Why Do Some Firms Become Debt-Free?[1]

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Abstract

We identify and examine a substantial number of firms that are debt-free. Debt-free firms are smaller, have fewer tangible assets and fewer credit ratings, and yet have relatively greater cash holdings and better stock-quality ranks than levered firms, suggesting that borrowing constraints and relative market conditions contribute to firms' extreme debt conservatism. Debt-free firms also pay exceptionally high dividends, which reflects their efforts to mitigate the adverse effect of the agency problem and to maintain accessibility to equity capital on favorable terms. Small debt-free firms are able to raise equity on attractive terms for their investments as their high dividends establish good reputations for them in the capital markets. Large debt-free firms' high dividends, on the other hand, substitute for debt in addressing the agency problem between managers and shareholders of current free cash flow as these firms generate more cash flows relative to their investment needs.

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1. Introduction

A recent newspaper article says, "Microsoft, Walgreen, Cisco Systems and William Wrigley have something in common that may be surprising to many readers. None of them has any debt."[1] Even more surprising is that the proportion of debt-free firms has steadily increased over time, with over 20% of U.S. firms becoming debt-free in recent years. Yet, modern capital structure theories generally hold that debt-free capital structure is contrary to value maximization. On average, about 12% of Compustat U.S. firms operate with no debt in any given year during the 1971-2006 period. More than 20% of firms are debt-free in some industries, but debt-free firms are not uncommon in most industries.

Conservative debt use has been noted in previous work. For example, Graham (2000), after observing that firms use too small amounts of debt to take advantage of tax benefits, concludes:

> Paradoxically, large, liquid, profitable firms with low expected distress costs use debt conservatively. Product market factors, growth options, low asset collateral, and planning for future expenditures lead to conservative debt usage. Conservative debt policy is persistent. (p.1901)

The debt conservatism puzzle refers to the notion that some firms have lower leverage than that which would maximize value from a static trade-off perspective (Miller(1977), Graham(2000), and Frank and Goyal (2005)). Capital structure theories generally provide only "qualitative" or "directional" predictions (Barclay and Smith (2005)). Accordingly, most empirical studies have focused on identifying variables related to firms' use of leverage and the choice between debt and equity.[2] Firms without debt have not been systematically

[1] "Companies with no debt fly high" by Matt Krantz, *USA TODAY* on August 21, 2002.

[2] For example, Marsh (1982), MacKie-Mason (1990), Hovakimian, Opler, and Titman (2001), and Jung, Kim, and Stulz (1996) test the models of debt-equity choice and MacKie-Mason (1990), Graham (1996), Berger, Ofek, and Yermack (1997), and Jung, Kim, and Stulz (1996) examine changes in leverage. Bradley, Jarrell and Kim (1984), Kester (1986), Titman and Wessels (1988), Rajan and Zingales (1995), Graham (2000), and Booth et al. (2001) examine the relationship between leverage and various firm characteristics. Shyam-Sunder and Myers (1999), Fama and French (2002), Frank and Goyal (2003), Leary and

analyzed and conditions under which firms become debt-free are not well understood. Strebulaev and Yang (2006) examine debt-free firms but leave this extreme debt conservatism as an unexplained mystery. In this study, we explore the phenomenon of extreme debt conservatism and provide potential explanations for it.

Some studies show that models with added assumptions can produce low optimal leverage ratios consistent with those observed in practice. For example, Morrellec (2004) presents a contingent claims model with manager-stockholder conflict which generates a low optimal debt ratio. Hennessy and Whited (2005) and Strebulaev (2007) dispute the claim that firms are underlevered relative to the predictions of dynamic trade-off models. These theoretical arguments are intuitively reasonable but they have not yet been convincingly supported empirically.

Another line of research suggests non-debt tax shelters as an alternative explanation for reduced debt use. DeAngelo and Masulis (1980) argue that firms with non-debt tax shields use less debt, and Graham and Tucker (2005) document that firms that invest in tax shelters use less debt. Graham, Lang, and Shackleford (2004) show that the debt policies of S&P 100 and Nasdaq 100 firms appear less conservative once tax savings from option deductions are considered. Stefanescu (2005) finds a similar effect for firms that use defined benefit pension plans. Although these studies help us understand the effect of non-debt tax shields on the use of debt, how non-debt tax shields affect capital structure policies remains to be seen.

The novelty of our study is the focus on identifying the reasons that firms become debt-free in order to understand debt conservatism in particular and firms' capital structure decisions in general. Even though we explore other alternative explanations for such extreme debt conservatism, our analyses center on the following explanations: borrowing constraints; profitability; investment opportunities and dividends; and market timing.

We first examine borrowing constraints as an explanation for firms' becoming debt-free.

Roberts (2004), Lemmon and Zender (2004), Leary and Roberts (2005), Fama and French (2005), and Flannery and Rangan (2006) test the trade-off theory and/or the pecking order theory. Baker and Wurgler (2002), and Welch (2004) look at the relationship between leverage and equity value.

Stiglitz and Weiss (1981) suggest that market frictions cause firms to be rationed by their lenders. Faulkender and Petersen (2006) show that firms without access to public debt market use much less debt than do firms with such access. Barclay, Smith and Morellec (2006), and Byoun (2008a) also suggest that developing firms with higher costs and lower benefits of debt abstain from issuing risky debt. Thus, firms with borrowing constraints may become debt-free by relying on equity.

An alternative explanation for why firms become debt-free is profitability relative to investment opportunities. According to the pecking order theory (Myers (1984) and Myers and Majluf (1984)), firms with sufficient profits to cover their investments are likely to become debt-free, as they prefer internal funds to external funds. Firms may also become debt-free in order to avoid either forgoing future investment opportunities or financing them with new risky securities. However, firms with large profits are prone to the agency problem, which may be mitigated by committing a larger fraction of their profits to debt payments or dividend payouts. Given that dividend and debt are substitutes for controlling free-cash-flow problems (Easterbrook (1984), and Fama and French (2002)), firms with large profits may pay large dividends instead of using debt. Thus, mature firms with more profits relative to their investment opportunities may address the agency problem of free cash flow with large dividends and become debt-free. Nevertheless, dividends can also work as a means of establishing a reputation for moderation of expropriating shareholders (La Porta et al. (2000)). The reputation for a good treatment of shareholders is worth the most for firms with a great need of external financing in order to raise external equity on attractive terms. However, such a reputation can be credibly developed only when firms rely mainly on equity (Gomes (2000)). Accordingly, growing firms that have built up good reputations through high dividend payouts and equity issuances may become debt-free.

Lastly, we examine market timing as an explanation for firms becoming debt-free. Baker and Wurgler (2002) argue that a firm's capital structure reflects the cumulative impact of managers' attempts to time the market by selling shares when overvalued by the market and repurchasing shares when undervalued. Welch (2004), Leary and Roberts (2004), Helwege and Liang (2004), and Alti (2006) also suggest that firms' equity issues are driven by

optimistic market valuation. Thus, we investigate whether firms' debt-free capital structures result from managers' attempts to take advantage of overvalued stock prices.

While we do not rule out other explanations for low leverage, our main findings point to borrowing constraints and equity market conditions as key explanations for the debt conservatism puzzle. In several respects, equity market conditions are found to be more favorable for debt-free firms, while credit market conditions are unfavorable for debt-free firms. Thus, financing decisions—especially for small firms—are affected by comparative advantages in issuing debt versus equity. While firms become debt-free in the presence of high market valuation and good stock performance, it is difficult to conclude that market timing drives firms to become debt-free. Rather, our evidence suggests that firms facing borrowing constraints pay high dividends in order to build up reputations for moderating the agency problem of expropriating shareholders or the agency costs of free cash flow, which may result in favorable equity market conditions. We further show that debt-free firms maintain persistently negligible debt even after they become debt-free and that extreme debt conservatism cannot be explained by non-debt tax shields and off-balance-sheet liabilities or managerial entrenchment.

This study adds to a growing literature on the debt conservatism puzzle. Our results suggest that small debt-free firms have replaced debt with external equity, whereas large debt-free firms have reduced debt with excess cash (or internal equity). High stock quality ranks, high market-to-book ratios, and low or unavailable credit ratings for debt-free firms, coupled with their equity financing activities, suggest that equity market conditions for these firms are much more favorable relative to debt market conditions. Thus, we provide evidence that market conditions and constraints have an important bearing on the debt conservatism puzzle.

Our study also supplements studies of dividend policy. The dividend policies of small debt-free firms appear to reflect their efforts to retain accessibility to equity financing. By maintaining high dividend payments, these firms maintain their ability to raise equity on favorable terms by moderating shareholders' concern for agency problems of expropriation. Small debt-free firms' high dividends effectively substitute for other disciplinary factors in

order to establish good reputations in the capital markets. Such reputations are especially credible for small growing debt-free firms as they depend heavily on equity financing for their investment needs. In contrast, large debt-free firms are found to generate more cash flows from operations relative to their investment opportunities; hence, they become debt-free by paying off existing debt. They also pay out excess cash through dividends and repurchases. For large debt-free firms, high dividends appear to substitute for leverage in addressing the agency costs of current free cash flow.

Finally, our study contributes to the explanation of another puzzle; i.e., larger firms tend to issue more debt relative to equity than do smaller firms, and, hence, they appear to comport more with the pecking order theory (Shyam-Sunder and Myers (1999) and Frank and Goyal (2003)). Our results suggest that small firms are likely to be conservative in using debt and to seek equity financing due to their borrowing constraints. Thus, the pecking order may be reversed for small firms.

The remainder of the paper is arranged as follows. Section 2 describes the data and provides summary statistics. Section 3 discusses empirical implications. Section 4 reports univariate results and Section 5 presents results from the estimation of logit regressions. Section 6 explores alternative explanations and Section 7 provides summary and concluding remarks.

2. Data

The initial sample consists of all available U.S. industrial firms from the annual Compustat files for the period of 1971–2006.[3] Following previous studies, we exclude financial firms and regulated utilities from the sample.[4] We require firms to have positive values for

[3] We exclude all firms with Company Location Code (STATE) equal to 99, which indicates that the company's principal location is in a country other than the U.S.

[4] Financial firms are represented by SIC codes 6000-6799 and utilities by SIC codes 4900-4999. These firms have very different capital structures and their financing decisions may not convey the same information as nonfinancial and nonregulated firms. For example, a relatively high leverage ratio is normal for financial firms, but the same high leverage ratio for nonfinancial firms may indicate possible financial distress.

total assets, common equity, number of shares outstanding and stock price at the end of the fiscal year. After these requirements are applied, the sample consists of 150,810 firm-year observations. Since we use all available observations in each analysis, the sample size varies with data availability. For example, the sample size is reduced when we combine the initial sample with the data from the Center for Research in Security Prices (CRSP).

Table I and Figure 1

We define a firm that has neither current nor long-term debt (item 34 + item 9 = 0) in a given year as a 'debt-free' firm and a firm with any amount of debt (item 34 + item 9 > 0) in a given year as a 'debt' firm. Table I reports the yearly summary statistics of debt-free and debt firms for selected years before 2000 and consecutive years from 2001 to 2006, as well as for the full sample. The number of debt-free firms as a percentage of sample firms each year is between 5.91% and 22.90% and has steadily increased over time. Figure 1 also shows this trend of an increasing proportion of debt-free firms during the entire sample period. On average, 12.18% of the sample firm years are debt-free. Another salient feature of debt-free firms is that their size measured by total assets (item 6) is much smaller than that of debt firms, which is about 6 to 10 times the size of debt-free firms. To see whether debt-free firms use more equity financing as a substitute for debt financing, we also examine the common (item 60) and preferred (item 130) stock as percentages of total assets. The amount of common equity for debt-free firms represents 76.89% of total assets, which is significantly greater than 48.13% for debt firms. The proportion of preferred stock for debt-free firms is not significantly different from that of debt firms, implying that debt-free firms are using mostly common equity as a means of financing.

Table II

Table II shows the number of firms with various debt-free years during the sample period and the mean and median percentages of debt-free years relative to the number of

years observed (number of debt-free years / total number of years observed). About 70% of firms are associated with no debt-free year, which suggests that about 30% of firms have had at least one year of debt-free capital structure during our sample period. A small number of firms have operated without debt for most of the sample period. For most firms (about 95%), however, debt-free years are limited to fewer than six years—which is, on average, one-half of the years observed.[5] The results suggest that most firms' debt-free capital structures are transitory.

Table III

Table III reports the distribution of debt-free and debt firms across two-digit SIC codes. Metal Mining, Holding and Other Investment Offices, Pipelines (except Natural Gas), Business Services, and Legal Services industries have especially high numbers of debt-free firms (more than 20%). Twelve industries have more than 15% debt-free firms. Debt-free firms are not uncommon in most industries.

3. Empirical Implications

Given that such a significant number of firms are debt-free and that the number of debt-free firms has grown to over 20% of sample firms in recent years, it's intriguing to see why firms become debt-free. In order to address this question, we have recourse to existing theories and empirical regularities that specify the relationship between leverage and firm characteristics. We incorporate the implications of existing theories and previous findings in order to motivate the empirical analyses that follow.

[5] To address the potential problem associated with consecutive debt-free years, we conduct unreported year-by-year analysis and find similar results to the tabulated results in Sections 4 to 6.

3.1. Financing Constraints

Stiglitz and Weiss (1981) suggest that market frictions may cause firms to be rationed by their lenders, leading some firms to appear under-levered relative to unconstrained firms. Thus, when estimating a firm's leverage, it is important to consider not only determinants of its desired leverage (the demand side) but also the constraints on a firm's ability to increase its leverage (the supply side). Faulkender and Petersen (2006) show that firms with access to the public debt market use much more debt than do firms without such access. The Almeida, Campello and Weisbach (2006) model also provides an explanation with regard to why firms' leverage ratios seem too low to be explained by standard tradeoff theories that emphasize the costs of financial distress. When firms face financing constraints so severe that the firms cannot raise any external capital, they rely solely on internal funds and become debt-free, even though there are no costs of financial distress. Bolton and Feixas (2000) also argue that small growing firms would like to reduce information dilution costs by funding their investments through bank loans or bond issues but are not able to obtain bank loans or issue bonds because of their high risk. In addition, small growing firms are in the stage of reputation acquisition with little favorable track records of borrowing (Diamond (1991)) and are most likely to be turned down for credit. Thus, the only option for these firms is equity financing, which incurs greater dilution costs but is more feasible. Barclay, Smith and Morellec (2006) and Byoun (2008a) also suggest that—due to higher costs and lower benefits of debt—firms in the development stage with lack of financial flexibility will abstain from issuing risky debt. Thus, firms with borrowing constraints may become debt-free.

3.2. Profitability, Investment Opportunities and Dividends

According to the pecking order theory (Myers (1984) and Myers and Majluf (1984)), firms with enough profits to fund their investment outlays are more likely to become debt-free, as they rely solely on internal funds. As noted by Fama and French (2002), however, the pecking order prediction regarding leverage is complicated by the firm's concern for future as well as current financing costs. Dynamic capital structure models also emphasize the importance of considering future financing needs in determining the current capital structure

(Goldstein et al. (2001), Hennessy and Whited (2005), and Byoun (2008a)). These models imply that—given the adjustment costs of capital structure or adverse selection costs—firms may become debt-free in order to prepare for large capital expenditures in the near future or to exploit future investment opportunities. Barclay et al. (2001) also present a model showing that growth options can have a negative impact on debt. Thus, firms with large expected investments may become debt-free in order to avoid either forgoing future investments or financing them with new risky securities.

The agency models of Jensen and Meckling (1976), Easterbrook (1984), and Jensen (1986) suggest that firms with more profitability commit a larger fraction of their earnings to debt payments or dividend payouts in order to prevent managers from wasting free cash flow. Since dividend and debt are substitutes for controlling free-cash-flow problems (Easterbrook (1984), and Fama and French (2002)), firms with large profits may pay large dividends instead of using debt. Thus, mature firms with more profits relative to investment opportunities may address the agency problem of free cash flow with large dividends as a substitute for debt and become debt-free.

DeAngelo and DeAngelo (2006) argue that high dividend payouts control agency costs without high leverage, thus preserving a firm's options to increase its equity issuance capacity. La Porta, et al. (2000) also view dividends as a means of establishing a reputation for moderation of expropriating shareholders. This view relies crucially on the need for firms to raise external capital. Thus, the reputation for good treatment of shareholders is worth the most for firms with a great need of external financing in order to raise external equity on attractive terms. This view implies that firms with better growth prospects have a stronger incentive to establish a reputation for future external financing and hence pay higher dividends. Gomes (2000) further shows that in the presence of agency problems and asymmetric information, a firm's ability to build a reputation and its cost of equity financing are unrelated to its growth opportunities as long as the firm can finance growth prospects by issuing safe debt. In other words, reputation can be credibly developed for treating shareholders well only when firms are mainly dependent upon equity for their financing. Accordingly, growing firms that have built up a good reputation through high

dividend payouts may become debt-free by raising external equity on favorable terms.

3.3. Market Timing

Baker and Wurgler (2002) argue that a firm's capital structure reflects the cumulative impact of managers' attempts to time the market such that they sell shares when overvalued by the market and repurchase shares when undervalued. Welch (2004) finds that firms with stocks underperforming the market have high debt ratios while firms with stocks outperforming the market have low debt ratios. Leary and Roberts (2004), in their study of pecking order theory of capital structure, conclude that most equity issues are undertaken by opportunistic firms attempting to take advantage of high stock prices. Helwege and Liang (2004) and Alti (2006) also suggest that hot market IPOs are driven by opportunistic behavior by managers to take advantage of greater investor optimism. These studies suggest that firms issue equity when market value is high as investors are over-optimistic about firms' earning prospects. Thus, we hypothesize that firms with high market valuation rely on external equity in order to take advantage of overvalued stock prices and are likely to become debt-free.

4. Univariate Analyses

4.1. Financing Constraints

In order to examine whether financing constraints that firms face in raising external capital are attributable to firms' becoming debt-free, we proxy financing constraints by firm size, cash holdings, tangible assets, capital-intensity ratio, S&P short-term and long-term credit ratings, and S&P stock quality ranks.

Firm size is related to asymmetric information, asset volatility, and the costs of public borrowing. Thus, small firms are more constrained and more likely to become debt-free than are large firms. We define firm size in three different ways: based on book value of total assets (item 6); market value of total assets (book value of total assets minus book value of equity plus market value of equity (item6 − item 60 + item 199 × item 25)); and

net sales (item 12), but the results are similar and we therefore report only those based on the book value of total assets. Since firm size is expected to be correlated with other variables, we divide the sample into size quintiles each year and compare other variables between debt-free and debt firms within each quintile.

Almeida, Campello and Weisbach (2006) suggest that constrained firms should hold more cash in their balance sheets than should unconstrained firms. Calomiris, Himmelberg, and Wachtel (1995) also classify firms with high cash holdings as relatively constrained because they accumulate cash as precautionary savings in order to avoid the high costs of being financially constrained or distressed in the future. Consistent with this argument, Opler et al. (1999), Minton and Wruck (2001), Graham (2000), and Byoun (2008a) show that cash holdings are negatively related to leverage. Accordingly, we expect that firms with large cash holdings are more constrained and are more likely to become debt-free than are firms with small cash holdings. Cash holding is defined as the ratio of cash and marketable securities to total assets ([item 162 + item 238] / item 6).[6]

An extensive theoretical and empirical body of literature suggests that collateral constraint is an important factor in firms' borrowing decisions (e.g., Bernanke and Gertler (1989), Whited (1992), and Kiyotaki and Moore (1997)). Tangible assets—defined as the ratio of property, plant, and equipment to total assets (item 8 / item 6)—support debt financing because they naturally serve as collateral (Fama and French (2002) and Frank and Goyal (2005)). Thus, we expect that firms with fewer tangible assets are more likely to become debt-free than are firms with more tangible assets.

Relatively low capital intensity implies high fixed costs of employee compensation (e.g., coupon payments for debt) and high incentive costs of employees in cases of financial distress (Opler and Titman (1994) and Babenko (2003)). Thus, low-capital-intensive (high-labor-intensive) firms are more constrained than are high-capital-intensive (low-labor-intensive)

[6] Including accounts receivable (item 2) in addition to cash and marketable securities or using short-term investments (item 193) instead of marketable securities produces almost identical results. We also examine the current ratio (item 4 / item 5) and the quick ratio ([item 4 - item 3] / item 5) as broad measures of financial constraint. The results are similar and are therefore not reported.

firms. This is also consistent with MacKay and Phillips (2002) and Williams (1995), who suggest that capital-intensive firms use more leverage than do labor-intensive firms. Babenko (2003) also shows that employees of companies facing financial difficulties do not apply enough efforts, making the financial distress costs higher for labor-intensive firms. Thus, firms with high labor intensity are more likely to become debt-free. We define capital intensity as fixed assets divided by number of employees (item 8 / item 29) adjusted for the industry median based on 2-digit SIC.

Table IV

Table IV reports the firm characteristics related to financing constraints and the proportion of debt-free and debt firms for each of the size quintiles. We drop observations with missing values in any of the reported variables or zero for the number of employees reported (since this variable is used as a denominator in the capital intensity ratio). The table shows that debt-free firms are concentrated in smaller size quintiles, with 21.90% being debt-free in the smallest size quintile while only 2.56% are debt free in the largest size quintile. Large debt firms use more long-term debt and less short-term debt than do small debt firms, which is consistent with the result in Barclay and Smith (1995). This may reflect the fact that small firms utilize more bank debt relative to public debt than do large firms.

The proportion of cash and marketable securities tends to be negatively correlated with firm size and is significantly greater for debt-free firms (ranging from 12.28% to 32.41% of total assets) than for debt firms (ranging from 4.76% to 12.97%). The pair-wise difference in means within each size quintile is statistically significant as indicated by close-to-zero p-values of t tests. For all size quintiles, tangible assets—as proportions of total assets—are significantly greater for debt firms (between 27.62% and 38.50%) than for debt-free firms (between 14.90% and 24.92%), suggesting that firms with a large portion of assets in intangible forms tend to become debt-free. Also, large firms tend to have more tangible assets. The capital-intensity ratio tends to be significantly smaller for debt-free firms than for debt firms. Thus, labor-intensive firms are more closely associated with a debt-free

capital structure than are capital-intensive firms.

Following Faulkender and Petersen (2006), we also use firms' long-term credit ratings (item 280) and short-term commercial paper ratings (item 283) as proxies for accessibility to the public debt markets. Faulkender and Petersen (2006) and Lemmon and Zender (2004) find that leverage ratios of firms with credit ratings are significantly higher than are those of firms without ratings. We also examine S&P common stock quality rank (item 282) as a measure of relative accessibility to equity market.[7] According to S&P's description, common stock quality rank measures a stock's "relative standing based on earnings, dividends, growth and stability within long-term trend." Firms without credit ratings but with good stock ranks are more likely to use equity exclusively and to become debt-free.

Table V

In Panel A of Table V, we assign 0 to 6 as the lowest to highest credit ratings and stock quality ranks. For example, a long-term credit rating of AAA is assigned to 6; AA to 5; A to 4; BBB to 3; BB to 2; B to 1; and below B to 0. Panel B of Table V shows long- and short-term credit ratings and common stock quality ranks based on our numerical classification of the ratings/ranks for debt and debt-free firms. We report the number of observations (N) in the column next to each measure. The results show that small debt-free firms rarely have credit ratings. Short-term credit ratings are concentrated on firms in the largest quintile, while long-term credit ratings are concentrated on firms in quintiles 4 and 5. The overall credit ratings for debt-free firms are worse than are those for debt

[7] We also measure firms' degrees of equity dependence by KZ score as used by Baker, Stein and Wurgler (2003). Based on parameter estimates from Kaplan and Zingles (1997), Baker, Stein and Wurgler (2003) construct a KZ score as follows:

$$KZ = -1.002CF_t/A_{t-1} - 39.368DIV_t/A_{t-1} - 1.315C_t/A_{t-1} + 3.139LEV_t,$$

where CF is cash flow, DIV is cash dividends (item 19 + item 21), C is cash balance (item 1), and LEV is leverage ratio ([item 9 + item 34] / [item 9 + item 34 + item 216]). Higher values of KZ indicate more constraints to equity financing. However, we find no systematic differences in KZ among debt-free and debt firms.

firms. On the other hand, debt-free firms tend to have better stock quality ranks than do debt firms. Equity market conditions relative to debt market conditions are more favorable for debt-free firms. Financing decisions—especially for small firms—appear to be affected by their comparative advantages or the borrowing constraints that they face in the capital market.

4.2. Investment Opportunities, Profitability and Dividends

If firms simply become debt-free by relying solely on internally generated funds, debt-free firms are likely to be more profitable than are debt firms. On the other hand, if firms become debt-free in order to reduce the likelihood of having to issue risky securities or to forgo profitable future growth/investment opportunities, then debt-free firms are likely to have more expected investments than debt firms. Accordingly, we examine firms' profitability and expected growth/investment opportunities. We also examine firms' dividends in order to examine whether debt-free firms are paying high dividends as a substitute for leverage in the presence of large free cash flows or as an effort to please shareholders so that they can raise external equity on favorable terms without the adverse effect of agency problem.

We measure a firm's profitability by operating cash flow (OCF, item 13) and free cash flow (FCF) divided by total assets.[8] We use market-to-book asset ratio (MB), R&D expenses (item 46), advertising expenses (item 45) and net investment (NI) as measures for growth/investment opportunities.[9] We measure dividend payout by cash dividends (item

[8] We follow Frank and Goyal (2003) and Byoun (2008) in defining free cash flows: For firms reporting format codes (item 318) 1 to 3, FCF equals Income Before Extra Items (item 123) + Discontinued Operation (item 124) + Depreciation and Amortization (item 125) + Deferred Taxes (item 126) + Equity in Net Loss (item 106) + Gain/Loss from Property, Plant & Equipment Sales (item 213) + Other Funds from Operations (item 217) + Other Sources of Funds (item 218). For firms reporting format code 7, item 218 is replaced by Exchange Rate Effect (item 314).

[9] We follow Frank and Goyal (2003) and Byoun (2008) in defining net investment: For firms reporting format codes (item 318) 1 to 3, NI equals Capital Expenditures (item 128) + Increase in Investments (item 113) + Acquisitions (item 129) + Use of Funds (item 219) − Sale of Property, Plant & Equipment (item 107) − Sale of Investments (item 109). For firms reporting format code 7, NI equals item 128 + item 113 + item 129 − item 107 −

127) divided by total assets.

Table VI

Table VI reports MB, R&D expenses, advertising expenses (AD), operating cash flow, free cash flow, net investment and the spread between net investment and free cash flow ($NI - FCF$) scaled by total assets across size quintiles.

For all size quintiles, debt-free firms have significantly greater MB than do debt firms. The difference in MB between debt-free and debt firms is much more profound for larger quintiles. Smith and Watts (1992), Rajan and Zingales (1995), Fama and French (2002) and Frank and Goyal (2004) also find that MB is negatively related to leverage, which is usually interpreted as reflecting a need to retain growth options under the trade-off theory. Under the pecking order theory, more profitable firms use less debt but have higher market values. Thus, a high MB firm would have low leverage. MB has also been used as a measure of equity market valuation (Baker and Wurgler (2002)). Firms that are trying to take advantage of overpriced equity (high MB) will replace debt with equity, which also implies that firms with high MB are likely to be less levered than are firms with low MB.

The table further shows that debt-free firms' R&D and advertisement spendings are significantly greater than are those of debt firms. Previous studies (e.g., Bradley, Jarell, and Kim (1984), Long and Malitz (1985), Titman and Wessels (1988), Minton and Wruck (2001), and Fama and French (2002)) also find a negative relationship between leverage and R&D spending.

Profitability measured by operating cash flow and free cash flow shows an unexpected pattern: The cash flows are lower for small debt-free firms than for small debt firms (in quintiles 1 and 2), whereas the cash flows are higher for large debt-free firms than for large debt firms (in quintiles 4 and 5). The average net investment (NI) suggests that debt-free firms—especially small debt-free firms—incur much less investment spending than do debt firms of similar size. This result suggests that debt-free firms incur much less

item 109 − Short-Term Investments (item 309) − Other Investment (item 310).

capital expenditures (in tangible forms) but much more R&D and advertisement expenses (in intangible forms) than do debt firms.

Cash flow deficit ($NI - FCF$) is much greater for debt-free firms than for debt firms in the smallest size quintile, which suggests that small debt-free firms invest more than internally generated funds. On the other hand, the cash flow deficits for debt-free firms in size quintiles 4 and 5 are negative and lower than they are for debt firms in the same size quintiles, suggesting that large debt-free firms generate more cash flows than do their investment needs. The table also shows that across all size quintiles, debt-free firms pay out more to shareholders as cash dividends than do debt firms. Small debt-free firms pay exceptionally large dividends relative to debt firms of similar size .

In summary, the results in Table VI suggest that debt-free firms have higher market-to-book ratios due to as yet unexercised growth options as reflected on R&D and advertisement spending, rather than growth options currently being exercised, as reflected on investment spending. Small debt-free firms are less profitable than are small debt firms. Thus, it is not likely that high market-to-book ratios for small debt-free firms are the result of anticipated future profitability of assets in place. On the other hand, large debt-free firms are more profitable and have more surplus cash than are large debt firms. Thus, large debt-free firms' high market-to-book ratios reflect future growth options (R&D spending) as well as high expected profitability of assets in place. Small debt-free firms invest more than available cash flow generated from operation, whereas large debt-free firms invest less than available cash flow. These results also suggest that small debt-free firms pay large dividends while raising external equity in order to finance cash flow deficits, whereas large debt-free firms pay high dividends using surplus cash flows.

4.3. Firm Valuation, Stock Performance and Financing Activities

As noted earlier, market-to-book ratio (MB) has been used as a measure of equity market valuation in previous studies. Baker and Wurgler (2002) argue that MB has a persistent effect on capital structure. Accordingly, we examine MB for debt-free firms relative to that of debt firms over five years prior to the debt-free year. We also report stock per-

formance measured by one- and three-year monthly compounded stock returns above the equal-weighted NYSE/AMEX/NASDAQ returns. We also examine net debt issues (item 111 − item 114 + item 301) divided by total assets; sales of common and preferred equity (item 108) minus repurchases of common and preferred equity (item 115) divided by total assets; and the change in market value of equity with split adjustment.[10]

Table VII

Table VII reports the results for debt and debt-free firms.[11] The results show that debt-free firms have significantly higher MB than do debt firms throughout five years prior to the debt-free year. One- and three-year stock returns suggest that debt-free firms experience exceptionally good stock performance prior to the debt-free year. Thus, firms' debt-free capital structure may be attributable to exceptional stock performance.[12]

The net issues of total debt for debt-free firms are negative prior to the debt-free year while those of debt firms are positive. This finding suggests that debt-free firms reduce their debt for several years prior to becoming debt-free. The results further show that debt-free firms issue significantly more equity before the debt-free year than do debt firms. The

[10] We follow Fama and French (2005) in using the change in the market value of equity as a measure of equity issuance ([item 25(t) × item 27(t) − item 25($t-1$) × item 27($t-1$)] × [item 199(t) / item 27(t) + item 199($t-1$) / item 27($t-1$)] / 2, for given year t).

[11] In each of the years relative to the debt-free year, we include all available firms that survive from the prior years to the debt-free year. We apply the same criteria for debt firms. Accordingly, the sample size varies across years. The number of observations reported is based on year 0. For firms with consecutive debt-free years, we examine five years prior to the first debt-free year. We exclude firms that are debt-free for their entire sample periods. Whether or not we require firms to have at least five years of data prior to the first debt-free year does not alter the result.

[12] Note that significant positive stock returns above the equal-weighted NYSE/AMEX/NASDAQ returns may reflect survivorship bias—as we require one- or three-year returns for the sample firms. However, our focus is not on the abnormal return itself, but rather on the difference in stock returns between debt firms and debt-free firms. Our examination of the number of years covered in the Compustat database indicates that there is no systematic difference between debt and debt-free firms' survival.

annual changes in the market value of equity for debt-free firms have significantly outpaced those of debt firms prior to the debt-free year, ranging between 12.56% and 24.08% for debt-free firms versus between 5.46% and 7.80% for debt firms over the five-year period prior to the debt-free year.

To summarize, debt-free firms experience particularly good stock performance and issue equity while reducing debt over many years prior to becoming debt-free. It appears that debt-free firms rely mainly on external equity capital in order to reduce debt when the market valuation is highly favorable; this finding is consistent with the market timing hypothesis.

4.4. Discussion

Our main findings from the univariate analysis point to borrowing constraints and equity market conditions as key explanations for firms' becoming debt-free. In several respects, equity market conditions are found to be most favorable for debt-free firms; debt-free firms experience particularly good stock performance and favorable market valuation while facing many borrowing constraints. Even though high market valuation and good stock performance for debt-free firms appear to be consistent with the market timing hypothesis, debt-free firms' high dividend payouts and investment activities seem to breed favorable equity market conditions such as these. High dividend payouts by debt free firms are well received by shareholders as they address shareholders' concerns for agency problems. High dividend payments by small debt-free firms work to build their reputations for addressing the agency problem of expropriating outside shareholders (La Porta et al (2000)), which allows them to raise external equity on favorable terms. Such efforts are especially credible for small growing debt-free firms as they become exclusively equity-dependent, which is consistent with the Gomes (2000) model. Large debt-free firms' high dividend payments, on the other hand, mitigate the need for leverage to reduce the agency costs of currently generated free cash flow. Accordingly, large debt-free firms use surplus cash flow to pay large dividends while reducing existing debt to become debt-free—without deteriorating their equity valuation due to shareholders' concern for agency costs of free cash flow.

Figure 2 and Figure 3

We further investigate how such large profitable debt-free firms use their surplus cash after becoming debt-free. If such profitable debt-free firms keep assuaging shareholders' concern for agency costs of free cash flow, then they are likely to repurchase their shares while increasing regular dividends. Indeed, this is exactly what we find in Figures 2 and 3, which show the net new equity issues and dividend payouts around the debt-free year, respectively, for small and large debt-free and debt firms.[13] Net equity issues after the debt-free year for large debt-free firms are negative and significantly lower than are those for large debt firms, suggesting that large debt-free firms actually repurchase shares after becoming debt-free (Figure 2.B). In contrast, small debt-free firms continue to use much more external equity than do small debt firms—even after becoming debt-free (Figure 2.A). The repurchasing activities of large debt-free firms make it difficult to fit the debt-free capital structure solely into the market timing effect. Our unreported results also show that debt-free firms maintain very low leverage ratios over the five-year period after becoming debt-free, suggesting that they mainly use equity for their external financing needs. Also, regardless of firm size, debt-free firms pay significantly higher dividends prior to and following the debt-free year (Figure 3). Interestingly, they pay more dividends after becoming debt-free. It appears as if some firms increase dividends in order to build a further reputation for their future needs of additional funds.

Coupled with evidence that debt-free firms face much harsher borrowing constraints than do debt firms, debt-free firms' high dividend payouts appear to reflect efforts to keep the accessibility of the equity market on favorable terms by mitigating the agency costs of free cash flow, the success of which is illustrated by good stock returns and high market valuations. We now turn to logit analysis in the next section in order to examine the relative

[13] Small firms are those in the first two smallest quartiles each year, while large firms are those in the largest two quartiles each year; the firms in the third quartile are dropped. We also find similar figures when we divide small and large firms based on the median asset size each year without dropping any observations.

importance of our proxy variables in explaining the probability of firms becoming debt-free.

5. Regression Analysis

5.1. Logit Regression

In order to determine relative importance of the factors related to the debt-free capital structure, in this section we estimate a logit choice model in which the dependent variable is zero for debt firms and one for debt-free firms.

$$Pr(y = 1) = \frac{1}{1 + e^{\alpha + X\beta}}. \tag{1}$$

We provide evidence of the robustness of our estimates from alternative specifications in the next section. Based on the univariate analysis in the previous section, we include the following independent variables for the logit regressions:

$Size$ = logarithm of total assets adjusted by GDP deflator with 2000 as a base year;

$Cash$ = cash and marketable securities divided by total assets;

TA = tangible assets measured by property, plant and equipment divided by total assets;

CI = capital intensity measured by total fixed assets divided by the number of employees;

OCF = operating cash flow divided by total assets;

Div = common stock cash dividends divided by total assets and missing Div is set to zero;

Div_D = dummy variable that equals one for firms with missing Div and zero otherwise;

$R\&D$ = research and development expenditures divided by total assets and missing $R\&D$ is set to zero;

$R\&D\_D$ = dummy variable that equals one for firms with missing $R\&D$ and zero otherwise;

AD = advertising expenses divided by total assets;

MB = market-to-book ratio of assets;

$Ret3$ = prior three-year stock return minus the corresponding equal weighted NYSE/AMEX/NASDAQ returns;

$CRating$ = dummy variable equal to one for firms with a long-term credit rating and zero otherwise;

$SRank$ = common stock quality rank as scaled in Table V and all non-ranked firm-year observations are set to zero;

$Lease5$ = five-year lease commitments (item 95) divided by total assets; and

$TShields$ = deprecation and amortization (item 14) and deferred tax and investment tax credit (item 35) divided by total assets.

Table VIII presents the estimation results of the logit model. Regressions with various combinations of independent variables yield similar results. Accordingly, we report the estimates of three regressions with and without variables related to credit ratings, stock ranks, five-year lease commitments and non-debt tax shields.[14] The negative intercepts simply suggest that debt-free firms are less common than are debt firms. The effects of other variables are consistent with the results in the previous section, as shown by the significant coefficient estimates.

Table VIII

In order to see the effects on probability (rather than on odds ratio) of changing a predictor from one level to another, we estimate the marginal probability corresponding to one standard deviation change around the mean (i.e., change from one-half standard deviation below to one-half standard deviation above the mean) of each explanatory variable

[14] We include $Lease5$ and $TShields$ to see the effects of non-debt tax shields and debt-like off-balance-sheet liabilities, which we further investigate in Section 6. The sample period is limited to 1985-2006 when rating information is included.

except for dummy variables, holding all other variables at their respective means.[15] The marginal probability is reported beside each parameter estimate. For example, from the first regression, controlling for other firm characteristics, an increase from one-half standard deviation below to one-half standard deviation above the mean cash balance increases the probability of firms becoming debt-free by 23.57%. The results show that the likelihood of being classified as debt-free relative to debt is particularly greater for firms with greater cash balances, fewer tangible assets, and higher dividend payments. Operating cash flows, R&D expenses and advertising expenses are also associated with relatively high marginal probabilities. The long-term credit rating dummy variable ($CRating$) is also highly significant and negative, which suggests that the existence of a long-term credit rating decreases the probability of a firm becoming debt-free by 9-10%. On the other hand, lease commitments and non-debt tax shields do not significantly affect the likelihood of becoming debt-free. An unexpected result is the negative coefficient estimate for a three-year stock returns ($Ret3$) prior to the debt-free year.[16] When we estimate the logit regression without MB and OCF (not reported), the coefficient estimates on stock returns become positive, suggesting that prior stock returns have limited ability in explaining the likelihood of firms becoming debt-free.

Overall, our logit regressions confirm the results from the univariate analyses that debt-free firms are associated with large cash holdings, large dividends, high profitability, large growth opportunities, and borrowing constraints.

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[15] For a given value of $x = X$ and the parameter estimate $\widehat{\beta}$, the probability is computed as follows:

$$\widehat{P}(y = 1) = \frac{\exp(X\widehat{\beta})}{1 + \exp(X\widehat{\beta})}, \quad \text{for} \quad j = 1, 2. \tag{2}$$

[16] We find a similar result when we use a one-year prior return instead of a three-year prior return.

5.2. Other Specifications and Robustness Checks

In this section, we address potential concerns about model specification and other estimation issues. First, in the logit regressions, we use the method of White (1980) to correct for the standard errors for cross-sectional heteroskedasticity; we also use the Fama and MacBeth (1973) approach, in which the coefficients are estimated by the averages from year-by-year cross-section regressions and the time series standard errors of the estimated coefficients are used to draw inferences. Second, we estimate the regressions with different combinations of variables in order to include the different sets of variables available for different time periods and to mitigate multicollinearity in the variables. Third, we run probit regressions as alternatives to logit regressions. Fourth, we estimate the regressions with lagged variables in order to address the issue of endogeneity. The results are qualitatively similar and we are confident that the results are not driven by any misspecification or peculiarity in the data.

For an additional robustness check, we estimate the regressions with different panels divided into various periods. Separate regressions allow us to examine whether the determinants of debt-free policy change over time. Some firm characteristics that are significant in the pooled cross-sectional logit regressions are not significant across all panels with subperiods. Specifically, the effects of R&D on the likelihood of following debt-free policy are less significant in the pre-1990 period panels. The effects of tax shields are significant and positive in the pre-1990 period panels, whereas their effects are weaker and reversed in the post-1990 period panels.

Lastly, we estimate the regressions for samples divided into small and large firms based on the median of total assets. We find that the effects of capital intensity ratio on the likelihood of becoming debt-free are significant and negative for large firms, whereas they are not significant for small firms. This finding suggests that large firms with high capital intensity are less likely to become debt-free. Also, the effect of operating cash flow on the likelihood of becoming debt-free is much more significant for large firms than it is for small firms. This is consistent with our univariate results that large firms' debt-free capital structures result from the replacement of debt with internal funds while small firms'

debt-free policies result from heavy reliance on external equity.

In summary, although there are some differences over time and across firm size, our primary findings from logit regressions are robust and consistent with the univariate results in the previous section.

6. Alternative Explanations as to Why Firms Become Debt-free

In this section, we explore alternative explanations as to why firms become debt-free. First, dynamic capital structure models emphasize the importance of considering future financing needs in determining the current capital structure (Goldstein et al. (2001) and Hennessy and Whited (2005)). These models suggest that firms may lower leverage in order to prepare for large acquisitions or capital expenditures in the near future. This implies that the debt-free capital structure is transitory. Accordingly, we examine leverage ratios, acquisitions and capital expenditures around the debt-free year. In an unreported analysis, we find that debt-free firms increase debt on a very small scale following the debt-free year and operate with negligible debt even five years after the debt-free year. Also, there is no evidence that debt-free firms significantly increase their spending on acquisitions and capital investments. This stands in contrast to Minton and Wruck (2001), who argue that firms' low leverage is largely transitory. Our results show that debt-free firms tend to keep very low leverage persistently.

According to the DeAngelo and Masulis (1980) model, firms with ample non-debt tax shields may become debt free. There is also evidence that U.S. corporations have been taking a host of other (newer) non-debt tax shelter alternatives (Desai (2003), Desai and Dharmapala (2005), and Graham and Tucker (2005)). Graham and Tucker (2005) find that firms engaging in tax shelter activities use less debt. Stefanescu (2005) also points out that pension plans have the features of debt in that pension contributions are tax deductible and that failure to make mandatory contributions leads to bankruptcy. She documents that including pension assets and liabilities significantly increases firms' leverage. If debt-free firms are over-burdened with other off-balance-sheet liabilities, then their debt-free policies could be justified from the perspective of the tradeoff theory. Thus, observing more non-

debt tax shields and off-balance-sheet liabilities among debt-free firms is consistent with the argument that these firms become debt-free because they achieve their tax deductions from non-debt sources.

We measure non-debt tax shields by deprecation and amortization (item 14) and deferred tax and investment tax credit (item 35) divided by total assets. We also directly measure tax rate (item 16 / [item 16 + item 53 × item 54], zero if negative) in order to examine whether or not debt-free firms pay more taxes than do debt firms. For off-balance-sheet liabilities, we first measure one- and five-year operating lease commitments (item 96 and item 95, respectively) divided by total assets. We also calculate the aggregate levels of pension assets as the sum of Pension Plan Assets of Overfunded Plans (item 287) and Pension Plan Assets of Underfunded Plans (item 296) divided by total assets. Following Stefanescu (2005), the expected pension liabilities are calculated as the sum of the Pension Projected Benefit Obligation of Overfunded Plans (item 286) and the Pension Projected Benefit Obligation of Underfunded Plans (item 294) divided by total assets. We report the difference between the aggregate levels of pension assets and the expected pension liabilities as pension net worth. We also examine pension expenses (item 43) divided by total assets in order to determine whether or not debt-free firms spend more for pension plans. Pension information is available in Compustat from 1991 on.

Table IX

Table IX shows that non-debt tax shields (depreciation, amortization and tax credit) of debt-free firms are significantly less than are those of debt firms. Surprisingly, though, debt-free firms pay no more taxes than do debt firms. Debt-free firms appear to engage in a variety of transactions that minimize taxes.[17] The table also shows that the overall

[17] Desai and Dharmapala (2005) report that—according to a review of typical tax shelter transactions and the policy issues provided by the U.S. General Accounting Office (2004) from 1996 to 2000—approximately one-third of large U.S. corporations reported zero tax liability and, by 2000, 53% of large U.S. corporations (a minimum of either $250 million in assets or $50 million in gross receipts) reported tax liabilities lower than $100,000. Desai (2003), Desai and Dharmapala (2005), and Graham and Tucker (2006) show that firms

five-year lease commitments are significantly lower for debt-free firms than they are for debt firms, while the one-year lease comitments are not significantly different between debt-free and debt firms at the 5% level. The table further shows that overall pension liabilities of debt-free firms are significantly smaller than are those of debt firms. When off-balance-sheet liabilities are substituted for debt, debt-free-firms are expected to have more—not fewer—of these liabilities. Overall, non-debt tax shields and off-balance-sheet liabilities cannot explain why firms are debt-free.

Next, we examine debt-free firms' governance structures compared to those of debt firms. If managers prefer less than the value-maximizing level of debt (because they personally suffer bankruptcy costs and have less discretion in more levered firms), then they are expected to take actions that reduce debt when their control increases. Jung, Kim, and Stulz (1996) find evidence consistent with the presumption that managerial discretion causes some firms to issue equity when they should issue debt. Berger, Ofek and Yermack (1997) find that managers prefer to use debt conservatively. In general, managers with more shares and options of their firms are more likely to make decisions to maximize shareholder wealth than are managers with fewer shares and options of their firms. Accordingly, if a debt-free capital structure is the result of non-value-maximizing decisions, then we expect managers of debt-free firms to hold fewer shares and options than do those of debt firms. In order to examine this possibility, we obtain data from the Compustat Execucomp database, which contains demographic and compensation data for all of the CEOs of firms in the S&P 500, S&P MidCap 400 and S&P SmallCap 600 since 1992.

For managerial incentives, we examine the number of common shares, vested options held by the CEO, and the number of years the CEO has been in office. If the CEO owns more stocks and options, she is expected to have a stronger incentive to make value-maximizing capital structure decisions (Berger et al. (1997)). Alternatively, Lewellen (2006) argues that stock-based compensation exposes the manager to firm-specific risk and gives her an incentive to keep a low debt level. The CEO's control over internal monitoring mechanisms increases as her tenure lengthens (Berger et al. (1997)). Following Malmidier and Tate

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engage in tax shelter activities.

(2005), we also examine whether the CEO also holds the title of Chairman of the Board. In addition, we examine the proportion of executives who are also directors (inside directors), the number of board meetings per year, and the percentage of shares and shares entitled for options held by other executives. These additional measures are intended to assess the CEO's autonomy and the monitoring of the CEO by other high-ranking company executives.

Due to the necessity of CEO compensation data, we restrict our attention solely to firms in the Execucomp universe starting from 1992. Table X shows the results. On average, CEOs and other managers of debt-free firms hold more shares as well as more options of their firms (CEO Shares and Inside Shares) than do those of debt firms. This result contrasts Lewellen (2006), who finds that leverage is positively associated with CEOs' option ownership and negatively with CEOs' stock ownership. However, our results also show that small debt-free firms' CEOs tend to hold fewer shares than do small debt firms' CEOs. Overall, it is difficult to attribute the debt-free capital structure to managers' incentives.

Table X

The CEO tenures of debt-free firms—especially large firms—are typically longer than are those of debt firms. The proportion of executives who are also directors (Inside Director) is smaller for debt-free firms than for debt firms. Small debt-free firms tend to have more board meetings than do small debt firms, whereas large debt-free firms tend to have fewer board meetings than do large debt firms. The proportion of firms in which CEOs also hold chairmanship of the board tends to be lower for debt-free firms. Overall, the results in Table X do not support the hypothesis that extreme debt conservatism results from managerial entrenchment.

Finally, we examine whether or not debt-free firms are more likely to be delisted from exchanges due to acquisitions. If the managers of debt-free firms make non-value-maximizing decisions, then these firms are more likely to be taken over by other firms. The free cash flow theory (Jensen (1986)) predicts that firms that have done exceptionally well and generated large free cash flows that managers refuse to pay out to investors are likely to be targets of

takeover. We find that there is no significant difference between debt-free and debt firms in the proportion of firms delisted due to acquisitions.

7. Summary and Conclusion

We investigate debt-free firms. Our results suggest that firms become debt-free when facing borrowing constraints with favorable equity market conditions. Debt-free firms pay, on average, significantly higher dividends than do debt firms. Such high dividend payouts appear to mitigate shareholders' concern for the agency problems of expropriation for small growing debt-free firms and of free cash flow for large profitable debt-free firms. Small debt-free firms become debt-free by replacing existing debt with new external equity while paying exceptionally high dividends despite having less profit relative to investment opportunities. On the other hand, large debt-free firms, generating large free cash flows from operations, pay off debt while paying out excess cash through large dividends. Even though firms' debt-free capital structure can be attributed to high market valuation and good stock performance, debt-free firms' high dividend payouts and investment activities seem to create these favorable equity market conditions. Thus, an important issue for future study is whether the correlation between market valuation and capital structure stems from managers' attempts to take advantage of overvalued stock, as suggested by the market timing hypothesis, or their efforts to keep the accessibility to external equity on favorable terms. Our logit regressions also confirm that debt-free firms are associated with borrowing constraints, favorable equity market conditions, and high dividend payouts.

In conclusion, borrowing constraints and equity market conditions have important bearings on firms' debt conservatism and, hence, on their financing decisions. However, we do not seek to distinguish whether debt-free firms do not actively tap into other capital markets in favor of one type of capital or if they choose to rely exclusively on one type of capital due to market constraints. A firm might use more external equity after having first established a good perspective and a good reputation about its stock or it might resort to equity financing after discovering that it is unable to issue debt at attractive terms. We find evidence for both perspectives. On the one hand, debt-free firms face significant bor-

rowing constraints. On the other hand, the dividend policies of debt-free firms, appear to reflect their efforts to retain the accessibility of equity financing. By paying high dividends, debt-free firms address shareholders' concerns for the agency problem and maintain their ability to raise equity capital on favorable terms without excessively adverse effects. Such efforts are especially credible for growing debt-free firms since these firms are exclusively equity-dependent and have many borrowing constraints. These firms may also use dividends to bid up the stock price and thus decrease the dilution effect of raising capital (John and Williams (1985)). Also, high dividends for large profitable debt-free firms appear to substitute for leverage as a means of addressing the agency problem of free cash flow. A further investigation of the substituting the role played by dividend for managerial discipline and leverage in addressing agency problems is left for a future study.

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Figure 1. Number of Debt and Debt-free Firms: 1971-2006

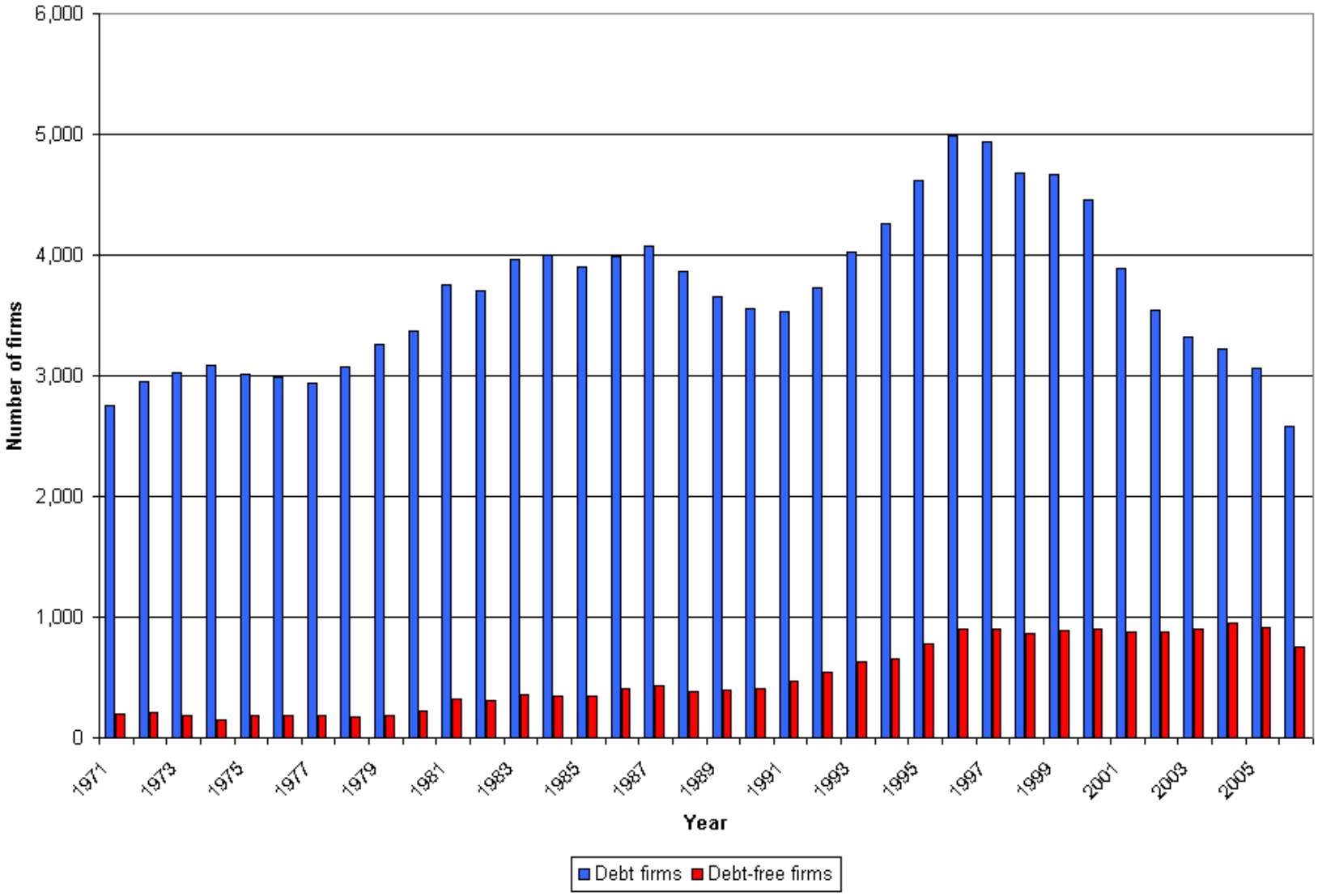
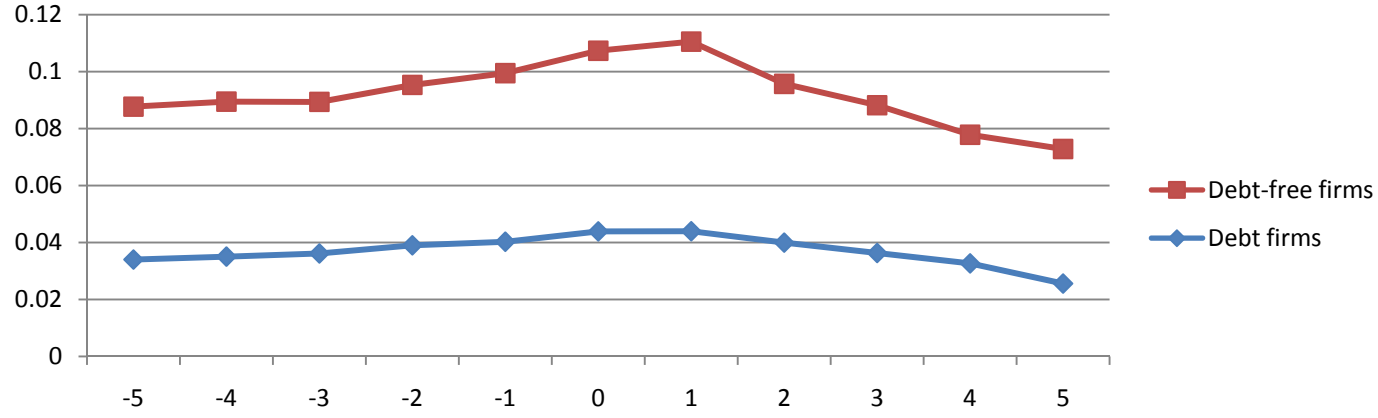


Figure 2. Net Equity Issues (as Percentage of Total Assets) around Debt-free Year

A. Small firms



B. Large firms

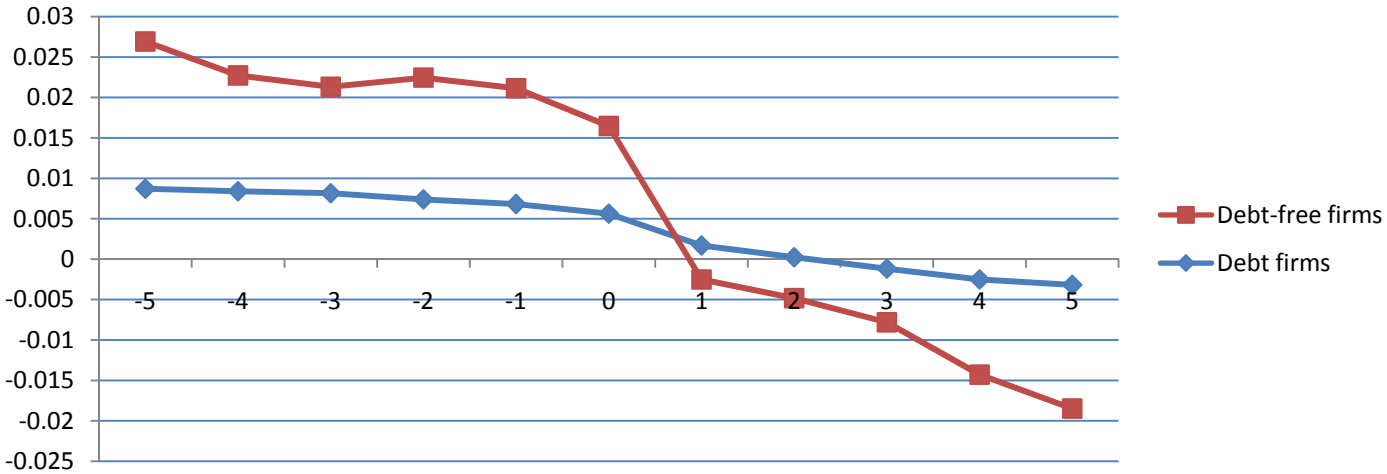
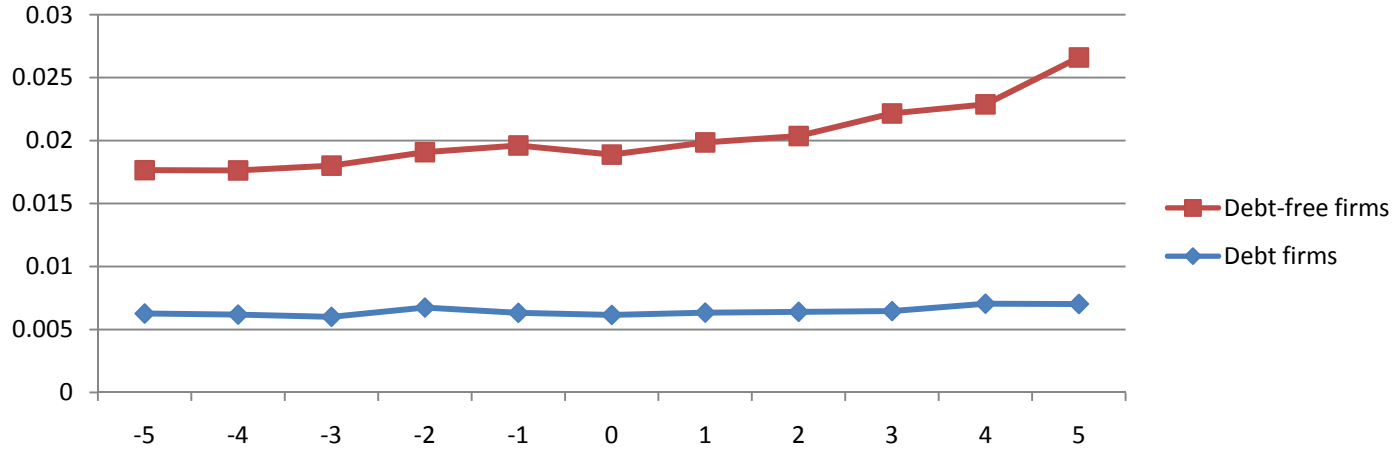


Figure 3. Cash Dividends (as Percentage of Total Assets) around Debt-free Year

A. Small Firms



B. Large Firms

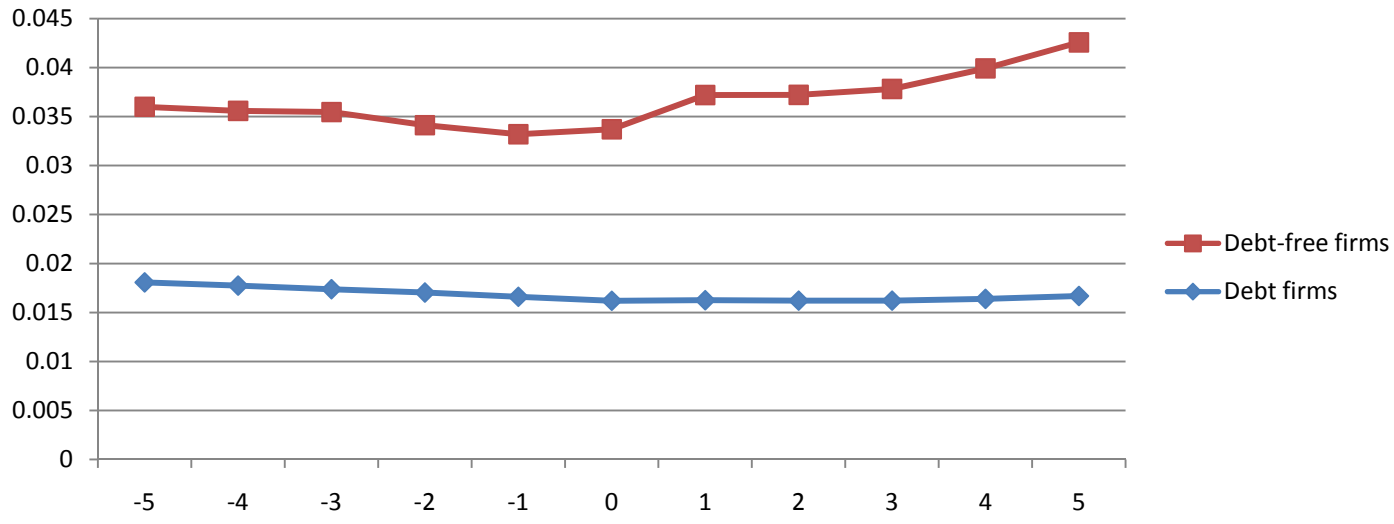


Table I. Summary Statistics

The data consist of 150,810 firm-year observations from Compustat for the period 1971-2006. Debt firms are firms with any level of debt and debt-free firms are firms with no debt. Total Assets are book value of assets in millions of dollars. MV of E is the market value of equity in millions. ST (LT) debt is the short-term (long-term) debt divided by total assets. Common (Preferred) is the book value of common (preferred) stock divided by total assets. N represents the number of observations each year. In the last column (%) is the percentage of debt or debt-free firms relative to the total number of sample firms.

Year	Debt	Total Assets	MV of E	ST debt	LT debt	Common	Preferred	N	%
1971	**Debt**	259.38	236.43	0.0759	0.2030	0.5039	0.0088	2,752	93.38
	Debt-free	47.14	113.74	0.0000	0.0000	0.7815	0.0025	195	6.62
1976	**Debt**	382.71	244.84	0.0615	0.2007	0.4869	0.0061	2,993	94.09
	Debt-free	54.08	73.62	0.0000	0.0000	0.7505	0.0003	188	5.91
1981	**Debt**	518.13	264.74	0.0727	0.1904	0.4783	0.0068	3,751	92.21
	Debt-free	37.71	47.77	0.0000	0.0000	0.7939	0.0023	317	7.79
1986	**Debt**	632.84	466.22	0.0825	0.1937	0.4721	0.0068	3,991	90.79
	Debt-free	47.89	88.76	0.0000	0.0000	0.8004	0.0094	405	9.21
1991	**Debt**	1064.98	820.35	0.0774	0.1827	0.4759	0.0090	3,536	88.16
	Debt-free	65.04	159.10	0.0000	0.0000	0.7842	0.0056	475	11.84
1996	**Debt**	1057.94	1142.32	0.0595	0.1788	0.4988	0.0080	4,989	84.76
	Debt-free	105.94	368.52	0.0000	0.0000	0.7763	0.0098	897	15.24
2001	**Debt**	2062.07	2750.83	0.0661	0.1766	0.4920	0.0103	3,886	81.62
	Debt-free	290.75	1159.06	0.0000	0.0000	0.7585	0.0131	875	18.38
2002	**Debt**	2212.30	1915.50	0.0598	0.1790	0.4804	0.0083	3,547	80.21
	Debt-free	323.84	866.69	0.0000	0.0000	0.7342	0.0113	875	19.79
2003	**Debt**	2542.08	2628.32	0.0529	0.1804	0.4832	0.0084	3,318	78.70
	Debt-free	374.57	1080.80	0.0000	0.0000	0.7485	0.0087	898	21.30
2004	**Debt**	2815.71	3024.04	0.0480	0.1725	0.4929	0.0079	3,222	77.14
	Debt-free	381.90	1154.66	0.0000	0.0000	0.7501	0.0102	955	22.86
2005	**Debt**	3024.36	3232.12	0.0459	0.1722	0.4927	0.0079	3,067	77.10
	Debt-free	346.78	1073.68	0.0000	0.0000	0.7494	0.0105	911	22.90
2006	**Debt**	3517.33	4076.93	0.0399	0.1812	0.4950	0.0053	2,580	77.43
	Debt-free	459.27	1447.66	0.0000	0.0000	0.7479	0.0090	752	22.57
All	**Debt**	1075.88	1070.00	0.0685	0.1895	0.4813	0.0080	132,444	87.82
	Debt-free	177.38	629.38	0.0000	0.0000	0.7689	0.0079	18,366	12.18

Table II. The Distribution of Firms across the Number of Debt-free Years

The data consist of 150,810 firm-year observations (15,686 firms) from Compustat for the period 1971-2006. Debt firms are firms with any level of debt and debt-free firms are firms with no debt. Debt-free years represent the number of years during which the firm has no debt. Mean and Median show the mean and median percentage of debt-free years relative to the available sample period (# of debt-free years divided by total number of years observed).

# of debt-free years	Number of firms	Percentage	Cumulative Percentage	Mean	Median
0	10,900	69.49	69.49	0.0000	0.0000
1	1,473	9.39	78.88	0.1215	0.0769
2	911	5.81	84.69	0.2244	0.1429
3	623	3.97	88.66	0.2901	0.2143
4	448	2.86	91.51	0.3517	0.2857
5	313	2.00	93.51	0.4239	0.3571
6	215	1.37	94.88	0.4751	0.4000
7	187	1.19	96.07	0.5285	0.4667
8	124	0.79	96.86	0.5545	0.5000
9	109	0.69	97.56	0.5798	0.5294
10	83	0.53	98.09	0.6222	0.5882
11	79	0.50	98.59	0.6056	0.5789
12	39	0.25	98.84	0.6500	0.6316
13	40	0.26	99.09	0.6574	0.6500
14	25	0.16	99.25	0.5512	0.4667
15	22	0.14	99.39	0.7416	0.7895
16	11	0.07	99.46	0.6743	0.6957
17	14	0.09	99.55	0.7881	0.7391
18	16	0.10	99.66	0.6501	0.6207
19	11	0.07	99.73	0.7572	0.7308
20	9	0.06	99.78	0.6475	0.5882
21	11	0.07	99.85	0.7700	0.7500
22	6	0.04	99.89	0.7857	0.7586
23	4	0.03	99.92	0.7419	0.6389
24	5	0.03	99.95	0.7229	0.6667
25	2	0.01	99.96	0.6944	0.6944
26	1	0.01	99.97	0.7222	0.7222
27	0	0.00	99.97	0.0000	0.0000
28	0	0.00	99.97	0.0000	0.0000
29	0	0.00	99.97	0.0000	0.0000
30	2	0.01	99.97	0.8333	0.8333
31	0	0.00	99.98	0.0000	0.0000
32	0	0.00	99.98	0.0000	0.0000
33	0	0.00	99.98	0.0000	0.0000
34	1	0.01	99.99	0.9444	0.9444
35	2	0.01	100.00	0.9859	0.9722
36	0	0.00	100.00	0.0000	0.0000
Total	15,686	100.00			

Table III. Distribution of Debt and Debt-free Firms across Industries.

The data consist of 150,810 firm-year observations from Compustat for the period 1971-2006. Debt firms are firms with any level of debt and debt-free firms are firms with no debt. N represents the number of observations. % is the percentage of firms relative to the total number of firms in each industry.

Two Digit Industry Code		Debt Firms		Debt-free Firms		Total
		N	%	N	%	N
01-09	Agriculture, Forestry, and Fishing	680	88.43	89	11.57	769
10	**Metal Mining**	**919**	**79.09**	**243**	**20.91**	**1,162**
12	Coal Mining	288	96.64	10	3.36	298
13	Oil and Gas Extraction	6,197	86.25	988	13.75	7,185
14	Mining and Quarrying Of Nonmetallic Minerals, except Fuels	328	89.13	40	10.87	368
15	Building Construction General Contractors and Operative Builders	1,420	96.08	58	3.92	1,478
16	Heavy Construction Other than Building Construction Contractors	517	94.52	30	5.48	547
17	Construction Special Trade Contractors	488	92.60	39	7.40	527
20	Food and Kindred Products	4,225	92.92	322	7.08	4,547
21	Tobacco Products	168	98.82	2	1.18	170
22	Textile Mill Products	1,654	96.84	54	3.16	1,708
23	Apparel and Other Finished Products	2,026	91.84	180	8.16	2,206
24	Lumber and Wood Products, except Furniture	1,130	89.47	133	10.53	1,263
25	Furniture and Fixtures	1,275	93.68	86	6.32	1,361
26	Paper and Allied Products	1,979	95.37	96	4.63	2,075
27	Printing, Publishing, and Allied Industries	2,536	91.59	233	8.41	2,769
28	**Chemicals and Allied Products**	**9,160**	**82.20**	**1,984**	**17.80**	**11,144**
29	Petroleum Refining and Related Industries	1,123	97.06	34	2.94	1,157
30	Rubber and Miscellaneous Plastics Products	2,447	94.81	134	5.19	2,581
31	Leather and Leather Products	644	88.83	81	11.17	725
32	Stone, Clay, Glass and Concrete Products	1,537	96.55	55	3.45	1,592
33	Primary Metal Industries	2,799	96.85	91	3.15	2,890
34	Metal Products, except Machinery and Transportation Equipment	3,480	93.05	260	6.95	3,740
35	Industrial and Commercial Machinery and Computer Equipment	10,013	86.96	1,502	13.04	11,515
36	Electronic and Other Electrical Equipment and Components	10,890	86.20	1,743	13.80	12,633
37	Transportation Equipment	3,796	92.95	288	7.05	4,084
38	**Photographic, Medical and Optical Goods; Watches and Clocks**	**8,757**	**81.85**	**1,942**	**18.15**	**10,699**
39	Miscellaneous Manufacturing Industries	1,876	89.98	209	10.02	2,085
40	Railroad Transportation	504	94.38	30	5.62	534
41	Interurban Highway Passenger Transportation	83	95.40	4	4.60	87
42	Motor Freight Transportation and Warehousing	1,342	93.52	93	6.48	1,435
44	Water Transportation	480	96.97	15	3.03	495
45	Transportation by Air	1,144	97.44	30	2.56	1,174

46	**Pipelines, except Natural Gas**	**59**	**79.73**	**15**	**20.27**	**74**
47	**Transportation Services**	**456**	**83.06**	**93**	**16.94**	**549**
48	Communications	3,821	93.84	251	6.16	4,072
50	Wholesale Trade: Durable Goods	4,496	90.86	452	9.14	4,948
51	Wholesale Trade: Non-durable Goods	2,502	94.31	151	5.69	2,653
52	Building Materials Hardware / Garden Supply Mobile Home Dealers	524	96.15	21	3.85	545
53	General Merchandise Stores	1,672	96.93	53	3.07	1,725
54	Food Stores	1,527	94.96	81	5.04	1,608
55	Automotive Dealers and Gasoline Service Stations	553	98.57	8	1.43	561
56	**Apparel and Accessory Stores**	**1,333**	**80.94**	**314**	**19.06**	**1,647**
57	Home Furniture, Furnishings and Equipment Stores	876	91.92	77	8.08	953
58	Eating and Drinking Places	2,723	93.35	194	6.65	2,917
59	Miscellaneous Retail	2,850	90.02	316	9.98	3,166
70	Hotels, Rooming Houses, Camps, and Other Lodging Places	794	94.52	46	5.48	840
72	Personal Services	504	92.99	38	7.01	542
73	**Business Services**	**11,456**	**76.90**	**3,441**	**23.10**	**14,897**
75	Automotive Repair, Services and Parking	391	94.67	22	5.33	413
76	Miscellaneous Repair Services	111	91.74	10	8.26	121
78	Motion Pictures	1,198	86.75	183	13.25	1,381
79	Amusement and Recreation Services	1,477	89.62	171	10.38	1,648
80	Health Services	2,775	93.66	188	6.34	2,963
81	**Legal Services**	**12**	**66.67**	**6**	**33.33**	**18**
82	**Educational Services**	**412**	**84.95**	**73**	**15.05**	**485**
83	Social Services	235	91.44	22	8.56	257
84	Museums, Art Galleries, and Botanical and Zoological Gardens	14	100.00	0	0.00	14
86	Membership Organizations	3	100.00	0	0.00	3
87	**Engineering Accounting Research Management Related Services**	**2,396**	**81.61**	**540**	**18.39**	**2,936**
88	**Private Households**	**4**	**66.67**	**2**	**33.33**	**6**
99	**Nonclassifiable Establishments**	**1,365**	**73.19**	**500**	**26.81**	**1,865**
	Total	132,444	87.82	18,366	12.18	150,810

Table IV. Financing Constraints Faced by Debt and Debt-free Firms

The data consist of 149,434 firm-year observations (Debt firms = 131,267; Debt-free firms = 18,167) for the period 1971-2006. Observations with missing values in any of the reported variables are deleted. Size is size quintiles based on total assets. Debt firms are firms with any level debt and debt-free firms are firms with no debt. Cash is cash and marketable securities divided by total assets. The current ratio is current assets divided by current liabilities. The quick ratio is current assets minus inventory divided by current liabilities. Tangible Assets are property, plant and equipment divided by total assets. ST (LT) debt is short-term (long-term) debt divided by total assets. Capital Intensity is fixed assets divided by total number of employees. Common (Preferred) is the book value of common (preferred) stock divided by total assets. N (%) is the percentage of firms in each group relative to the total number of firms in each size quintile. P-value represents p-values from t-tests for difference in means with unequal variances.

Size		Cash	Tangible Assets	Capital Intensity	ST Debt	LT debt	N(%)
1	Debt	0.1297	0.2762	21.9610	0.1048	0.1220	78.10
	Debt-free	0.3241	0.1594	7.1130	0.0000	0.0000	21.90
	p-value	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	
2	Debt	0.1060	0.2839	36.0634	0.0851	0.1548	84.32
	Debt-free	0.2565	0.1490	23.0124	0.0000	0.0000	15.68
	p-value	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	
3	Debt	0.0885	0.3006	57.5129	0.0657	0.1838	86.99
	Debt-free	0.2219	0.1712	34.8227	0.0000	0.0000	13.01
	p-value	(0.0000)	(0.0000)	(0.0100)	(0.0000)	(0.0000)	
4	Debt	0.0690	0.3289	82.1229	0.0502	0.2284	92.25
	Debt-free	0.1741	0.2020	49.7207	0.0000	0.0000	7.75
	p-value	(0.0000)	(0.0000)	(0.0100)	(0.0000)	(0.0000)	
5	Debt	0.0476	0.3850	111.6652	0.0449	0.2420	97.44
	Debt-free	0.1228	0.2492	22.7426	0.0000	0.0000	2.56
	p-value	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	
All	Debt	0.0864	0.3177	64.6786	0.0685	0.1895	87.82
	Debt-free	0.2570	0.1684	23.6848	0.0000	0.0000	12.18
	p-value	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	

Table V. Credit Ratings and Common Stock Quality Ranks of Debt and Debt-free Firms

The data consist of 97,458 firm-year observations for the period 1985-2006. LT Credit and ST Credit are the Standard and Poor's (S&P) Issuer Credit Rating (ICR) of an issuer's overall long-term and short-term creditworthiness, respectively. Prior to September 1, 1988, LT Credit represents the issuer's senior debt rating that has been assigned to the company and ST Credit represents the issuer's commercial paper rating that has been assigned to the company. Stock Rank is S&P Stock quality rank which measures a stock's relative standing based on earnings, dividends, growth and stability within long-term trend. Each code of credit ratings and stock ranks is assigned to a number as in Panel A. Debt firms are firms with any level of debt and debt-free firms are firms with no debt. The averages of the assigned numerical values to ratings and ranks are reported in Panel B. N is the number of observations with a rating or rank in each size quintile. P-value represents p-values from t-tests for difference in means with unequal variances.

Panel A. Numerical assignments of credit rating and stock quality rank.

LT Credit	ST Credit	Stock Rank	Assigned Value
AAA	A1	A+ and A	6
AA	A2	A-	5
A	A3	B+	4
BBB	B	B	3
BB	C	B-	2
B	D	C	1
CCC and below	Suspended	D and liquidation	0

Panel B. Long-term and Short-term Credit Ratings and Common Stock Quality Ranks

Size		*ST Credit*	*N*	*LT Credit*	*N*	*Stock Rank*	*N*	*Total N*
1	**Debt**			2.0000	1	1.4650	2,830	14,534
	Debt-free			3.2857	7	1.5953	1,149	4,949
	p-value					(0.0000)		
2	**Debt**	6.0000	1	1.0000	12	1.7833	5,809	15,554
	Debt-free			1.0000	1	2.0215	1,491	3,936
	p-value					(0.0000)		
3	**Debt**			1.0181	331	2.2980	7,232	16,145
	Debt-free			1.3000	10	2.4863	1,314	3,347
	p-value			(0.1000)		(0.0000)		
4	**Debt**	5.5893	56	1.4596	3,229	2.8483	9,438	17,550
	Debt-free			1.4800	25	3.1614	1,047	1,940
	p-value			(0.9100)		(0.0000)		
5	**Debt**	5.4819	5,372	2.9462	12,918	3.7000	13,425	18,861
	Debt-free	5.2727	11	3.0448	67	3.7773	440	642
	p-value	(0.1600)		(0.5600)		(0.3100)		
All	**Debt**	5.4831	5,429	2.6149	16,491	2.7799	38,734	82,644
	Debt-free	5.2727	11	2.5273	110	2.4051	5,441	14,814
	p-value	(0.1500)		(0.4400)		(0.0000)		

Table VI. Profitability, Investment Opportunities and Dividends for Debt and Debt-free Firms

The data consist of 149,434 firm-year observations (Debt firms = 131,267; Debt-free firms = 18,167) for the period 1971-2006. Size is size quintiles based on total assets. Debt firms are firms with any level of debt and debt-free firms are firms with no debt. MB is the market-to-book asset ratio. R&D is R&D expenses divided by total assets. AD is advertising expenses divided by total assets. OCF is operating cash flow divided by total assets. FCF is free cash flow divided by total assets. NI is net investment divided by total assets. NI-FCF is the difference between NI and FCF. Dividend is cash dividends divided by total assets. P value represent p-values from t-tests for difference in means with unequal variances

Size	Debt	MB	R&D	AD	OCF	FCF	NI	NI – FCF	Dividend
1	Debt	2.5375	0.1199	0.0494	-0.1224	-0.0906	0.0788	0.1690	0.0033
	Debt-free	3.2951	0.2233	0.0547	-0.3745	-0.2480	0.0182	0.2649	0.0236
	p-value	(0.0000)	(0.0000)	(0.3800)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
2	Debt	1.7132	0.0861	0.0440	0.0572	0.0444	0.0895	0.0453	0.0060
	Debt-free	2.5083	0.1384	0.0530	0.0120	0.0182	0.0592	0.0417	0.0163
	p-value	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.5300)	(0.0000)
3	Debt	1.5976	0.0600	0.0437	0.1056	0.0826	0.1022	0.0197	0.0085
	Debt-free	2.6184	0.1019	0.0548	0.1002	0.0903	0.1004	0.0101	0.0145
	p-value	(0.0000)	(0.0000)	(0.0000)	(0.1000)	(0.0100)	(0.5900)	(0.0100)	(0.0000)
4	Debt	1.5366	0.0405	0.0417	0.1328	0.1027	0.1059	0.0036	0.0112
	Debt-free	2.6861	0.0692	0.0571	0.1637	0.1383	0.0974	-0.0415	0.0216
	p-value	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0100)	(0.0000)	(0.0000)
5	Debt	1.5409	0.0302	0.0397	0.1443	0.1128	0.1026	-0.0105	0.0172
	Debt-free	2.9808	0.0720	0.0537	0.1759	0.1495	0.0994	-0.0506	0.0204
	p-value	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.4900)	(0.0000)	(0.0200)
All	Debt	1.7615	0.0663	0.0435	0.0701	0.0555	0.0965	0.0410	0.0096
	Debt-free	2.8570	0.1474	0.0546	-0.0814	-0.0410	0.0599	0.1005	0.0194
	p-value	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)

Table VII. Firm Valuation, Stock Performance, and Financing Activities for Debt and Debt-free Firms

The data consist of 109,571 firm-year observations (Debt firms = 97,308; Debt-free firms = 12,263) for the period 1971-2006. Size is size quintiles based on total assets. Debt firms are firms with any level of debt and debt-free firms are firms with no debt. Net Total Debt Issues are net total debt issues divided by total assets. Net Equity Issues are net equity issue divided by total assets. ΔMarket Equity is changes in market value of equity. MB is the market-to-book asset ratio. One-Year Stock Return is prior one-year stock return above the equal weighted one-year NYSE /AMEX /NASDAQ returns. Three-Year Stock Return is prior three-year stock return above the equal weighted three-year NYSE /AMEX /NASDAQ returns. P-value represents p-values from t-tests for difference in means with unequal variances.

Years relative to debt-free year		-5	-4	-3	-2	-1	0
MB	**Debt**	1.6407	1.6429	1.6554	1.6705	1.7005	1.7162
	Debt-free	2.7698	2.7172	2.7760	2.8728	3.0354	3.2367
	p-value	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
One-Year Stock Return	**Debt**	0.0417	0.0382	0.0348	0.0289	0.0228	0.0115
	Debt-free	0.0943	0.0813	0.1006	0.0964	0.0869	0.0749
	p-value	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Three-Year Stock Return	**Debt**	0.1377	0.1276	0.1197	0.1015	0.0872	0.0636
	Debt-free	0.2646	0.2458	0.2779	0.2886	0.2587	0.2391
	p-value	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Net Total Debt Issues	**Debt**	0.0144	0.0142	0.0147	0.0161	0.0175	0.0196
	Debt-free	-0.0037	-0.0054	-0.0073	-0.0074	-0.0088	-0.0150
	p-value	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Net Equity Issues	**Debt**	0.0184	0.0197	0.0212	0.0231	0.0249	0.0269
	Debt-free	0.0445	0.0450	0.0486	0.0523	0.0583	0.0681
	p-value	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
ΔMarket Equity	**Debt**	0.0549	0.0589	0.0629	0.0691	0.0780	0.0738
	Debt-free	0.1256	0.1268	0.1432	0.1542	0.1879	0.2408
	p-value	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)

Table VIII. Logit Regressions for the Effects of the Firm Characteristics on the Type of Debt Policy

Debt firms are firms with any level debt and debt-free firms are firms with no debt. The dependent variable equals 1 for debt-free and 0 for debt firms. Independent variables are as follows: Size = Logarithm of total assets adjusted by GDP deflator as a base year; Cash = Cash and marketable securities divided by total assets; TA = Tangible assets measured by property, plant and equipment divided by total assets; CI = Capital intensity measured by total fixed assets divided by the number of employees; OCF = Operating cash flow divided by total assets; DIV = Common stock cash dividends divided by total assets; Div_D = Dummy variable equal to one if a firm' dividend is missing, zero otherwise; R&D = Research and development expenditures divided by total assets; R&D_D = Dummy variable equal to one for missing R&D and zero otherwise; AD = Advertising expenses divided by total assets; MB = Market-to-book ratio of assets; Ret3 = Prior three-year stock return above the equal weighted one-year NYSE /AMEX /NASDAQ returns; CRating = Dummy variable equal to one if the firm has S&P long-term credit rating, zero otherwise; SRank = Common stock quality rank as scaled in Table V; Lease5 = Lease commitments for the next five years divided by total assets; and TShield = Deprecation, amortization, deferred tax, and investment tax credit divided by total assets. Year dummies are included to control for time series effects variable. ** (*) denotes significance at the 1% (5%) level.

	Parameter Estimate	Marginal Probability	Parameter Estimate	Marginal Probability	Parameter Estimate	Marginal Probability
Size	-0.3429**	-0.0218	-0.2697**	-0.0124	-0.2329**	-0.0126
Cash	3.7102**	0.2357	4.0052**	0.1840	3.9698**	0.2146
TA	-2.5996**	-0.1651	-2.5500**	-0.1171	-2.6459**	-0.1430
CI	0.0001**	0.0000	0.0001**	0.0000	0.0002**	0.0000
OCF	1.5234**	0.0968	1.3321**	0.0612	1.3483**	0.0729
Div	6.4511**	0.4098	3.2681**	0.1501	2.4687**	0.1334
Div_D	-0.2150**	-0.0138	-0.1001*	-0.0046	-0.1008*	-0.0055
RD	1.0426**	0.0662	1.3429**	0.0617	1.5123**	0.0817
RD_D	-0.0992**	-0.0063	-0.0430	-0.0020	-0.0391	-0.0021
AD	1.3757**	0.0874	1.7509**	0.0804	1.7642**	0.0954
MB	0.1417**	0.0090	0.1332**	0.0061	0.1290**	0.0070
Ret3	-0.0376**	-0.0024	-0.0475**	-0.0022	-0.0467**	-0.0025
CRating			-2.6939**	-0.0871	-2.7466**	-0.1044
SRank			0.2203**	0.0101	0.2158**	0.0117
Lease5					0.1308	0.0071
Tshield					-0.1139	-0.0062
Intercept	-1.5041**		-2.0463**		-1.9948**	
Observations	81530		39565		31155	
Pseudo R2	0.2152		0.2457		0.2425	

Table IX. Non-debt Tax Shields, Pension Obligations and Lease Commitments for Debt and Debt-free Firms

The data consist of 149,434 (76,043) firm-year observations for the period 1971-2006 (1991-2006 for pension information). Debt firms are firms with any level of debt and debt-free firms are firms with no debt. Tax shields are deprecation, amortization, deferred tax, and investment tax credit divided by total assets. Tax rate is income tax divided by before-tax earnings. One- and five-year operating leases are lease commitments for one and five years, respectively, divided by total assets. Pension liabilities are the sum of the Pension Projected Benefit Obligation of Overfunded Plans and the Pension Projected Benefit Obligation of Underfunded Plans divided by total assets. Pension net worth is the sum of Pension Plan Assets of Overfunded Plans and Pension Plan Assets of Underfunded Plans divided by total assets minus pension liabilities. Pension expenses are pension expenses divided by total assets. P-value represents p-values from t-tests for difference in means with unequal variances.

Size	Debt	Tax Shields	Tax Rate	One-Year Lease	Five-Year Lease	Pension Net Liabilities	Pension Net Worth	Pension Expenses
1	**Debt**	0.0639	0.2179	0.0481	0.1645	0.0289	0.0268	0.0058
	Debt-free	0.0514	0.2471	0.0574	0.1513	0.0234	0.0222	0.0139
	p-value	(0.0000)	(0.6800)	(0.5300)	(0.4100)	(0.4800)	(0.5400)	(0.3500)
2	**Debt**	0.0613	0.3019	0.0347	0.1272	0.0701	0.0692	0.0056
	Debt-free	0.0475	0.2773	0.0305	0.1072	0.0384	0.0347	0.0070
	p-value	(0.0000)	(0.4100)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.4900)
3	**Debt**	0.0633	0.3913	0.0317	0.1200	0.1068	0.1009	0.0058
	Debt-free	0.0537	0.3631	0.0322	0.1287	0.0961	0.1133	0.0046
	p-value	(0.0000)	(0.4500)	(0.6200)	(0.1100)	(0.5800)	(0.6800)	(0.0100)
4	**Debt**	0.0695	0.4251	0.0297	0.1037	0.1315	0.1247	0.0056
	Debt-free	0.0560	0.3540	0.0360	0.1414	0.1007	0.1027	0.0055
	p-value	(0.0000)	(0.0500)	(0.1000)	(0.0000)	(0.0000)	(0.0400)	(0.5900)
5	**Debt**	0.0844	0.4127	0.0188	0.0724	0.1511	0.1508	0.0059
	Debt-free	0.0655	0.3667	0.0234	0.0922	0.0803	0.0883	0.0078
	p-value	(0.0000)	(0.1200)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0700)
All	**Debt**	0.0690	0.3556	0.0315	0.1140	0.1187	0.1157	0.0058
	Debt-free	0.0521	0.2989	0.0398	0.1302	0.0579	0.0607	0.0077
	p-value	(0.0000)	(0.0400)	(0.0800)	(0.0000)	(0.0000)	(0.0000)	(0.3400)

Table X. Governance Structures of Debt, Debt-free and Long-term-debt-free Firms

The data consist of 100,082 firm-year observations (Debt firms = 89,323; Debt-free firms = 10,759) for the period 1992-2006. Debt firms are firms with any level of debt and debt-free firms are firms with no debt. CEO shares (options) is the proportion of shares (shares entitled to options) owned by the CEO relative to outstanding shares. Inside shares (options) is the proportion of shares (shares entitled to options) owned by executives relative to outstanding shares. CEO tenure is the number of years the CEO has been in office. Inside director is the proportion of executives who are directors. Board meetings is the number of meetings per year. CEO chair is a dummy variable equal to one if the CEO is also the chairperson of the board of directors and zero otherwise. P-value represents p-values from t-tests for difference in means with unequal variances.

Size	Debt	CEO Shares	CEO Options	Inside Shares	Inside Options	CEO Tenure	Inside Director	Board Meeting	CEO Chair
1	**Debt**	0.0378	0.0113	0.0364	0.0186	5.6667	0.2684	7.5127	0.0735
	Debt-free	0.0159	0.0185	0.0251	0.0318	7.2500	0.2473	8.4034	0.0466
	p-value	(0.0500)	(0.1300)	(0.0100)	(0.0000)	(0.3000)	(0.0500)	(0.0000)	(0.1000)
2	**Debt**	0.0593	0.0137	0.0740	0.0258	5.4157	0.2807	7.6991	0.0594
	Debt-free	0.0556	0.0209	0.0710	0.0378	5.0676	0.2868	6.9575	0.0511
	p-value	(0.7800)	(0.0000)	(0.6100)	(0.0000)	(0.5100)	(0.4600)	(0.0000)	(0.4200)
3	**Debt**	0.0371	0.0125	0.0697	0.0258	6.6820	0.2832	6.7240	0.0636
	Debt-free	0.0401	0.0131	0.0642	0.0308	7.1544	0.2863	6.8234	0.0716
	p-value	(0.4300)	(0.4500)	(0.2700)	(0.0100)	(0.2000)	(0.3800)	(0.2400)	(0.1400)
4	**Debt**	0.0386	0.0104	0.0577	0.0212	7.8799	0.3035	6.7031	0.0839
	Debt-free	0.0569	0.0087	0.0848	0.0192	9.3341	0.2963	6.4497	0.0884
	p-value	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0100)	(0.0000)	(0.3100)
5	**Debt**	0.0214	0.0057	0.0326	0.0129	7.3859	0.3079	7.4016	0.1088
	Debt-free	0.0331	0.0080	0.0540	0.0156	9.1751	0.2802	6.8129	0.0917
	p-value	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0100)
All	**Debt**	0.0284	0.0077	0.0433	0.0165	7.4235	0.3040	7.1636	0.0972
	Debt-free	0.0461	0.0110	0.0706	0.0234	8.2640	0.2885	6.7041	0.0807
	p-value	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)