Testing the Market Timing Theory of Capital Structure

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Abstract

This paper examines time-series patterns of external financing decisions. Consistent with the market timing theory of capital structure, publicly traded U.S. firms fund a much larger proportion of their financing deficit with net external equity when the expected equity risk premium is lower, the first-day returns of initial public offerings are higher, and prior (post) realizations of the Fama-French value factor are lower (higher). Inconsistent with the pecking order theory, equity issues are frequent, and announcement effects of seasoned equity offerings are only weakly related to the volume of external equity financing. Inconsistent with the static tradeoff theory, firms adjust very slowly toward target leverage, and past securities issues have strong and long-lasting effects on capital structure even after controlling for target leverage.

1. Introduction

Firms may fund their investment projects with internally generated funds, debt, and/or external equity. What determines their financing decisions? The static tradeoff theory and the pecking order theory try to address this question.

Under the static tradeoff theory, firms compare the costs and the benefits of debt. The costs of debt include potential bankruptcy costs and agency conflicts between bondholders and shareholders. The benefits of debt include the deductibility of interest expenses and the mitigation of agency conflicts between managers and shareholders. According to the static tradeoff theory, if firms seek external financing, they should issue equity when their leverage is above the desired target leverage, issue debt when their leverage is below the target, or issue debt and equity proportionately to stay close to the target.

The pecking order theory proposes that firms follow the standard pecking order in their financing decisions. Firms prefer internally generated funds, and raise external funds only if internal funds are insufficient. If external funds are required, they prefer straight debt, then convertible debt, and finally external equity. Target leverage is of second-order importance under the pecking order theory. Firms may take "extended excursions away from their targets" because of past profits and losses and their financing needs (Myers (1984)).

How successful are these two theories in explaining the time-series patterns of financing activities? Figure 1A shows the average financing activities of publicly traded U.S. firms from 1963 to 2001, using information from the balance sheet. The average firm increasingly relied on the external capital market over this period. In the choice between debt and equity, firms issued increasingly more external equity relative to debt in the 1990s. These facts are inconsistent with the pecking order prediction that securities issues, especially equity issues should be rare.

The averages weigh the financing activities of small firms heavily. To capture the economic significance of large firms, Figure 1B shows the aggregate financing activities. At the aggregate level, firms issue more debt than external equity during almost all years. The aggregate amount of net external equity peaked at over seven percent of aggregate assets in 2000. Again, this pattern cannot be easily reconciled with the pecking order prediction that equity issues should be a last resort and a rarity. Both the average and aggregate net debt and equity issuance fluctuates substantially. The static tradeoff theory has been unable to provide a satisfactory explanation for the magnitude of these fluctuations.

A third theory, the market timing theory, has increasingly challenged both the static tradeoff theory and the pecking order theory. The market timing (or windows of opportunity) theory, states that firms prefer external equity when the cost of equity is low, and prefer debt otherwise. According to the market timing theory, corporate executives sometimes perceive their risky securities as misvalued by the market. Conditional on having financing needs, firms issue equity when they perceive the relative cost of equity as low, and issue debt when they perceive the relative cost of equity as high. How do they judge the relative cost of equity? On the one hand, they may know themselves or their industries better. On the other hand, they may follow certain psychological patterns. For example, reference points, as suggested by prospect theory, may play a role.[1]

The pecking order theory assumes semi-strong form market efficiency, while the market timing theory does not rely on this assumption. If markets are not semi-strong form efficient, then external equity is not necessarily more expensive than external debt, and a firm might want to take advantage of a temporary overvaluation of debt or equity by raising external capital before the overvaluation disappears. Therefore, while the pecking order theory predicts equity issues to be rare, the market timing theory does not make such a prediction. In fact, the standard pecking order is just a special case under the market timing theory. We summarize different financing hierarchies under different scenarios in Table 1. Under normal market conditions, firms follow the standard pecking order. When external equity is less expensive than debt, firms prefer external equity if they seek external financing. When external equity is really cheap, issuing equity is the first choice. Similarly, when debt is really cheap, issuing debt becomes the first choice. Firms may issue equity or debt even if they have no immediate financing needs and do not need to adjust their capital structure, because issuing overvalued securities is itself a positive NPV project.

Fama and French (2004) document that equity issues have been increasingly frequent and firms issue equity even when they could have used internally generated funds or issued debt. They interpret this as evidence against the pecking order theory. They suggest that new external

[1] Casual conversations with investment bankers suggest that when they advise their clients on the choice between debt and external equity financing, the most important factor they consider is whether their clients' stock prices are at a 52-week high.

equity financing tools, such as stock-financed acquisitions and employee stock option plans, involve less severe information asymmetry, leading to the increased use of external equity financing over time. However, they do not provide an explanation for why firms are more likely to fund acquisitions with external equity in the 1990s, and why employee stock option plans, which have been around for a long time, have become more popular over time as a mechanism for external equity financing. Furthermore, even within each decade, financing activities show substantial variations that need to be explained.

Like Fama and French (2004), we question the importance of the pecking order theory. Our study also goes one step further. We find that by dropping the assumption of semi-strong form market efficiency, the market timing theory based on the relative cost of equity provides a better explanation for observed time-series patterns of financing decisions than alternative theories. To our knowledge, our study is the first to systematically link the time series of capital structure choices to the time-varying relative cost of equity for a large sample of U.S. publicly traded firms, other than the Korajczyk, Lucas, and McDonald (1990) analysis.

We begin with the pecking order test in Shyam-Sunder and Myers (1999), who run a regression with a firm's change in debt as the dependent variable and its financing deficit as the explanatory variable. Instead of pooling all years together, we conduct this pecking order test each year, examine time-series properties of the slope coefficient, and link it to proxies for the time-varying relative cost of equity. Our proxies for the cost of equity include lagged values of the implied equity market risk premium, the average first-day return of initial public offerings (IPOs), and the average closed-end fund discount. We also include lagged realized market returns, and the realizations of the Fama-French size factor SMB and value factor HML. Since the pecking order theory assumes that markets are semi-strong form efficient, the announcement effect associated with equity issues should be the primary proxy for the level of information asymmetry. The average announcement effect of seasoned equity offerings (SEOs) is thus included to directly test the pecking order theory.

Consistent with the market timing theory, firms fund a large proportion of their financing deficit with external equity when the cost of equity is low, and fund a large proportion of their financing deficit with debt when the cost of equity is high. The magnitude of the effect is economically and statistically significant. For example, an increase in the implied equity market risk premium from three percent to four percent results in approximately three percent more (e.g., from 32 percent to 35 percent) of the financing deficit being funded with net debt.

Frank and Goyal (2002) and others have documented that the pecking order slope coefficient has weakened over time. Lemmon and Zender (2002) argue that the weakening of the standard pecking order in the 1990s is due largely to the increased proportion of small growth firms among the pool of publicly traded firms. They argue that these small growth firms are debt-constrained, and must fund their growth opportunities with external equity. Our study shows that small growth firms rely heavily on debt financing, and only resort to equity markets when the cost of equity is low. This finding is consistent with the market timing theory rather than the debt market constraints view. Furthermore, excluding small growth firms from our sample does not change our qualitative results, although the magnitude of the change is reduced.

Mergers and acquisitions are frequent. Consistent with the market timing theory, firms are less likely to make stock-financed acquisitions from 1974 to 1978 when the relative cost of equity was high, and more likely to do so from 1996 to 2001 when the relative cost was low (see also Dong, Hirshleifer, Richardson, and Teoh (2004), and Rhodes-Kropf, Robinson, and Viswanathan (2004)). However, firms involved in mergers and acquisitions do not drive our major results.

The static tradeoff theory stresses the role of target leverage in security issues and buybacks. Changing target leverage could potentially lead to swings of financing activities. To address this issue, we first estimate target leverage using lagged firm characteristics that are identified by previous studies to be important determinants of capital structure. We then re-run the pecking order tests controlling for partial adjustment toward target leverage. Consistent with Shyam-Sunder and Myers (1999), these additional tests suggest that target leverage is of only secondary importance in securities issue decisions.

Chirinko and Singha (2000) question the validity of Shyam-Sunder and Myers' pecking order tests. To gain more intuition for our regression results, we present scatter-plots of net debt financing versus net external financing for selected years for which the pecking order slope coefficient is especially strong or weak. We also conduct alternative tests. Using pre-issue firm characteristics and market conditions, we estimate logit and multinomial logit regressions to predict the propensity to issue equity. We find stronger support for the market timing theory based on the relative costs of debt versus equity. Firms are more likely to issue equity instead of debt when the implied equity market risk premium is lower, the first-day return of IPOs is higher, the closed-end fund discount is smaller, prior (post) market returns are higher (lower), prior (post) realizations of SMB are larger (lower), prior (post) realizations of HML are lower (higher), and the expected default spread is higher, even after controlling for firm characteristics. Lagged announcement effects of seasoned equity offerings are positively related to the propensity to issue equity, but are less important economically and statistically, suggesting that the assumption of semi-strong form market efficiency is questionable.

Some recent papers have examined whether historical securities issues have strong and long-lasting effects on capital structure (e.g., Kayhan and Titman (2004)). We find that the adjustment speed toward target leverage is slow, and past securities issues have strong and long-lasting effects on capital structure, after controlling for firm characteristics that determine target leverage.

The rest of this paper is organized as follows. Section 2 reviews the related literature. Section 3 describes the data and summary statistics. Section 4 presents the empirical results. Section 5 concludes.

2. Existing Capital Structure Research

In the perfect world of Modigliani and Miller (1958) with no frictions such as transaction costs and taxes, capital structure is irrelevant. Various theories have been developed through adding back frictions.

2.1. Static Tradeoff Theory

The static tradeoff theory focuses on the tradeoff between the cost of debt and the benefit of debt. Evidence supporting the static tradeoff theory is mixed. On the one hand, evidence suggests that target leverage, if it exists, is not important. Many studies find that higher profitability leads to lower leverage, inconsistent with the tradeoff prediction that more profitable firms should borrow more to reduce their tax liabilities (for example, Titman and Wessels (1988), Rajan and Zingales (1995), and Fama and French (2002b)). Graham (2000) estimates the cost and benefit of debt, and finds that large, liquid, profitable firms with low expected distress costs use debt conservatively.[2] One classic example is Microsoft, which has been very profitable

[2] Graham (2003) reviews the literature on taxes and capital structure.

and has maintained a zero-debt policy. Surveyed corporate executives also indicate that their target leverage is soft (Graham and Harvey (2001)). Jalilvand and Harris (1984) and Fama and French (2002b) show that the speed of adjustment toward target leverage is slow. Welch (2004) finds that prior stock returns are the main determinant of market leverage (leverage measured using the market value of equity), and firms do not actively offset the effects of stock returns on their capital structure.

On the other hand, several studies support the tradeoff theory. Marsh (1982), Hovakimian, Opler, and Titman (1999), Korajczyk and Levy (2003), Hovakimian (2004), and Hovakimian, Hovakimian, and Tehranian (2004) confirm the role of target leverage in security issues and repurchases. Frank and Goyal (2004) examine the relative importance of 39 factors in leverage decisions, and argue in favor of the tradeoff theory. Flannery and Rangan (2004) disagree with Welch and find that firms quickly offset the effects of prior stock price movements when target market leverage is allowed to vary with firm characteristics and firm fixed effects are controlled for. Leary and Roberts (2004) show that firms are inactive with respect to their financial policy most of the time, but do issue or buy back securities in clusters to adjust toward target leverage. Hennessy and Whited (2004) and Strebulaev (2004) try to reconcile empirical findings inconsistent with the tradeoff theory in a dynamic framework.

2.2. Pecking Order Theory

The pecking order theory is formally proposed in Myers (1984) and Myers and Majluf (1984). In the theoretical framework of Myers and Majluf, investors are willing to buy risky securities only at a discount because of the information asymmetry between managers and outside investors. Expecting this problem, managers prefer internally generated funds. External funds are raised only when internal funds are insufficient. When external funds have to be raised, firms prefer straight debt, then convertible debt, with external equity issued as a last resort. Although the information asymmetry in Myers and Majluf is one potential reason, the standard pecking order may arise for other reasons. Donaldson (1961) cites transaction costs. The preference for debt over equity could also be driven by managerial optimism (Lee (1997), Heaton (2002), and Hackbarth (2003)). Optimistic entrepreneurs are unwilling to issue external equity because they think their stock is undervalued. Graham (1999) finds that the majority of corporate executives surveyed believed that their common equity was undervalued even when the Dow was approaching 10,000 in 1999.

Empirical tests of the pecking order theory only started to receive attention more than ten years after the theory was formally proposed. Helwege and Liang (1996) find that the decision to raise external capital is unrelated to the shortfall in internally generated funds for a sample of firms that went public in 1983, inconsistent with the pecking order theory. Shyam-Sunder and Myers (1999) provide an influential empirical test of the pecking order theory against the tradeoff theory. Using a sample of 157 firms that had traded continuously from 1971 to 1989, they find that the basic pecking order model, which predicts external debt financing driven by the financing deficit, has much greater explanatory power than the static tradeoff model. Chirinko and Singha (2000) question the validity of the simple pecking order tests of Shyam-Sunder and Myers by showing that the tests may generate misleading inferences when evaluating plausible patterns of external financing. Fama and French (2002b) find that more profitable firms are less levered, consistent with the pecking order model. Frank and Goyal (2003) extend the pecking order tests for a much larger sample of U.S. firms, and find that net equity issues track the financing deficit more closely, especially in the 1990s. Lemmon and Zender (2002) argue that the large proportion of debt-constrained small growth firms weakens the standard pecking order in the 1990s. Fama and French (2004) challenge the pecking order theory by showing that firms frequently issue and repurchase equity. They suggest that external equity can be raised with financing tools that involve less information asymmetry.

Under the pecking order theory, on average any misvaluation is corrected at the announcement of equity issuance. If this is true, then time-varying announcement effects of seasoned equity offerings should help explain time-varying financing activities. Consistent with this conjecture, Choe, Masulis, and Nanda (1993), Bayless and Chaplinsky (1996), and Korajczyk and Levy (2003) find that firms are more likely to conduct seasoned equity offerings when the announcement effects are less negative.

2.3. Market Timing Theory

The static tradeoff theory and the pecking order theory implicitly assume semi-strong form market efficiency. What if capital markets are inefficient? If firms seek to minimize their cost of capital, market inefficiencies have important implications for corporate financing (Stein (1996)). A large literature on long-run stock performance suggests market inefficiency at the firm level (Loughran and Ritter (1995), Spiess and Affleck-Graves (1995), Ikenberry, Lakonishok, and Vermaelen (1995), Loughran and Vijh (1997), Billett, Flannery and Garfinkel (2001), and Hertzel, Lemmon, Linck and Rees (2002)).[3]

Several studies also suggest market inefficiency at the industry level and the market level. Loughran, Ritter, and Rydqvist (1994) document IPO clustering for 15 countries, and find that IPO volume is positively correlated with the inflation-adjusted level of the stock market in 14 of them. Pagano, Panetta, and Zingales (1998) note that the most important determinant of Italian firms' going-public decision is the industry's market-to-book ratio. They argue that the ratio is a proxy for mispricing as well as growth opportunities. Baker and Wurgler (2000) find that the share of equity in aggregate securities issuance predicts aggregate stock-market returns. Lowry (2003) shows that the volume of IPOs is partly determined by proxies for investor sentiment.

In practice, corporate executives seem to actively engage in market timing in their financing decisions. Two-thirds of corporate executives agree that "the amount by which our stock is undervalued or overvalued was an important or very important consideration" in equity issue decisions in surveys by Graham and Harvey (2001).

The key difference between the pecking order theory and the market timing theory is whether the assumption of semi-strong form market efficiency is maintained. The pecking order theory assumes markets are semi-strong efficient, thus the announcement effect of securities issues is the primary proxy for the degree of information asymmetry. The market timing theory does not rely on the assumption of semi-strong form market efficiency. Windows of opportunity exist as long as the relative cost of equity varies over time for either rational or irrational reasons.

Most of the literature relies on realized returns to estimate the cost of equity. However, Fama and French (1997) conclude that the estimation of the cost of equity using realized returns is "unavoidably imprecise" because of the difficulty in identifying the right asset-pricing model and the imprecision in the estimation of factor loadings and factor risk premia. Furthermore, what happened in the past does not necessarily repeat itself in the future. An alternative approach estimates the implied equity risk premium with valuation models using accounting fundamentals (for example, Claus and Thomas (2001), Gebhardt, Lee, and Swaminathan (2001), Ritter and Warr (2002), and Fama and French (2002a)). Although there could be plausible rational and irrational explanations for the time-variation in the expected equity risk premium, academics

[3] See Table 5 in Ritter (2003) for a summary of recent studies in this area.

tend to agree that the expected equity risk premium has declined over the last several decades. The market timing theory simply argues that the time-variation in the relative cost of equity, whether it is due to rational or irrational investors, has important implications for capital structure choices.

Only recently has empirical work started to directly link the cost of equity to capital structure. Baker and Wurgler (2002) find that an external finance-weighted average of historical market-to-book ratios is negatively related to current market leverage, and they interpret this as evidence for market timing. Aydogan (2004), Hovakimian (2004), and Kayhan and Titman (2004) confirm the existence of market timing for securities issuance, though they disagree with Baker and Wurgler on the persistence of the effect of market timing on capital structure.

3. Data and Summary Statistics

3.1. Data

The firm-level data are from CRSP and Compustat. The sample consists of firms from 1963 to 2001. To be included in the sample for calendar year t, a firm must have total assets (Compustat item 6), total liabilities (181) and retained earnings (36) for the fiscal years ending in calendar years t-1 and t. Firms must also have CRSP share codes of 10 or 11, and stock price (199) and shares outstanding (25) for the fiscal year ending in calendar year t-1 to ensure that they are publicly traded. IPO firms are thus excluded from the sample until their second fiscal year as a publicly traded firm. Missing R&D (46), capital expenditures (30), and convertible debt (79) are set to zero to avoid losing most observations in the analyses.

Utilities (4900-4949) and financial firms (6000-6999) are excluded because they were regulated during most of the sample period. A small number of firms with a format code of 4, 5, or 6 are also excluded from the sample.[4] Firm years with beginning-of-year book assets of less than $10 million, measured in terms of 1998 purchasing power, are also excluded to reduce the effect of outliers and eliminate very small firms. Finally, we exclude firm-year observations

[4] Format code 5 is for Canadian firms, and format codes 4 and 6 are not defined in Compustat.

where there was an accounting change for adoption of Statement of Financial Accounting Standards (SFAS) No. 94.[5]

3.2. Summary Statistics of Firm Characteristics

Summary statistics of firm characteristics are presented by year because we analyze the time-series properties of financing activities. Figure 1 presents financing activities using information from the balance sheet. Net debt is defined as the change in book debt. Net equity is defined as the change in book equity minus the change in retained earnings. Following Baker and Wurgler (2002) and Fama and French (2002b), book debt is defined as total liabilities plus preferred stock (10) minus deferred taxes (35) and convertible debt (79), and book equity is total assets less book debt.[6]

In Figure 1, the average ratios are the annual averages of net financing scaled by beginning-of-year assets (in percent), and the aggregate ratios are the annual aggregate amount of net financing of all firms scaled by the aggregate amount of beginning-of-year total assets (in percent). The average ratios weigh small firms heavily, while the aggregate ratios weigh large firms heavily. Focusing on the average ratios misses the economic significance of large firms, while focusing on the aggregate ratios misses the financing behavior of small firms. The average net debt increase exceeded 10 percent of beginning-of-year assets in 1966, 1968, 1973-74, 1978-79, and 1997-98. The average net equity issuance exceeded six percent in 1969, 1983, and 1992-2001. The pecking order theory gains some support during 1974-78, when the average percent of net equity issuance was below two percent. The aggregate amount of net debt issuance exceeded seven percent of the aggregate assets in 1966-68, 1974, 1978-79, 1989, and 1998-2000. The aggregate amount of net equity issuance exceeded two percent in 1966, 1969, 1980-81, 1983, and 1996-2001.

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[5] We exclude 201 such firm years identified with Compustat footnote codes. The FASB issued SFAS No. 94 in late 1987. Heavy equipment manufacturers and merchandise retailers were most affected by the standard, because they made extensive use of unconsolidated finance subsidiaries. For example, Ford, General Motors, General Electric, and International Business Machines all had a huge increase in debt on their balance sheet from fiscal year 1987 to 1988. More specifically, Ford had a debt increase of about $93.8 billion while its end-of-year total assets were $45.0 billion in 1987 and $143.4 billion in 1988, largely because Ford Credit was consolidated under the new standard. This standard also caused some firms to divest themselves of unconsolidated subsidiaries, because otherwise they would violate debt covenant agreements on the maximum amount of leverage, and their return on assets would appear too low and financial leverage would appear too high. It is desirable for future empirical studies of capital structure using lagged accounting variables to remove the inconsistencies due to accounting changes, discontinued operations, acquisitions or divestures.

[6] When preferred stock is missing, it is replaced with the redemption value of preferred stock (56). When the redemption value is also missing, it is replaced with the carrying value of preferred stock (130).

The pecking order theory predicts that equity issues should be rare. However, during most years from 1991 to 2001, the average ratio of net equity issuance was more than the average ratio of net debt issuance, inconsistent with the pecking order theory. Even at the aggregate level, net equity issuance was over four percent of assets in 1999, and over seven percent of assets in 2000.

Figure 1 uses information from the balance sheet. Alternatively, the financing deficit and net security issues and buybacks can be defined using information from the statement of cash flows (Fama and French (2002b), Lemmon and Zender (2002), and Frank and Goyal (2003)). One problem with this approach is that non-cash transactions, such as stock-finance acquisitions and exchange offers, do not show up in the statement of cash flows.[7]

Figure 2 presents financing activities using information from the statement of cash flows to get a sense of how much the statement of cash flows understates security issues and buybacks. The difference between the balance sheet and the statement of cash flows is large. For example, in 2000, the average percent of net equity peaked at about 12 percent in Figure 2, compared with about 20 percent in Figure 1. In Figure 1, the aggregate percent of net equity to assets peaked at 7.2 percent in 2000, while it was only 0.5 percent in the same year in Figure 2. Because of the difference between the balance sheet and the statement of cash flows, we check our results in section 4 using the statement of cash flows in unreported analyses. No major results are affected.

Figures 1 and 2 understate net security issues and buybacks because they are mixed together. For example, the average percent of net equity can be near zero if net equity repurchases by some firms offset net equity issues by other firms. Table 2 separates net security issues from net security buybacks. Once we separate net security issues from net security buybacks, we see much more frequent financing activities. The proportion of firms with net debt issuance of at least five percent of assets was never below 28 percent. The pecking order theory predicts the rarity of equity issues. However, the proportion of equity issuers (firms issuing at least five percent of assets) never drops below 6.6 percent in any year, peaks at over 34 percent in 1969, and is at least 25 percent from 1995 to 2001.

Since small growth firms are more likely to require external funds, we also present the proportions of debt and equity issuers for small growth firms. We annually sort all NYSE listed

[7] For example, Apple Computer issued common equity of $654 million, about 15 percent of its beginning-of-year assets of $4.3 billion, for redemption of its long-term debt in 1999. This transaction showed up on its balance sheet, but did not show up on its statement of cash flows.

firms by total assets and use the quartile cutoff points to categorize firms in our sample into four size groups. We also sort all NYSE-listed firms by asset growth and use the quartile cutoff points to categorize all our sample firms into four growth groups. In each year, small growth firms are defined as those in both the bottom size quartile and the top asset growth quartile. Small growth firms rely heavily on external debt. During all years, over 66 percent of them raised external debt of at least five percent of beginning-of-year assets. However, small growth firms do not always rely on external equity. Less than 17 percent of them raised equity of at least five percent of assets in each of the years 1974-77 (cold equity markets), while more than 50 percent of them did so each year in 1968-69, 1983, 1992-93, and 1995-2001 (hot equity markets).

The financing method of mergers and acquisitions is relevant for capital structure choices. In the last three columns of Table 2, we present the percent of debt and equity issues for firms involved in mergers and acquisitions identified with Compustat footnote codes.[8] More than 800 firms were involved in mergers and acquisitions during each of the years from 1995 to 2001. The balance sheet approach defines debt and equity issues using the difference between end-of-year and beginning-of-year assets. Different accounting practices for mergers and acquisitions may lead to complications for this definition.[9] However, it is still informative to see how the balance sheet changes when a merger or acquisition occurs. Around mergers and acquisitions, over 50 percent of firms have a net debt increase of at least five percent of beginning-of-year assets in each year of our sample period. Over 40 percent of them have a net equity increase of at least five percent in each of the years 1968-69 and 1992-2001. At the other extremity, less than 18 percent of them do so each year from 1974 to 1977. Firms seem to be more likely to fund mergers and acquisitions with net equity issuance when equity market valuation is high, consistent with the evidence in Loughran and Vijh (1997).

Table 3 reports the median firm characteristics for all firms in our sample. The median asset growth, net sales growth, and capital expenditures do not show a clear time trend. The median total assets, net sales, profitability, and tangibility have declined over time, partly because of the failure of Compustat to cover many smaller firms at the beginning of our sample

[8] Compustat footnote codes AA, AB, AR, AS, FA, FB, FC, FD, FE, and FF are used to identify all major and minor mergers or acquisitions. Compustat defines a merger or acquisition as a major one (footnote code AB) if the effects on the prior year's sales constitute 50 percent or more of the reported sales for that year.

[9] The pooling of interest method combines the balance sheet of the acquirer and the target. The purchase method adds the payment to both sides of the balance sheet of the acquirer. In practice, the two methods can be used in combination.

period in the 1960s. The market-to-book ratio for assets, often used as a proxy for Tobin's Q, is defined as market assets to book assets. It was below one from 1973 to 1979 and above one during other years.

Figure 3 plots the median book and market leverage. Book leverage is defined as book debt to book assets. Market leverage is defined as book debt to market assets. The median book leverage is quite stable, hovering around 45 percent with a slight uptrend. The median market leverage, however, fluctuates over time. It was below the median book leverage in the 1960s, above the median book leverage in most of the 1970s, and below the median book leverage in the 1980s and the 1990s. This pattern is consistent with Welch's (2004) finding that firms do not quickly rebalance away the effects of stock returns on their market leverage.

Overall, our summary statistics of firm characteristics are consistent with other studies (Fama and French (2002b), Fama and French (2004)) that cast doubt on the pecking order theory as a theory that is capable of describing most of observed capital structures and call for an alternative explanation for changing financing activities.

3.3. Summary Statistics of Time-Series Variables

Table 4 reports summary statistics of time-series variables. Our first proxy for the cost of equity is the lagged implied equity market risk premium, estimated using analyst forecasts at the year-end for the 30 stocks in the Dow Jones Industrial Average.[10] The implied equity risk premium is defined as the internal rate of return that equates the current stock price to the present value of all future cash flows to common shareholders of the firm, minus the risk-free rate (the return on one-month Treasury bills from Ibbotson Associates). The equally weighted average of the implied equity premium for each of the Dow 30 stocks is used as an estimate of the equity risk premium for the market. The time-variation of the implied equity risk premium may be due

[10] By using the lagged year-end values, we are using the Dec. 31 of year t-1 accounting information and stock price during year t for a firm with a Dec. 31 fiscal year. For a firm with a June 30 fiscal year, we use the June 30 of year t-1 accounting information and Dec. 31 of year t-1 stock price during year t. Our study closely follows Ritter and Warr (2002) and corrects for inflation-induced distortions in the estimation of the implied equity risk premium. We use forecasts from Value Line for 1968-1976 and from I/B/E/S for 1977-2001. We hand-collected Value Line data from *Value Line Investment Survey* for early years when the I/B/E/S database was not available. Because previous studies document that I/B/E/S and Value Line analysts make systematically different forecasts, we estimate the implied equity risk premium for 1977 using analyst forecasts from both sources and then adjust the implied equity risk premia for 1968-1976 by multiplying the ratio of the 1977 premium using I/B/E/S and the 1977 premium using Value Line. Brav, Lehavy, and Michaely (2003) estimate the implied equity risk premium using target prices and future dividends from Value Line for 1975-2001. Using their series instead does not change our major results.

to either the time-variation of risk aversion of investors (a rational reason) or the time-variation of investor sentiment (an irrational reason).

If investors occasionally become overly optimistic, then the cost of equity for firms is low when this occurs. The average first-day return of IPOs and the closed-end fund discount are two well-known proxies for investor sentiment. The first-day returns of IPOs are sensitive to investor sentiment because IPO firms have no observable market price prior to the offering, and many of them have little operating history and face a lot of uncertainties (Ibbotson, Sindelar, and Ritter (1994), and Lowry and Schwert (2002)).

The discount on a closed-end fund is the difference between its net asset value (NAV) and market price as a fraction of its NAV. The average discount is the value-weighted average of discounts on closed-end funds.[11] Lee, Shleifer, and Thaler (1991) find that closed-end funds are mostly held by individual investors, and argue that investor sentiment explains much of the variation of the discount. When their sentiment is high, investors pay relatively more for shares of closed-end funds, and the discount is smaller.

We use realized returns as alternative proxies for the cost of equity. Lowry (2003) uses future market returns as a proxy for investor sentiment and finds that there is a negative relation between IPO volume and future market returns for the U.S., a pattern also documented by Loughran, Ritter, and Rydqvist (1994) for nine out of 13 other countries. If the cost of equity falls, then future stock-market returns should be low. Marsh (1982), Korajczyk, Lucas, and McDonald (1990), Loughran and Ritter (1995), and others document that aggregate equity issuance is positively related to past stock-market performance. Although there are other possible explanations, past market returns may reflect changes in the cost of equity. A stock market run-up may occur if the equity premium falls.

We also include the lagged realizations of the value effect and the size effect. The value effect is defined as the difference in the average return on portfolios of value stocks and portfolios of growth stocks (HML), and the size effect is defined as the difference in the average return on portfolios of small stocks and portfolios of big stocks (SMB). The value effect may capture investor sentiment toward growth stocks. If investors become overly optimistic about growth firms following strong performance of growth stocks, then growth firms are more likely to issue equity and their subsequent performance should be poor. Similarly, the size effect may

[11] We thank Jeffrey Wurgler for providing the average discount on closed-end funds.

measure investor sentiment toward small stocks. Since the majority of stocks are small (relative to the median NYSE firm), we expect that in our regressions, where all firms are weighted equally, high realizations of SMB will be associated with more external equity financing in the next year.

We further include the lagged average announcement effect in our regressions to see whether the pecking order theory is able to explain time-varying financing activities with time-varying information asymmetry.

Our control variables include contemporaneous measures of inflation, the statutory corporate tax rate, the real GDP growth rate, and the lagged default spread. The statutory corporate tax rate has changed over time and may have a major influence on financing decisions of U.S. firms.[12] The real GDP growth rate controls for growth opportunities. The default spread, defined as the yield difference between Moody's Baa rated and Aaa rated corporate bonds at the year-end, is used as a proxy for time-varying bankruptcy costs of debt.

Inflation, measured using the Consumer Price Index, and the real rate of GDP growth are plotted in Figure 4. Inflation was below seven percent during the 1960s, rose above eight percent during 1973-74 and 1978-81, and then fell below seven percent during 1982-2001, a long period of low inflation. Inflation peaked at over 13 percent in 1979, and bottomed out at about one percent in 1964 and 1986. The real rate of GDP growth ranges from -2 percent in 1982 to over seven percent in 1984.

Figure 5 shows the equity market risk premium and the default spread at the end of each calendar year. The equity risk premium fluctuates dramatically, while the default spread shows less fluctuation. The implied equity risk premium turned negative from 1996-2001, suggesting overvaluation of the stock market.

The average first-day return of IPOs and the closed-end fund discount are plotted in Figure 6. The average first-day return of IPOs fluctuates dramatically, ranging from –1.7 percent in 1975 to 69.5 percent in 1999. The historical low of the closed-end fund discount was -10 percent in 1969, and the historical high was 24 percent in 1975. These figures suggest that the implied equity market risk premium is positively correlated with the closed-end fund discount, and is negatively correlated with the average first-day return of IPOs. In 1974, when the implied

[12] The statutory corporate tax rate was 52 percent in 1963, 50 percent in 1964, 48 percent from 1965-67, 52.8 percent from 1968-69, 49.2 percent in 1970, 48 percent from 1971-78, 46 percent from 1979-86, 40 percent in 1987, 34 percent from 1988-92, and 35 percent from 1993-2001.

equity market risk premium peaked at 11.4 percent, the closed-end fund discount was around 23 percent, while the average first-day return of IPOs was near zero. In 1999 when the implied equity premium dropped below negative four percent, the average first-day return of IPOs reached over 69 percent. The closed-end fund discount, however, was near its unconditional average at the end of 1999.

4. Empirical Results

This section reports and discusses the results from pecking order regressions for the proportion of the financing deficit funded with net debt, time-series regressions linking the pecking order slope coefficient to the time-varying cost of equity, logit regressions for the choice between debt and equity issues, multinomial logit regressions for the joint decision of whether to issue securities and which security to issue, and Fama-MacBeth regressions for the effects of past securities issues.

4.1. Pecking order Tests

Following Shyam-Sunder and Myers (1999), we first estimate

$$\Delta D_{it} = a_t + b_t DEF_{it} + u_{it}, \quad (1)$$

where ΔD_{it} is the change in book debt scaled by beginning-of-year assets for firm i at the end of the fiscal year ending in calendar year t, and DEF_{it} is the change in assets minus the change in retained earnings scaled by beginning-of-year assets. Instead of pooling all firm years together, we estimate this equation each year and report the results in Table 5. The estimated coefficient, $\hat{b}$, shows very interesting time-series patterns. It ranges from 0.67 to 0.92 in the 1960s and the 1970s, from 0.48 to 0.79 in the 1980s, and from 0.27 to 0.58 from 1990 to 2001. Frank and Goyal (2002) find that the coefficient was low in the 1990s as well. However, a time trend does not explain everything. Even within each decade, there are ups and downs which need to be explained.

Figure 7 plots the estimated pecking order coefficient. Comparing Figure 7 with Figures 5 and 6, it is not difficult to see that the pecking order coefficient is positively correlated with lagged values of the implied equity risk premium and the closed-end fund discount, and negatively correlated with the lagged average first-day return of IPOs.

In Table 6, the time-series of the slope coefficient is linked to cost-of-equity proxies by estimating the following equation:

$$\hat{b}_t = f(\text{cost of equity proxies, control variables}) . \quad (2)$$

If the cost of equity varies over time, then firms are more likely to issue equity when the cost of equity is relatively low, and the pecking order slope coefficient, $\hat{b}$, will be smaller. Our proxies for the cost of equity are highly correlated, so we do not include all of them in one regression to avoid potential multicollinearity. We also include an autoregressive term to control for residual serial correlation.

The results provide relatively strong support for the market timing theory. Firms finance a large proportion of their financing deficit with net external equity when the cost of equity is low. Six specifications are reported. In specification (1), the lagged implied equity risk premium is positively related to the pecking order coefficient. In economic terms, a one-standard-deviation increase (or 3.7 percent) in the implied equity risk premium is associated with 10.1 percent more of the financing deficit being funded with net debt (for example, from 40 percent to 50.1 percent). The lagged average first-day return of IPOs is used as an alternative proxy for the cost of equity in specification (2). A one-standard-deviation increase in the lagged average first-day return of IPOs results in 7.2 percent less of the financing deficit being funded with net debt. When the closed-end fund discount is included in (3), it has the expected sign, but the relation is not statistically significant at conventional levels.

Realized EW stock market returns are included in specification (4). Firms tend to fund a smaller proportion of their financing deficit with net debt after stock market price run-ups and before market downturns, though neither lagged nor future realized returns are statistically significant at conventional levels. The statistical insignificance does not lead us to reject the importance of the cost of equity, however. Realized return is a noisy proxy for the expected cost of equity, because it might be difficult for arbitrageurs to eliminate low-frequency market-level misvaluations (Shleifer and Vishny (1997)).

In specification (5), firms fund a larger proportion of their financing deficit with net equity after strong performance and before poor performance of growth stocks. A one-standard deviation change in HML is associated with around a 3.5 percent change in the proportion of financing deficit being funded with debt. The size effect also has the expected sign, but is not statistically significant.

Specification (6) includes the average announcement effect of SEOs as an explanatory variable. Its sign is consistent with previous studies, but the relation is not economically or statistically significant, suggesting that announcement effects are of secondary importance, and other factors such as equity market valuation are more important in equity issue decisions.

Focusing on the control variables, firms fund a larger proportion of their financing deficit with net debt when the corporate tax rate is higher. The tax rate effect is weaker in specification (1) because the time trend in the corporate tax rate is highly correlated with the equity risk premium (ρ=0.71 in Table 4). The real GDP growth rate and the business expansion dummy are never significant at the 10 percent level, suggesting that investment opportunities do not drive the changing financing behaviors. We do not expect inflation to have an impact on the choice between debt and external equity if it is neutral. However, inflation may have real implications, perhaps due to tax reasons. If inflation is positively related to the relative cost of equity versus debt, then firms are expected to issue more debt in the presence of high inflation. This is indeed what we reliably find in specifications (2), (4), and (5). The expected default spread is never significant, possibly because the cost of debt does not vary as much as the cost of equity.

Since small growth firms are more likely to be outliers and could potentially have a large influence on the pecking order slope coefficient, in unreported results we re-estimate equations (1) and (2) excluding small growth firms. We also exclude firms involved in mergers and acquisitions to check whether they drive our results. The results, which are available on request, are the essentially same.

In the above analysis, we first estimate the pecking order slope coefficient each year, and then link the slope coefficient to the time-varying relative cost of equity. Instead of the two-step approach, we also estimate for all years a firm fixed-effects regression where the dependent variable is the net debt issuance and the independent variables are the financing deficit and the interactions of the financing deficit and macro variables. We do not report the results because they are similar to what we find with the two-step approach.

The pecking order test implicitly assumes that real investment needs are exogenous. It could be argued that investing and financing activities are jointly determined (Hennessey and Whited (2004)). To remove potential endogeneity, we use the lagged financing deficit as an alternative measure for the expected financing deficit in unreported analyses. Our major results do not change.

Since firm characteristics have changed substantially over time, target leverage should have also changed over time under the static tradeoff theory. Can the time-series patterns of financing activities be explained by time-varying target leverage?

We estimate, annually, the pecking order equation with partial adjustment:

$$\Delta D_{it} = a_t + b_t DEF_{it} + c_t (TL_{it} - L_{it-1}) + u_{it} , \qquad (3)$$

where TL_{it} is the fitted value for firm i at the end of the fiscal year ending in calendar year t from target book leverage regression (1) in Table A1. We also try using target leverage estimated using other regressions in Table A1, and the major results are not affected.

Table 7 reports the results. Partial adjustment indeed occurs in most years. However, the adjustment coefficient is below 12 percent for all years, suggesting that the adjustment speed is slow. During 1995-2001, the partial adjustment coefficient becomes negative, inconsistent with partial adjustment. Furthermore, the t-statistics for the adjustment coefficients are small. The pecking order coefficients, however, have much larger t-statistics. Shyam-Sunder and Myers (1999) report similar results, leading them to question the importance of the static tradeoff theory. After controlling for partial adjustment toward target leverage, we once again link the pecking order coefficient to proxies for the cost of equity. Table 8 reports the results. Firms still prefer debt when the cost of equity is high and prefer equity when the cost of equity is low. The statistical and economic significance is still very impressive. These results should not be surprising, given that the only difference between Tables 6 and 8 is that Table 8 controls for partial adjustment, and this effect is quite modest.

4.2. Scatter-Plots

The regression approach has both advantages and disadvantages. The advantages include the summarization of information in the pecking order coefficient, the convenience for analyzing a large number of firms, and the convenience for controlling for other factors in a multivariate framework. The disadvantages include the large influence of a few outliers and the oversimplification of information. Consequently, we present additional checks.

Figure 8 shows different scenarios of net external financing. If a firm funds 100 percent of its financing deficit with net debt, then it should lie on the 45-degree line. A firm with negative net equity issuance should lie on the left hand side of the 45-degree line, while a firm with positive net equity issuance should lie on the right hand side of the 45-degree line.

To gain additional insight, we randomly select 100 firms each year and draw a scatter-plot. We limit the number of randomly selected firms to only 100 per year because a larger number makes it difficult to visually identify meaningful patterns. We report the scatter-plots for only six years in Figure 9 because those for other years with similar slope coefficients are qualitatively the same. In 1975, when the slope coefficient is 0.909, only a small number of firms deviate from the 45-degree line. In 2000, however, around 20 percent of the points are to the far right of the 45-degree line. These firms raise a lot of equity to finance their financing deficit or to retire debt. Only a few firms are noticeably to the left of the 45-degree line, suggesting that firms only infrequently repurchase shares in a quantitatively important manner.

4.3. Logit Model for the Choice between Debt and Equity

Since Chirinko and Singha (2000) point out that the pecking order tests may generate misleading inferences, we try alternative tests for the market timing theory. Instead of estimating the pecking order equation to examine continuous financing decisions for all firms, we focus on the subsample of firms that have issued a significant amount of debt or equity and estimate a logit regression for the discrete choice between debt and equity issues, using pre-issue firm characteristics and market conditions. We estimate pooled logit regressions for all firm years. When we instead estimate firm fixed-effects regressions in unreported analyses, our major results are not affected.

The dependent variable equals one if the firm issues external equity, and equals zero if the firm issues debt. We follow Hovakimian et al. (2001) and Korajczyk and Levy (2003) in the use of the five percent rule to define debt and equity issues. A firm is defined as issuing debt if net debt is at least five percent of its beginning-of-year assets. Similarly, a firm is defined as issuing equity if net equity is at least five percent of its beginning-of-year assets.[13]

The explanatory variables include financial slack (the sum of cash and short-term investments scaled by assets), a dummy for whether the firm pays dividends, profitability, Q (market-to-book ratio for assets), R&D, the logarithm of net sales, the logarithm of the number of years the firm has been listed on CRSP, the leverage deficit, lagged leverage, the market-adjusted return during the previous fiscal year, and the market-adjusted return during the

[13] For convenience, firm years when both debt and equity are issued are excluded in the logit regressions.

three following fiscal years.[14] The leverage deficit is defined as the fitted value from target leverage regression (1) in Table A1 minus lagged leverage. In addition to firm characteristics, we also include our proxies for the relative cost of equity and macro conditions.

The results are reported in Table 9. In all specifications, small, high Q, and high R&D firms are more likely to issue equity, consistent with the existing literature. Firms with more cash on hand and non-dividend payers are more likely to issue equity rather than debt.

The static tradeoff theory predicts firms with a large leverage deficit, defined as the difference between target leverage and lagged leverage, will issue debt to adjust toward their target leverage. Surprisingly, we find that firms with a large leverage deficit are more likely to issue equity. When we use the industry median leverage as target leverage instead to define the leverage deficit in unreported analyses, however, firms with a large leverage deficit are more likely to issue debt. This is partially consistent with Hovakimian et al. (2001), who find that the median industry leverage is more important than the estimated target leverage in securities issue decisions.

Consistent with the existing literature, firms are more likely to issue equity following stock price run-ups. Consistent with the long-run performance studies of SEOs by Loughran and Ritter (1995) and Spiess and Affleck-Graves (1995), firms that subsequently underperform are more likely to issue equity instead of debt. In contrast, Jung, Kim, and Stulz (1996) do not find any statistical significance of the post-issue return for a small sample of U.S. firms from 1977 to 1984. The difference arises partly because the sample employed in our study is larger than their sample. Since the post-issue return is a noisy measure of misvaluation, only a large sample is able to detect any statistically significant relation. The important role of Tobin's Q, the pre-issue market-adjusted firm return, and the post-issue firm return in the choice between debt and equity issues is supportive of the market timing theory at the firm level.

Unlike most of the literature, we are also interested in examining the role of the relative cost of equity at the market level. All our cost-of-equity proxies are statistically significant and have the expected sign, even after controlling for firm characteristics. Since we have at most 39 data points for these variables, it is amazing that their statistical significance is comparable to that of firm specific characteristics. In economic terms, an increase of one standard deviation in the implied equity risk premium and the closed-end fund discount reduces the average propensity

[14] Excluding the market-adjusted return during the three following fiscal years does not change our major results.

to issue equity by 2.1 percent in specification (1) and by 3.7 percent in (3), respectively, while an increase of one standard deviation in the lagged average return of IPOs increases the propensity by 3.7 percent in (2).

Although realized returns are insignificantly related to the pecking order slope coefficient, they are significantly related to the propensity to issue equity at the one percent level. In specification (4), firms are more likely to issue equity following stock market run-ups. The propensity to issue equity increases by 2.3 percent per standard deviation increase in the pre-issue market return. The importance of past market returns is consistent with the market timing theory. The average propensity to issue equity decreases by 2.3 percent per standard deviation increase in the post-issue market return. Neither the static tradeoff theory nor the pecking order theory can explain this.

In specification (5), past realizations of the Fama-French size factor are positively related to the propensity to issue equity, while future realizations are negatively related. Past realizations of the value factor are negatively related to the propensity to issue equity, while future realizations are positively related.

In specification (6), confirming Bayless and Chaplinsky (1996), the average market-adjusted announcement effect of SEOs is positively related to the propensity to issue equity. However, in terms of economic significance, the propensity to issue equity increases by only 1.7 percent per standard deviation increase in the average announcement effect.

Surprisingly, although the statutory corporate tax rate is positively related to the proportion of the financing deficit being funded with net debt, it has a very modest impact on the discrete choice between debt and equity issues. There is a negative relation between inflation and the propensity to issue equity in each specification. In specification (1), the propensity to issue equity decreases by 3.6 percent per standard increase in the rate of inflation. The importance of inflation suggests that inflation is not neutral and is linked to the relative cost of equity versus debt. The coefficient on the lagged default spread is significant and positive, consistent with Korajczyk and Levy (2003). Economically, a one-standard-deviation increase in the lagged default spread raises the propensity to issue equity by 2.5 percent in specification (1).

Overall, the logit regression results are supportive of the market timing theory. The choice between debt and equity depends largely on the relative cost of equity versus debt, even after controlling for firm characteristics. It is difficult to explain all these results simultaneously unless the relative cost of equity varies across time, and firms take advantage of this in their securities issue decisions.

4.4. Multinomial Logit Model for the Joint Decision

A firm may jointly decide whether to issue securities and which security to issue. For example, it is possible that a firm chooses between issuing equity and not issuing any securities, without even thinking of issuing debt. Therefore, we also estimate a multinomial logit model for the joint decision. The dependent variable equals two if the firm issues equity, one if the firm issues debt, and zero if the firm issues neither equity nor debt. We use non-issuers as the base category. [15]

Table 10 reports the results, which are generally in line with the logit regression results. However, it is interesting to note that some variables are more important for the decision to issue equity, while others are more important for the decision to issue debt. Therefore, our motivation for estimating the multinomial logit model is justified. Future studies of financing decisions should consider the joint determination of whether to issue any securities and which security to issue.

Consistent with the pecking order prediction, firms with a lot of cash on hand avoid issuing securities, especially debt, and dividend payers also avoid issuing securities. These firms have less need for external funds. The coefficients on Tobin's Q are all significant and positive for the decision to issue securities, especially equity. Profitable firms are less likely to issue debt, contrary to the static tradeoff prediction that these firms should issue debt to reduce agency costs and tax liabilities. Small and high R&D firms are more likely to issue equity, but are less likely to issue debt. The coefficients on AGE are all significant and negative, suggesting that young firms rely more on external funds.

Firms with a large leverage deficit are less likely to issue debt and more likely to issue equity. This is not predicted by the tradeoff theory. Firms that have recently experienced a stock price run-up are more likely to issue securities, especially equity. Unlike most of the literature, our study has included subsequent market-adjusted firm returns in our regressions. Firms that subsequently underperform are more likely to issue equity. In contrast, there is no statistically significant relation between debt issuance and subsequent market-adjusted returns.

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[15] For convenience, firm years when both debt and equity are issued are excluded in the logit regressions and the multinomial logit regressions. The major results are the same when they are included. For characteristics of firms issuing both debt and equity, see Hovakimian et al. (2004). We keep these firms in other analyses.

The multinomial logit results provide stronger support for the market timing theory. In all specifications, Tobin's Q and pre-issue market-adjusted returns have much larger t-statistics than other variables in the decision to issue equity. The subsequent market-adjusted return also has a large t-statistic in the decision to issue equity. The primary importance of price levels and changes in the decision to issue equity can be explained with the market timing theory based on the relative cost of equity.

Our proxies for the relative cost of equity at the market level are also important, statistically and economically, even after controlling for firm characteristics. In specification (1), an increase of one standard deviation in the expected equity market risk premium reduces the propensity to issue equity by 3.8 percent. And it is interesting to note that the expected equity risk premium has no material impact on the decision to issue debt.

The lagged first-day return of IPOs tends to increase the propensity to issue equity and decrease the propensity to issue debt. In economic terms, the propensity to issue equity increases by 3.2 percent per standard deviation increase in the lagged first-day return of IPOs, while the propensity to issue debt decreases by 1.3 percent. The closed-end fund discount is positively related to the propensity to issue debt, but is negatively related to the propensity to issue equity. Firms are more likely to issue equity and less likely to issue debt after a stock market run-up and before a stock market downturn. In specification (5), firms are more likely to issue equity and less likely to issue debt after superior performance and before poor performance of small growth stocks. Finally, firms also tend to issue equity when the announcement effect of SEOs is less negative, and issue debt otherwise. All these results are consistent with the market timing theory based on the time-varying cost of capital.

Surprisingly, the statutory tax rate has no material effect. The real GDP growth rate is positively related to the likelihood of debt issuance, but is not reliably related to the likelihood of equity issuance. The business expansion dummy has no reliable relation with securities issue decisions. Inflation is positively related to the propensity to issue debt, but is not reliably related to the decision to issue equity. One possible explanation is that inflation actually reduces the real cost of debt, perhaps due to the tax deductibility of nominal interest payment. The expected default spread is negatively related to the propensity to issue debt. In contrast, it is not always significantly related to the propensity to issue equity.

In summary, the logit and multinomial logit results provide substantial support for the market timing theory, although the results do not imply that other theories are irrelevant. In unreported analyses, we also estimate the propensity to issue equity each year using only pre-issue firm characteristics, and then link market conditions to the annual average of the predicted propensity to issue equity. We find that our cost-of-equity proxies greatly help explain the average predicted propensity to issue equity. Therefore, we believe that our findings are robust to various methodologies.

4.5. Effects of securities issues on capital structure

Firms may adjust their capital structure with internal funds or external funds. The pecking order theory assumes that external funds are more expensive than internal funds, and external equity is more expensive than external debt. Therefore, securities issues, especially equity issues, should be rare and only have material impact on capital structure of firms with insufficient internal funds. The market timing theory does not make these assumptions, allowing securities issues to play a more important role in determining capital structure. According to the static tradeoff theory, securities are issued mainly to help firms adjust toward their target leverage. Once target leverage is properly controlled for, past securities should have no material impact on current leverage (although with adjustment costs, Leary and Roberts (2004) and others allow for a role). Therefore, it is important to examine the effects of past securities issues in order to compare the relative strength of each theory.

Table 11 presents leverage levels around securities issues. The median book leverage of firms issuing equity and retiring debt in year 0 decreases from 51 percent at the end of year –1 to 42 percent at the end of year 0, then gradually increases to about 47 percent over a ten-year period. Their median market leverage declines from 42 percent at year –1 to 35 percent at year 0, and reverts back to 42 percent over the next six years. Firms issuing both equity and debt experience an increase in leverage at year 0 and a continuous increase over the next ten years. The median leverage of firms issuing debt and retiring equity increases from year –1 to year 0, but the pattern over the next ten years is not clear. Finally, firms retiring both debt and equity reduce their leverage from year –1 to year 0. Over the next ten years, their market leverage gradually increases, but their book leverage does not show a clear pattern.

Analyses of medians camouflage the underlying difference in firm characteristics that determine target leverage. To control for target leverage, we estimate the following regression each year:

$$L_t = f(Characteristics_{t-1}, Net\ Equity_{t-1}, ..., Net\ Equity_{t-k}, Net\ Debt_{t-1}, ..., Net\ Debt_{t-k}, L_{t-k-1}) \quad (4)$$

Table 12 reports the Fama-MacBeth results. While the existing literature has identified them as the most important determinants of target leverage, the t-statistics of target leverage proxies are not very impressive. Among all target leverage proxies, profitability has the largest t-statistic. However, the relation between leverage and profitability is not predicted by the static tradeoff theory. On the other hand, past net debt and net equity have very large t-statistics. Their effects are also economically important. For example, if a firm with a beginning book leverage ratio of 50 percent issues net debt of 10 percent of its beginning assets, then its book leverage will be 54.5 percent immediately after the net debt issue (because the numerator increases by 20 percent and the denominator increases by ten percent) and 51.5 percent seven years later. Similarly, if this firm issued net equity of 10 percent of its assets, then its book leverage will be 45.5 percent immediately after the net equity issue and 47.8 percent seven years later. The effects of debt and equity on market leverage are weaker, possibly because of stock price fluctuations. Our results also suggest that the speed of adjustment toward target leverage is slow. For example, a coefficient of 0.621 on BL_{t-6} implies that over six years a firm only closes 38 percent of the gap between its desired target book leverage and book leverage at year t-6. Firms adjust a little faster toward their target market leverage. But it still takes about six years to close half of the gap.

The weak role of target leverage in securities issue decisions, the large effects of securities issues on leverage after controlling for target leverage, and the slow adjustment toward target leverage are inconsistent with the static tradeoff theory. The strong effects of securities issues, especially equity issues, are inconsistent with the pecking order theory.

5. Conclusions

The time-series variation of financing decisions of U.S. firms has been explored only recently. Neither the static tradeoff theory nor the pecking order theory provides an adequate explanation for these variations. The market timing theory based on time-variation in the relative cost of equity provides a better explanation for the year-to-year fluctuations in the use of debt and external equity.

The key difference between the pecking order theory and the market timing theory is whether semi-strong form market efficiency is assumed. The market timing theory does not rely on this assumption. Under the market timing theory, external funds are not necessarily more expensive than internal funds, and equity issues are not necessarily more expensive than debt issues. Therefore, the market timing theory does not predict equity issues to be rare. When the cost of equity is low, a lot of firms can issue equity in a short period of time. Equity issue decisions depend on the time-varying cost of equity. Linking the pecking order slope coefficient to the relative cost of equity, we find that firms fund a larger proportion of their financing deficit with net external equity when the expected equity market risk premium is lower, the lagged average first-day return of IPOs is higher, and past (future) realizations of the Fama-French value factor are lower (higher), even after controlling for other macroeconomic conditions. Time-varying announcement effects of seasoned equity offerings have the expected signs but are not statistically or economically significant, undermining the importance of the pecking order theory based on the assumption of semi-strong form market efficiency.

Our results are robust to various additional checks. We gain additional insight into our regression results through our summary statistics and scatter-plots of randomly selected firms. Small growth firms do not drive our results. While small growth firms rely on debt financing in all periods, they only resort to external equity when the cost of equity is low. Furthermore, excluding small growth firms from our sample does not change our major results. Controlling for partial adjustment toward target leverage does not change our major results either, suggesting that target leverage is of secondary importance in securities issue decisions.

We also estimate a logit model for the discrete choice between debt and equity issues and a multinomial logit model for the joint determination of whether to issue securities and which security to issue. We find that firms are more likely to issue equity instead of debt when the expected equity risk premium is lower, the average first-day return of IPOs is higher, the closed-end fund discount is smaller, past (future) market returns are higher (lower), past (future) realizations of the size factor are higher (lower), past (future) realizations of the value factor are lower (higher), and the expected default spread is higher, even after controlling for firm characteristics and other macro conditions in a multivariate framework. At the firm level, firms that subsequently underperform are more likely to issue equity. In the multinomial logit model, we also find that Tobin's Q and the past market-adjusted firm return have much larger t-statistics than other variables in explaining the decision to issue equity. The role of target leverage in securities issue decisions, however, is not robust.

Because the market timing theory does not predict securities issues, especially equity issues, to be rare, it allows debt and equity issues to play a more important role in determining capital structure. We find that the effects of equity and debt issues are strong and last for over ten years, even after controlling for firm characteristics that have been identified as the most important determinants of capital structure. We also find that firms adjust very slowly toward their target leverage. These findings are inconsistent with the static tradeoff theory.

Overall, our results favor the market timing theory over alternative theories as an explanation for observed time-series patterns of external financing decisions of U.S. publicly traded firms. Because of the importance of the time-varying cost of equity in observed external financing decisions, future theoretical work on capital structure should take it into consideration. We also feel that it would be fruitful to explore the importance of the implied equity risk premium for corporate financing decisions in other countries.

Appendix

A.1. Determinants of Target Leverage

In the body of our paper we find that the market timing theory based on the relative cost of equity greatly help explain the time-series patterns of financing activities. Can the static tradeoff theory provide a satisfactory explanation? Target leverage changes as firm characteristics change. To determine whether the time-series patterns of financing activities can be explained by time-varying target leverage, we first estimate the target leverage regression:

$$L_{it} = f(\text{firm characteristics}_{\text{it-1}}) . \qquad \text{(A1)}$$

The dependent variable, L_{it}, is either book leverage or market leverage as defined earlier for firm i at the end of the fiscal year ending in calendar year t. Firm characteristics include the lagged values of the market-to-book ratio for assets (or Tobin's Q), R&D, capital expenditure, the logarithm of net sales, operating income before depreciation, a dividend paying dummy, tangibility, intangibility, inventory, net operating loss carry forwards, and investment tax credits. These variables have been documented to be important determinants of capital structure.

Because the static tradeoff theory is silent on whether firms should target book leverage or market leverage, we try both. We also try various empirical methodologies to deal with potential econometric problems (Fama and French (2002b)). The results are reported in Table A1. The first four specifications estimate the fixed-effects model with time dummies. This methodology requires the same coefficient over time for each independent variable, with time-series variations being explained by time dummies. Specifications (5) and (6) do not impose this restriction. The target leverage regression is estimated annually, and the annual averages of the coefficients are reported. The t-statistic for the average coefficient is calculated as the average coefficient divided by its time series standard deviation, following Fama and MacBeth (1973).

In all regressions, large firms, low R&D firms, and firms with more collateral as measured by tangibles, intangibles, and inventories, have higher target leverage, consistent with the static tradeoff theory. Investment tax credits, which can serve as non-debt tax shields, decrease target leverage, also consistent with the tradeoff theory.

However, profitable firms have lower targets, and firms with large net operating loss carry forwards have higher targets. This is not consistent with the tradeoff prediction that profitable firms should have high leverage to reduce tax liability and agency costs associated with free cash flows, and firms with non-debt tax shields such as net operating loss carry forwards should prefer lower leverage. The pecking order theory gains support here. According to the pecking order theory, firms simply accumulate past profits and losses, with leverage being changed mechanically.

Dividend-paying firms have lower target leverage in all specifications. The static tradeoff theory does not provide a clear prediction on whether dividend payers should have lower or higher target leverage. Tobin's Q switches signs in different regressions. In specification (1) it increases target book leverage, while it reduces target leverage in other specifications, especially when market leverage is the dependent variable. The negative relation between Q and market leverage should not receive too much attention. As pointed out in Titman and Wessels (1988), Fama and French(2002), Baker and Wurgler (2002) and Goyal, Lehn, and Racic (2002), this relation is largely mechanical. Capital expenditure also switches signs, possibly because of the competition between the pecking order effect and the static tradeoff effect.

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Table 1. Alternative pecking orders by financing cost assumptions

Normal market conditions	When external equity is less expensive than debt	When external equity is really cheap, and debt is expensive
1) Internal equity	1) Internal equity	1) External equity
2) Debt	2) External equity	2) Internal equity
3) External equity	3) Debt	3) Debt

When external equity is really cheap, and debt is cheap	When debt is really cheap, and external equity is expensive	When debt is really cheap, and external equity is cheap
1) External equity	1) Debt	1) Debt
2) Debt	2) Internal equity	2) External equity
3) Internal equity	3) External equity	3) Internal equity

Table 2. Percent of firms in different financing groups

A firm is defined as issuing debt if ΔD scaled by beginning-of-year assets is at least 5%, where ΔD is the change in debt and preferred stock (Compustat item 181+10-35-79) from year t-1 to year t, or issuing equity if ΔE scaled by assets is at least 5%, where ΔE is the change in equity and convertible debt (6-181-10+35+79) minus the change in retained earnings (36). The percent of debt and equity issuers do not necessarily add up to 100 because firms can issue both debt and equity or neither debt nor equity. We annually sort all NYSE listed firms separately both by total assets and asset growth and use the quartile cutoff points to independently categorize firms in our sample into four size and growth groups. Each year, small growth firms are defined as those in both the bottom size quartile and the top growth quartile. Mergers and acquisitions are identified with Compustat footnote codes. Firms with beginning of the year assets of less than $10 million (1998 purchasing power) are excluded

	All firms			Small growth firms			M&A firms		
Year	N	Debt issues (%)	Equity issues (%)	N	Debt issues (%)	Equity issues (%)	N	Debt issues (%)	Equity issues (%)
1963	129	33.3	16.3	15	86.7	26.7	10	50.0	20.0
1964	465	35.7	12.0	26	88.5	34.6	41	56.1	26.8
1965	558	45.9	14.3	26	92.3	26.9	67	73.1	32.8
1966	722	54.2	16.3	38	97.4	36.8	97	78.4	21.6
1967	1316	43.8	16.6	107	87.9	49.5	223	73.5	29.1
1968	1570	53.9	24.5	150	89.3	57.3	339	77.3	44.0
1969	1929	47.4	34.1	208	90.4	58.2	418	69.6	48.3
1970	2211	40.9	14.7	274	91.6	32.8	472	61.2	25.2
1971	2493	33.8	14.4	322	85.1	33.2	425	53.2	25.2
1972	2739	43.0	16.7	405	86.7	39.0	571	62.7	29.1
1973	2986	58.6	10.4	538	94.1	25.1	525	78.9	21.9
1974	3039	57.9	6.8	449	96.0	15.1	337	84.0	16.9
1975	3097	28.1	6.6	442	81.9	13.1	259	56.4	14.3
1976	3046	38.6	8.1	430	88.4	15.8	279	71.0	16.1
1977	2986	46.9	7.9	482	93.6	17.0	345	79.7	15.7
1978	2875	57.7	9.5	422	94.1	22.5	350	83.7	17.4
1979	2905	56.9	11.6	407	94.3	30.0	379	80.5	20.3
1980	2975	45.5	15.4	390	88.5	38.2	384	72.9	27.1
1981	2915	42.4	19.3	427	81.0	48.2	369	68.8	28.7
1982	3073	34.8	13.1	491	83.3	31.8	381	63.3	26.8
1983	3065	35.7	23.1	492	77.6	53.9	398	61.6	39.4
1984	3146	45.3	17.7	507	86.8	39.8	504	71.4	30.4
1985	3210	40.2	16.4	498	85.7	37.3	529	69.2	31.4
1986	3079	39.6	19.4	387	83.5	48.1	520	72.1	35.2
1987	3104	43.9	19.8	420	86.4	44.3	490	74.7	32.7
1988	3097	44.4	14.8	468	89.1	36.8	490	74.9	30.8
1989	3075	41.2	14.7	490	82.9	35.5	443	74.9	26.2
1990	3063	39.7	13.5	477	78.6	35.6	425	70.1	24.2
1991	3041	30.6	16.2	519	66.5	38.2	369	62.1	33.9
1992	3133	35.8	21.8	540	69.4	51.9	476	63.7	45.8
1993	3380	40.2	24.0	614	75.9	52.6	520	70.8	43.7
1994	3715	45.0	24.5	719	83.6	49.9	718	77.2	44.6
1995	3944	47.6	25.2	761	83.3	53.4	841	76.1	44.1
1996	4214	43.5	29.7	705	75.7	70.9	929	73.5	52.2
1997	4543	44.8	29.5	756	83.2	68.1	1036	75.5	52.2
1998	4564	49.5	27.4	730	86.2	59.7	1286	75.5	46.2
1999	4366	44.7	26.7	771	82.6	59.1	1073	72.2	45.7
2000	4202	43.1	31.5	852	76.8	62.8	944	66.8	51.3
2001	4160	28.4	27.7	595	66.2	58.7	808	51.0	51.1

Table 3. Median firm characteristics

Assets (Compustat item 6) are in millions of constant 1998 dollars. Firm years with beginning book assets of less than $10 million are excluded. SALE is the net sales (12) in millions of constant 1998 dollars. Q is the market-to-book ratio of assets, where the market value of assets is defined as the book value of total assets minus the book value of equity plus the market value of equity (Compustat item 181+10-35+25*199) at the end of the year t fiscal year. ΔA is the change in total assets divided by beginning-of-year assets. ΔSALE is the change in the net sales from year t-1 to t divided by the net sales of year t-1. OIBD is operating income before depreciation (13) scaled by end-of-year assets. CAPEX is capital expenditure (128) scaled by end-of-year assets. TANG is property, plant, and equipment (PPE) (8) scaled by end-of-year assets.

Year	N	Assets	SALE	Q	ΔA (%)	ΔSALE (%)	OIBD (%)	CAPEX (%)	TANG (%)
1963	129	250	329	1.16	4.6	6.8	16.0	4.9	43.2
1964	465	409	456	1.22	6.4	8.1	15.8	5.1	35.8
1965	558	417	514	1.36	8.3	9.7	16.2	6.1	35.0
1966	722	355	495	1.18	9.2	9.7	16.2	6.7	35.0
1967	1316	272	356	1.46	6.7	4.9	15.4	6.4	34.4
1968	1570	257	348	1.67	8.5	7.7	15.6	6.0	31.8
1969	1929	218	299	1.33	5.6	6.3	14.9	6.6	31.6
1970	2211	196	261	1.11	1.9	1.4	13.5	6.1	32.1
1971	2493	182	245	1.21	2.8	3.7	13.1	5.0	31.9
1972	2739	174	235	1.20	5.6	9.7	13.9	5.3	31.2
1973	2986	165	235	0.93	4.2	8.4	14.8	6.2	30.2
1974	3039	162	233	0.81	0.7	5.0	15.3	6.2	30.2
1975	3097	151	218	0.85	-2.9	-0.9	14.7	5.3	30.9
1976	3046	157	235	0.93	3.3	7.4	15.9	5.1	30.2
1977	2986	160	244	0.93	3.3	5.6	16.0	5.9	30.5
1978	2875	170	260	0.96	3.7	5.7	16.6	6.4	30.7
1979	2905	158	238	0.98	0.4	2.6	16.3	6.8	30.8
1980	2975	139	212	1.00	-2.2	0.0	15.3	7.1	31.5
1981	2915	136	199	1.01	0.6	1.5	14.7	6.8	32.0
1982	3073	122	159	1.02	0.3	-0.5	12.8	6.4	33.3
1983	3065	122	149	1.21	2.9	2.8	12.6	5.5	31.6
1984	3146	120	150	1.14	4.8	10.2	13.6	6.5	31.4
1985	3210	111	136	1.20	2.6	3.8	12.2	6.3	31.4
1986	3079	117	135	1.23	4.7	6.7	11.5	5.7	30.4
1987	3104	113	136	1.21	2.6	7.4	12.0	5.2	28.7
1988	3097	105	125	1.20	2.9	8.9	11.9	5.3	28.1
1989	3075	114	139	1.25	1.7	6.1	12.0	5.1	27.8
1990	3063	120	148	1.11	-1.0	2.3	12.0	5.2	28.0
1991	3041	119	146	1.20	-0.8	0.9	11.6	4.6	27.9
1992	3133	114	143	1.31	1.1	4.6	12.0	4.5	27.1
1993	3380	113	135	1.44	2.7	6.1	11.9	4.7	25.6
1994	3715	118	140	1.39	6.0	10.3	12.5	5.1	25.3
1995	3944	120	145	1.46	7.3	11.7	12.5	5.2	24.3
1996	4214	120	144	1.50	5.2	9.9	12.2	5.0	23.3
1997	4543	119	133	1.58	6.2	11.2	11.8	4.9	22.2
1998	4564	131	141	1.42	6.6	9.7	11.0	4.9	21.6
1999	4366	142	149	1.36	3.5	7.2	10.7	4.4	21.1
2000	4202	158	154	1.24	2.2	8.2	10.3	4.3	20.5
2001	4160	151	141	1.32	-3.2	1.6	8.1	3.7	19.5

Table 4. Summary statistics of time-series variables, 1963-2001

ERP is the implied market equity risk premium at the year-end, estimated using analyst forecasts for the Dow 30 stocks from Value Line for 1968-1976 and from I/B/E/S for 1977-2001. RIPO is the annual average of initial returns of initial public offerings at http://bear.cba.ufl.edu/ritter/ipodata.htm. CEFD is the value-weighted average of the closed-end fund discount at the year-end from Malcolm Baker and Jeffrey Wurgler, who construct the series by combining several sources (Neal and Wheatley, 1962-1993; CDA/Weisenberger, 1994-1998; and the *Wall Street Journal*, 1999-2001). EWR is the annual equally weighted market return from CRSP. SMB is the difference in the average return on portfolios of small stocks and portfolios of big stocks, and HML is the difference in the average return on portfolios of value stocks and portfolios of growth stocks from Kenneth French, both on an annualized basis. RSEO is the annual average of market-adjusted returns from one day before to one day after the file date of seasoned equity offerings (SEOs) from Thomson Financial. The average announcement effect is calculated from 1980, the first year the file date is available for most SEOs. TAXR is the statutory corporate tax rate. RGDP is the real GDP growth rate from the Bureau of Economic Analysis, Department of Commerce. INF is the inflation rate from CRSP. DSP is the default spread calculated as the yield difference between Moody's Baa rated and Aaa rated corporate bonds at the year-end. The subscripts denote years. The superscripts a, b, and c denote statistical significance at the 1%, 5%, and 10% levels in a two-tailed test.

	ERP $_{t-1}$	RIPO $_{t-1}$	CEFD $_{t-1}$	EWR $_{t-1}$	EWR $_{t+1}$	SMB $_{t-1}$	SMB $_{t+1}$	HML $_{t-1}$	HML $_{t+1}$	RSEO $_{t-1}$	TAXR $_{t}$	RGDP $_{t}$	INF $_{t}$	DSP $_{t-1}$
N	33	39	39	39	39	39	39	39	39	21	39	39	39	39
Mean	0.031	0.176	0.088	0.158	0.161	0.026	0.039	0.044	0.046	-0.018	0.430	0.033	0.047	0.011
Std Dev	0.037	0.161	0.081	0.260	0.258	0.149	0.152	0.144	0.147	0.005	0.067	0.022	0.031	0.005
Min	-0.043	-0.017	-0.104	-0.356	-0.356	-0.239	-0.239	-0.394	-0.394	-0.028	0.340	-0.020	0.010	0.003
Median	0.037	0.135	0.097	0.188	0.202	0.004	0.044	0.078	0.058	-0.017	0.460	0.036	0.038	0.009
Max	0.114	0.695	0.237	0.774	0.774	0.506	0.506	0.246	0.273	-0.008	0.528	0.073	0.133	0.023
Correlation														
ERP $_{t-1}$	1													
RIPO $_{t-1}$	-0.42^{b}	1												
CEFD $_{t-1}$	0.33^{c}	-0.21	1											
EWR $_{t-1}$	-0.09	0.33^{b}	0.04	1										
EWR $_{t+1}$	0.29	-0.26	0.29^{c}	-0.18	1									
SMB $_{t-1}$	0.23	0.38^{b}	0.04	0.80^{a}	-0.08	1								
SMB $_{t+1}$	0.18	-0.04	0.39^{b}	0.04	0.77^{a}	0.10	1							
HML $_{t-1}$	0.29	-0.43^{a}	-0.04	-0.16	0.06	-0.03	-0.07	1						
HML $_{t+1}$	0.09	0.19	0.07	-0.11	-0.13	-0.05	0.06	-0.19	1					
RSEO $_{t-1}$	0.19	0.23	0.28	0.41^{c}	0.23	0.22	0.07	-0.39		1				
TAXR $_{t}$	0.71^{a}	-0.12	0.11	0.09	0.03	0.30^{c}	0.13	0.24	0.14	0.42^{c}	1			
RGDP $_{t}$	-0.18	-0.08	-0.01	0.49^{a}	-0.20	0.27^{c}	-0.07	0.01	-0.28^{c}	0.08	0.16	1		
INF $_{t}$	0.56^{a}	0.07	0.48^{a}	0.06	0.23	0.16	0.18	-0.06	0.04	0.36	0.32^{c}	-0.27^{c}	1	
DSP $_{t-1}$	0.48^{a}	-0.07	0.02	-0.03	-0.08	-0.02	-0.12	0.10	0.41^{a}	0.39^{c}	0.13	-0.36^{b}	0.15	1

Table 5. Pecking order tests

Coefficients are computed annually from the cross-sectional regression

$$\Delta D_{it} = a_t + b_t DEF_{it} + u_{it}.$$

The net debt issuance, ΔD_{it}, is the change in debt (Compustat item 181+10-35-79) scaled by beginning-of-year assets, $\Delta D_{it} = (D_{it} - D_{it-1}) / A_{it-1}$. The financing deficit, DEF_{it}, is the change in assets (6) minus the change in Compustat's adjusted value of balance sheet retained earnings (36) scaled by beginning-of-year assets, $DEF_{it} = ((A_{it}-A_{it-1})-(RE_{it}-RE_{it-1})) / A_{it-1}$. Firm years with a net debt or net equity amount of over 400 % of beginning-of-year assets are excluded to remove the large influence of a few outliers.

Year	b_t	$t(b_t)$	a_t	$t(a_t)$	N	Adj. R^2
1963	0.733	20.6	-0.008	-1.5	129	0.767
1964	0.797	57.9	-0.004	-1.7	465	0.878
1965	0.867	69.2	-0.008	-2.9	558	0.896
1966	0.917	95.0	-0.011	-4.7	722	0.926
1967	0.671	66.5	0.006	1.9	1316	0.771
1968	0.723	90.0	-0.003	-1.1	1570	0.838
1969	0.727	94.9	-0.023	-9.2	1929	0.823
1970	0.799	108.0	-0.010	-6.1	2211	0.841
1971	0.707	92.8	-0.008	-5.0	2493	0.776
1972	0.684	96.0	-0.004	-2.4	2738	0.771
1973	0.797	134.3	0.005	3.4	2986	0.858
1974	0.911	266.4	0.000	0.5	3039	0.959
1975	0.909	196.4	-0.009	-12.6	3097	0.926
1976	0.877	185.3	-0.006	-7.2	3046	0.919
1977	0.897	190.2	-0.004	-4.8	2986	0.924
1978	0.871	179.0	-0.002	-1.5	2875	0.918
1979	0.846	139.4	-0.001	-0.7	2905	0.870
1980	0.735	112.1	-0.007	-4.1	2975	0.809
1981	0.626	77.4	-0.006	-2.4	2915	0.673
1982	0.768	118.3	-0.010	-6.0	3073	0.820
1983	0.482	61.0	-0.010	-3.8	3064	0.548
1984	0.724	112.6	-0.004	-1.8	3146	0.801
1985	0.714	110.9	-0.006	-2.6	3210	0.793
1986	0.657	87.6	-0.006	-2.2	3079	0.714
1987	0.739	106.6	-0.010	-4.1	3104	0.785
1988	0.768	118.4	-0.002	-0.8	3097	0.819
1989	0.773	127.7	-0.006	-2.9	3075	0.841
1990	0.582	79.9	0.004	1.7	3063	0.676
1991	0.440	53.2	-0.007	-2.5	3040	0.482
1992	0.423	52.7	-0.005	-1.8	3131	0.470
1993	0.444	57.9	-0.003	-1.1	3380	0.498
1994	0.517	75.1	0.002	0.8	3713	0.603
1995	0.445	68.1	0.011	3.6	3939	0.541
1996	0.375	57.9	0.004	1.3	4204	0.443
1997	0.480	81.0	0.003	1.1	4543	0.591
1998	0.518	89.2	0.013	4.2	4560	0.636
1999	0.420	67.3	0.012	3.6	4353	0.510
2000	0.268	48.6	0.016	4.4	4173	0.362
2001	0.340	54.8	-0.017	-6.8	4155	0.420

Table 6. Time-series of the pecking order slope coefficient

The following equation is estimated:

$$\hat{b}_t = f(\text{cost of equity proxies, control variables}) .$$

The dependent variable is the estimated pecking order slope coefficient from Table 5. ERP is the implied market equity risk premium at the year-end, estimated using analyst forecasts for the Dow 30 stocks from Value Line for 1968-1976 and from I/B/E/S for 1977-2001. RIPO is the annual average of initial returns of initial public offerings at http://bear.cba.ufl.edu/ritter/ipodata.htm. CEFD is the value-weighted average of the closed-end fund discount at the year-end from Malcolm Baker and Jeffrey Wurgler, who construct the series by combining several sources (Neal and Wheatley, 1962-1993; CDA/Weisenberger, 1994-1998; and the *Wall Street Journal*, 1999-2001). EWR is the equally weighted market returns from CRSP. SMB is the difference in the average return on portfolios of small stocks and portfolios of big stocks, and HML is the difference in the average return on portfolios of value stocks and portfolios of growth stocks from Kenneth French. RSEO is the annual average of market-adjusted returns from one day before to one day after the file date of seasoned equity offerings (SEOs) from Thomson Financial. The average announcement effect is calculated from 1980, the first year the file date is available for most SEOs. TAXR is the statutory corporate tax rate. RGDP is the real GDP growth rate from the Bureau of Economic Analysis, Department of Commerce. INF is the inflation rate from CRSP. DSP is the default spread calculated as the yield difference between Moody's Baa rated and Aaa rated corporate bonds at the year-end. An autoregressive term, AR (1), is included to account for residual serial correlation. The subscripts denote years. t-statistics are reported in parentheses.

	(1)		(2)		(3)		(4)		(5)		(6)	
	coeff	t-stat	coeff	t-stat	coeff	t-stat	coeff	t-stat	coeff	t-stat	coeff	t-stat
ERP_{t-1}	2.74	3.23										
$RIPO_{t-1}$			-0.45	-4.43								
$CEFD_{t-1}$					0.48	1.58						
EWR_{t-1}							-0.10	-1.26				
EWR_{t+1}							0.11	1.57				
SMB_{t-1}									-0.09	-0.75		
SMB_{t+1}									0.15	1.30		
HML_{t-1}									0.24	2.04		
HML_{t+1}									-0.24	-1.96		
$RSEO_{t-1}$											-3.97	-0.58
$TAXR_t$	0.84	1.78	1.50	4.89	1.71	3.99	1.66	4.40	1.61	4.45	1.07	0.92
$RGDP_t$	0.48	0.54	0.56	0.74	-0.11	-0.13	1.43	1.25	0.76	0.76	0.52	0.26
INF_t	1.04	1.29	1.91	3.17	0.88	1.09	1.47	1.94	1.63	2.38	1.66	0.79
DSP_{t-1}	-4.64	-0.87	-2.67	-0.70	-3.77	-0.76	0.58	0.12	2.71	0.59	4.70	0.38
Constant	0.19	1.11	0.02	0.15	-0.12	-0.63	-0.17	-1.09	-0.16	-1.07	-0.06	-0.15
AR (1)	-0.22	-1.13	-0.26	-1.51	-0.42	-2.60	-0.29	-1.70	-0.26	-1.44	-0.21	-0.80
Adjusted R^2	0.772		0.798		0.720		0.721		0.772		0.430	
N	33		39		39		39		39		22	

Table 7. Pecking order tests with partial adjustment

Coefficients are computed annually from the cross-sectional regression:

$$\Delta D_{it} = a_t + b_t DEF_{it} + c_t (TL_{it} - L_{it-1}) + u_{it} .$$

The net debt issuance, ΔD_{it}, is the change in debt (Compustat item 181+10-35-79) scaled by beginning-of-year assets, $\Delta D_{it} = (D_{it} - D_{it-1}) / A_{it-1}$. The financing deficit, DEF_{it}, is the change in assets (6) minus the change in Compustat's adjusted value of balance sheet retained earnings (36) scaled by beginning-of-year assets, $DEF_{it} = ((A_{it}-A_{it-1})-(RE_{it}-RE_{it-1})) / A_{it-1}$. TL_{it} are the fitted values from target leverage regression (1) in Table A1. Target leverage and leverage (L) are measured using book values.

Year	b_t	$t(b_t)$	c_t	$t(c_t)$	a_t	$t(a_t)$	N	Adj. R^2
1963	0.737	19.7	0.011	0.4	-0.008	1.4	123	0.765
1964	0.798	49.3	0.036	2.5	-0.004	1.6	364	0.870
1965	0.819	53.8	0.033	2.1	-0.004	1.4	439	0.871
1966	0.926	85.8	0.034	2.4	-0.013	4.4	562	0.930
1967	0.642	52.6	-0.019	0.9	0.008	1.8	962	0.750
1968	0.729	76.9	0.116	6.3	-0.004	1.1	1124	0.842
1969	0.735	86.1	0.121	9.2	-0.021	6.9	1443	0.837
1970	0.802	106.1	0.032	3.4	-0.009	5.3	2110	0.842
1971	0.706	91.7	0.038	4.2	-0.006	4.0	2438	0.777
1972	0.680	91.8	0.023	2.3	-0.003	1.8	2681	0.759
1973	0.799	132.7	0.022	2.8	0.005	3.4	2918	0.858
1974	0.910	260.3	-0.007	1.5	0.000	0.4	2920	0.959
1975	0.910	197.2	0.013	3.1	-0.008	11.0	2972	0.930
1976	0.878	186.9	0.025	5.3	-0.005	5.7	2934	0.923
1977	0.896	186.6	0.021	3.9	-0.004	3.8	2871	0.924
1978	0.865	171.3	0.026	4.4	-0.001	0.5	2764	0.914
1979	0.849	136.3	0.018	2.3	-0.001	0.6	2792	0.870
1980	0.744	112.4	0.009	1.1	-0.007	4.4	2853	0.816
1981	0.623	75.4	0.023	2.0	-0.004	1.7	2798	0.670
1982	0.762	114.5	0.020	2.6	-0.009	5.3	2964	0.817
1983	0.474	59.0	0.052	4.3	-0.007	2.6	2963	0.547
1984	0.724	113.7	0.031	3.9	-0.003	1.5	3051	0.809
1985	0.710	107.8	0.004	0.4	-0.006	2.7	3118	0.789
1986	0.655	85.6	-0.004	0.4	-0.006	2.0	2974	0.711
1987	0.737	105.0	0.024	2.6	-0.010	4.0	3008	0.787
1988	0.771	117.1	0.009	1.1	-0.002	0.9	2995	0.821
1989	0.768	123.3	-0.017	2.2	-0.006	2.6	2965	0.837
1990	0.588	80.6	0.012	1.5	0.003	1.4	2963	0.688
1991	0.451	52.6	0.008	0.9	-0.008	2.9	2945	0.493
1992	0.414	50.3	0.011	1.2	-0.005	1.9	3038	0.463
1993	0.462	59.7	0.017	1.9	-0.004	1.5	3286	0.526
1994	0.530	76.0	0.009	1.0	0.000	0.1	3622	0.619
1995	0.459	69.5	-0.036	3.4	0.012	3.8	3833	0.559
1996	0.393	59.1	-0.041	3.5	0.004	1.1	4099	0.462
1997	0.484	80.9	-0.041	4.0	0.006	1.9	4414	0.597
1998	0.523	89.0	-0.042	4.3	0.017	5.3	4446	0.641
1999	0.436	68.7	-0.058	5.5	0.015	4.4	4241	0.527
2000	0.274	47.5	-0.044	3.9	0.020	5.3	4078	0.362
2001	0.354	55.6	-0.032	4.3	-0.013	4.9	4045	0.434

Table 8. Time-series of the pecking order slope coefficient with partial adjustment

The following equation is estimated:

$$\hat{b}_t = f\,(\text{cost of equity proxies, control variables})\,.$$

The dependent variable is the estimated pecking order slope coefficient from Table 7. ERP is the implied market equity risk premium at the year-end, estimated using analyst forecasts for the Dow 30 stocks from Value Line for 1968-1976 and from I/B/E/S for 1977-2001. RIPO is the annual average of initial returns of initial public offerings at http://bear.cba.ufl.edu/ritter/ipodata.htm. CEFD is the value-weighted average of the closed-end fund discount at the year-end from Malcolm Baker and Jeffrey Wurgler, who construct the series by combining several sources (Neal and Wheatley, 1962-1993; CDA/Weisenberger, 1994-1998; and the *Wall Street Journal*, 1999-2001). EWR is the equally weighted market returns from CRSP. SMB is the difference in the average return on portfolios of small stocks and portfolios of big stocks, and HML is the difference in the average return on portfolios of value stocks and portfolios of growth stocks from Kenneth French. RSEO is the annual average of market-adjusted returns from one day before to one day after the file date of seasoned equity offerings (SEOs) from Thomson Financial. The average announcement effect is calculated from 1980, the first year the file date is available for most SEOs. TAXR is the statutory corporate tax rate. RGDP is the real GDP growth rate from the Bureau of Economic Analysis, Department of Commerce. INF is the inflation rate from CRSP. DSP is the default spread calculated as the yield difference between Moody's Baa rated and Aaa rated corporate bonds at the year-end. An autoregressive term, AR (1), is included to account for residual serial correlation. The subscripts denote years. t-statistics are reported in parentheses.

	(1)		(2)		(3)		(4)		(5)		(6)	
	coeff	t-stat	coeff	t-stat	coeff	t-stat	coeff	t-stat	coeff	t-stat	coeff	t-stat
ERP_{t-1}	2.71	3.24										
$RIPO_{t-1}$			-0.44	-4.47								
$CEFD_{t-1}$					0.44	1.45						
EWR_{t-1}							-0.10	-1.22				
EWR_{t+1}							0.11	1.66				
SMB_{t-1}									-0.09	-0.72		
SMB_{t+1}									0.15	1.40		
HML_{t-1}									0.25	2.15		
HML_{t+1}									-0.24	-2.02		
$RSEO_{t-1}$											-4.25	-0.63
$TAXR_t$	0.81	1.75	1.44	4.97	1.66	4.02	1.59	4.39	1.54	4.41	1.03	0.91
$RGDP_t$	0.40	0.46	0.58	0.76	-0.05	-0.06	1.45	1.28	0.70	0.77	0.45	0.23
INF_t	1.04	1.30	2.01	3.46	1.02	1.27	1.56	2.10	1.71	2.56	1.69	0.81
DSP_{t-1}	-5.15	-0.98	-2.42	-0.65	-3.43	-0.70	0.66	0.14	2.65	0.59	4.02	0.33
Constant	0.22	1.27	0.04	0.31	-0.10	-0.57	-0.15	-0.98	-0.13	-0.91	-0.04	-0.10
AR (1)	-0.21	-1.11	-0.20	-1.15	-0.38	-2.33	-0.26	-1.51	-0.24	-1.32	-0.20	-0.77
Adjusted R^2	0.768		0.788		0.701		0.710		0.770		0.409	
N	33		39		39		39		39		22	

Table 9. Logit regressions

Logit regressions are estimated and marginal effects are reported. The dependent variable equals one if the firm issues equity, and zero if the firm issues debt. Debt issuers are the base category. ΔD is the change in debt and preferred stock (Compustat item 181+10-35-79). ΔE is the change in equity and convertible debt (6-181-10+35+79) minus the change in retained earnings (36). A firm is defined as issuing debt if $\Delta D/A_{t-1} \geq 0.05$. Similarly, a firm is defined as issuing equity if $\Delta E/A_{t-1} \geq 0.05$. CASH is the sum of cash and short-term investments (1) scaled by assets. DIVID equals one if a firm pays dividend. OIBD is operating income before depreciation (13) scaled by assets. CAPEX is the capital expenditure (128) scaled by assets. Q is the market-to-book ratio of assets. R&D is the intensity of research and development (46) scaled by assets. SALE is the logarithm of net sales (12). AGE is the logarithm of the number of years the firm has been listed on CRSP. $LDEF_{it}$ is the leverage deficit, $LDEF_{it} = TL_{it} - L_{it-1}$, where TL_{it} is the fitted value from target leverage regression (1) in Table A1, and L_{it-1} is lagged leverage. $ERET_{it-1}$ is the market-adjusted returns during the previous fiscal year, measured as the difference between the firm raw return and the value-weighted market return in the preceding fiscal year. $ERET_{it+1, t+3}$ is the market-adjusted returns during the three fiscal years after events, measured as the difference between the firm raw return and the value-weighted market return in the following three fiscal years. If a firm is delisted, its post-event three-year raw return is calculated by compounding the CRSP value-weighted market return for remaining months. The calculation of post-event returns will not be affected if a firm changes its fiscal year-end month. ERP is the implied market equity risk premium at the year-end, estimated using analyst forecasts for the Dow 30 stocks from Value Line for 1968-1976 and from I/B/E/S for 1977-2001. RIPO is the annual average of initial returns of initial public offerings at http://bear.cba.ufl.edu/ritter/ipodata.htm. CEFD is the value-weighted average of the closed-end fund discount at the year-end from Malcolm Baker and Jeffrey Wurgler, who construct the series by combining several sources (Neal and Wheatley, 1962-1993; CDA/Weisenberger, 1994-1998; and the *Wall Street Journal*, 1999-2001). EWR is the equally weighted market returns from CRSP. SMB is the difference in the average return on portfolios of small stocks and portfolios of big stocks, and HML is the difference in the average return on portfolios of value stocks and portfolios of growth stocks from Kenneth French. RSEO is the annual average of market-adjusted returns from one day before to one day after the file date of seasoned equity offerings (SEOs) from Thomson Financial. The average announcement effect is calculated from 1980, the first year the file date is available for most SEOs. TAXR is the statutory corporate tax rate. RGDP is the real GDP growth rate from the Bureau of Economic Analysis, Department of Commerce. INF is the inflation rate from CRSP. DSP is the default spread calculated as the yield difference between Moody's Baa rated and Aaa rated corporate bonds at the year-end. The subscripts denote firms or years.

	(1)		(2)		(3)		(4)		(5)		(6)	
	dy/dx	t-stat	dy/dx	t-stat	dy/dx	t-stat	dy/dx	t-stat	dy/dx	t-stat	dy/dx	t-stat
$CASH_{it-1}$	0.07	4.3	0.08	4.4	0.08	4.9	0.08	4.7	0.09	5.1	0.07	3.2
$DIVID_{it-1}$	0.02	3.8	0.02	3.1	0.02	3.7	0.02	3.4	0.02	3.8	0.03	2.9
$OIBD_{it-1}$	0.05	1.4	0.03	1.0	0.08	2.7	0.06	2.0	0.09	2.6	0.05	1.3
$CAPEX_{it-1}$	-0.05	-2.0	-0.05	-2.1	-0.06	-2.3	-0.05	-2.0	-0.06	-2.1	-0.13	-3.4
Q_{it-1}	0.04	18.4	0.04	18.0	0.04	18.0	0.04	18.6	0.04	18.2	0.04	15.4
$R\&D_{it-1}$	0.54	13.8	0.52	13.6	0.55	14.4	0.53	13.9	0.54	14.1	0.68	13.4
$SALE_{it-1}$	-0.03	-18.1	-0.03	-18.1	-0.03	-18.5	-0.03	-18.6	-0.03	-19.0	-0.04	-17.7
AGE_{it}	0.00	1.7	0.00	1.4	0.00	0.8	0.00	1.6	0.00	1.6	0.00	1.2
$LDEF_{it}$	0.40	8.3	0.35	7.6	0.45	9.5	0.41	8.8	0.45	9.5	0.56	8.7
L_{it-1}	0.58	12.0	0.53	11.4	0.62	13.1	0.59	12.5	0.63	13.1	0.76	11.9
$ERET_{it-1}$	0.03	11.4	0.03	11.2	0.03	11.3	0.03	10.3	0.03	10.5	0.04	10.6
$ERE_{it+1, t+3}$	-0.01	-8.6	-0.01	-8.2	-0.01	-7.4	-0.01	-8.4	-0.01	-7.8	-0.01	-5.3
ERP_{t-1}	-0.57	-5.5										
$RIPO_{t-1}$			0.23	14.2								
$CEFD_{t-1}$					-0.44	-12.6						
EWR_{t-1}							0.09	8.6				
EWR_{t+1}							-0.09	-9.0				
SMB_{t-1}									0.14	7.9		
SMB_{t+1}									-0.16	-8.8		
HML_{t-1}									-0.09	-5.4		
HML_{t+1}									0.10	5.8		
$RSEO_{t-1}$											3.39	5.3
$TAXR_t$	0.26	4.3	0.15	2.9	0.11	2.1	0.15	3.0	0.16	3.0	-0.20	-1.9
$RGDP_t$	-0.67	-5.3	-0.66	-5.3	-0.38	-3.1	-1.38	-9.7	-0.80	-6.1	0.30	1.4
INF_t	-1.17	-11.4	-1.60	-17.6	-0.71	-6.6	-1.35	-14.7	-1.37	-14.5	-1.17	-5.4
DSP_{t-1}	4.90	8.0	3.76	7.0	3.84	7.1	2.56	4.6	2.45	4.1	7.67	6.3
Constant	-0.50	-13.1	-0.45	-12.2	-0.46	-12.2	-0.42	-11.1	-0.46	-12.0	-0.43	-7.6
N	33,602		34,601		34,601		34,601		34,601		22,388	
Pseudo R^2	0.126		0.129		0.128		0.128		0.129		0.115	

Table 10. Multinomial logit regressions

Multinomial logit regressions are estimated and marginal effects are reported. The dependent variable equals two if the firm issues equity, one if the firm issues debt, and zero if the firm issues neither debt nor equity. Non-issuers are the base category. ΔD is the change in debt and ΔE is the change in equity. All variables are as defined in Table 9.

	(1)				(2)				(3)			
	Debt		Equity		Debt		Equity		Debt		Equity	
	dy/dx	t-stat	dy/dx	t-stat	dy/dx	t-stat	dy/dx	t-stat	dy/dx	t-stat	dy/dx	t-stat
CASH $_{it-1}$	-0.27	-16.0	-0.03	-2.5	-0.27	-16.1	-0.02	-2.0	-0.27	-16.2	-0.02	-1.7
DIVID $_{it-1}$	-0.03	-6.6	-0.02	-4.5	-0.03	-5.9	-0.02	-5.7	-0.03	-6.2	-0.02	-5.1
OIBD $_{it-1}$	-0.21	-6.8	-0.02	-1.1	-0.19	-6.1	-0.03	-1.4	-0.21	-6.8	0.01	0.6
CAPEX $_{it-1}$	0.53	20.8	0.32	19.5	0.53	21.1	0.32	19.8	0.53	21.2	0.32	19.4
Q $_{it-1}$	0.02	8.3	0.05	36.5	0.02	9.0	0.05	36.8	0.02	9.0	0.05	37.0
R&D $_{it-1}$	-0.21	-5.0	0.38	16.9	-0.19	-4.6	0.38	17.0	-0.20	-4.9	0.40	17.9
SALE $_{it-1}$	0.03	16.5	-0.01	-12.9	0.02	16.0	-0.01	-12.6	0.03	16.3	-0.01	-13.1
AGE $_{it}$	0.00	-8.3	0.00	-13.3	0.00	-8.1	0.00	-13.6	0.00	-7.9	0.00	-13.8
LDEF $_{it}$	-0.50	-10.5	0.20	7.2	-0.44	-9.4	0.19	7.0	-0.49	-10.3	0.26	9.6
L $_{it-1}$	-0.56	-11.5	0.28	10.3	-0.50	-10.4	0.27	10.1	-0.54	-11.3	0.34	12.6
ERET $_{it-1}$	0.04	12.0	0.06	33.6	0.04	11.8	0.06	33.2	0.04	11.6	0.06	33.5
ERET $_{it+1, t+3}$	0.00	0.9	-0.02	-17.8	0.00	0.5	-0.02	-17.2	0.00	0.2	-0.02	-16.6
ERP $_{t-1}$	-0.25	-3.1	-1.02	-16.5								
RIPO $_{t-1}$					-0.08	-5.4	0.20	20.4				
CEFD $_{t-1}$									0.14	5.0	-0.25	-11.9
TAXR $_{t}$	-0.15	-2.9	0.27	7.4	-0.21	-4.8	0.06	2.0	-0.21	-4.7	0.04	1.2
RGDP $_{t}$	1.29	13.1	-0.28	-3.6	1.37	14.2	-0.13	-1.7	1.26	13.0	0.10	1.3
INF $_{t}$	1.69	21.8	-0.18	-2.9	1.71	24.4	-0.74	-13.2	1.43	17.6	-0.16	-2.5
DSP $_{t-1}$	-6.01	-12.0	0.89	2.4	-6.40	-14.2	-0.82	-2.4	-6.39	-14.2	-0.83	-2.4
Constant	0.15	4.2	-0.34	-15.4	0.15	4.2	-0.27	-12.6	0.16	4.6	-0.28	-12.8
N	82,213				84,450				84,450			
Pseudo R^2	0.082				0.082				0.080			

	(4)				(5)				(6)			
	Debt		Equity		Debt		Equity		Debt		Equity	
	dy/dx	t-stat	dy/dx	t-stat	dy/dx	t-stat	dy/dx	t-stat	dy/dx	t-stat	dy/dx	t-stat
CASH $_{it-1}$	-0.27	-16.2	-0.02	-1.6	-0.27	-16.4	-0.01	-1.4	-0.25	-13.8	-0.04	-3.1
DIVID $_{it-1}$	-0.03	-5.9	-0.02	-5.2	-0.03	-6.1	-0.02	-5.0	-0.05	-7.6	-0.03	-5.8
OIBD $_{it-1}$	-0.20	-6.4	0.00	0.1	-0.21	-6.7	0.01	0.4	-0.21	-5.8	-0.06	-2.4
CAPEX $_{it-1}$	0.53	21.0	0.32	19.8	0.53	21.1	0.32	19.6	0.45	16.0	0.26	11.9
Q $_{it-1}$	0.02	8.8	0.05	37.5	0.02	9.0	0.05	37.2	0.02	7.5	0.06	33.9
R&D $_{it-1}$	-0.19	-4.7	0.39	17.4	-0.20	-4.8	0.39	17.4	-0.33	-7.8	0.39	14.2
SALE $_{it-1}$	0.02	16.2	-0.01	-13.3	0.03	16.3	-0.01	-13.6	0.02	13.9	-0.01	-10.1
AGE $_{it}$	0.00	-8.2	0.00	-13.2	0.00	-8.0	0.00	-13.2	0.00	-4.8	0.00	-13.7
LDEF $_{it}$	-0.47	-9.8	0.24	9.0	-0.49	-10.2	0.26	9.4	-0.50	-9.4	0.27	8.0
L $_{it-1}$	-0.52	-10.8	0.33	12.1	-0.54	-11.2	0.34	12.4	-0.54	-10.2	0.35	10.4
ERET $_{it-1}$	0.04	12.0	0.06	32.3	0.04	11.9	0.06	32.5	0.03	8.2	0.07	28.6
ERET $_{it+1, t+3}$	0.00	0.6	-0.02	-17.5	0.00	0.0	-0.02	-16.9	0.00	0.7	-0.02	-12.7
EWR $_{t-1}$	-0.04	-5.4	0.05	8.2								
EWR $_{t+1}$	0.03	4.3	-0.06	-10.0								
SMB $_{t-1}$					-0.09	-6.3	0.07	6.1				
SMB $_{t+1}$					0.10	6.7	-0.09	-8.3				
HML $_{t-1}$					0.06	4.4	-0.08	-7.6				
HML $_{t+1}$					-0.05	-4.0	0.03	3.3				
RSEO $_{t-1}$									-1.71	-3.9	1.47	4.0
TAXR $_{t}$	-0.23	-5.2	0.07	2.3	-0.24	-5.1	0.10	3.0	-0.06	-0.8	0.05	0.8
RGDP $_{t}$	1.74	15.0	-0.54	-6.0	1.51	14.5	-0.16	-2.0	0.80	5.5	0.48	3.8
INF $_{t}$	1.66	23.2	-0.53	-9.2	1.64	22.8	-0.56	-9.6	0.95	6.7	-0.65	-5.1
DSP $_{t-1}$	-5.60	-12.0	-1.76	-5.0	-5.29	-10.9	-1.45	-3.8	-4.43	-5.4	0.66	0.9
Constant	0.14	4.0	-0.26	-11.8	0.16	4.3	-0.29	-13.0	0.13	3.0	-0.30	-9.6
N	84,450				84,450				56,715			
Pseudo R^2	0.081				0.081				0.078			

Table 11. Leverage before and after securities issues

ΔE_0 and ΔD_0 are net equity and net debt in year 0 scaled by book assets, respectively. Book leverage is defined as book debt (item 181+10-35-79) divided by book assets (item 6). Market leverage is defined as book debt divided by market assets (item 181+10-35+25*199).

	(1) $\Delta E_0 \geq 0$, $\Delta D_0 \leq 0$				(2) $\Delta E_0 \geq 0$, $\Delta D_0 > 0$			
	Book leverage		Market leverage		Book leverage		Market leverage	
Year	N	Median	N	Median	N	Median	N	Median
-1	31,162	0.510	27,176	0.418	62,188	0.443	55,769	0.318
0	31,325	0.419	29,310	0.345	62,495	0.472	58,650	0.356
1	27,055	0.427	25,638	0.361	56,458	0.471	53,867	0.380
2	24,186	0.436	23,086	0.376	51,435	0.473	49,431	0.394
3	21,816	0.441	20,942	0.390	46,832	0.474	45,185	0.406
4	19,781	0.449	19,032	0.401	42,558	0.475	41,133	0.414
5	17,856	0.452	17,214	0.409	38,624	0.477	37,340	0.421
6	15,990	0.455	15,421	0.416	35,235	0.478	34,068	0.427
7	14,526	0.460	14,019	0.419	32,086	0.479	30,969	0.427
8	13,110	0.462	12,659	0.417	29,286	0.481	28,259	0.429
9	11,799	0.466	11,393	0.416	26,917	0.484	25,937	0.429
10	10,626	0.466	10,262	0.418	24,828	0.488	23,873	0.426

	(3) $\Delta E_0 < 0$, $\Delta D_0 \geq 0$				(4) $\Delta E_0 < 0$, $\Delta D_0 < 0$			
	Book leverage		Market leverage		Book leverage		Market leverage	
Year	N	Median	N	Median	N	Median	N	Median
-1	27,193	0.446	23,711	0.371	16,794	0.497	14,867	0.471
0	27,818	0.504	25,018	0.436	33,447	0.473	24,824	0.353
1	25,092	0.498	23,124	0.426	28,732	0.454	24,672	0.349
2	22,824	0.495	21,347	0.420	25,596	0.460	23,094	0.365
3	20,734	0.493	19,679	0.414	23,015	0.467	21,140	0.374
4	18,885	0.493	18,141	0.414	20,690	0.469	19,406	0.388
5	17,399	0.492	16,843	0.413	18,685	0.472	17,802	0.395
6	16,106	0.490	15,607	0.412	16,817	0.473	16,142	0.397
7	14,950	0.490	14,512	0.420	15,126	0.472	14,611	0.407
8	13,813	0.491	13,407	0.436	13,787	0.473	13,316	0.412
9	12,765	0.492	12,399	0.446	12,434	0.472	12,027	0.418
10	11,783	0.490	11,449	0.454	11,186	0.475	10,855	0.425

Table 12. Effects of past securities issues

The following regression is estimated each year:

$$L_t = f(Characteristics_{t-1}, Net\ Equity_{t-1}, ..., Net\ Equity_{t-k}, Net\ Debt_{t-1}, ..., Net\ Debt_{t-k}, L_{t-k-1})$$

Fama-MacBeth results are reported. The dependent variable is either book or market leverage. Book leverage (BL) is defined as book debt (item 181+10-35-79) divided by book assets (item 6). Market leverage (ML) is defined as book debt divided by market assets (item 181+10-35+25*199). Q is the market-to-book ratio of assets. R&D is the research and development expense (item 46). CAPEX is the capital expenditure (128). SALE is the log of net sales (12). OIBD is the operating income before depreciation (13). DIVID equals one if a firm pays dividends, and equals zero otherwise. TANG is the net PPE (8). INTANG is the intangibles (33). INVENT is the inventory (3). NOLCF is the net operating loss carry forward (52), and ITAXC is the investment tax credit (208). R&D, CAPEX, OIBD, TANG, INTANG, INVENT, NOLCF, and ITAXC are scaled by end-of-year assets. Net debt and net equity are scaled by beginning-of-year assets. The subscripts denote years. The R^2 is the average from the annual regressions.

	Five-year history				Ten-year history			
	Book leverage $_t$		Market leverage $_t$		Book leverage $_t$		Market leverage $_t$	
	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat
Q_{t-1}	0.020	5.7	-0.053	-14.4	0.019	4.9	-0.075	-14.1
$R\&D_{t-1}$	-0.148	-4.3	-0.307	-7.5	-0.110	-1.4	-0.261	-4.5
$CAPEX_{t-1}$	-0.045	-1.4	-0.105	-3.8	-0.111	-2.8	-0.144	-4.8
$SALE_{t-1}$	0.010	12.9	0.008	7.1	0.013	10.6	0.008	6.2
$OIBD_{t-1}$	-0.608	-17.5	-0.589	-23.4	-0.633	-14.3	-0.658	-31.3
$DIVID_{t-1}$	-0.034	-10.2	-0.050	-16.7	-0.071	-10.2	-0.073	-14.0
$TANG_{t-1}$	0.090	7.3	0.113	10.4	0.138	11.0	0.151	14.3
$INTANG_{t-1}$	0.112	5.4	0.065	3.2	0.162	6.6	0.064	2.8
$INVENT_{t-1}$	0.039	5.6	0.094	10.6	0.070	7.4	0.121	9.3
$NOLCF_{t-1}$	0.262	6.5	0.023	0.9	0.348	12.0	0.124	5.5
$ITAXC_{t-1}$	-0.394	-0.2	-3.817	-2.0	1.618	0.7	-3.944	-1.7
Net debt $_{t-1}$	0.207	15.0	0.148	15.0	0.230	14.6	0.150	16.4
Net debt $_{t-2}$	0.211	22.8	0.159	24.8	0.213	20.0	0.171	14.1
Net debt $_{t-3}$	0.206	23.0	0.146	23.2	0.191	12.9	0.147	18.0
Net debt $_{t-4}$	0.193	22.4	0.151	24.0	0.179	17.1	0.137	9.9
Net debt $_{t-5}$	0.211	21.9	0.173	23.5	0.172	14.8	0.118	13.9
Net debt $_{t-6}$					0.163	13.2	0.125	15.7
Net debt $_{t-7}$					0.151	14.7	0.119	15.6
Net debt $_{t-8}$					0.128	10.0	0.107	10.0
Net debt $_{t-9}$					0.143	13.2	0.117	14.0
Net debt $_{t-10}$					0.141	16.1	0.119	18.3
Net equity $_{t-1}$	-0.253	-11.3	-0.232	-9.2	-0.274	-11.0	-0.246	-8.5
Net equity $_{t-2}$	-0.254	-12.9	-0.201	-11.0	-0.233	-7.6	-0.235	-7.7
Net equity $_{t-3}$	-0.247	-15.0	-0.182	-11.7	-0.267	-9.7	-0.214	-8.9
Net equity $_{t-4}$	-0.239	-13.7	-0.153	-12.2	-0.220	-7.2	-0.219	-10.6
Net equity $_{t-5}$	-0.199	-11.5	-0.064	-4.4	-0.198	-8.9	-0.186	-8.3
Net equity $_{t-6}$					-0.224	-11.3	-0.167	-11.3
Net equity $_{t-7}$					-0.217	-9.4	-0.141	-6.4
Net equity $_{t-8}$					-0.205	-11.4	-0.124	-7.7
Net equity $_{t-9}$					-0.185	-12.9	-0.090	-7.2
Net equity $_{t-10}$					-0.210	-14.8	-0.049	-4.7
BL_{t-6}	0.621	78.9						
ML_{t-6}			0.509	47.2				
BL_{t-11}					0.454	61.7		
ML_{t-11}							0.385	39.4
Constant	0.150	19.1	0.298	19.9	0.209	21.5	0.373	21.3
N	33		33		28		28	
R-squared	0.599		0.658		0.540		0.631	

Table A1. Target leverage regressions

The following equation is estimated:

$$L_{it} = f(\text{firm characteristics}_{\text{it-1}}).$$

The dependent variable, L, is book leverage, defined as the book value of debt (Compustat item 181+10-35-79) divided by the book value of total assets, or market leverage, defined as the book value of debt divided by the market value of total assets. The market value of assets is defined as the book value of total assets minus the book value of debt plus the market value of equity (181+10-35+25*199). All independent variables are lagged by one year. Q is the market-to-book ratio of assets. R&D is the research and development expense (46). CAPEX is the capital expenditure (128). SALE is the log of net sales (12). OIBD is the operating income before depreciation (13). DIVID equals one if a firm pays dividends, and equals zero otherwise. TANG is the net PPE (8). INTANG is the intangibles (33). INVENT is the inventory (3). NOLCF is the net operating loss carry forward (52), and ITAXC is the investment tax credit (208). R&D, CAPEX, OIBD, TANG, INTANG, INVENT, NOLCF, and ITAXC are scaled by assets. We use industry classifications from Kenneth French to classify all firms into 17 industries, two of which are utilities and financials, which are excluded from our sample. Coefficients for 38 time dummies and the 14 industry dummies are not reported for brevity. In columns (5) and (6), the R^2 is the average R^2 from the 39 annual regressions.

	(1)		(2)		(3)		(4)		(5)		(6)	
	Firm fixed-effects with time dummies		Firm fixed-effects with time dummies		Industry fixed-effects with time dummies		Industry fixed-effects with time dummies		Fama-MacBeth procedure		Fama-MacBeth procedure	
	Book leverage		Market leverage		Book leverage		Market leverage		Book leverage		Market leverage	
	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat
Q	0.01	9.4	-0.03	-56.0	-0.01	-8.5	-0.05	-108.3	0.00	0.9	-0.07	-13.6
R&D	-0.14	-6.5	-0.34	-22.1	-0.88	-54.8	-0.84	-73.7	-0.92	-16.6	-1.01	-21.3
CAPEX	-0.05	-4.5	-0.11	-13.5	0.02	1.6	-0.16	-16.7	0.10	2.2	-0.07	-2.0
SALE	0.02	17.7	0.03	43.7	0.04	71.7	0.03	71.9	0.03	16.7	0.03	22.2
OIBD	-0.49	-66.5	-0.41	-81.3	-0.63	-90.1	-0.55	-109.5	-0.67	-24.2	-0.65	-18.6
DIVID	-0.06	-25.2	-0.05	-30.3	-0.11	-55.0	-0.09	-66.1	-0.11	-17.9	-0.09	-15.0
TANG	0.17	21.3	0.19	35.1	0.19	33.0	0.19	47.8	0.11	5.2	0.15	9.5
INTANG	0.18	16.3	0.15	19.2	0.34	36.8	0.17	25.4	0.33	21.1	0.19	8.3
INVENT	0.12	11.7	0.15	20.5	0.19	29.1	0.21	45.8	0.11	10.2	0.17	15.0
NOLCF	0.12	48.1	0.02	9.8	0.13	52.5	0.02	10.2	0.23	10.8	0.00	0.2
ITAXC	-4.74	-8.4	-2.28	-5.8	-5.93	-12.9	-3.91	-12.0	-2.73	-4.1	-4.99	-4.3
Constant	0.44	58.1	0.27	52.5	0.35	63.2	0.37	94.6	0.39	26.0	0.45	22.2
R^2	0.130		0.349		0.199		0.406		0.251		0.422	
N	107,187		106,673		107,187		106,673		39		39	

Figure 1A

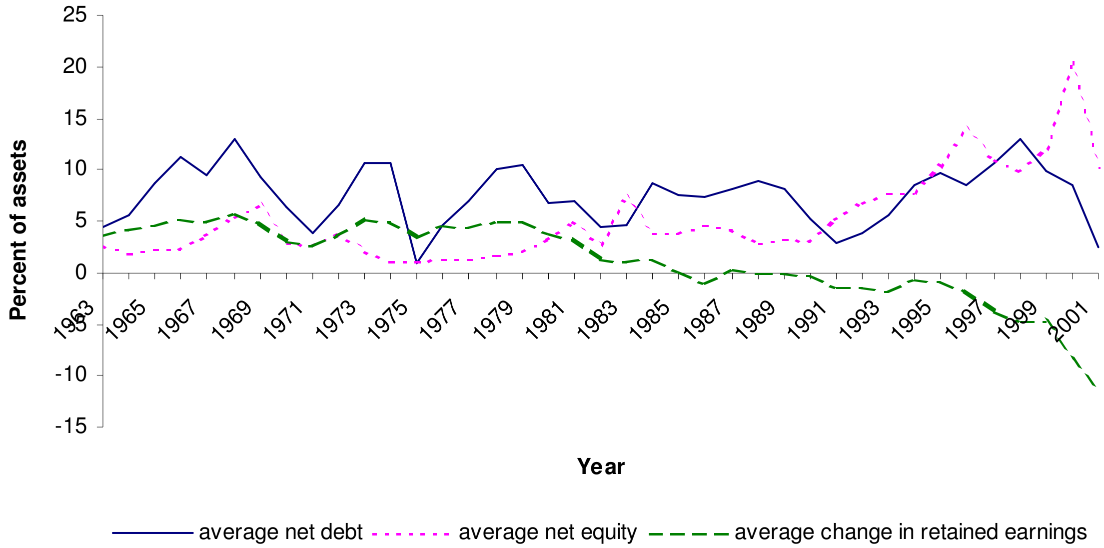

Figure 1B

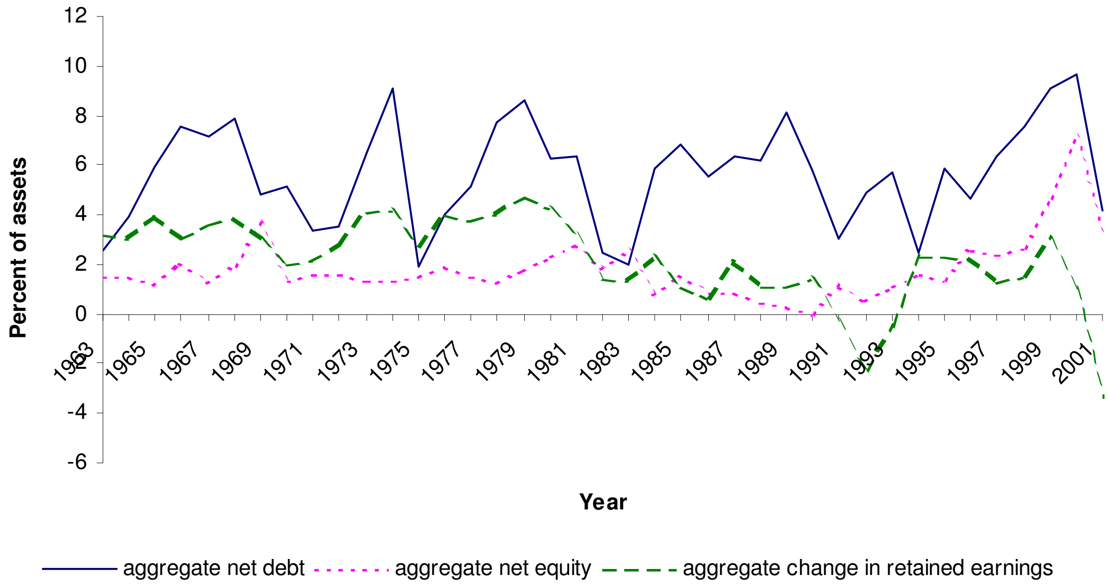

Figure 1. Average and aggregate financing activities from the balance sheet. Net debt is the change in debt and preferred stock (Compustat item 181+10-35-79). Net equity is the change in equity and convertible debt (6-181-10+35+79) minus the change in retained earnings (36). The average percents are the EW annual averages of net financing scaled by beginning-of-year assets of each firm (in percent). The aggregate percents are the annual aggregate amount of net financing of all firms in the sample scaled by the aggregate amount of beginning-of-year assets (in percent). Figure 1A presents the average percents, and Figure 1B presents the aggregate percents.

Figure 2A

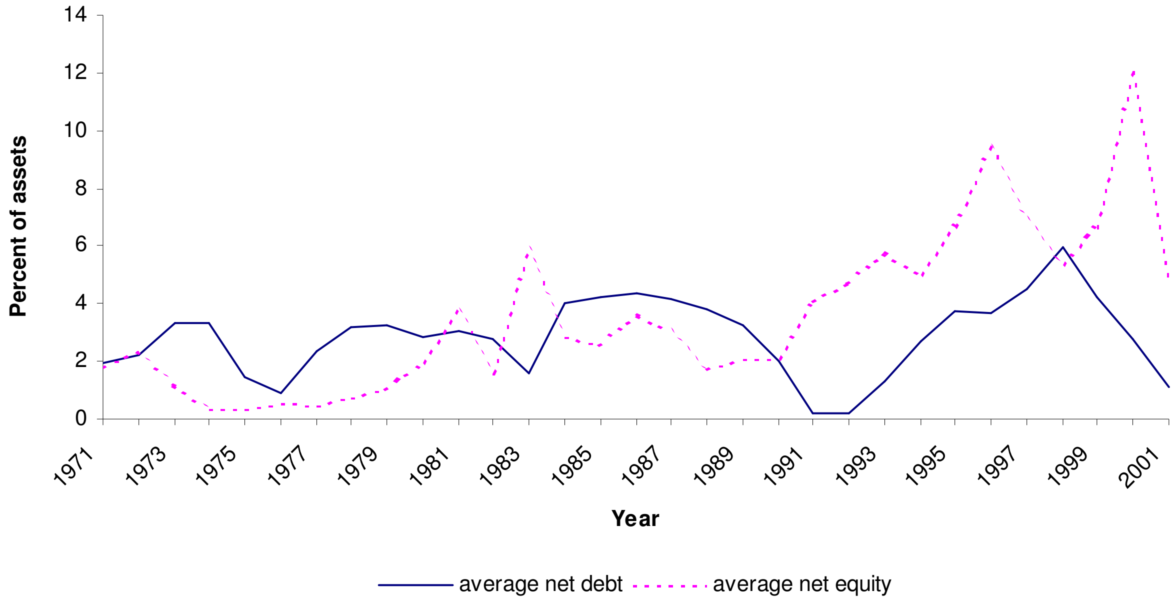

Figure 2B

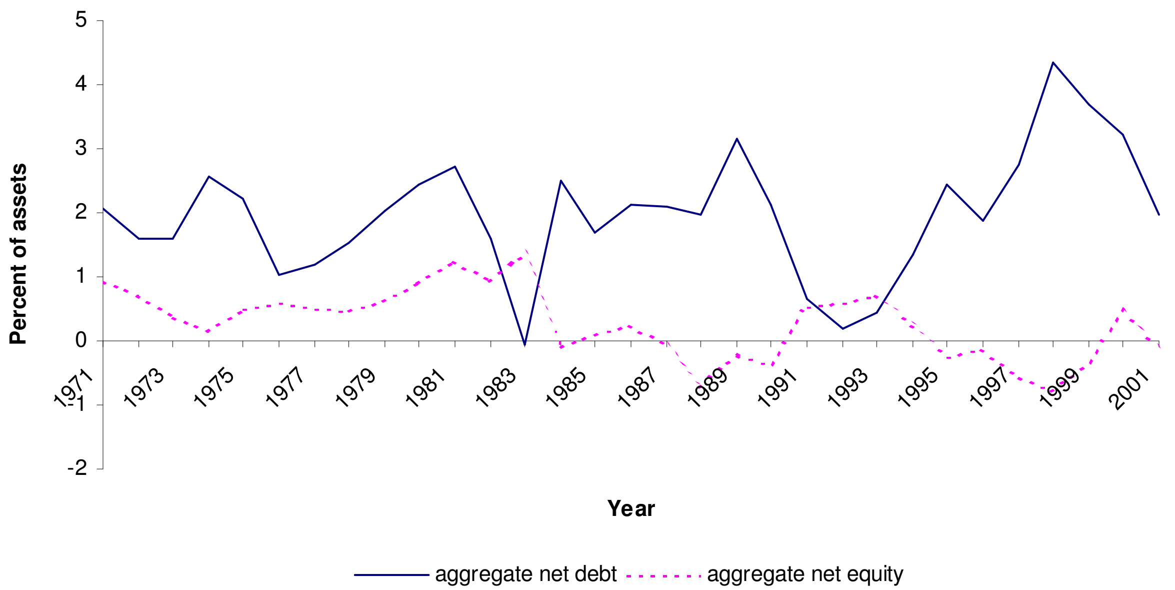

Figure 2. Average and aggregate financing activities from the statement of cash flows. Net debt is the net debt issuance from the statement of cash flows (Compustat item 111-114-301 for firms with format code 1, 111-114+301 for firms with format codes 2, 3, and 7). Net equity is the net equity issuance from the statement of cash flows (108-115). The average percents are the annual averages of net financing scaled by beginning-of-year assets of each firm (in percent). The aggregate percents are the annual aggregate amount of net financing of all firms in the sample scaled by the aggregate amount of beginning-of-year assets (in percent). Figure 2A presents the average percents, and Figure 2B presents the aggregate percents.

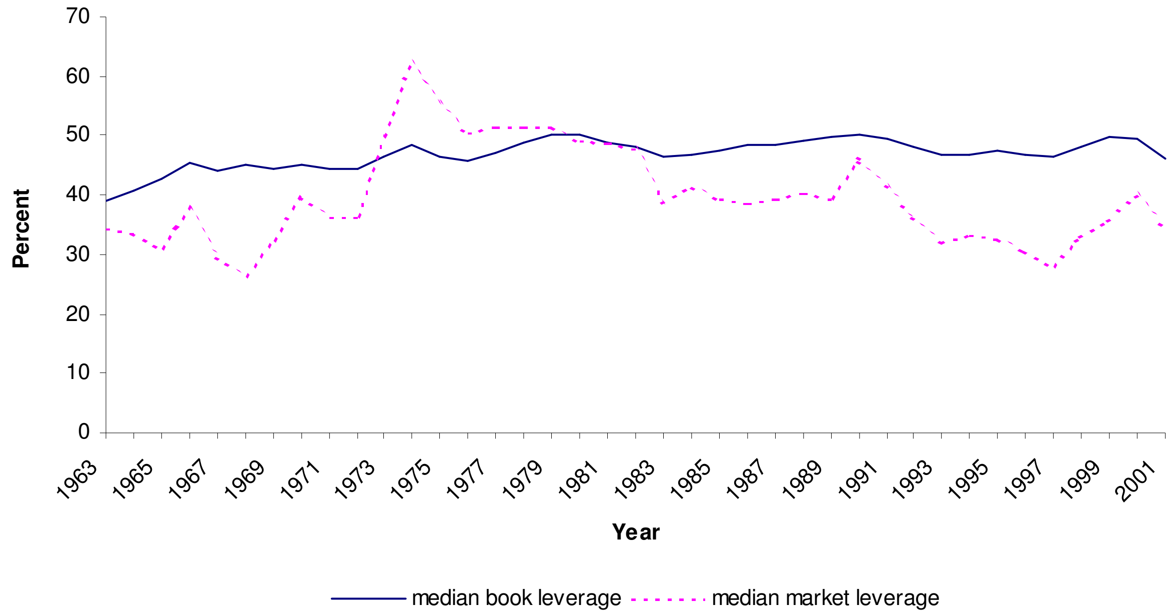

Figure 3. Median leverage. Book leverage is defined as the book value of debt (Compustat item 181+10-35-79) divided by the book value of assets. Market leverage is defined as the book value of debt divided by the market value of assets. The market value of assets is defined as the book value of total assets minus the book value of debt plus the market value of equity (181+10-35+25*199).

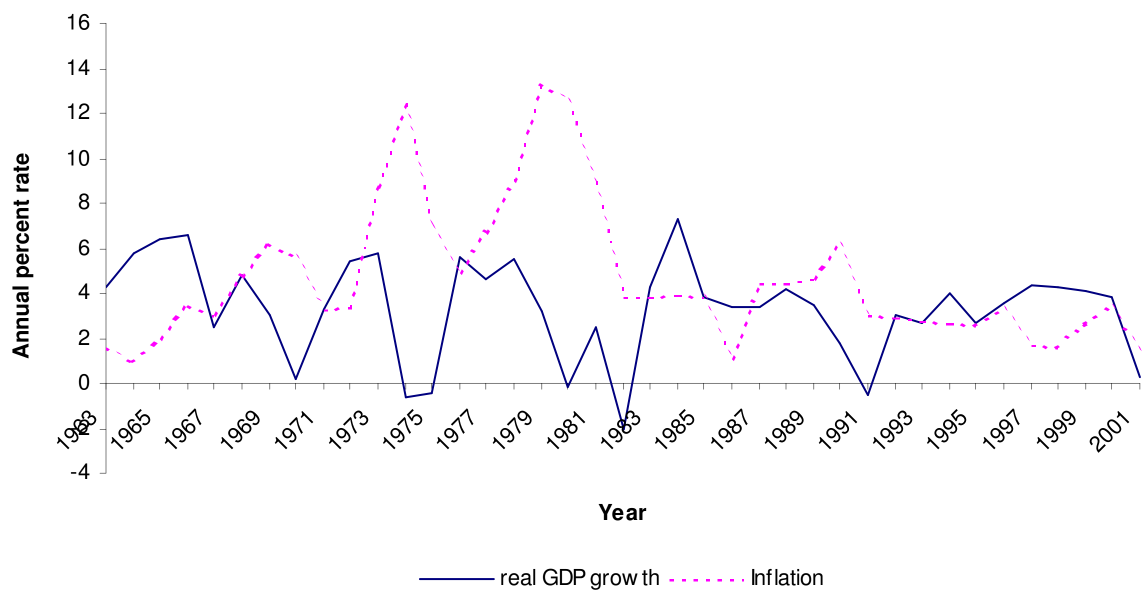

Figure 4. Inflation and real GDP growth. Inflation is the growth rate of the Consumers Price Index. Real GDP growth is the real growth rate of Gross Domestic Product from year t-1 to t.

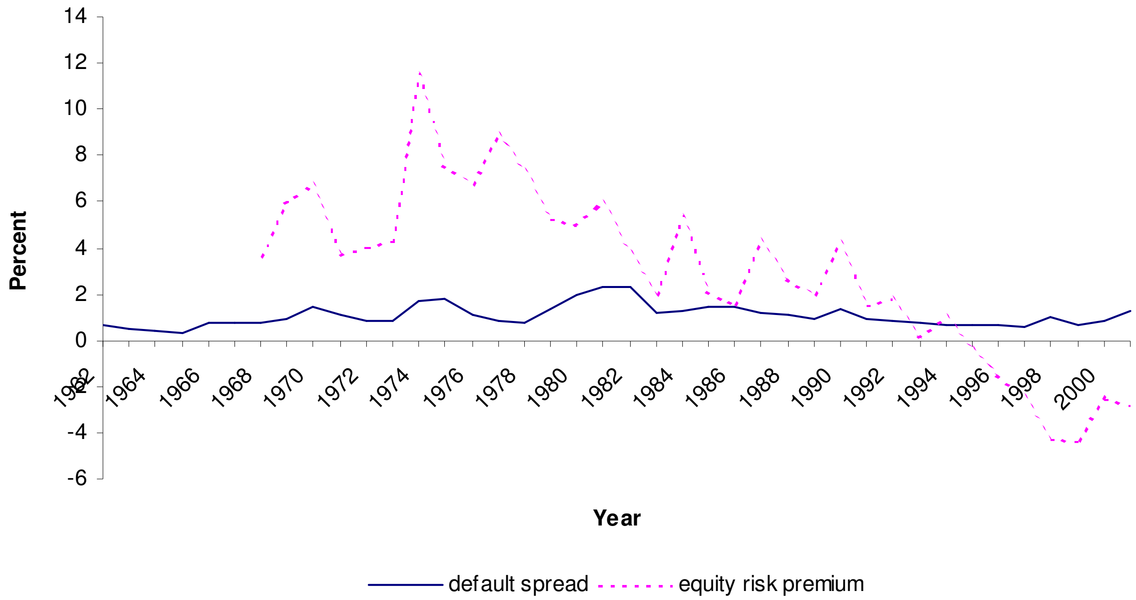

Figure 5. Equity risk premium and default spread. The market equity risk premium is estimated using analyst forecasts at the year-end for the Dow 30 stocks from Value Line for 1968-1976 and from I/B/E/S for 1977-2001. The default spread is the yield difference at the year-end between Moody's Baa and Aaa rated bonds.

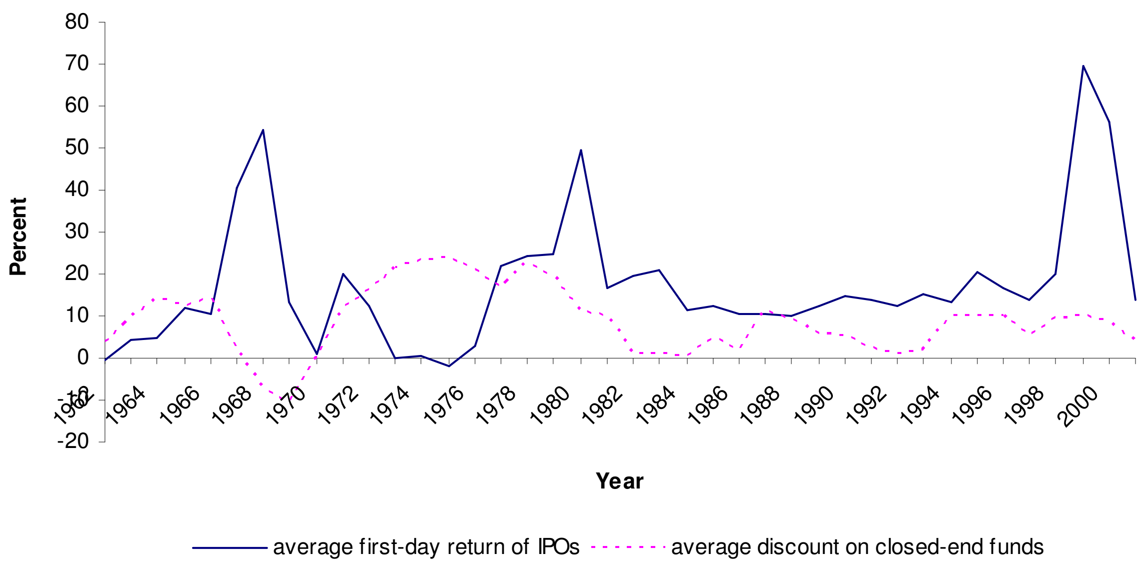

Figure 6. Average first-day return of IPOs and closed-end fund discount. The annual average of first-day returns of initial public offerings, including unit and penny stock IPOs, can be found at http://bear.cba.ufl.edu/ritter/ipodata.htm. The closed-end fund discount is the value-weighted average of closed-end fund discounts at the year-end from Malcolm Baker and Jeffrey Wurgler, who construct the series by combining several sources (Neal and Wheatley, 1962-1993; CDA/Weisenberger, 1994-1998; and the *Wall Street Journal*, 1999-2001).

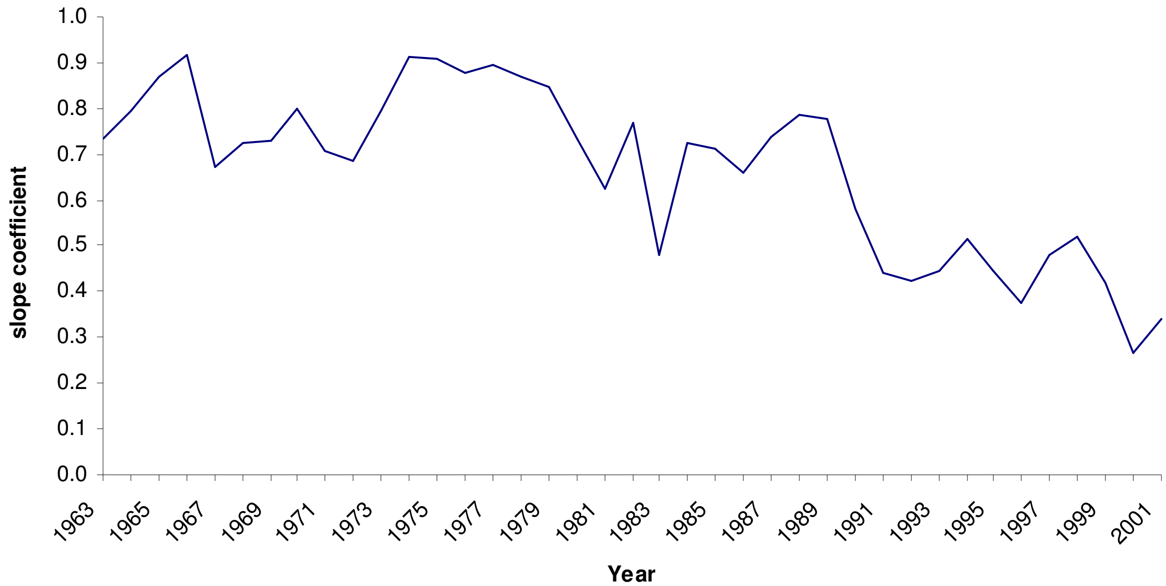

Figure 7. Pecking order slope coefficients. Coefficients are computed annually by estimating equation (1), and are reported in Table 5.

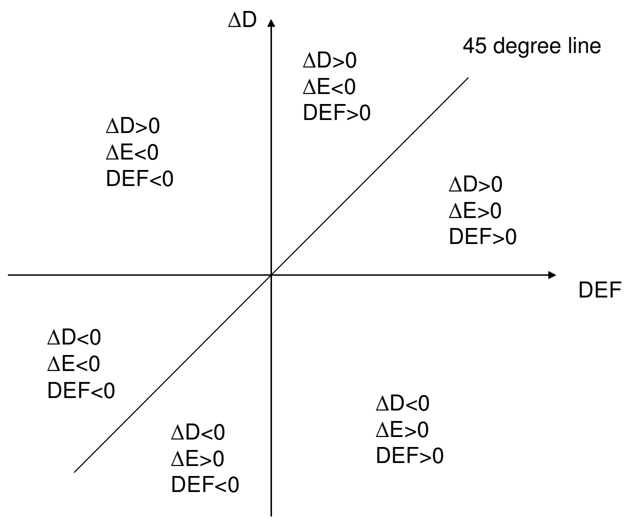

Figure 8. External financing activities. The horizontal axis is the external financing deficit, and the vertical axis is net debt issuance. ΔD is net debt issuance, ΔE is net equity issuance, and DEF is net external financing.

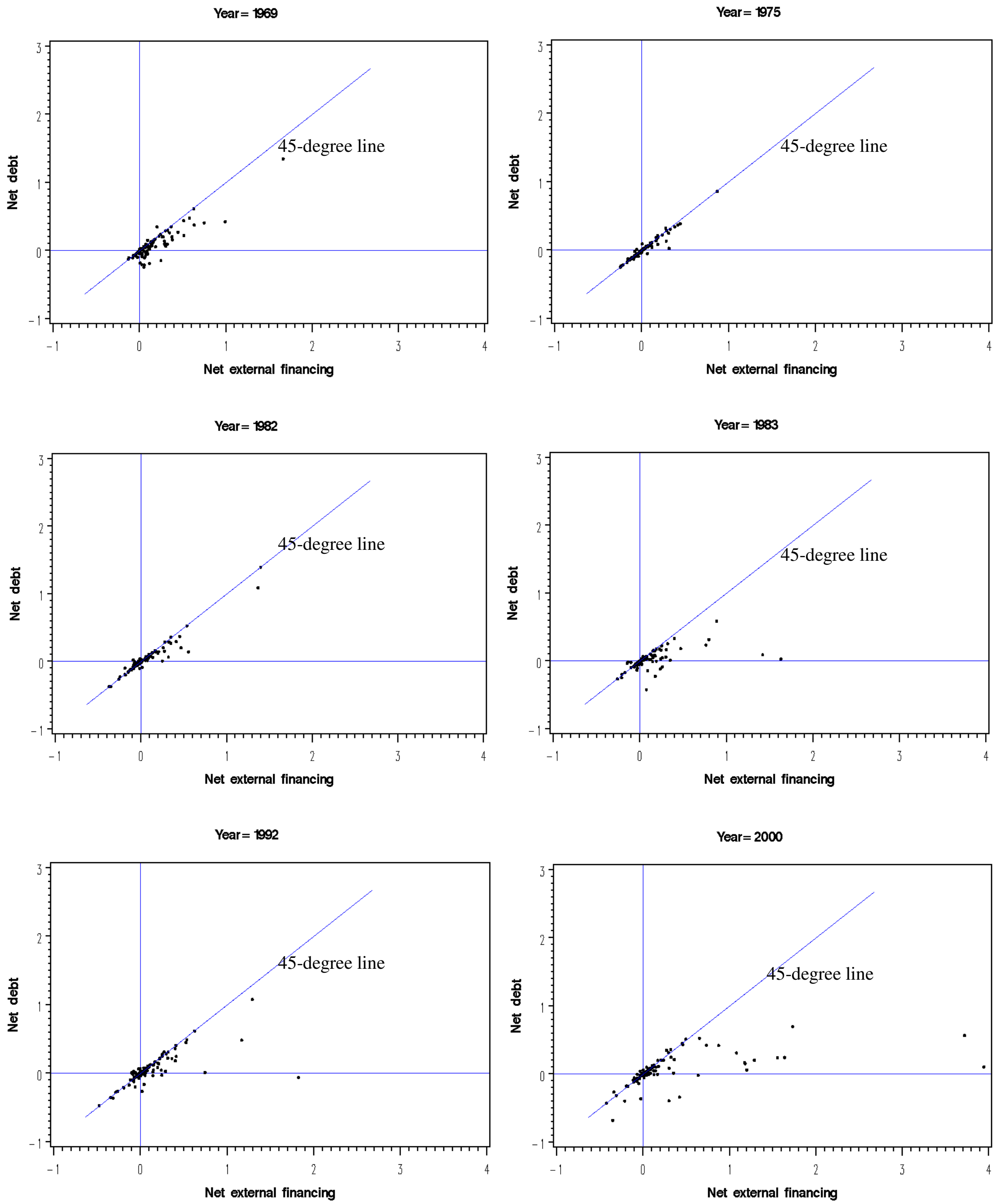

Figure 9. Scatter-plots of net debt versus net external financing. The horizontal axis denotes net external financing scaled by beginning-of-year assets, and the vertical axis denotes net debt scaled by beginning-of-year assets. For each selected year, 100 randomly selected observations are plotted. The pecking order slope coefficient in Table 5 is 0.727 for 1969, 0.909 for 1975, 0.768 for 1982, 0.482 for 1983, 0.423 for 1992, and 0.268 for 2000, respectively.