Profits and Capital Structure*

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ABSTRACT

It is well known that in a leverage regression, profits are negatively related to leverage. The literature (e.g., Myers, 1993; Fama and French, 2002) considers this to be a key rejection of the static trade-off theory. In this paper, we show that: 1. The literature has misinterpreted the evidence as a result of the wide-spread use of familiar but empirically misleading, leverage ratios. 2. More profitable firms experience an increase in both book equity and the market value of equity. 3. Empirically, they react as in the trade-off theory. Highly profitable firms typically issue debt and repurchase equity, while low profit firms typically reduce debt and issue equity. 4. Firm size matters. Large firms make more active use of debt, while small firms make more active use of equity. 5. In a trade-off model, financing decisions depend on market conditions ('market timing'). Empirically, poor market conditions result in reduced use of external finance. The impact is particularly strong on small and low profit firms.

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I. Introduction

It is widely held that in the static trade-off theory of capital structure ¹, a more profitable firm is predicted to have a higher leverage ratio.² It is also well known that empirically more profitable firms tend to have lower leverage ratios. This fact – and it is a fact – is widely regarded as a particularly serious defect of the trade-off theory.³ As a result, the static trade-off theory is widely regarded as defective⁴ and so more complex theories, such as dynamic trade-off models, the pecking order theory and behavioral theories, have drawn the attention of many scholars. This widely held impression is not correct.

To see why the usual interpretation is not correct, start with the key question to be answered. What is the impact of some exogenous factor, x (profits) on capital structure? In a static trade-off model of capital structure, the firm chooses both debt, D , and equity E , giving a pair of first order conditions, $D = D(x)$ and $E = E(x)$. According to theory the effect of x on D is the derivative, $D'(x) > 0$. According to theory the effect of x on E is the derivative, $E'(x) < 0$.

How does the literature test these comparative static predictions? The normal method is to form a leverage ratio, $L \equiv \frac{D(x)}{D(x)+E(x)}$. Then, a regression is estimated as $L_{it} = \alpha + \beta x_{it} + \varepsilon_{it}$. To test the prediction $D'(x) > 0$, we test whether we can reject the hypothesis that $\beta > 0$. With x as profits the static trade-off theory says that $D'(x) > 0$. So the usual finding that $\beta < 0$, is interpreted as a sharp rejection of the theory.

¹The term ‘trade-off theory’ is used in different ways by different authors. For some authors it means that bankruptcy and taxes are being balanced (Kraus and Litzenberger, 1973). For other authors it includes agency based arguments (Fama and French, 2002). Some authors simplify by assuming that investment is unaffected, even though the cost of capital is changed by the leverage choice. Other authors actually analyze the impact of the leverage choice on investment. A recent review is provided by (Frank and Goyal, 2008). An explicit model is provided in Appendix A.

²“In the trade-off model, agency costs, taxes, and bankruptcy costs push firms to increase debt as earnings increase” (Fama and French, 2002, pages 8-9).

³“The most telling evidence against the static trade-off theory is the strong inverse correlation between profitability and financial leverage” (Myers, 1993, page 6).

⁴“[T]here is consensus in the profession that a simple friction-free trade-off model cannot explain the evidence” (Welch, 2007, page 18).

What is wrong with the usual interpretation? Running a leverage regression amounts to asking, what is the effect of x on $\frac{D(x)}{D(x)+E(x)}$? **It is not $D'(x)$.** Take the derivative of the leverage ratio with respect to x . It is,

$$\frac{D'(x)}{D(x) + E(x)} - \frac{D(x)(D'(x) + E'(x))}{(D(x) + E(x))^2}. \quad (1)$$

This need not have the same sign as $D'(x)$. Whether the sign is the same, depends on the sign and the magnitude of $-\frac{D(x)(D'(x)+E'(x))}{(D(x)+E(x))^2}$.

It turns out empirically that this extra term is first order big, not second order small. This happens because debt ($D(x)$) is fairly big relative to the change in debt ($D'(x)$), and so the extra term is big enough to really matter. To see this consider data that will be presented in Table IV. For the median category of all firms (in millions of dollars) we have $D = 947.5$, $E = 1491$, $D' = 26.9$, $E' = 74.2$. Plugging these values into (1) we see that $\frac{D'}{D+E} = 0.011 > 0$, and $\frac{D'}{D+E} - \frac{D(D'+E')}{(D+E)^2} = -0.005 < 0$. So the sign reversal takes place at the median of all firms.

To properly understand how and why this takes place, it is important to dig deeper into the data. Conceptually, several problems interact in the leverage ratio.

First, there is variation that operates through an effect on D , and variation that operates through an effect on E . In the leverage ratio these cannot be distinguished. Commonly the ratio is interpreted as if the effect operated through an effect on D . In the data there is actually much more variation from year to year in E . This is true both for book and for market based definitions of E .

The leverage ratio is an average of totals. The static trade-off theory has implications about the signs of the debt and equity issuing decisions at the margin. The static trade-off theory, by itself, does not restrict the magnitude of the averages or of the totals.⁵ The total values of debt and equity are only partly a result of issuing decisions.⁶ The book

⁵Since this has been a source of some confusion in the verbal theorizing literature, we illustrate the point analytically in the appendix.

⁶Existing debt and equity levels are in part the result of past decisions (Welch, 2004). As stressed by Leary and Roberts (2005) the manner in which these issuing decisions translate into levels of debt and equity depends on the form and magnitude of the adjustment costs.

value of equity depends on accumulated profits from operations. The market value of equity depends on market anticipation of future profits.

Second, small firms and large firms face somewhat different financing cost structures. These differences are hidden in a leverage ratio. Small public firms are relatively more active in the equity market. Large public firms are relatively more active in the debt market. Pooling these together can be misleading.

Our empirical evidence is fairly easy to understand from the perspective of the static trade-off theory.

1. When a firm makes extra profit, this adds to the book value of equity unless the firm takes some type of offsetting action. Similarly, when a firm makes extra profits, unless there is some type of offsetting action, the market value of the firm's equity increases. Thus more profitable firms have both more book equity and more market value of equity.
2. Among the large firms, the highest profit firms increase their debt the most. Among the large firms, those with high profits experience great increases in both book and market value of equity. Among the large firms, the highest profit firms tend to repurchase equity while the lowest profit firms tend to issue more equity.
3. Among the small firms, the profit seems to have only a very minor effect on debt. Among the small firms, those with high profits experience some increases in both book and market value of equity. Those with low profits experience negative effects on market equity. Among the small firms there is a tendency to issue equity, with the lowest profit firms tending to issue the most equity.
4. Almost any optimizing model of an interior optimal capital structure will imply that the use of debt and of equity will vary as market conditions vary. Empirically there is time variation in corporate use of external financing. In good times there is more issuing of both net debt and of net equity when compared to bad times. In particular, issuing equity in bad times is more of a problem than issuing equity in

good times. The negative effect of profits on equity issuing is much stronger in good times than in bad times.

To summarize the evidence, more profitable firms really do borrow more, do repurchase equity, and experience an increase in both book value of equity and market value of equity. Less profitable firms really do tend to reduce their debt and issue equity. Among the low profit firms there is more variation in the book equity and market equity.

There is a huge prior literature on our topic, and so we cannot review all related studies. For a recent review of the literature see Frank and Goyal (2008). The fact that there is an inverse relationship between profitability and leverage ratios has generated a variety of responses from scholars.⁷

One response in the literature has been to argue that we should not consider static models. The trade-off theory predictions on profitability are more complex in a dynamic model (see Strebulaev, 2007) than in a static model.⁸ In a dynamic trade-off model, leverage can appear to be negatively related to profitability in the data due to various frictions.

Empirically, the response has been to argue that leverage and profitability are negatively related because firms passively accumulate profits (see Kayhan and Titman, 2007).⁹ This implies that at rebalancing points, leverage should be positively related to profitability. Mackie-Mason (1990) shows that companies with tax loss carry forwards are more likely to issue equity. Hovakimian et al. (2001) and Gomes and Phillips (2007) show that highly profitable firms are indeed more likely to issue debt. This is consistent with what we find. In contrast, Jung et al. (1996) report finding no relation between the likelihood of equity issuance and profitability.

⁷A partial list of papers documenting an inverse relation include Auerbach (1985), Graham and Tucker (2006), Long and Malitz (1985), Titman and Wessels (1988), Fischer et al. (1989), Rajan and Zingales (1995), and Booth et al. (2001). Frank and Goyal (2009) show that the inverse relation between leverage and profitability has become weaker in the recent decades.

⁸Of course, every model leaves things out. For instance one could argue to only consider general equilibrium models, or to only consider models which account for the nature of industrial competition, or which account for imperfect decision making, or any of a host of other plausible considerations. In this regard, tastes differ.

⁹However, Chen and Zhao (2005) conclude that neither transaction costs nor taxes can properly explain the negative relation between leverage and profitability.

Welch (2004, 2007) makes the important point that changes in debt and equity values and changes in debt ratios are conceptually different. This distinction also plays a role in our analysis. Welch (2007) stresses the fact that non-financial liabilities should not be treated together with financial debt. We have adopted his approach to distinguishing between financial and non-financial debt in the empirical work reported here.

This paper is organized as follows. Section II describes the construction of the data and variables and provides some summary statistics. Section III provides results from the fixed effects estimates of leverage ratios. Section IV provides the main results on debt and equity issuance regressions. Section V examines debt and equity issuances when scaled by total issuances and total capital. Section VI explores debt and equity issuance responses by firms during good and bad times. Section VII concludes the paper.

II. Data

As described in Appendix A, the data are constructed from the usual Compustat and CRSP databases. Table I provides summary statistics for the financial variables. The average debt (in constant US\$) is about \$477 million while the median is \$14 million. A significant fraction of firms have zero debt (the 10th percentile is 0). Book equity is slightly larger than book debt. Market equity is more than two times larger than book debt.

If there were no fixed costs for issuing or retiring securities, then we would expect to see very many small actions and very few large actions (Leary and Roberts, 2005). If there were significant fixed costs for issuing or retiring outstanding securities, then small issues might not be worthwhile. Table I shows that although most firms issue little debt or equity in a given year, the averages are large. This suggests that when firms actually enter debt and equity markets, they intervene massively.

The mean constant dollar debt issue is \$118 million (the median is \$0.8 million). As a fraction of assets, the mean debt issue is 10% of assets (the median is 2%). About 37% of the firms issue no debt; 8% issue between 0 and 1% of the value of their assets as

debt; another 16% issue between 1 and 5% of the value of their assets as debt; and the remaining 39% issue in excess of 5% of the value of their assets as debt.

The mean equity issue is \$17 million (the median is about \$0.1 million). As a fraction of assets, the mean and median equity issues are 8.5% and 0.1%, respectively. About 40% of the firms issue no equity; 29% of the firms issue between 0 and 1% of the value of their assets as equity; another 12% issue between 1 and 5% of the value of their assets as equity; and the remaining 19% of the firms issue in excess of 5% of the value of their assets as equity.

Average debt repayments are larger than are equity repurchases. This perhaps reflects the finite maturity of debt and its contractual repayment. The median firm does not repurchase equity. The median book leverage is 0.38 (the average is 0.28). The median market leverage is 0.21 (the average is 0.34).

III. Estimating a Leverage Ratio

The previous literature focuses on estimates using leverage ratios. Hence, we start with a similar estimation to check whether our results match those of previous studies. Table II presents the results. Some scholars advocate book leverage ratios while others advocate market leverage ratios. We report results for both. Book leverage is defined as debt over debt plus book equity. Market leverage is defined as debt over debt plus market equity.¹⁰

As found by many previous studies, the results in Table II show that the coefficient on profitability is negative and statistically significant. This is true for both book leverage and for market leverage. The coefficients on other factors largely match what has been reported by earlier studies. Firms operating in industries with high leverage tend to have high leverage. A higher market-to-book ratio is associated with lower leverage. Larger firms are typically more highly levered. The coefficients on tangibility are positive. The

¹⁰These leverage definitions are consistent with Welch (2007). Welch argues that commonly used leverage definitions, such as the debt-to-assets ratio, are noisy because assets include non-financial liabilities.

conclusion from Table II is clear. The leverage regression results match results reported by previous studies.

In Table II we run conventional cross section leverage regressions. Since we are using the usual data, it is not surprising that our results match those reported in the existing capital structure literature, i.e., profitability has a negative sign in both the book leverage regression and in the market leverage regression.

A. Frequency of Financing Activity

Table III tabulates the percentage of firms issuing or repurchasing debt and equity as classified by lagged values of firm size and profitability levels. In Table III, we employ the conventional 5% cut-off rule to exclude minor fluctuations. Firms ‘issuing debt’ are therefore those that issue debt (both short-term and long-term) in excess of 5% of the value of their assets. Other decisions are similarly defined using a 5% cutoff.

First, we sort by firm size (Panel A of Table III). Larger firms are prone to issuing debt and to retiring debt. These forces roughly cancel each other so that large firms are neither dramatically more nor less likely to be net debt issuers than are small firms. Firm size interacts with equity issuing quite differently. Large firms are much less prone to issue equity but more likely to repurchase it. As a result, small firms are much more likely to issue net equity than are large firms.

Second, we sort by profitability (Panel B, Table III). The probability of issuing debt is roughly independent of firm profitability. Similarly, there is only a weak relation between the profitability and the probability that the firm retires debt. Unlike the probability of issuing debt, the probability of issuing equity is strongly related to profitability. Low-profit firms are **much** more likely to issue equity than are high-profit firms. High-profit firms are **much** more likely to repurchase equity. Accordingly, low profitability firms are much more likely to be net equity issuers than are high profitability firms.

How do size and profitability interact? To examine this question, we first sort firms annually by firm size and then, within each size quintile, we sort firms based on profitability.

The bottom part of Table III reports results for the smallest and the largest size quintiles. Among the small firms, there is little or no relation between profitability and the likelihood of issuing debt. However, larger firms exhibit small increase in the likelihood of net debt issuance with increasing profitability.

The effects of profitability on equity issuance and repurchases are much more consistent across size quintiles. As profitability increases, firms generally are less likely to issue equity and more likely to repurchase it. Equity issuance concentrates in the low profits quintile.

The last four columns consider firms that issue both debt and equity, firms that issue debt and repurchase equity, firms that issue equity and retire debt, and firms that undertake no (nontrivial) issuing activity. A small fraction of firms issue both debt and equity in the same year. By contrast, a much large fraction of firms (roughly 30 to 40%) issue neither security.

Importantly, Column (8) shows that the likelihood of issuing debt and simultaneously repurchasing equity increases with profitability. Column (9) shows that, conversely, the likelihood of issuing equity and retiring debt declines with profitability. The effects of sorting on firm size and firm profitability mirror the results reported for all firms. Again, we find that low-profit firms are less likely to issue debt and to repurchase equity; they are more likely to issue equity and retire debt. Firms with high profitability exhibit the reverse pattern.

B. Magnitude of Financing Activity

In the previous section, we considered the probability of having a nontrivial level of activity for either debt or equity. The next question is how large are the dollar values involved. In Table IV, we sort the firms according to profits and then tabulate the levels

and changes in both debt and equity. We do this first for all firms and then for small versus large firms.

For all firms, we observe in Column (1) that debt peaks at the middle of the distribution. This fact is confused by mixing together firms of different size. For small firms, debt is roughly independent of profits, while for large firms low profit firms tend to have a higher level of debt.

We might expect more profitable firms to have higher equity values. This pattern roughly holds in Columns (3) and (5), although there are some minor fluctuations observed. Columns (1), (3), and (5) show that firms in our sample are quite typical of what has been found in previous studies, which stands to reason because we are studying firms from the most commonly used data set for such studies.

In Column (2) of Table IV, we consider the relationship between the change in debt and firm profitability. For small firms the change in debt is largely unrelated to profits. For large firms there is a strong relation. High profit firms have a big positive change in debt. Low profit large firms have a slightly negative change in debt.

The changes in both book value of equity and market value of equity across profit quintiles are illustrated in columns (4) and (6). Large and highly profitable firms are associated with a big positive change in equity. For small firms the effect is much weaker. However the impact of the large firms is sufficiently strong that the patterns also hold up for the case of all firms.

Column (7) Table IV is of particular importance for theory. It shows that small and low profit firms tend to issue more equity than do small and high profit firms. Among large firms, low profit firms tend to issue equity, while the high profit firms tend to repurchase equity.

The finding that more profitable firms tend to repurchase equity is what might be expected from the basic trade-off theory. The fact that in general high profit firms tend to issue more debt is also as predicted.

This evidence also illustrates an important issue concerning the use of leverage ratios. Such ratios are often interpreted as essentially reflecting the use of debt by the firm. That verbal interpretation, while common, is empirically misleading.

For the typical firm change in the value of equity is larger than the change in debt. For example, in the third profit quintile for large firms, the mean equity issue was just \$8 million, but the change in the market value of equity was \$490.7 million. At the same time the mean change in debt was \$75.8 million. This suggests that a fair bit of the observed variation in the leverage ratios are primarily driven by the changes in the market value of equity in the denominator, rather than by changes in debt in the numerator. Since equity issues are often small, this implies that the variation in the leverage ratio is primarily being driven by internal operations more than by external financing actions. This again points to the fact that leverage ratios can provide a misleading account of actual patterns in the data. As pointed out in the introduction we can use Table IV to cast light on equation (1).

There is always a potential concern that the averages may be misleading due to the impact of outliers. To address this concern in Table V we present median values of the profitability sorts. This table generally reinforces what was found in Table IV.

IV. Estimating Debt and Equity Regressions

So far we demonstrated that in our data the conventional leverage regressions have the usual signs. We then demonstrated that in sorts, very different patterns emerge when we focus on changes in debt and on equity issues.

Next we estimate a sequence of debt and equity issuances regressions. Table VI predicts changes in: debt, book equity, market equity, as well as equity issues. These are run as separate regressions. Consistent with the sorts, we control for changes in firm size, and we also include year dummies. There may be a concern about the speed of the firm's responses. Accordingly we consider lagged change in profits as the main case, but we also

try including contemporaneous change in profits. Whether the contemporaneous change in profits is included or omitted, does not matter.

Petersen (2008) argues that standard errors produced by fixed effects are unbiased only when the firm effect is permanent. If the firm effect decays over time, standard errors are no longer unbiased and it is still important to estimate clustered standard errors. Thus, we report panel-robust standard errors adjusted for clustering at the firm level.

The results in Table VI support what we found in the sorts. More profitable firms increase debt, increase book equity, increase market equity, and they have negative equity issues. All of these effects are statistically significant.

In Table VI all firms are pooled, and there are year fixed effects. Thus the time effects have been removed, and identification is coming from the differences between firms.

Some scholars have argued that firms have financial targets that are key to an understanding of their financing behavior. Empirically defining the target is controversial since there is no accepted model of the target. However, Lemmon et al. (2008) have argued that there is a great deal of persistence in capital structure, so that a long term average does a good job of predicting what firms will do. Thus, in unreported tests, we run all of our regressions using firm fixed effects. The long term average ought to reflect this targeting behavior.

We find that empirically very little changes whether we include firm fixed effects, or whether we leave them out. Thus the targeting behavior, to the extent that it happens, does not account for what we are reporting. To save space we have not included all these extra tables. However, in Table VII we provide an illustration. As is readily apparent nothing much changes when we include the firm fixed effects. Accordingly we do not think that an omitted concern for capital structure target seeking drives what we find.

Tables VI and VII correspond to the sorts. However, they do not control for the conventional leverage factors. Thus the natural next step is to include the conventional leverage factors. This is done in VIII.

We now report results on the leverage factors in addition to profitability: (i) median industry leverage, (ii) the market-to-book assets ratio, (iii) tangibility of assets, and (iv)

firm size (measured by the log of assets). Rajan and Zingales (1995) show that these factors are related to leverage in G7 countries. A number of studies have used these factors to estimate leverage targets. Frank and Goyal (2009) show that these factors are robustly related to leverage in the U.S.

The previous literature, such as Frank and Goyal (2009) focus on leverage ratios. As we have argued that such a specification is misleading, we consider changes in levels of debt, equity, as well as equity issues.

The results in Columns (1) and (2), which examine debt issues, show that profits *positively* affect debt issuances. The effects are large and statistically significant at the 1% level. Columns (3) and (4), which examine book equity show a strong effect of profits. This effect is only slightly reduced by the inclusion of other factors. Columns (5) and (6) illustrate that the impact of profits on the change in market equity is also robust to the inclusion of the conventional factors.

Columns (7) and (8) examine equity issuances. Here we find that there is a significant negative impact of profits on equity issuances. As before, the results are robust to the inclusion of the conventional factors.

Continuing with our analysis of the results on leverage factors, we note that the market-to-book ratio *positively* affects both debt issues and change in book value of equity. However, the impact of the market-to-book ratio on market equity and on equity issues is not statistically significant.¹¹ In the existing literature, it is common to find a negative relation between the market-to-book ratio and leverage.¹²

¹¹We are not focusing on testing the market timing hypothesis. However, it is worth observing that these results are rather surprising from the perspective of a market timing theory of capital structure.

¹²The market-to-book ratio is commonly considered as a proxy for growth opportunities. Growth firms are expected to finance with relatively more equity to avoid debt-related agency conflicts (Myers, 1977). Previous studies typically find a negative relation between leverage and growth opportunities (see Smith and Watts, 1992; Rajan and Zingales, 1995; Hovakimian et al., 2001; Goyal et al., 2002; Barclay et al., 2006; Frank and Goyal, 2009). The market-timing literature also predicts a negative relation between the market-to-book ratio and leverage (Baker and Wurgler, 2002). Flannery and Rangan (2006), Kayhan and Titman (2007), and Liu (2007) suggest that it is difficult to disentangle the effect of growth opportunities and market timing in cross-sectional regressions of the market-to-book ratio on leverage. Graham and Harvey (2001) provide a useful survey of executive's opinions about the importance of various factors.

The effect of firm size is substantially larger on debt issuances than it is on equity issuances. This may help explain the commonly observed positive relation between firm size and leverage ratios.

We perform a number of robustness tests to validate these findings. First, we estimate specifications similar to those examined previously but with both lagged outstanding debt and debt repayments and equity repurchases. In unreported results, we note qualitatively identical results to those reported here. Second, we included yields on 10-year government bonds and the yield on Moody’s Baa corporate bonds. None of the main conclusions are affected and so we do not tabulate these results.

Overall, the results from the debt and equity issuance regressions are largely consistent with the trade-off theory. The coefficient estimates on the leverage factors generate several interesting results. Profits *positively* affect debt issuances. Equity issues show a negative relation to profits. The market-to-book positively affects the change in debt. Firm size positively affects the change in debt and equity. Firm size negatively affects equity issues. In Table IX we replace the leverage factors with an indicator for the quintile that the firm is in for each factor. This does not make much difference for the profitability effects.

V. Is Scaling Empirically Important?

In the preceding section, we provided results for unscaled debt and equity issues.¹³ This seems appropriate to us. However it involves making two changes relative to past practice. We would like to determine if both changes are crucial. Accordingly, in this section, we take a step back to consider prior literature which scales variables. The questions are, how does scaling affect the results and why.

Table X examines alternative scalings. In Column (1), we present results from regressions of scaled debt issuances where the scaling is done by total issuances (net debt

¹³More than a century ago the famous statistician Pearson pointed out that scaling two independent variables by the same third variable, induces spurious correlation. Barraclough (2007) points out that this idea extends to capital structure regressions. If you scale both the right hand and left hand side variables in a regression by the same variable, that can induce a spurious correlation.

issuance + net equity issuances). Similarly, column (2) presents results from regressions of scaled equity issuances with scaling variable being the total issuances. These results mirror the results from unscaled debt and equity issuances presented earlier - debt issuances are positively related to profitability while equity issues are negatively related to profitability.

However, if we scale debt and equity issuances by total book capitalization (sum of debt and equity), the result for scaled debt issuances change dramatically. The coefficient on change in profitability variable now has a negative coefficient. This makes the point that scaling matters. The type of scaling, if any, that is appropriate depends on the theory being tested. In Appendix B we provide an explicit static trade-off model in which scaling would not be appropriate.

We also examine the effect of changes in profitability on changes in leverage ratio in column (5). Consistent with the level results reported in Table II, profitability has a negative and statistically significant coefficient. However, as argued earlier, changes in leverage ratios (and also changes in debt and equity) reflect the net effects of debt issuances and retirements, equity issuances and repurchases, and combined effects of other adjustments, most prominent of which would be the effect of change in retained earnings between year t and $t-1$. We therefore separate out the effect of debt and equity issues from those due to changes in retained earnings by defining leverage change due to external financing as:

$$\Delta \text{Leverage}^{EF} = \frac{D + d}{A + d + e} - \frac{D}{A}, \quad (2)$$

where D is lagged debt, A is lagged assets, d is debt issues net of retirements, and e is equity issues net of repurchases. Garvey and Hanka (1999) use a similar measure in their study. This measure directly captures the net leverage effect of debt and equity issuances. Column (6) reports results from regressions of net leverage effect of debt and equity issues on changes in profitability after controlling for other leverage factors in differences and year indicator variables. In contrast to earlier results, we find that profitability no longer has the negative sign. The effect of profitability on leverage change due to

external financing is positive although the coefficient itself is statistically insignificant. This comparison suggests that changes in total debt and equity are only partly a result of debt and equity issuance decisions. Other balance-sheet adjustments complicate the inferences from leverage ratio regressions.

VI. Are Financial Market Conditions Important?

Proponents of market timing believe that financing decisions ought to depend on market conditions. This should also be observed in a trade-off theory. For a clear illustration of the point look at Appendix B. The costs and benefits of deviating from the static optimum affects the predicted financing choices as the firm attempts to optimize.

In order to test this, we require a definition of good times and bad times. Our empirical strategy is to estimate good times versus bad times at the level of 4-digit industry. We define an industry as having “good times” if the median firm in that industry has a market-to-book that is higher than the 67th percentile of the time-series distribution of the industry median market-to-book ratios. Conversely, an industry is defined as having bad times if the median firm in the industry has a market-to-book ratio that is lower than the 33rd percentile of the time-series distribution of the industry median market-to-book ratios.

Panel A of Table XI tabulates issuance activity for profitability sorts in both good times and in bad times. While the patterns of debt and equity issuances are similar during the two periods, issuance activity is significantly more pronounced during good times.

Panel B reports the issuance activity for the smallest and the largest firm during the good times and bad times. Within each size quintile, firms are sorted on profitability. We find that small, low-profit firms are more likely to issue equity in good times than in bad times. Debt issuances are significantly higher in good times. Large, high-profit firms are significantly more likely to issue debt and repurchase equity in good times than in bad times.

Panel C reports the magnitudes of the financial variables rather than the frequencies. Large firms have significantly more debt compared to small firms. During bad times, large firms retire substantial amounts of debt. During good times, large firms raise significant amounts of debt. Most large firms are much less affected by the state of the market. As their profitability improves, the large firms repurchase equity in both kinds of markets. The least profitable small firms makes larger issue of equity in good times than in bad times. Table XI shows that, as an empirical matter, profitability has a time-varying impact on leverage choices.

In Table XII the basic regressions for changes in debt and for equity issuance are presented both for good times and for bad. Comparing good times to bad times, we see that the effects of profits are much stronger in good times. In bad times the impacts are not statistically significant. This difference is interesting and deserves further study. However for our purposes recall that the static trade-off theory implies time-varying capital structure choices even when the target is time invariant. Empirically we do observe time varying choices.

VII. Conclusion

The connection between corporate profits and corporate capital structure has been very influential in the assessment of the static trade-off theory. The standard evidence has pushed the literature away from the static trade-off, and towards much more complex models and ideas. As a result it is important to make sure that the evidence is correctly interpreted.

Unfortunately the literature has misinterpreted the data. This is due to the widespread use of leverage ratios. Such ratios have a number of undesirable features for testing the implications of the static trade-off theory. We illustrate that the impact of these features is not limited to the tails of the data distributions. Instead, the impact is observed even at the median of the data.

Empirically, we show that more profitable firms tend to issue more debt and repurchase equity. Less profitable firms tend to do the reverse. Firm size also matters. Larger firms tend to be more active in the debt markets while smaller firms tend to be relatively more active in the equity markets. More external financing is used in good times than in bad times. Overall, the empirical evidence on issuance seems rather easy to understand from the perspective of the static trade-off theory.

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Appendix A. Data Construction

We use conventional data sources, starting with the merged Compustat-CRSP data. The data are annual and are converted into constant 2000 dollars using the GDP deflator. We exclude financial companies (SIC 6000-6999), firms involved in major mergers (Compustat footnote code AB) and firms with missing book value of assets. The final sample consists of 226,355 firm-year observations from 1971-2006. The ratio variables (described below) are winsorized at the 0.50% level in both tails of the distribution. This serves to replace outliers and the most extremely misrecorded data.

Debt and equity issuances: Debt issues include both long-term debt issuance (item #115) and increases in current debt (item # 301⁺). Equity issues include sale of common stock (item #108).

Payments due on bonds outstanding: We consider two alternative proxies for payments due on bonds outstanding. The first is the debt repayments estimated as the reduction of long-term debt (item #114) and the decline in current debt (item # 301⁻). An alternative proxy is the lagged debt outstanding (item #9 + item #34). Debt repayments are expected to be increasing in the amount of existing debt.

Available cash: Cash available is the beginning-of-period cash and marketable securities (item #1).

Leverage factors: The debt and equity targets are a function of leverage factors following the previous capital structure literature (see, for example, Rajan and Zingales (1995) and Frank and Goyal (2009)). The factors include (i) profitability, (ii) the market-to-book ratio, (iii) tangibility of assets, and (iv) firm size. Profitability is defined as the ratio of operating income before depreciation (item #13) to assets (item #6). The market-to-book ratio is defined as the ratio of the market value of assets (market value of equity + debt + liquidation value of preferred stock - deferred taxes) to book assets. Finally, tangibility is defined as the ratio of net property, plant and equipment (item #8) divided by assets (item #6). Firm size is defined as the natural log of assets (item #6).

Costs of funds: The opportunity cost of funds is measured by the ten-year government bond rate. Interest rates are from the Federal Reserve files (<http://www.federalreserve.gov/releases/>). An alternative measure of the opportunity cost of funds, yield on Baa corporate bonds, yields similar results.

Appendix B. A Simple Static Trade-Off Model

As observed in footnote (1), the term ‘trade-off model’ (or ‘trade-off theory’) has been used by various scholars to refer to a range of models that have different features. A range of costs and benefits are commonly included within the static trade-off framework (Frank and Goyal, 2008). The common feature is the idea that observed capital structures are the result of optimizing choices. The costs and benefits are most commonly assumed to include corporate tax effects, and either bankruptcy costs (Kraus and Litzenberger, 1973), or agency costs (Jensen and Meckling, 1976). Other kinds of transactions costs are also included in some models. This is particularly true for dynamic trade-off models. Frequently the term ‘trade-off theory’ is used without direct reference to any explicit model. In such cases, there is often some ambiguity about the underlying theoretical assumptions.

To illustrate how we think about the term, this appendix presents a particularly simple illustrative model. The model motivates our method of testing. The model is simplified to the point where the empirical implications are particularly stark.

In the model there is a Board of Directors which chooses the executive compensation package, and a CEO who chooses both debt issues and equity issues. There is a quadratic cost to making capital structure choices that depart from the static optimal. However, there are agency costs associated with the financing choices, and these must be factored in. Comparative static implications within a linear structure are presented.

The Firm. The firm’s revenue is given by $p(I - \frac{1}{2}I^2)$ where p is the output price (assumed to be greater than 1) and I is the level of investment. Investment $I = D + E + C - B$, where D is debt issued, E is equity issued, C is cash, and B is the payment due on the outstanding bonds. Outside investors are risk-neutral and the opportunity cost of funds is β . There is a random noise term, ε , with a variance of σ^2 .

The target debt for the firm (D^*) is exogenous, as is the target equity (E^*). We assume that the firm would like to be close to its debt and equity targets. The firm bears a cost that is a function of the distance from the target. For analytic simplicity, the cost function is assumed to be quadratic. If there were no agency problem, then the firm’s problem would be:

$$\begin{aligned} \max_{D,E} \quad & p(I - \frac{1}{2}I^2) - \beta(D + E) - \frac{1}{2}(D - D^*)^2 - \frac{1}{2}(E - E^*)^2 + \varepsilon \\ \text{s.t.} \quad & I = D + E + C - B. \end{aligned} \tag{B1}$$

Here, the costs are assumed to be symmetric. This is not essential. More generally, we could replace $\frac{1}{2}(D - D^*)^2$ with $\frac{k_D}{2}(D - D^*)^2$, and $\frac{1}{2}(E - E^*)^2$ with $\frac{k_E}{2}(E - E^*)^2$ where k_D and k_E become parameters that need to be estimated. The model that we are actually analyzing amounts to an assumption that $k_D = k_E = 1$.

The targets are exogenous to the model. This is easily generalized as follows. Suppose that there is a set of exogenous factors, denoted f_i , that determines the target values in a linear manner. Then, we have

$$D^* = a_0 + \sum_i a_i f_i \text{ and } E^* = b_0 + \sum_i b_i f_i. \quad (\text{B2})$$

These expressions can be substituted for D^* and E^* without fundamentally changing the analysis that follows. When empirically testing the model, we make use of this substitution.

It is worth stressing the fact that we are assuming the target takes the form of a pair of numbers one for desired debt level (D^*) and another for the desired equity level (E^*). This is not innocuous, nor is it accidental. It is done for simplicity. The obvious alternative would be to instead assume that there is actually a target leverage ratio (L^*). Unfortunately that leads to analytical problems.¹⁴

The Manager. The firm is actually being run by a manager who earns a wage, $W = w + \alpha\pi$, where w is a fixed base salary, α is the pay-for-performance component, and π is the corporate profit.¹⁵ The manager has a coefficient of risk aversion denoted by r . The manager has a per-unit agency cost of debt denoted as δ and a per-unit agency cost of equity denoted as γ . The manager chooses debt (D) and equity (E) to maximize the certainty equivalent (CE) of income. This is given by

$$CE = w + \alpha \left[p \left(I - \frac{1}{2} I^2 \right) - \beta(D + E) - \frac{1}{2}(D - D^*)^2 - \frac{1}{2}(E - E^*)^2 \right] - \delta D - \gamma E - \frac{r}{2} \alpha^2 \sigma^2.$$

The first-order conditions for the manager are

$$\frac{\partial CE}{\partial D} = 0, \frac{\partial CE}{\partial E} = 0.$$

It is assumed that the second-order conditions are satisfied and that the parameters are in the range with an interior solution. To simplify the notation, we define $A_0 = (1 - (\frac{p}{1+p})^2)$, $A_1 = (\frac{p}{1+p})$, and $A_2 = (\frac{1}{1+p})$.

By solving the first-order conditions, we get:

$$\begin{aligned} D &= A_0 A_1 (1 - A_1) (1 + B - C) + A_0 A_2 (D^* - A_1 E^* + (\gamma A_1 - \delta) \frac{1}{\alpha} + (A_1 - 1) \beta) \\ E &= A_0 A_1 (1 - A_1) (1 + B - C) + A_0 A_2 (E^* - A_1 D^* + (\delta A_1 - \gamma) \frac{1}{\alpha} + (A_1 - 1) \beta). \end{aligned} \quad (\text{B3})$$

¹⁴If we assume a quadratic penalty function, we can set the problem as choosing D and E to maximize $\pi = p(I - \frac{1}{2} I^2) - \beta(D + E) - \frac{1}{2}(\frac{D}{D+E} - L)^2$. Then the first order conditions are $\frac{\partial \pi}{\partial D} = p + Bp - Cp - \beta - pD - pE + \frac{LDE - DE + LE^2}{D^3 + E^3 + 3DE^2 + 3D^2E} = 0$ and $\frac{\partial \pi}{\partial E} = p + Bp - Cp - \beta - pD - pE + \frac{D^2 - LDE - LD^2}{D^3 + E^3 + 3DE^2 + 3D^2E} = 0$. Solving these simultaneously for D and for E does not provide a nice regression structure.

¹⁵This functional form is often attributed to Holmstrom and Milgrom (1987); it has also been used by Aggarwal and Samwick (2003)

These equations provide an obvious empirical specification,

$$\begin{aligned} D &= d_0 + d_1 B + d_2 C + d_3 \beta + d_4 D^* + d_5 E^* + d_6 \frac{1}{\alpha} + \varepsilon_d; \\ E &= e_0 + e_1 B + e_2 C + e_3 \beta + e_4 D^* + e_5 E^* + e_6 \frac{1}{\alpha} + \varepsilon_e. \end{aligned} \quad (\text{B4})$$

Appendix A. Predictions

If the model is valid, what do we expect to find when we estimate equation (B4)? The predictions can be described in the following manner:

Hypothesis 1 *Debt issues are increasing with the payments due on outstanding bonds ($d_1 > 0$), the debt target ($d_4 > 0$), and decreasing with cash ($d_2 < 0$), the opportunity cost of funds ($d_3 < 0$), and the equity target ($d_5 < 0$). Equity issues are increasing with existing debt ($e_1 > 0$), and the equity target ($e_5 > 0$), and decreasing with cash ($e_2 < 0$), the opportunity cost of funds ($e_3 < 0$), and the debt target ($e_4 < 0$).*

We do not directly observe the targets for debt and equity. Instead we use conventional proxy variables as in equation (B2). In equation (B4), we will have opposite signs on the coefficients on D^* and E^* . It is natural to model the target debt and equity as functions of factors as in equation (B2). Doing so gives us

$$\begin{aligned} D &= (d_0 + d_4 a_0 + d_5 b_0) + d_1 B + d_2 C + d_3 \beta + \sum_i (d_4 a_i + d_5 b_i) f_i + d_6 \frac{1}{\alpha} + \varepsilon_d \\ E &= (e_0 + e_4 a_0 + e_5 b_0) + e_1 B + e_2 C + e_3 \beta + \sum_i (e_4 a_i + e_5 b_i) f_i + e_6 \frac{1}{\alpha} + \varepsilon_e. \end{aligned} \quad (\text{B5})$$

In equation (B5), the estimated coefficients on f_i are mixes of deeper parameters that are not restricted by the model.

The coefficients d_6 and e_6 can have either sign when considered individually. However, recall that $A_1 = \frac{p}{1+p} < 1$. Thus if there are strictly positive agency costs (i.e., $\delta > 0$ and $\gamma > 0$), then we have:

Hypothesis 2 *The signs of d_6 and e_6 depend on $(\gamma A_1 - \delta)$ and $(\delta A_1 - \gamma)$. A greater agency cost of debt is associated with reduced debt ($\frac{\partial D}{\partial \delta} < 0$) and increased equity ($\frac{\partial E}{\partial \delta} > 0$). A greater agency cost of equity is associated with increased debt ($\frac{\partial D}{\partial \gamma} > 0$) but reduced equity issues ($\frac{\partial E}{\partial \gamma} < 0$). If we assume that agency costs are strictly positive, then d_6 and e_6 have opposite signs.*

If d_6 and e_6 have the same sign, that would be evidence against the model.

Leverage Ratio. Suppose that the model is correct, but we estimate

$$\frac{D}{D+E} = c_0 + c_1 B + c_2 C + c_3 \beta + \sum_i c_i f_i + c_6 \frac{1}{\alpha} + \varepsilon_l. \quad (\text{B6})$$

When we estimate equation (B6), what will we find? Essentially, we will find a mess.

To see the problem, consider, for instance, the effect of past debt (B) on debt issues. In equation (B4), we have the parameters $d_1 > 0$ and $e_1 > 0$. But, in the leverage ratio form, we have,

$$\frac{\partial(\frac{D}{D+E})}{\partial B} = \frac{(-A_1 - 1)(\delta - \gamma - \alpha D^* + \alpha E^*)\alpha A_1 A_2}{(\gamma A_2 - 2\alpha A_1 + \delta A_2 - 2B\alpha A_1 + 2C\alpha A_1 + 2\alpha\beta A_2 - \alpha A_2 D^* - \alpha A_2 E^*)^2 (A_1 - 1)}.$$

This can be reduced to the sign of $(\delta - \gamma - \alpha D^* + \alpha E^*)$. If this term is positive, then the expression is positive overall. If it is negative, then it is negative overall.

This shows that $\frac{D}{D+E}$ is a complex expression when debt and equity are chosen optimally. In the leverage ratio, all of the exogenous parameters appear in both the numerator and in the denominator along with the parameters. As a result of the complexity, the predictions on the leverage ratio are not guaranteed to match the intuition, which is guided by the direct comparative statics. The problem will re-emerge routinely when theory suggests a first-order condition for debt as well as a first-order condition for equity while the empiricist estimates a complex ratio rather than estimating each of the equations directly.

Appendix B. The Predicted Effect of Market Conditions

An interesting aspect of the model is that all of the comparative statics depend crucially on p , the output price. Accordingly, it is possible to test what happens to the predictions when p changes. The empirical version of this requires us to distinguish good times from bad times (the periods of high p versus those with low p). The model predicts that the adjustments to debt and equity in response to exogenous changes will differ in good times and in bad times.

When the partial derivatives have the same sign as the original comparative static, we say that, in good times, the firm reacts more strongly. When the partial derivative has the opposite sign, we say that in good times the firm's reaction is smaller (closer to zero).

Hypothesis 3 *In good times, the firm's debt issuing decisions and the firm's equity issuing decisions will react less strongly to the opportunity cost of funds (β), the debt target (D^*), the equity target (E^*), the agency cost of debt (δ), and the agency cost of equity (γ).*

The intuition seems to be that, when times are good, the revenue effects are relatively more important. When times are not so good, the cost impacts loom larger. These results can be tested by examining whether firms adjust more rapidly in good times (high p) or in bad times (low p).

Appendix C. Profits in the Model?

As noted in the introduction, many well-known papers have verbally hypothesized that within the static trade-off theory, greater profits should induce greater debt to shield the profits.

In equation (B3) we present the solutions of the model for the choices of debt and equity. Yet profits does not appear as an explanatory variable. This is no accident.

Profits are a mix of other variables such as demand for output and the opportunity costs of resources to be used in production. Profit itself is not a natural exogenous variable. Accordingly natural theories will make predictions about how these deeper factors affect debt and equity choices. A possible, and perhaps not unreasonable, reaction would be to say simply that the static trade-off theory does not make a clear cut prediction for how profits affects debt.

Yet there really is a very strong intuition behind the verbal tradition of hypothesizing that in the static trade-off theory profits should have a positive affect on debt (Myers (1993) and Fama and French (2002)). How can we reconcile the verbal tradition with our model? The model offers two natural attempts.

The first method is to take advantage of time sequencing. In this approach we would acknowledge that profits are not properly exogenous at a moment in time. However last year has already taken place. It is predetermined from our current point of view. It can thus be taken to be exogenous.

However in a static model “last period” does not easily fit. In the model C is cash. Implicitly it comes from the past, and in a sense we might imagine that firms with high values of C are firms that have accumulated high book profits in the past. Unfortunately this method does not match the usual interpretation because C are profits that have already been successfully shielded from taxation and from agency abuse. Greater C implies lower debt issues. Taking the first difference of C will not help much either. So this method does not seem to work well.

The second method is to take advantage of equation B2. If we simply accept the verbal tradition, we can directly substitute profits as an f_i with a positive impact coefficient on debt (a_i) and a negative coefficient on equity (b_i). In that case equation B5 becomes critical to seeing how profits affects things. The impact of profits on debt issues will be a weighted sum of the two coefficients as illustrated by the expression $(d_4a_i + d_5b_i)f_i$ and the corresponding expression for the impact on equity.

This matters. Suppose that we are prepared to directly accept the verbal hypothesis that profits has the usually asserted effect on the financing targets. Even then the impact on debt issues and on equity issues is not simple. It rests on a weighted sum of two terms that may plausibly have the opposite sign. To then make a prediction requires the further judgement that the one effect is more powerful than the other. Implicitly this judgement is common held. It does strike us as plausible. But it is a judgement rather than a clear cut prediction of the trade-off theory.

Table I
Data description

Variable	<i>N</i>	<i>Mean</i>	SD	Distribution		
				10 th	50 th	90 th
Debt (\$ millions)	225,719	476.82	3,509.89	0.00	13.66	763.85
Book equity (\$ millions)	225,949	523.21	2,848.54	0.05	33.68	894.72
Market equity (\$ millions)	184,918	1,387.25	9,489.49	4.89	74.36	1901.84
Assets (\$ millions)	226,355	1528.15	8,612.93	4.09	85.46	2,470.04
Debt issuance (\$ millions)	226,355	117.82	1,033.05	0.00	0.82	164.75
Equity issuance (\$ millions)	226,355	17.39	139.91	0.00	0.09	24.73
Debt repayment (\$ millions)	226,355	96.45	858.83	0.00	1.48	123.03
Equity repurchase (\$ millions)	226,355	15.48	188.07	0.00	0.00	3.85
Cash balance (\$ millions)	225,724	112.16	782.48	0.15	5.69	132.99
Book leverage	215,389	0.39	0.37	0.00	0.35	0.80
Market leverage	182,510	0.27	0.25	0.00	0.21	0.66
Profitability	220,550	0.03	0.31	-0.22	0.11	0.23
$\frac{M}{B}$	176,686	1.76	2.25	0.53	1.04	3.53
Tangibility	219,259	0.32	0.24	0.05	0.26	0.72

Data sources: The sample comes from the annual Compustat files. The sample period is 1971–2006. All financial variables are deflated to year 2000 using the GDP deflator.

Variable definitions:

Debt	=	Long-term debt (#9) + Short-term debt (#34)
Book equity	=	Common shareholder equity (#60)
Market equity	=	Outstanding shares (#199) × Closing share price (#25)
Assets	=	Book assets (#6)
Debt issuance	=	Issuance of long-term debt (#115) + Increase in current debt (#301 ⁺)
Equity issuance	=	Sale of common stock (#108)
Debt repayment	=	Reduction of long-term debt (#114) + Decrease in current debt (#301 ⁻)
Equity repurchase	=	Purchase of common (#115)
Cash balance	=	Cash and marketable securities (#1)
Book leverage	=	Debt/(Debt + Book equity)
Market leverage	=	Debt/(Debt + Market equity)
Profitability	=	EBITDA (#13)/Total assets (#6)
Market-to-book ratio	=	Market value of assets (MVA)/Total assets (#6), where MVA=Debt + Market equity + Preferred-liq. value (#10) - Deferred taxes (#35)
Tangibility	=	Net Property plant and equipment (#8)/Total assets (#6)

Table II
Regressions of Book and Market Leverage Ratios

The sample comes from the annual Compustat files during the period 1971-2006. Financial firms are excluded. The table presents estimates of the following leverage ratio regression:

$$\begin{aligned} \text{LeverageRatio}_t = & \alpha + \beta_1 \text{Profitability}_{t-1} + \beta_3 \text{IndMedianLev}_{t-1} + \beta_2 \left(\frac{M}{B} \right)_{t-1} + \beta_3 \text{Tangibility}_{t-1} \\ & + \beta_4 \text{Ln}(\text{Assets})_{t-1} + \text{Year}_t + \epsilon_{i,t}, \end{aligned}$$

where *Leverage Ratio*_{*t*} is the ratio of debt over debt plus book equity in Columns (1) and the ratio of debt over debt plus market equity in Columns (2). The explanatory variables *Profitability*_{*t-1*}, *IndMedianLev*_{*t-1*}, $\left(\frac{M}{B}\right)_{t-1}$, *Tangibility*_{*t-1*}, and *Ln(Assets)*_{*t-1*}, are described in Table I. The regressions include year fixed effects. In parentheses, we report t-statistics where the standard errors are clustered at the firm level. ^aSignificant at the 1 percent level. ^bSignificant at the 5 percent level. ^cSignificant at the 10 percent level.

	Book Leverage	Market Leverage
	(1)	(2)
<i>Profitability</i> _{<i>t-1</i>}	-0.262 ^a (-30.0)	-0.150 ^a (-33.7)
<i>IndMedianLev</i> _{<i>t-1</i>}	0.823 ^a (51.4)	0.642 ^a (58.1)
$\left(\frac{M}{B}\right)_{t-1}$	-0.016 ^a (-19.9)	-0.031 ^a (-52.4)
<i>Tangibility</i> _{<i>t-1</i>}	0.130 ^a (14.6)	0.096 ^a (14.3)
<i>Ln(Assets)</i> _{<i>t-1</i>}	0.011 ^a (10.8)	0.009 ^a (12.3)
<i>Constant</i>	0.086 ^a (12.4)	0.089 ^a (16.3)
<i>R</i> ² – <i>Adjusted</i>	0.163	0.304
<i>Observations</i>	152,267	153,350

Table III: Debt and equity issuers: Size and profitability sorts

The sample is non-financial firms listed on the annual Compustat files for the period from 1971 to 2006. The table presents the percentage of firms issuing and retiring (or repurchasing) debt and equity. A firm is classified as ‘issuing debt’ if it issues debt in excess of 5% of the value of its assets; as ‘issuing equity’ if it issues equity in excess of 5% of the value of its assets; as ‘retiring debt’ if it retires debt in excess of 5% of the value of its assets; and as ‘repurchasing equity’ if it repurchases equity in excess of 5% of the value of its assets. In addition, we also report net-debt issuers, which are firms that issued net debt over 5% of the value of their assets, and net equity issuers that issued net equity in excess of 5% of the value of their assets. We annually sort firms on lagged assets and lagged profitability and report the percentage of firms in each of these categories in Panels A and B, respectively. The bottom part of Panel B reports the percentage of firms issuing or retiring securities by profitability within the smallest and largest asset quintiles.

Table III Continued

Percentage of firms										
	Issuing Debt	Retiring Debt	Iss. Net Debt	Issuing Equity	Repurch. Equity	Iss. Net Equity	Iss. Both D&E	Iss. Debt Rep. Equity	Iss. Equity Ret. Debt	Iss. None Rep. None
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<i>Panel A: Sorts on firm size</i>										
Size										
Small	27.6	26.2	18.7	25.8	1.4	25.4	6.2	0.1	4.0	29.0
2	30.2	29.7	18.5	20.2	2.3	19.8	3.9	0.2	3.5	33.8
3	32.9	30.5	19.2	13.3	3.1	12.7	2.7	0.4	2.2	36.4
4	37.0	32.5	20.8	9.6	3.9	8.8	2.4	0.5	1.6	37.1
Large	40.2	32.4	18.3	6.2	4.6	5.4	1.6	0.9	0.8	39.0
<i>Panel B: Sorts on firm profitability</i>										
All firms										
Low π	28.0	25.5	18.5	29.9	1.2	29.6	7.2	0.1	4.0	27.3
2	32.4	30.2	18.3	12.4	1.7	12.0	2.9	0.2	2.1	37.4
3	38.1	34.5	19.2	9.3	2.4	8.8	2.3	0.4	1.6	36.5
4	38.2	33.4	20.9	9.7	3.4	9.0	2.2	0.5	1.9	36.8
High π	32.5	28.9	19.2	12.9	6.7	11.9	2.2	1.0	2.5	38.6
Small firms										
Low π	28.8	24.0	19.9	37.2	1.1	36.7	10.2	0.0	4.4	17.0
2	28.5	24.7	20.0	33.4	1.1	33.2	8.6	0.1	4.6	26.4
3	27.0	25.4	18.9	23.1	1.2	22.8	5.7	0.1	3.9	34.7
4	27.7	28.6	18.4	16.6	1.4	16.3	3.5	0.1	3.5	37.6
High π	28.9	31.7	18.0	19.2	2.3	18.8	3.3	0.2	4.0	35.2
Large firms										
Low π	40.5	35.3	17.7	8.9	1.8	8.3	2.7	0.2	1.2	35.6
2	43.9	36.1	17.7	6.2	2.2	5.7	1.7	0.5	0.8	36.5
3	42.4	34.3	17.9	5.7	3.1	5.0	1.6	0.7	0.8	39.1
4	38.9	31.1	18.7	5.0	5.0	4.3	1.2	0.9	0.7	41.1
High π	35.5	25.5	19.5	5.2	10.8	3.8	1.0	2.3	0.6	42.5

Table IV: **Magnitude of Financing Activity**

The sample is non-financial firms listed on the annual Compustat files for the period from 1971 to 2006. The table presents debt and equity, changes in debt and equity and equity issuances for firms sorted on profitability within size classes. The table reports information for all firms sorted on profitability and for profitability sorts within the smallest and largest firms. The sorts are done annually.

	D	ΔD	BVE	ΔBVE	MVE	ΔMVE	Equity Iss.	Assets
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
All Firms	Low π	48.5	38.6	0.4	109.0	-0.9	7.4	128.7
	2	464.2	342.9	-2.1	581.1	18.1	14.0	1,254.4
	3	943.2	808.9	12.8	1,459.9	75.3	7.9	2,688.8
	4	659.4	834.9	40.6	1,960.3	148.6	-1.4	2,288.8
	High π	425.7	767.3	76.8	2,894.9	206.2	-21.0	1,794.0
Small Firms	Low π	2.0	2.6	2.8	43.4	1.9	4.6	7.8
	2	2.2	3.1	1.5	34.8	1.8	2.8	8.2
	3	2.1	3.4	0.9	23.8	1.9	1.5	7.9
	4	2.0	3.9	1.0	18.8	1.8	1.0	8.3
	High π	1.8	5.1	2.1	23.1	2.2	1.4	9.4
Large firms	Low π	2,752.6	1,970.6	-26.8	3,602.2	177.8	48.5	7,553.6
	2	2,873.7	2,205.0	13.2	4,073.5	120.3	12.0	7,846.6
	3	2,158.9	2,294.6	70.2	4,759.6	490.7	8.0	6,713.6
	4	1,972.9	2,745.1	140.8	6,980.5	334.7	-27.9	7,246.4
	High π	1,648.8	3,069.7	286.5	11,656.7	721.4	-95.7	7,121.0

Table V: **Median Profitability Sorts**

The sample is non-financial firms listed on the annual Compustat files for the period from 1971 to 2006. The table presents debt and equity, changes in debt and equity and equity issuances for firms sorted on profitability within size classes. The table reports information for all firms sorted on profitability and for profitability sorts within the smallest and largest firms. The sorts are done annually. For each category we report the value at the median firm.

	D	ΔD	BVE	ΔBVE	MVE	ΔMVE	Equity Iss.	Assets
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
All Firms	Low π	1.5	0.0	3.6	-0.4	17.7	-0.8	0.1
	2	14.2	-0.0	28.3	-0.2	42.5	-0.5	0.0
	3	62.7	-0.1	82.3	0.8	112.7	0.9	0.0
	4	58.4	0.0	97.9	3.1	168.3	2.4	0.0
	High π	16.1	0.0	75.1	6.3	205.1	3.8	0.0
Small Firms	Low π	0.5	0.0	0.6	-0.1	11.2	-0.5	0.3
	2	0.6	0.0	1.5	-0.2	8.2	-0.5	0.0
	3	0.8	0.0	2.0	-0.1	6.2	-0.3	0.0
	4	0.9	0.0	2.5	0.1	5.5	-0.1	0.0
	High π	0.8	0.0	3.4	0.4	8.6	0.1	0.0
Large firms	Low π	836.6	-9.7	694.5	-4.7	900.8	6.0	0.0
	2	953.7	-8.9	850.9	11.3	1,191.6	31.8	0.0
	3	820.5	-5.1	881.5	18.0	1,460.6	48.5	0.0
	4	723.3	-4.9	1,029.0	34.0	2,086.1	64.3	0.0
	High π	536.4	0.0	1,106.7	61.9	3,348.5	99.3	0.0

Table VI: Debt and Equity Changes

The sample is non-financial firms listed on the annual Compustat files for the period from 1971 to 2006. The table presents estimates from regressions of change in debt (ΔD), change in book value of equity (ΔBVE), change in market value of equity (ΔMVE), and net equity issuances ($EquityIss.$). The explanatory variables include current and lagged change in operating income before depreciation ($\Delta Profits$ and $\Delta Profits_{t-1}$) and lagged change in book value of assets ($\Delta Assets_{t-1}$). The regressions include year indicator variables. The reported t-statistics are corrected for clustering at the firm level. ^a, ^b, and ^c mean significant at the 1%, 5%, and 10% level, respectively.

	ΔD		ΔBVE		ΔMVE		$EquityIss.$	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\Delta Profits_{t-1}$	0.398 ^b (2.2)	0.303 ^c (1.8)	0.384 ^a (4.2)	0.499 ^a (4.5)	0.616 ^a (2.8)	1.086 ^a (3.8)	-0.130 ^a (-3.6)	-0.153 ^a (-4.4)
$\Delta Profits_t$		0.504 ^a (2.6)		1.179 ^a (5.5)		2.919 ^a (6.9)		-0.077 ^a (-2.7)
$\Delta Assets_{t-1}$		0.026 ^c (1.7)		-0.068 ^c (-1.6)		-0.248 ^a (-2.7)		0.011 ^b (2.2)
<i>Constant</i>	21.116 ^a (6.1)	13.087 ^a (3.9)	30.068 ^a (10.7)	19.720 ^a (5.2)	132.045 ^a (7.2)	109.933 ^a (6.1)	-3.594 ^a (-2.8)	-3.359 ^a (-2.8)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
$R^2 - Adjusted$	0.014	0.040	0.011	0.121	0.001	0.026	0.024	0.036
<i>Observations</i>	187,107	186,734	187,411	187,013	160,777	160,519	187,695	187,264

Table VII: Debt and Equity Changes - Fixed Effects

The sample is non-financial firms listed on the annual Compustat files for the period from 1971 to 2006. The table presents fixed-effect estimates from regressions of change in debt (ΔD), change in book value of equity (ΔBVE), change in market value of equity (ΔMVE), and net equity issuances ($EquityIss.$). The explanatory variables include current and lagged change in operating income before depreciation ($\Delta Profits$ and $\Delta Profits_{t-1}$) and lagged change in book value of assets ($\Delta Assets_{t-1}$). In addition to fixed firm effect, the regressions include year indicator variables. The reported t-statistics are corrected for clustering at the firm level. ^a, ^b, and ^c mean significant at the 1%, 5%, and 10% level, respectively.

	ΔD		ΔBVE		ΔMVE		$EquityIss.$	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\Delta Profits_{t-1}$	0.341 ^c (1.8)	0.333 ^c (1.8)	0.230 ^b (2.2)	0.455 ^a (3.9)	0.138 (0.7)	0.847 ^a (3.1)	-0.101 ^a (-3.1)	-0.134 ^a (-4.3)
$\Delta Profits$		0.494 ^b (2.6)		1.096 ^a (4.9)		2.580 ^a (6.2)		-0.054 ^b (-2.1)
$\Delta Assets_{t-1}$		0.005 (0.2)		-0.086 ^b (-2.0)		-0.280 ^a (-3.1)		0.014 ^a (2.6)
<i>Constant</i>	10.081 (1.2)	2.803 (0.3)	13.725 ^b (2.4)	7.761 ^c (1.7)	-15.059 (-0.4)	-24.914 (-0.6)	30.469 ^a (7.7)	30.436 ^a (7.8)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
$R^2 - Adjusted$	0.011	0.032	0.005	0.105	0.002	0.024	0.027	0.040
<i>Observations</i>	187,107	186,734	187,411	187,013	160,777	160,519	187,695	187,264

Table VIII: Debt and Equity Changes across Profitability Quintiles

The sample is non-financial firms listed on the annual Compustat files for the period from 1971 to 2006. The table presents estimates from regressions of change in debt (ΔD), change in book value of equity (ΔBVE), change in market value of equity (ΔMVE), and net equity issuances ($EquityIss.$). The explanatory variables include lagged profitability quintiles and lagged leverage factors. The regressions include year indicator variables. The reported t-statistics are corrected for clustering at the firm level. ^a, ^b, and ^c mean significant at the 1%, 5%, and 10% level, respectively.

	ΔD		ΔBVE		ΔMVE		$EquityIss.$	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Profitability Quintile	11.175 ^a (9.9)	4.779 ^b (2.1)	19.633 ^a (11.0)	14.865 ^a (5.8)	55.966 ^a (6.8)	16.981 ^a (2.8)	-7.293 ^a (-9.5)	-6.287 ^a (-9.8)
Industry median leverage		21.076 (1.2)		-20.469 (-0.6)		-182.313 (-1.5)		43.983 ^a (4.0)
$\frac{M}{B}$		5.734 ^a (8.4)		16.093 ^a (4.1)		-13.652 (-1.5)		-0.893 (-1.4)
Tangibility		-20.385 (-0.9)		10.676 (0.8)		74.069 (1.4)		31.656 ^a (6.3)
$Ln(Assets)$		19.589 ^a (3.6)		19.484 ^a (5.7)		69.490 ^a (4.9)		-7.592 ^a (-3.8)
Constant	-7.806 ^b (-2.1)	-88.978 ^a (-6.6)	-23.197 ^a (-5.6)	-136.256 ^a (-6.0)	-35.521 ^a (-2.6)	-208.693 ^a (-3.0)	19.413 ^a (15.6)	30.494 ^a (4.2)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
$R^2 - Adjusted$	0.000	0.002	0.001	0.003	0.000	0.001	0.003	0.009
Observations	198,362	153,532	198,656	153,529	161,175	152,221	199,031	153,703

Table IX
Debt and Equity Issuances, Profitability and Leverage Factor Quintiles

The sample is non-financial firms listed on the annual Compustat files for the period from 1971 to 2006. The table presents estimates from regressions of change in debt (ΔD), change in book value of equity (ΔBVE), change in market value of equity (ΔMVE), and net equity issuances ($EquityIss.$). The explanatory variables include lagged profitability quintiles and lagged leverage factors quintiles. The regressions include year indicator variables. The reported t-statistics are corrected for clustering at the firm level. ^a, ^b, and ^c mean significant at the 1%, 5%, and 10% level, respectively.

	ΔD	ΔBVE	ΔMVE	$EquityIss.$
	(1)	(2)	(3)	(4)
Profitability Quintile	5.895 ^a (3.8)	12.728 ^a (8.7)	30.527 ^a (5.9)	-7.923 ^a (-12.8)
Industry Median Leverage quintiles	0.213 (0.1)	-1.144 (-0.8)	-6.588 (-0.6)	2.797 ^a (3.1)
Asset quintiles	20.045 ^a (5.4)	20.353 ^a (9.0)	66.867 ^a (5.8)	-4.373 ^a (-3.3)
Market/Book quintiles	8.222 ^a (5.1)	19.066 ^a (6.5)	-14.642 ^b (-2.3)	-0.250 (-0.4)
Tangibility quintiles	0.871 (0.4)	5.297 ^b (2.3)	24.741 ^a (4.0)	1.789 ^b (2.2)
<i>Constant</i>	-78.398 ^a (-12.0)	-138.633 ^a (-7.5)	-176.693 ^a (-3.2)	17.057 ^a (3.4)
Year effects	Yes	Yes	Yes	Yes
$R^2 - Adjusted$	0.001	0.002	0.001	0.005
<i>Observations</i>	153,532	153,529	152,221	153,703

Table X
Scaled issuances

The sample is non-financial firms listed on the annual Compustat files for the period from 1971 to 2006. The table presents estimates from regressions of debt issuance to total issuance (in column(1)), equity issuance to total issuance (in column (2)), debt issuance to total capital (in column (3)), equity issuance to total capital (in column (4)), change in debt to assets (in column (5)), and change in leverage ratio considering only external financing (in column (6)). The change in leverage ratio considering only external financing is defined as:

$$\Delta Leverage^{EF} = \frac{D + d}{A + d + e} - \frac{D}{A}, \quad (B7)$$

where D is lagged debt, A is lagged assets, d is debt issues net of retirements, and e is equity issues net of repurchases. The regressions include lagged leverage factors and year indicator variables. The reported t-statistics are corrected for clustering at the firm level. ^a, ^b, and ^c mean significant at the 1%, 5%, and 10% level, respectively.

	$\frac{DebtIss}{TotIss}$	$\frac{EquityIss}{TotIss}$	$\frac{DebtIss}{(D+E)}$	$\frac{EquityIss}{(D+E)}$	$\Delta \frac{D}{A}$	$\Delta Leverage^{EF}$
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta Profitability_{t-1}$	0.059 ^a (5.2)	-0.059 ^a (-5.2)	-0.009 ^c (-1.9)	-0.041 ^a (-6.3)	-0.026 ^a (-4.5)	0.001 (0.4)
$\Delta Ind.medianleverage_{t-1}$	0.080 ^b (2.3)	-0.081 ^b (-2.3)	-0.027 ^a (-3.3)	-0.009 (-1.1)	-0.015 ^c (-1.8)	-0.009 ^b (-2.4)
$\Delta Market/book_{t-1}$	-0.007 ^a (-4.9)	0.007 ^a (4.9)	0.002 ^a (5.3)	0.009 ^a (11.8)	-0.002 ^a (-5.2)	0.000 (0.2)
$\Delta Tangibility_{t-1}$	-0.053 ^c (-1.8)	0.053 ^c (1.8)	0.115 ^a (12.6)	0.092 ^a (9.4)	0.063 ^a (6.5)	0.037 ^a (8.2)
$\Delta Assets_{t-1}$	-0.094 ^a (-11.9)	0.094 ^a (11.9)	0.057 ^a (26.5)	0.016 ^a (7.0)	0.019 ^a (9.6)	0.023 ^a (23.6)
<i>Constant</i>	0.794 ^a (50.5)	0.216 ^a (13.0)	0.011 ^a (6.3)	0.012 ^a (10.2)	-0.004 ^a (-2.7)	0.005 ^a (5.0)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes
$R^2 - Adjusted$	0.014	0.014	0.019	0.023	0.010	0.018
<i>Observations</i>	130,707	130,706	136,225	136,889	137,582	136,915

Table XI
Debt and equity issues in good and bad times

The table reports frequency and magnitude of financing activity for sorts on profits for sub-samples of firms in good and bad times. An industry is defined as having “good times” if the median firm in that industry has a market-to-book which is higher than the 67th percentile of the time-series distribution of industry median market-to-book ratios. Conversely, an industry is defined as having bad times if the median firm in that industry has a market-to-book ratio which is lower than the 33rd percentile of time-series distribution of industry median market-to-book ratios. Panels A and B report the percentage of firms (a) issuing net debt in excess of 5% of the value of their assets, (b) issuing net equity in excess of 5% of the value of their assets, (c) issuing debt and repurchasing equity both in excess of 5% of the value of their assets, and (d) firms issuing equity and retiring debt in excess of 5% of the value of their assets. Panel C tabulates the mean debt and equity levels, and the mean changes in debt and equity issuances. The sample is non-financial firms listed on the annual Compustat files for the period from 1971 to 2006.

Table XI Continued

			Issuing Net Debt (1)	Issuing Net Equity (2)	Issuing Debt Rep. Equity (3)	Iss. Equity Ret. Debt (4)
Panel A: Sorts on Profitability						
Bad Times		Low Profits	16.8	16.0	0.1	2.5
		2	17.2	6.6	0.2	1.3
		3	18.4	5.8	0.4	1.1
		4	18.9	6.0	0.4	1.2
		High Profits	17.5	8.4	0.5	1.8
Good Times		Low Profits	19.5	39.9	0.1	5.0
		2	19.5	16.6	0.2	2.6
		3	19.9	11.7	0.3	2.0
		4	22.2	11.3	0.7	2.4
		High Profits	20.3	13.7	1.2	2.8
Panel B: Sorts on firm size and profitability						
Bad Times	Small Firms	Low Profits	18.8	26.0	0.0	3.6
		2	18.3	17.9	0.1	2.9
		3	16.7	12.4	0.2	2.1
		4	17.5	8.8	0.1	2.1
		High Profits	17.8	11.1	0.2	2.4
	Large firms	Low Profits	16.8	5.7	0.0	0.9
		2	16.2	4.3	0.5	0.6
		3	15.7	4.1	0.4	0.5
		4	16.4	3.5	0.4	0.7
		High Profits	15.0	3.7	0.7	0.5
Good Times	Small Firms	Low Profits	19.9	42.9	0.1	4.8
		2	21.0	44.1	0.1	5.7
		3	20.3	31.7	0.1	5.2
		4	18.2	21.8	0.2	4.4
		High Profits	18.2	23.0	0.2	5.3
	Large firms	Low Profits	20.1	11.0	0.3	1.3
		2	19.4	7.0	0.5	0.8
		3	21.6	5.5	0.9	0.8
		4	19.9	4.1	1.0	0.6
		High Profits	22.3	3.9	3.1	0.4

Table XI Continued

		D	ΔD	BVE	ΔBVE	MVE	ΔMVE	Equity Iss.	Assets	
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
<i>Panel C: Magnitude of Financing Activity (Means)</i>										
Bad Times	Small Firms	Low π	2.0	0.2	1.1	0.4	21.9	2.2	1.2	5.1
		2	2.1	0.2	2.2	0.1	14.4	1.7	0.6	6.3
		3	2.0	0.1	2.7	0.1	11.6	2.2	0.4	6.7
		4	2.0	0.2	3.3	0.3	9.6	0.8	0.3	7.3
		High π	1.7	0.2	3.9	0.8	12.9	1.7	0.4	7.7
	Large firms	Low π	1,985.0	-35.3	1,471.3	-63.6	1,669.5	204.7	38.2	5,397.9
		2	2,086.3	0.5	1,776.5	-9.0	2,294.4	202.6	28.1	5,850.0
		3	1,865.2	-8.7	2,011.1	20.7	2,757.5	255.7	31.0	5,736.1
		4	1,424.1	20.0	2,130.7	33.0	3,268.8	61.3	14.0	5,254.4
		High π	1,074.2	32.8	2,457.1	116.4	5,545.9	296.8	-20.5	5,178.3
	Small Firms	Low π	2.2	0.8	4.3	5.3	62.1	0.6	7.9	10.9
		2	2.4	0.8	4.4	3.3	52.8	0.0	5.3	10.6
		3	2.2	0.7	4.4	2.1	35.3	1.3	2.8	9.9
		4	2.0	0.5	4.5	1.7	28.3	2.9	1.9	9.5
		High π	1.9	0.5	6.5	3.3	31.2	2.3	2.4	11.4
Large firms	Low π	3,215.1	118.1	2,402.2	40.9	5,250.4	29.2	67.8	8,905.3	
	2	3,357.3	122.7	2,430.2	85.4	5,404.7	25.8	12.7	9,098.8	
	3	2,215.9	138.2	2,515.0	136.6	6,231.5	157.7	-10.0	7,119.1	
	4	2,259.8	117.8	3,236.0	191.1	10,049.9	385.2	-63.9	8,538.8	
	High π	1,848.9	235.8	3,513.6	424.3	16,730.0	1,139.0	-156.2	8,163.6	

Table XII: Debt and Equity Issuances in Good and Bad Times

The sample is non-financial firms listed on the annual Compustat files for the period from 1971 to 2006. The table presents estimates from regressions of change in debt (ΔD) and net equity issuances ($EquityIss.$). The explanatory variables include change in profits, lagged change in profits, and lagged change in assets. The regressions include year indicator variables. The reported t-statistics are corrected for clustering at the firm level. ^a, ^b, and ^c mean significant at the 1%, 5%, and 10% level, respectively.

	Good Times				Bad Times			
	ΔD	(2)	(3)	$EquityIss.$	ΔD	(6)	(7)	$EquityIss.$
	(1)			(4)	(5)	(8)		
$\Delta Profits$	0.740 ^a (3.5)	0.637 ^a (3.1)	-0.205 ^a (-2.8)	-0.191 ^a (-3.4)	0.559 (1.6)	0.578 (1.6)	0.028 (0.6)	0.027 (0.6)
$\Delta Profits_{t-1}$		0.077 (0.7)		-0.298 ^a (-3.5)		0.085 (1.1)		-0.014 (-0.7)
$\Delta Assets_{t-1}$		0.056 ^b (2.4)		0.020 ^b (2.4)		0.031 (1.2)		-0.005 (-1.2)
<i>Constant</i>	17.586 ^a (5.3)	11.885 ^a (3.3)	1.984 (1.1)	1.664 (0.8)	17.662 ^a (4.9)	16.803 ^a (4.6)	-2.520 ^b (-2.2)	-3.710 ^a (-3.1)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
$R^2 - Adjusted$	0.060	0.078	0.039	0.104	0.101	0.116	0.003	0.006
<i>Observations</i>	74,499	66,378	74,779	66,622	62,727	57,997	62,844	58,094