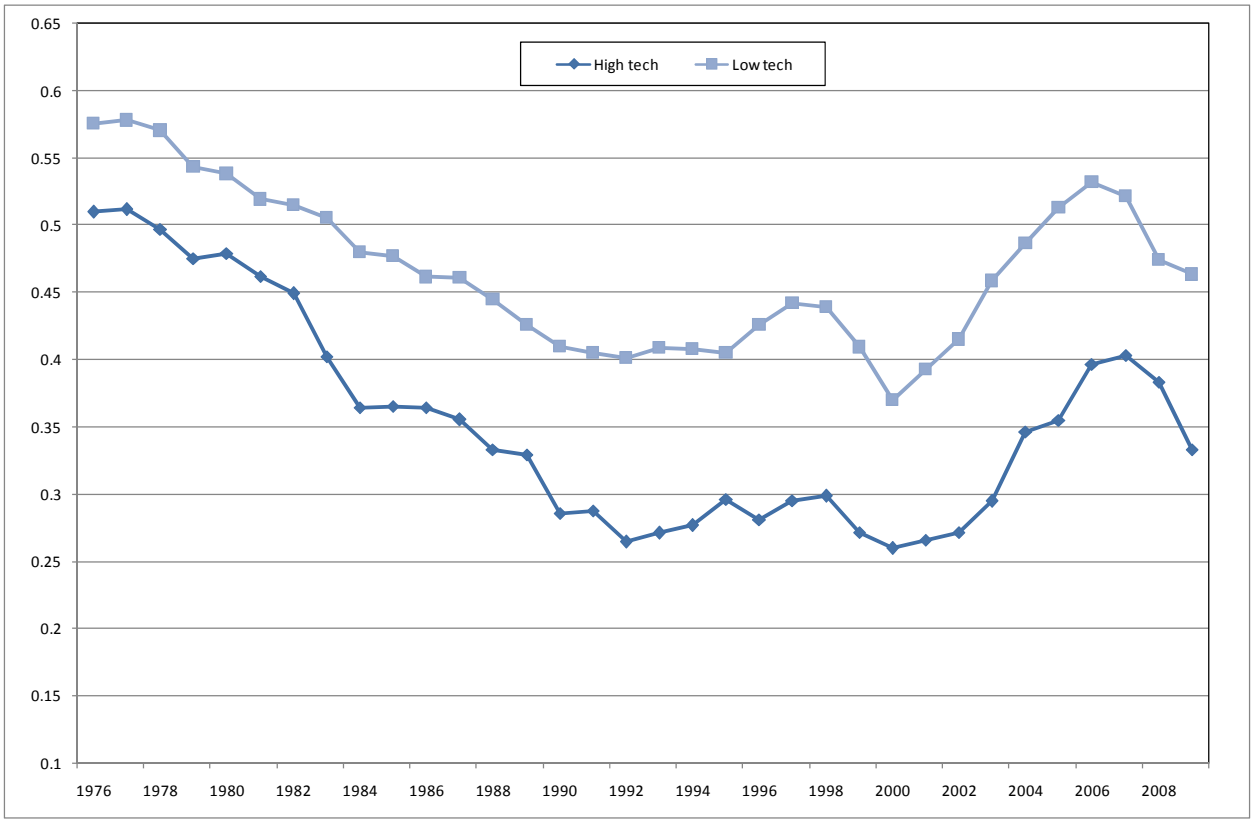
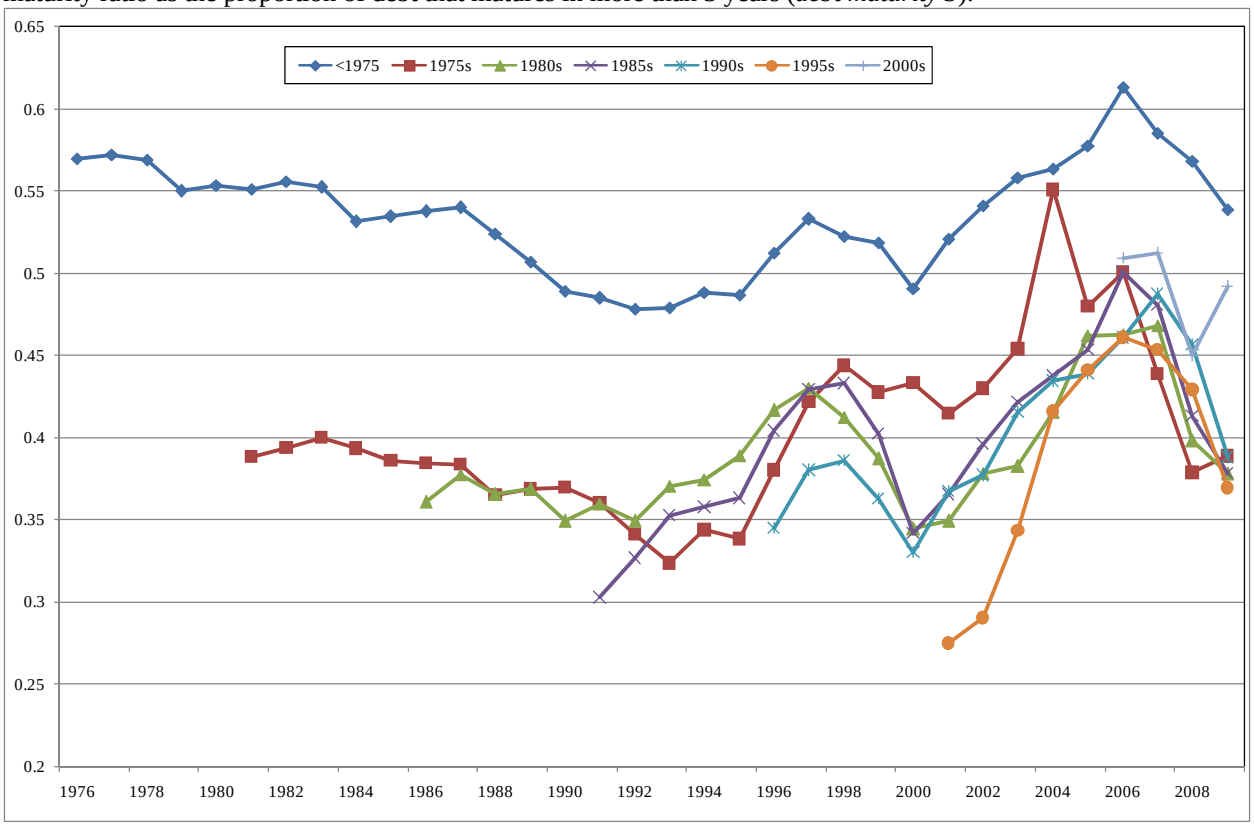


Figure 13
Average Debt Maturity by IPO Cohort

The figure depicts the average debt maturity ratio for cohorts of firms and is constructed by listing date. The <1975 cohort includes all firms with a listing prior to 1975. The 1975 cohort includes all firms listed from 1975 to 1980. We then construct each cohort of firms that have a listing date within a 5-year period. The debt maturity ratio for each firm is included in each cohort beginning in the 6th year after the listing date. The sample includes all US Compustat firm-year observations from 1976 to 2008 with positive values for the book value of total assets. We exclude from the sample financial firms (SIC one digit 6) and utilities (SIC two digits 49). We measure the debt maturity ratio as the proportion of debt that matures in more than 3 years (*debt maturity 3*).



Appendix: Variable Definitions

Variable	Definition
Abnormal earnings	Ratio of the difference between the income before extraordinary items, adjusted for common/ordinary stock (capital) equivalents (IBADJ) for time t and t-1 over the market value of equity used to calculate earnings per share (PRCC_F*CSHPRI)
Age	The difference between the fiscal year (FYEAR) and the CRSP listing year (LISTYEAR)
Amihud illiquidity	Average of the ratio of the absolute stock return over the dollar volume
Assets maturity	Measured as the ratio of property, plant and equipment (PPEGT) over depreciation and amortization (DP) times the proportion of property, plant and equipment in total assets (PPEGT/AT), plus the ratio of current assets (ACT) over the cost of goods sold (COGS) times the proportion of current assets in total assets (ACT/AT)
Assets volatility	Standard deviation of stock return during the fiscal year x (market value of equity (CSHO x PRCC_F) / market value of assets (AT+CSHO x PRCC_F-CEQ))
Cash	Ratio of cash and short-term investments (CHE) over the book value of total assets (AT)
Debt maturity 1	Ratio of the total long-term debt (DLTT) over the book value of total debt (TD)
Debt maturity 2	Measured as (total long-term debt (DLTT) – debt maturing in two years (DD2))/book value of total debt (TD)
Debt maturity 3	Measured as (total long-term debt (DLTT) – debt maturing in two years (DD2) – debt maturing in three years (DD3))/book value of total debt (TD)
Debt maturity 4	Measured as (total long-term debt (DLTT) – debt maturing in two years (DD2) – debt maturing in three years (DD3) – debt maturing in four years (DD4))/book value of total debt (TD)
Debt maturity 5	Measured as (total long-term debt (DLTT) – debt maturing in two years (DD2) – debt maturing in three years (DD3) – debt maturing in four years (DD4) – debt maturing in five years (DD5))/book value of total debt (TD)
Dividend dummy	Takes the value of one if the firm pays dividends (DVC) and zero otherwise
Government share	Share of government debt and coupon payments with maturity of one year or more
Long term leverage	Ratio of the total long-term debt (DLTT) over the book value of total debt (TD)
Market leverage	Ratio of total debt (DLTT + DLC) over the market value of assets (AT+CSHO*PRCC_F-CEQ)
Market-to-book	Ratio of the market value of assets (AT+CSHO*PRCC_F-CEQ) over the book value of total assets (AT)
PIN	Probability of information-based trading, defined as the ratio of the expected number of informed trades over the expected total number of trades
Positive net income	Takes the value of one if the firm has positive net income (NI) and zero otherwise
PPE	Ratio of the net total of property, plant and equipment (PPENT) over the book value of total assets (AT)
R&D	Ratio of research and development expense (XRD) over the book value of total assets (AT)
Rating dummy	Takes the value of one for firms with S&P domestic long-term issuer credit rating (CPLTICRM) and zero otherwise
Short term rate	Month-end yield on the 1-year government bonds

Size	Logarithm of the market value of assets; the market value of assets is measured as the sum of the book value of total assets (AT) and the market value of equity (CSHO x PRCC_F) minus the book value of common equity (CEQ)
Taxes	Ratio of total income taxes (TXT) over the pretax income (PI)
Term spread	Difference between the month-end yield on the 10-year government bonds and the month-end yield on the 1-year government bonds
Total leverage	Ratio of the book value of total debt (TD) over the book value of total assets (AT)