Capital Structure Decisions: Which Factors are Reliably Important?

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ABSTRACT

This paper examines the relative importance of many factors in the leverage decisions of publicly traded U.S. firms from 1950 to 2000. The most reliable factors are median industry leverage (+ effect on leverage), market-to-book ratio (-), collateral (+), profits (-), dividend-paying (-), log of assets (+), and expected inflation (+). Industry subsumes a number of smaller effects. While there are models that account for these facts – a few at a time – we are not aware of models that simultaneously account for all of the robust facts.

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I. Introduction

What factors determine the capital structure decisions made by publicly traded U.S. firms? Despite decades of intensive research, there is a surprising lack of consensus even about many of the basic empirical facts. This is unfortunate for financial theory since disagreement over basic facts implies disagreement about desirable features for theories. This is also unfortunate for empirical research in corporate finance; if an empirical researcher wants to offer new empirical insights, it may be unclear what other factors need to be controlled.

The need for a basic set of empirical facts about capital structure decisions is often handled by making reference to the survey by Harris and Raviv (1991), or to the empirical study by Titman and Wessels (1988). These two classic papers illustrate the problem of disagreements over basic facts. According to Harris and Raviv (1991, page 334), the available studies "generally agree that leverage increases with fixed assets, non-debt tax shields, growth opportunities, and firm size and decreases with volatility, advertising expenditures, research and development expenditures, bankruptcy probability, profitability and uniqueness of the product." However, Titman and Wessels (1988, page 17) find that their "results do not provide support for an effect on debt ratios arising from non-debt tax shields, volatility, collateral value, or future growth." Consequently, different studies employ different factors to control for what is 'already known.'

This study contributes to our understanding of capital structure in several ways. First, starting with a long list of factors from the prior literature we examine which factors are reliably signed, and reliably important, for predicting leverage. Second, there is good reason to suspect that pattern of corporate financing decisions might have changed over the decades. During the 1980s, many firms took on extra leverage apparently due to pressure from the market for corporate control. During the late 1980s and the 1990s, many more small firms made use of publicly traded equity. Other factors may also have changed. It is therefore important to examine the changes over time. Finally, it has been argued that different theories apply to firms under different circumstances.[3] To address this serious concern the effect of conditioning on firm circumstances is studied.

[3] "There is no universal theory of capital structure, and no reason to expect one. There are useful conditional theories, however. Each factor could be dominant for some firms or in some circumstances, yet unimportant elsewhere." (Myers, 2002)

We do find reliable empirical patterns that account for much of the variation between firms in market leverage.[4] A set of seven factors account for more than 32% of the variation in leverage, while the remaining 29 factors only add a further 4%. These seven factors have very consistent sign and statistical significance across many alternative treatments of the data. The remaining factors are not nearly as consistent. The seven main factors are as follows.

- Firms in industries in which the median firm has high leverage tend to have high leverage.
- Firms that have a high market-to-book ratio tend to have less leverage.
- Firms that have more collateral tend to have more leverage.
- Firms that have more profits tend to have less leverage.
- Firms that pay dividends tend to have less leverage than non-payers.
- Firms that are large tend to have high leverage.
- When inflation is expected to be high firms tend to have high leverage.

This set of factors raises several important questions. (1) Are all of these effects equally reliable? (2) Can we replace some of these factors with other common factors and still adequately control for the known facts? (3) How important are the factors that have been excluded? (4) How does this set of factors relate to the popular theories of leverage?

Question 1. Of course, these factors are not all equally reliable. Expected inflation is likely to be the least reliable factor. It is the only macroeconomic factor to be included and so instead of having 225,000 firm-year observations we only have 51 annual observations for expected inflation. Accordingly, we cannot have nearly the same level of confidence that this factor will perform in the same manner out of sample.

The seven core factors provide a more powerful account of a market-based definition of leverage than of a book-based definition of leverage. If we had been focusing on a book-based definition of leverage, then neither the market-to-book ratio nor expected inflation would have been included in the core model.

[4]Dynamic aspects of leverage are important and have recently been studied by Shyam-Sunder and Myers (1999), Welch (2004), Hovakimian, Opler and Titman (2001), and Frank and Goyal (2003, 2004) among others. There has been much less recent attention to cross sectional differences which are the focus of this paper.

There have been significant changes in the core model over time. The most important of these changes is the declining importance of profits. In the 1950s and the 1960s profits plays a very powerful role in determining leverage. In the 1980s and the 1990s, profits – while still statistically significant – became a rather minor factor in leverage decisions. This result provides yet more evidence of the fact, discussed in Frank and Goyal (2003), that during the 1980s and 1990s, equity markets became more willing to fund currently unprofitable firms with good growth prospects.

When we consider firms in different circumstances, the most important fact is the degree of similarity among the factors. However, as should be expected, there are interesting differences to be found. The most noteworthy difference is between high and low market-to-book firms. Collateral, assets and dividends are more important for low market-to-book firms than for high market-to-book firms. Even in this case the patterns are basically similar, but they are much weaker for the high market-to-book firms.

Question 2. Many studies in the literature have used different sets of factors. We can identify three variations on the list of seven factors that are likely to be innocuous. First, replacing assets with sales is unlikely to matter, since both reflect the role of firm size. Second, replacing expected inflation with the Treasury bill rate is unlikely to matter much. These are highly correlated. It is also true that even excluding this factor altogether would probably not make a huge difference for many purposes. Third, replacing collateral with tangibility is unlikely to matter. Collateral and tangibility differ in that collateral includes inventories while tangibility does not. Inventories usually support short-term debt. What is more, inventories as a fraction of total assets have declined significantly over time.

When selecting control factors some studies point to the four factors used by Rajan and Zingales (1995). Their factors are: market-to-book, profit, tangibility and sales. These factors are reasonable. They omit the effect of being a dividend paying firm, and as well as the many factors subsumed by the industry factor. Depending on the purpose, we can show that omission of these factors may be quite important.

Question 3. Statistically, the excluded factors make little difference. As mentioned above they add little to the explanatory power of the model and many of them have effects that are not reliable. On the other hand, these factors may be critical for the consideration of particular theories. For this reason we also report the patterns that tend to be observed for the minor factors.

Some excluded factors have their effects subsumed within the median industry factor; which is empirically the single most powerful factor. Unfortunately median industry leverage does not have a unique interpretation. If we exclude the industry factor several other familiar factors become important.[5] None of these factors are strong enough to be important when median industry leverage is included, and none of these effects is all that powerfully robust in the data even when industry is excluded. Thus these are not the primary facts that leverage theory needs to account for.

Question 4. The current paper is not a direct test of any theory. Rather, we provide evidence on the patterns in the data. Using this information we offer suggestions about directions in which the theories might be developed so they can be more empirically relevant.

Six of the seven core factors have the sign predicted by the static trade-off theory in which deadweight bankruptcy costs are traded-off against tax saving of debt. The sign on profits is inconsistent with static trade-off theory, but is consistent with dynamic trade-off models such as Fischer, Heinkel and Zechner (1989) in which firms allow their leverage to drift most of the time, and only adjust their leverage if it gets too far out of line.[6]

While the taxes versus bankruptcy trade-off is the most common version of the trade-off theory, it is not the only model that is included within the general trade-off theory label. Trade-off theory also includes models such as Morellec (2004) in which agency costs of debt play a crucial role.

There is reason to suspect that the agency costs of debt may be quite important relative to taxes. Our findings reproduce the well-known fact that tax effects are relatively hard to clearly identify in the data. A further reason to doubt that taxes are the crucial driving force in the use of debt comes from history. Historians have documented that firms commonly used debt finance long before the introduction of the corporate income tax.[7] Clearly corporate income tax cannot explain the use of debt contracts centuries before such taxes were introduced.

[5]To be specific: (a) firms with more intangible contractual rights have more leverage, (b) firms in regulated industries have more leverage, (c) firms with more volatile stocks have less leverage, (d) firms with more corporate overhead (selling, general and administrative expenses) have less leverage, (e) when managerial sentiment is more optimistic leverage declines, (f) firms in high technology industries have lower leverage, (g) when macroeconomic performance improves leverage declines, (h) firms that do more research and development have less leverage, (i) firms that are incurring losses have less leverage.

[6]An interesting question is whether the levels of underwriting costs reported by Altinkiliç and Hansen (2000) and Corwin (2003) are sufficient to explain the observed periods of inactivity followed by rebalancing. Recent work by Hennessy and Whited (2003), and Strebulaev (2003) seems particularly promising in this respect.

[7]For instance consider Braudel (1982, pages 397-398): "[in 1731] the French consul in Genoa wrote: 'Lack of confidence keeps money in short supply; so those who usually do business on credit, which means most of the merchants in the city, are doing very little. The best purses are shut.' "

Even if taxes are not the full story there are reasons to think that they might matter at least to some extent. Graham (2003) reviews a range of facts that suggest at least some role for taxation to matter. Hennessy and Whited (2003) show that due to transactions costs it is possible that tax effects will be hard to identify empirically even when they are an element of the firm's problem. For these reasons we think that distinguishing the relative importance of agency cost of debt versus tax cost of debt deserves further work.

The pecking order theory is often used to explain financing decisions of firms. A significant merit of the pecking order theory is that it predicts the effect of profits correctly (Shyam-Sunder and Myers, 1999). However, as shown by Frank and Goyal (2003) the theory has other problems. In terms of the current paper, the pecking order makes no prediction for the signs of most of the reliable factors. Accordingly, at least in its current form, the pecking order is not helpful in organizing many of the features that we see in the way firms finance themselves. What is worse for the theory is that it incorrectly predicts that dividend paying firms should have greater leverage. The dividend prediction stems from the fact that dividends require funds, and as discussed by Shyam-Sunder and Myers (1999), they are treated as exogenous within the pecking order. If the pecking order theory is to be used as a basis for organizing what we know about firm leverage, the theory will need to be extended on several fronts.

Market timing theory has recently become popular. The theory makes correct predictions for the market-to-book and the effect of expected inflation. However, by itself market-timing does not make any predictions for many of the patterns in the data that are accounted for by the trade-off theory. If market timing is to stand as an independent theory, then considerable theoretical development is needed.

There is no unified model of leverage currently available which can simultaneously account for the seven reliable factors. However, the main elements that might be used to create such a theory seem to be present in the literature already. The theory will probably need to be explicitly inter-temporal in order to reflect the effects of market-to-book and expected inflation. In order to reflect profits the theory is likely to need to have significant fixed costs of adjustment so that there are periods of drift and moments of rebalancing. In order to capture the role of collateral it will need to have some role for repossession of assets by the suppliers of debt. The theory might well have a role of financial constraints of some type to explain the firm size and the dividend effects.

The rest of this paper is organized as follows. Section II provides predictions associated with major leverage theories. The data are described in Section III. The factor selection process and results are presented in Section IV. This leads to the core model of leverage that is presented in Section V. The conclusions are presented in Section VI.

II. Predictions

There are three perspectives on capital structure that are particularly prominent. Since these three perspectives are influential we provide some discussion here about what patterns in the data might be expected under each theory. We do not do this to provide a definitive test of one theory against another. Instead our point is to help clarify the extent to which each of these points of view helps us to organize the patterns that we see in the data. In this way we can suggest places where each of the theories might be productively further developed.

The three ideas are as follows: (1) The trade-off theory. Firms trade-off between the benefits of leverage such as tax savings or mitigation of agency problems against the costs of leverage such as the expected deadweight costs of bankruptcy. (2) The pecking order theory. Due to adverse selection, firms prefer to finance their activities using retained earnings if possible. If retained earnings are inadequate, then they turn to the use of debt. Equity financing is only used as a last resort. (3) The market timing theory. Firms try to time the market by using debt when it is cheap and equity when it seems cheap.

The pecking order theory and market timing theory provide ways to understand how managers react to particular aspects of the environment rather than making broader trade-offs. Table 1 provides definitions of the factors. Table 2 provides a list of predictions associated with leverage theories. The predictions are discussed in the appendix.

The theories are not developed in terms of standard accounting definitions. In order to test the theories it is necessary to make judgments about the connection between the observable data and the theory. While many of these judgments seem uncontroversial, there is room for significant disagreement in some cases. These judgements are discussed in the appendix.

III. Data Description

The sample consists of non-financial U.S. firms over the years 1950-2000. The financial statement data are from Compustat. The data are annual and are converted into 1992 dollars using the GDP deflator. The stock return data are from the Center for Research in Security Prices (CRSP) database. The macroeconomic data are from various public databases and these are listed with variable definitions in Table 1.

Financial firms and firms involved in major mergers (Compustat footnote code AB) are excluded. Also excluded are firms with missing book value of assets and a small number of firms that reported format codes 4, 5, or 6. Compustat does not define format codes 4 and 6. Format code 5 is for Canadian firms. The balance sheet and cash flow statement variables are expressed as a percentage of assets, and other variables used in the analysis are winsorized at the 0.50% level in both tails of the distribution. This serves to replace outliers and the most extremely misrecorded data.[8]

A. Defining leverage

Several alternative definitions of leverage have been used in the literature. Most studies consider some form of a debt ratio. These differ according to whether book measures or market values are used. They also differ in whether total debt or only long term debt is considered. Some authors prefer to consider the interest coverage ratio instead of a debt ratio (Welch, 2004). Finally, firms have many kinds of assets and liabilities. Accordingly a range of more detailed adjustments can be made.

Book ratios are conceptually different from market ratios. Market values are determined by looking forward in time. Book values are determined by accounting for what has already taken place. As pointed out by Barclay, Morellec and Smith (2001), there is no inherent reason why a forward-looking measure should be the same as a backward-looking measure. The older academic

[8]Prior to trimming, several balance sheet and cash flow statement items are recoded as zero if they were reported missing or combined with other data items in Compustat. The data are often coded as missing when a firm does not report a particular item or combines it with other data items. After examining accounting identities, we determine that recoding missing values on these items as zero respects the reported accounting identities.

literature tends to focus on book debt ratios. The more recent academic literature tends to focus on market debt ratios.

We consider five alternative definitions of leverage. Let LD = long term debt, TD = total debt (i.e. long term debt plus current debt), ME = market value of equity, BE = book value of equity, OIBD = operating income before depreciation, INT = interest expenses. Let TA = total book value of a company's assets and MA = (quasi-)market value of the firm's assets (MA = TD + ME + preferred stock- Deferred taxes and investment credits). Using this notation, the total debt to assets is given by TDA = TD/TA, the long-term debt to assets is given by LDA = LD/TA, the total debt to market value of assets is TDM = TD/MA, the long-term debt to market value of assets is LDM = LD/MA, and the interest coverage ratio is ICR = OIBD/INT. A high interest coverage ratio means a low level of leverage since there are lots of earning to cover the debt payments.[9]

Most studies focus on a single measure of leverage. The most common measure is TDM which we take to be the main focus. However, it is also common to report that the crucial results are robust to alternative leverage definitions. Having reviewed many such robustness claims, we expect the results to be largely robust to the choice among the first four measures. Since ICR is less heavily studied, we expect less robustness in this case.[10] We focus on TDM as the main case.

B. Means

Table 3 provides some descriptive statistics. The median leverage is below mean leverage. There is a large cross-sectional difference so that the 25th percentile of TDM is 0.05 while the 75th percentile is 0.46. Several factors have mean values that diverge sharply from the median.

Most of the factors have firm specific observations and thus around 225,000 observations. However the macro factors have only a single observation per year. Accordingly it is much harder for

[9]The interest coverage ratio has a very skewed distribution. A drawback to interest coverage is that corporate earnings are reportedly smoothed by managers who may attempt to portray a positive picture of health while it remains feasible to do so. Periodically, they take a "big bath" and may even exaggerate the losses. This may help to explain why the measure performs so poorly.

[10]Beyond the five measures that we consider, many other leverage definitions can be considered. Some scholars regard corporate cash holdings as negative debt and hence subtract cash from the debt measure. Similarly, corrections can also be made for a range of other assets and liabilities such as deferred taxes, accounts payable, pension liabilities, and others. It is important to understand that we have not carried out a full comparison of all treatments of all candidate leverage definitions. We focus on a market based measure, and then discuss some implications of using alternative measures of leverage.

the macro factors to match the firm-level leverage measures well. This implies that it is much harder for the macro factors to prove to be reliably significant.[11]

C. Time patterns

Table A1 in the appendix presents average common-size balance sheets for U.S. firms from 1950-2000. There have been significant changes. Cash holdings fell until the 1970s and then built back up. Inventories declined by almost half while net property, plant and equipment had a more modest decline. Intangibles are increasingly important.

Current liabilities, especially 'current liabilities-other', are increasingly important. These liabilities are a grab bag of short-term liabilities that are not considered as accounts payable or ordinary debt. Included are things like some contractual obligations, employee withholdings, interest in default, damage claims, warrantees, etc. This category has risen from being trivial to accounting for more than 12% of the average firm's liabilities.

Long-term debt rose early in the period but has been fairly stable over the period 1970-2000. The net effect of the various changes is that total liabilities rose from less than 40 percent of assets to more than 60 percent of assets while common book equity had a correspondingly large decline.

Table A2 in the appendix presents average corporate cash flows, again normalized by total assets. The changes in the cash flows are fairly remarkable. Both sales and cost of goods sold fell dramatically. The selling, general and administrative expenses more than doubled over the period. As a result, the average firm has negative operating income by the end of the period.

The fact that the average firm has negative operating income is also a case in which the simple average is potentially misleading. There are large cross-sectional differences that are masked by the averages. The median firm has positive operating income. What seems to have happened is that, increasingly, public firms include currently unprofitable firms with high hopes for future growth.

Corporate income taxes paid have been declining over time. This is not surprising since the statutory tax rates have dropped, and the average includes more unprofitable firms.

[11] We have experimented with imposing different levels of acceptance for the macro factors. However we are not aware of any fully convincing alternative weighting scheme. In the end we have opted not to treat the macro factors differently. The fact that expected inflation still proves to be significant is thus particularly impressive. The significance of the various macro factors is a topic that merits further investigation.

The cash flows from financing activities have changed significantly. During the 1990s, the mean firm sold a fair bit of equity, but the median firm did not. During the 1990s, the mean firm issued more debt than it retired, but the median firm did the reverse. The average firm both issues and reduces a significant amount of debt each year.

The fact that the mean and the median firms behave so differently has serious implications both for this study and also for the empirical literature on leverage more generally. Many studies have truncation rules such that firms below, say $50 million or $100 million in total assets are excluded. Or firms with average sales below, say, $5 million might be excluded. Some papers use multiple exclusion criteria. Since there are big differences across firms, the results of such studies are likely to be sensitive to the precise exclusion criterion employed.

IV. Factor Selection

Many factors have been used in previous empirical studies of leverage. We have included as many of these factors as practical. Table 1 provides the definitions for the factors that we consider. The factors considered include size factors, growth factors, the nature of the firm's assets, macroeconomic factors, tax factors, and factors reflecting the state of debt and equity markets.

In the interest of parsimony, and to control multicollinearity, it is desirable to remove inessential factors. As discussed in Hastie, Tibshirani, and Friedman (2001) there are several methods that can be used to decide which factors to keep and which to drop. We use the Bayesian Information Criterion (BIC) to determine which factors are worth keeping. This is perhaps the most prominent method.

In order to remove factors we proceed in steps. First we examine the correlation structure among the factors. We use this to exclude several cases in which the correlations are simply too high. Second the Bayesian Information Criterion is used to determine which of the remaining factors to keep. Third, a variety of robustness checks are carried out in order to ensure that the selection is not over-fitting.

Linear regressions are used to study the effects of the factors. Let L_{it} denote the leverage of firm i on date t. The set of factors observed at firm i at date t-1 is denoted F_{it-1}. The factors

are lagged one year so that they are in the information set. The error term is assumed to follow $\varepsilon \sim N(0, \sigma^2 I)$, while α and the vector β are the parameters to be estimated. The basic model is,

$$L_{it} = \alpha + \beta F_{it-1} + \varepsilon_{it}. \tag{1}$$

The Akaike Information Criterion (AIC) and the Bayesian Information Criterion (BIC) are two of the most commonly used model selection criteria and we have tried both. Let P be the number of parameters and let N be the number of observations in a fitted model. Bayesian Information Criterion is defined as follows,

$$BIC = -2 * \text{log-likelihood} + P * log(N). \tag{2}$$

The Akaike Information criterion almost the same, but with the number 2 replacing $log(N)$ in the definition. Both BIC and AIC have a sensible structure. In each case, smaller is better. As the log-likelihood increases, both measures fall. As the number of parameters increase, both measures increase. As the number of observations increase so does the BIC.

It is known that the BIC is asymptotically consistent. In other words, suppose that you have a family of possible models that includes the true model. Then as the sample size grows to infinity, the probability that the BIC will pick the true model approaches one. In small samples it is not clear whether AIC or BIC is better. Since $log(N) > 2$ the BIC tends to select a more parsimonious model. In our analysis they routinely produce the same answers and so to save space we only report the BIC.[12] For a useful discussion of the relative merits of many approaches to model selection, including both the AIC and BIC, see Hastie, Tibshirani, and Friedman (2001).

Robustness of conclusions is extremely important. For this reason, in addition to overall results, we systematically consider the results for sub-samples. Reliably important results should be robust across sub-samples. The sub-samples are defined by (i) formation of 10 random groups, (ii) annual cross sections, (iii) firm classifications that seem interesting in light of the previous literature.

[12] In an earlier draft of the paper we used stepwise regressions rather than information criteria to select factors. This gave generally similar results. In the earlier version we had included the Z-score which replaced the effect of profits. Given the manner in which the Z-score is defined and interpreted, this is potentially misleading and so we have dropped the Z-score. We also found that Intangible assets were included. Under the BIC and AIC criteria intangibles are the top factor that is actually excluded. Since the BIC and AIC have firmer theoretical foundations we prefer the approach used in the current draft.

A. Empirical evidence on factor selection

The first problem is that there are high correlations between some of the factors. When a correlation is high, but a factor does not prove to be important, there is not much of a problem for the interpretation of the evidence. There are cases in which high correlations are present, and one of the factors would prove to be important. Such cases invite misinterpretation of the evidence.

These concerns caused us to drop several factors prior to further analysis. We drop: 1) Titman and Wessels (1988) version of Non-debt tax shields. The correlations that caused trouble are between Non-debt tax shields and profits (0.97) and Net operating loss carry-forwards (-0.63), Losses (-0.60), and the Z-Score (0.79). 2) Graham's (1996) trichotomous tax variable. The correlations of concern here are with the top corporate tax rate (0.54), Dividend (0.52) and Losses (-0.60). 3) The Z-score factor. The Z-score is highly correlated with Profit (0.77) and Net operating loss carry-forwards (-0.81). 4) Korajczyk and Levy's (2003) measure of financial constraints. It was not a robust factor. Since it is based on dividends and the market to book ratio which are already included, we decided to drop it from consideration in our analysis as reported below. There are several other cases in which the absolute value of the correlation coefficient is greater than 0.5.[13]

The high correlations suggest that it is unlikely that the data will do a good job of distinguishing between: the effect of sales and assets, between collateral and tangibility, and between expected inflation and the Treasury bill rate.

Table 4 provides the correlations between each of the factors and each of the leverage measures. Beneath each correlation, the pluses and minuses indicate the fraction of the time the correlation was of a particular sign and was statistically significant at a 95% confidence level. A single $+$ means that the correlation was positive and significant in at least 2 out of 5 decades. A $++$ means that the correlation was positive and significant in at least 4 out of 5 decades. A $+++$ means that the correlation was positive and significant in all of the 5 decades from 1950 to 2000. The $-$, $--$, and $---$, are analogously defined for the negative and significant cases. A $-+$ indicates that

[13]We note the following high correlations: Profit and Net operating loss carry-forwards (-0.61), Profit and Losses (-0.63), Assets and Sales (0.92), Assets and Dividend (0.57) Sales and Dividend (0.57), Sales and Losses (-0.54), collateral and Tang (0.75), change in assets and change in sales (0.51), regulated and investment tax credit (0.56). Several of the macrofactors are also highly correlated: Term spread and Quality Spread (-0.82), Treasury bill rate and expected inflation (0.76), purchasing manager's sentiment index and Macro-profits (0.63), purchasing manager's sentiment index and Macro-growth (0.78). Due to these correlations one might argue for more aggressive pruning of the factor list. However, we find little evidence that such changes would alter our final conclusions.

the correlations are negative and significant for at least two out of five decades and positive and significant for at least another two decades.

In every decade positive and significant correlations with leverage (TDM) are found for: log of sales, median industry leverage, the dummy for being regulated, collateral, tangibility, and the Treasury bill rate. Similarly powerful negative correlations are found for: the market to book ratio, uniqueness, selling general and administration expenses, the variance of stock returns, and cumulative stock returns. These factors tend to have similar records under the alternative leverage definitions. The correlations are almost uniformly weaker under the interest coverage measure, although they tend to have similar signs as leverage increases.

Unconditional correlations are interesting, but far more important is the effect of a factor when the other factors are also present in the analysis. In Table 5 we examine which factors survive when other factors are also included. To understand this table, start at the bottom of Table 5 with all factors and compute a regression and the summary statistics that are reported. Then remove the factor with the lowest t-statistic (in this case, it is the top corporate tax rate). Next recalculate all statistics on the reduced sample that includes all factors except the top corporate tax rate. This improves the model slightly as the BIC drops from -31602.9 to -31614.2. Next remove the factor with the lowest t-statistic and recalculate. This process continues removing one factor at a time until at the top of the table only a single factor remains – the median industry leverage.

In Table 5 we select the model with the minimal value of the BIC. In Table 5 we also list the regression coefficient and the associated t-statistic from the last regression to just include a given factor. In general factors closer to the table have higher t-statistics, but the process is not always monotonic. This stems from the fact that the number of observations can change due to the data availability of some factors.

For convenience we have drawn a line beneath the last included factor. This happens at the stage where intangible assets are left out of the model (t-statistic of 40.6) while expected inflation (t-statistic 55.7) is included in the model. Seven factors are selected to be included by the minimum BIC criterion. These seven factors account for 32% of the variation in the data. Not surprisingly, most of these seven factors also have good univariate performance records in Table 4. We have also examined the performance of the variables one at a time in order to ensure that major variables are

not being excluded from the final model due to a quirk of path dependence in the selection process. We find no evidence of a path-dependence problem.

The two factors that just fail to make the cut-off are intangible contract rights, and stock volatility. Both of these effects are close but not powerful enough to be included. When we examine the robustness checks in subsequent tables we find that these two factors are fairly consistent, but they do not appear to have powerful effects in the data.

Table 6 considers two kinds of robustness. First, we randomly partition the data into 10 equal groups. The Table 5 exercise is repeated on each group separately. Under the heading "Group Positive %" are listed the percentage of the groups for which the given factor was included in the minimum BIC specification and had the indicated sign. Similarly "Group Negative %" lists the percentage of the groups for which the given factor was included in the minimum BIC specification and had the indicated sign.

Second, we repeat the minimum BIC selection process for each year of data run separately. Since the macro factors have only a single observation in each year, they are excluded from the year-specific tests. The final two columns report the results.

Table 6 is quite reassuring. All of the seven factors are included every time in the 10 randomly formed groups. None of the other factors was ever significant in the randomly formed groups. When we consider the year by year results the patterns are still quite reassuring, but more variation is observed. The weakest among the seven included factors is assets. Notice that assets is still selected almost twice as often as any of the omitted factors such as intangibles. Table 6 does not suggest reintroducing any of the excluded factors.

B. Different classes of firms

Myers (2002) has argued that different factors might affect various kinds of firms in fundamentally different ways. If this is true, then fitting a single model to firms in different situations will generate unstable results due to the aggregation process.

To address this serious concern, Table 7 divides firms into several classes that have often been treated separately in the literature. For each class of firm we repeat the Table 5 exercise and then report whether a given factor is included or excluded. We also report how often the factor is

included for that class of firms in annual cross sections. Table 7 distinguishes: dividend paying versus non-dividend paying, mature firms versus young firms, small firms versus large firms, low market-to-book firms versus high market-to-book firms, and low profit firms versus high profit firms.

Table 7 does offer evidence of variation in the data. Suppose that we use a 50% cutoff rule of thumb for inclusion, then Table 7 shows that none of the excluded factors should be added back to the set of seven core factors. On the other hand, some of the seven included factors do not perform as well for certain types of firms. As in Table 6, the greatest variation is associated with assets.

Dividend-paying firms are often considered to be financially unconstrained. Under this interpretation we see that financially constrained firms have leverage that is more sensitive to the market-to-book ratio and to firm size, but less sensitive to firm profits. Whether the firm pays dividends or not, is relatively more important for large, mature, low market-to-book firms.

The interpretation of dividends needs further development beyond that contained in the literature. Analysis of both pecking order theory (Shyam-Sunder and Myers, 1999), and trade-off theory (Henessy and Whited, 2003, and Strebulaev, 2003) often treat the dividend decision as exogenous. Both theories might benefit from a more satisfactory account of dividends.

The key point in Table 7 is the remarkable similarity of effects across the classes of firms. Clearly there are some difference. However the basic patterns are quite similar for different types of firms.

C. Alternative leverage measures

Much of the focus so far has been on a market-based definition of leverage (TDM). This definition is the most commonly used in the literature, but a range of alternative definitions have been used in other studies. Often, empirical papers contain an assertion that whichever effect is being documented is robust to consideration of alternative leverage measures. We consider book leverage (TDA) and two versions of leverage that exclude short term debt (LDM, LDA).

The seven main factors are fairly but not perfectly robust. The same seven factors are included under LDM. Of the seven main factors, median industry leverage, profit, dividend, and assets are also included under both TDA and LDA. The exceptions are market-to-book and expected inflation,

which are not included under both TDA and LDA. Collateral is replaced by tangible assets under the LDA definition, which also includes intangible contractual rights. Under TDA, we find that intangible assets, research and development, stock variance, log of sales, net operating loss carry forwards, treasury bill rate, the purchasing manager's sentiment index, and selling general and administrative expenses are all included. Many of these added factors are not robust across years. The non-robust factors under the TDA measure of leverage are research and development, stock variance, log of sales, net operating loss carry forwards, purchasing manager's sentiment index, and selling, general and administrative expenses.

We are not aware of any theory that satisfactorily accounts for the differences that are observed between those factors that influence the alternative definitions of leverage.

D. How should industry be interpreted?

It has long been known that median industry leverage is an extremely powerful and robust predictor of corporate leverage. However it does not have an agreed upon interpretation. MacKay and Phillips (2003) provide a recent analysis of industry effects on leverage. They interpret industry in terms of industry equilibrium models, rather than in terms of correlated but omitted factors.

To get a sense of the kinds of effect that are being subsumed by median industry leverage, we examined the effect of omitting this factor. These results are collected in the appendix as Tables A3a, A3b, A4, and A5. Several other factors now become significant: intangibles, regulated, stock variance, selling general and administrative expenses, purchasing manager's sentiment index, unique, macroeconomic profits, research and development, losses.

The fact that median industry replaces so many factors implies that one should not expect it to have a unique "correct interpretation." It proxies for several effects, not just one.

Tables A3a and A3b show that many of these "added factors" have effects that are not very robust across classes of firms. If we return to the 50% rule of thumb, then almost none of these newly added factors are reliably important. The effects that are being summarized by median industry leverage appear to be a large number of individually minor effects.

V. Parameter Estimates For the Core Leverage Model

So far the analysis has provided a set of seven factors that are reliably important for leverage. The next task is to estimate equation (1) using the factors. Table 8 provides parameter estimates.[14]

In the first column of table 8, an overall regression model is reported that makes use of the available data for "All Years". In addition to the coefficients, t-statistics and elasticities are reported for each factor. The reported elasticities are evaluated at the means, and they are calculated as follows.[15] Let the regression model be represented as $y = f(x)+\epsilon$, then the elasticity is a numerical approximation to $\partial log(y)/\partial log(x)$.

In table 8 column 2 is headed "Impute Missing." These results are discussed in subsection A below. Columns 3 to 7 present estimates on a decade by decade basis. Over the decades there is a slight worsening in the ability of the set of seven factors to explain leverage. In the 1950s these factors account for 41% of the variation in leverage while in the 1990s they account for 29% of the variation.[16]

The estimated elasticities do not change much from decade to decade for median industry leverage, market to book, or collateral. The impact of profits declines sharply. In the 1950s the elasticity of leverage with respect to profits is -0.56, while in the 1990s this same elasticity is just -0.01. While still statistically significant, the economic impact of profit has diminished sharply. At the same time, the effect of firm size and whether the firm pays dividends or not have both increased in economic importance.

In every decade, firms in a high leverage industry have higher leverage. This is quite natural within a trade-off model since firms in the same industry must face many common forces. Under a pure pecking order perspective, the industry should only matter to the degree that it serves as a proxy for the firm's financing deficit - a rather indirect link. Under the market timing theory, this result is not predicted.

[14]The Table reports simple regressions. Using panel regressions with either fixed effects or random effects leads to the same conclusions.

[15]We have also evaluated the elasticities at the medians and they show very similar patterns.

[16]By way of comparison Rajan and Zingales (1995) suggest a basic model with 4 factors: tangibility, sales, market-to-book and profits. Their model has often been used as benchmark model, eg. Frank and Goyal (2003). Estimates of that model account for 17.5% of the variation in the data. By any reasonable method of factor their four factor model does not provide as satisfactory an account of the data as these seven factors. The biggest single missing factor is the industry effect. They also omit the distinction between dividend paying and non-dividend paying firms.

Leverage is positively related to firm size as measured by log of assets. Firm size has been interpreted in a number of ways. Larger firms are often thought to be less volatile. Accordingly, under the trade-off theory, they should have more leverage. Under the pecking order theory, volatility might signal more asymmetric information and hence more debt and less equity. However, under the pecking order theory, a larger firm might have more assets and hence a greater possibility of adverse selection relative to the existing assets.

Leverage is positively related to collateral. This effect is well known. From a trade-off perspective, a firm with more assets can pledge them in support of debt. Under the pecking order theory, a firm with more assets has a greater worry about the adverse selection on those assets. Accordingly, we might predict that leverage is positively related to assets. On the other hand, a firm with more assets is probably safer. Under the pecking order theory, we might predict a negative relation between leverage and assets. This ambiguity stems from the fact that collateral can be viewed as a proxy for different economic forces.

Dividend-paying firms have lower leverage. This is a fact. But how should it be interpreted? This is not so clear. Under the pecking-order theory, as interpreted by Shyam-Sunder and Myers (1999), dividends are part of the financing deficit. The greater are the dividends, the greater the financing needs, all else equal. Since financing is by debt, the implication is that dividend-paying firms should have greater leverage. This is not what we find.[17]

Within a trade-off perspective dividends can have different interpretations. 1. Perhaps dividend paying firms are less risky. Under the trade-off theory less risky firms should use more leverage since they have less chance of paying the deadweight bankruptcy costs. 2. Easterbrook (1984) argues that dividend-paying firms have lower agency costs of equity and this allows firms to raise more equity. If so, then dividend payers should have less leverage. 3. Perhaps dividend paying firms are those that generate more cash from operations relative to their investment opportunities, and so they pay out the difference. Such firms would be unlikely to raise more debt since that would incur the unnecessary transactions costs. Accordingly we would predict that dividend paying firms

[17]It seems that the problem is that the pecking order treats dividends as exogenous. One way to endogenize the dividend decision is to argue that paying dividends might be a proxy for insider confidence as in the Miller and Rock (1985) signaling theory. However, as pointed out by Cadsby, Frank, and Maksimovic (1998), the presence of signals undermines the pecking order theory since it may permit insiders to reveal their information to the market. If that is true, then dividend-paying firms are known to be good while non-dividend paying firms are known to be bad. In each case the assets are fairly priced.

would have less leverage. While the data seems inconsistent with the first of these ideas, it might be consistent with either the second or the third interpretation.

The market-to-book ratio is negatively related to leverage. This fact is well known. It is usually interpreted as reflecting a need to retain growth options, as in Goyal, Lehn, and Racic (2002). This interpretation is consistent with the trade-off theory. Under the pecking order theory, more profitable firms use less debt. More profitable firms should also have a higher market value. Thus we might expect that a high market-to-book firm would have low leverage. This is consistent with the evidence.

Expected inflation is positively related to leverage. According to Taggart (1985) this may reflect features in the tax code that favor debt when inflation is expected. However, it might also reflect efforts by managers to time the market. It is hard to see why expected inflation would matter within a pecking order theory.

A. Adjusting for missing data

In the analysis so far we have followed standard practice in our treatment of missing data. We have used an unbalanced panel of firms, but we have left out the records of firms for which necessary data items are not available. This is not innocuous.[18]

How might this matter in corporate finance? The accountants record the data. They decide, within the confines of GAAP, what to report and what not to report. They make many decisions that reflect a variety of pressures. It is far from clear how this process works. In general values that are close to zero seem likely to be left blank and thus enter the data as missing. How much correlation there is from one data item to another is not obvious a priori. However it is unlikely that they would be independent.

[18]To understand why this is potentially so important consider a simple example. We let x and y be two independent accounting measures that are each normally distributed with a mean of 100 and a standard deviation of 10. We generate 500 of each variable and then regress x on y. The intercept is 105 (S.E. = 4.6), the slope is -0.05 (S.E. = 0.05) and the $R^2 = 0.002$. This is as it should be. Next suppose that we only include observations for which $x > 100$, or $y > 100$ or both. Now the intercept is 139.9 (S.E. = 5.1) the slope is -0.37 (S.E. = 0.05) and the $R^2 = 0.12$. Finally suppose that we require that $x + y > 200$. Now the intercept is 159.9 (S.E. = 5.5) the slope is -0.52 (S.E. = 0.05) and the $R^2 = 0.27$. Obviously, when there are requirements that must be satisfied in order for the data to be observed, regressions reflect both the underlying data and the data recording process.

Leaving out incomplete records might be important depending on what determines which data is missing and which data is reported.[19] There is no "theory free" remedy for such potential bias. Any remedy must implicitly or explicitly make assumptions about how the data that are missing might be related to the data that are observed. If the implicit assumptions are wrong, then the correction will also be wrong.

Since we lack an accepted theory about why various data items are missing, we face a troubling problem if we wish to extend the range of interpretation of our estimates. Fortunately, the missing data problem has been well studied and a fair bit of practical experience has determined that certain procedures, known as "multiple imputation," work well.

The idea of multiple imputation is to use the facts that you can observe about a firm in a given year to predict the data that has not been recorded. The predicted data is less certain than is the observed data. There is a distribution of possible values. Accordingly, the standard approach is to stochastically impute the missing values several times. In this way several data sets are created. Each data set is analyzed as if it were a complete data set. Then the results are aggregated in order to see how sensitive the results are to the imputed values.

The missing imputation procedure starts by computing a vector of means and a covariance matrix from the data that does not have missing values. This prior distribution is then used to simulate values for missing data by randomly selecting a value from the available distribution of values.[20] The mean vector and covariance matrix is then recomputed with the imputed estimates. The procedure then iterates until the posterior distribution becomes stationary. In other words, the mean vector and covariance matrix should be unchanging as we iterate. Imputations from the final iteration are used to form a data set that has no missing values. In the implementation of this procedure, ten complete data sets were imputed and analyzed.

[19]The missing data problem is related to, but distinct from, the familiar survivorship bias. Compustat includes data only on firms that continue to exist. This leads to the well known problem of survivorship bias. Early studies such as Titman and Wessels (1988) examined balanced panels of data. Only firms that existed over the full time period were included. In recent years this practice has been replaced by the now common use of unbalanced panels of firms. We use unbalanced panel methods.

[20]To implement this idea we use a Markov Chain Monte Carlo procedure. Rubin (1996) and Schafer (1997) provide in depth coverage about this method. We use SAS PROC MI with a "burn in" period of 1000 observations that are deleted (rather than the default of 50), and we use 10 replications (rather than the default of 5). We use the full set of factors as the basis for the imputation.

The results of imputing the missing values are found under the heading "Impute Missing" in Tables 8 and 9. Imputing missing data has the effect of dramatically increasing the number of firm years from 160,698 to 225,476. With this 40% increase in data one might have expected large changes. However, for the set of seven factors that form the core model, it is remarkable how little change is observed. None of the conclusions about the reliable factors are affected. We have done some experimentation and found, not surprisingly, that the minor factors are more sensitive to multiple imputation. Since we do not stress the minor factors we have not explored this issue systematically.

B. Reintroducing the minor factors

The minor factors are of interest for some purposes. Accordingly in Table 10 we reintroduce these factors one at a time. We consider their effect when added to the core seven factor model, to the six factors that exclude industry and to the 15 factors that are included when industry is omitted. The table does not report the coefficients on the control factors. The coefficients on the seven reliable control factors are extremely stable no matter which of the minor factors is added back in.

The first thing to note about Table 10 is that if we use conventional levels of "statistically significant" then most of these factors are deemed to be significant. This is despite the earlier evidence that these effects are weak. This shows that it is easy to add a factor to our list and find that "it matters empirically." In essence Table 10 provides a lengthy list of such factors. Despite being statistically significant, some of the minor factors have signs that are unreliable. The choice of a leverage definition is important in quite a few cases.[21] These cases may reflect either lack of robustness, or cases in which a forward looking measure simply provides a different perspective than a backwards looking measure. Theoretically disentangling such cases might be interesting. Since these were not core factors, we have not explored these further.

In our view statistical significance is not the right criterion for adding a factor to our list. There are reasons that would justify adding factors. First, if a new factor materially affects the sign and

[21] The NBER recession year factor is positive under market leverage and negative under book leverage. The Treasury bill rate has a negative effect on market leverage and a positive effect on book leverage. The investment grade rating factor is negative under market leverage and positive under book leverage. Net operating loss carry forwards are negative under market leverage and positive under book leverage.

significance of one of our seven factors then it is interesting. Second, if a new factor accounts for a fair bit of the variation that the seven factors leave unexplained then it is interesting. Third, if a new factor is a variable that is policy relevant then it might be quite interesting to add it to the model for some purposes.

In Table 10 there are also cases in which it matters whether one includes the industry factor or not. The impact of the interest rate quality spread is reversed depending on whether industry is included or not. Under a market definition of leverage, the effect of the corporate tax rate is positive and significant when industry is included, but negative when it is excluded. Depreciation has a negative coefficient when industry is included but a positive effect when industry is excluded. All of these have t-statistics suggesting statistical significance.

Adding or dropping a factor that is itself minor, typically has little effect. Thus there are cases in which one can provide "robust" evidence that a given factor has a positive sign on leverage and yet by using a slightly different set of control factors it can also be established that the same factor also has a robust negative effect on leverage. This is why it would be helpful for the literature to make use of a standardized set of control factors, such as the seven robust factors.

A particularly interesting minor factor is the investment tax credits. In Table 4. these are positively correlated with leverage. In Table 5. they are dropped at the point that the they have a coefficient of -0.766 and a t-statistic of -3.7. What is much more interesting is seen in Table 10. Depending on the set of factors used as controls this factor can have either a positive sign or a negative sign. In each direction the associated t-statistics are fairly large; 27.1 in the positive direction, and 7.9 in the negative direction. Now if you add one or two factors that are themselves fairly minor they will have little effect. Some of the minor factors are quite familiar in the literature, and thus they would seem plausible robustness checks.

What this means is that using exactly the same data, but different control factors, one paper might report a robust positive effect and another paper might report a robust negative effect from the same factor. This points to the importance of working with a standard set of control factors and for doing relatively extensive robustness checking on a variety of dimensions.

C. Caveats

The current paper documents reliable patterns in the leverage data. We do not directly test theory. The seven factor model is not a structural model. In order to mitigate concern about endogeneity we use factors from the previous year, not contemporaneous factors. This does not resolve the endogeneity problem nor the lack of a structural model. But at least it has the merit of ensuring that the factors are in the firm's information set.

To go further would require imposing extra structure and then testing whether that structure fit the data. Such studies are worth doing, but they are well outside the scope of the current paper. We hope that out results may be a useful precursor to studies that impose more structure.

There are a number of other things that we have not studied in this paper. Accordingly we cannot be sure how important such adjustments might prove to be. We have not allowed for alternative functional forms and general non-linearities. We have not allowed for general interaction effects, although some minor interaction effects can be found in Table 7. We have not measured underwriting costs (see Altinkiliç and Hansen, 2000) and their impacts. We have not studied dynamic effects in this paper. All of these are potentially interesting, and we hope to explore many of them in the future.

VI. Conclusion

This paper studies the leverage decisions of U.S. firms in order to determine which factors have reliable effect on leverage. There are several reasons to do this. First, there is the simple desire to sort out the differences between the influential papers by Harris and Raviv (1991) and by Titman and Wessels (1988). Second, in empirical work on leverage there is frequent need for a standard account of "what we already know." In the absence of an agreed upon list, there is a serious problem of inconsistencies across papers. Third, theories of leverage make suggestions for the patterns that should be observed in the data. Empirically robust patterns that are not predicted by a theory may warrant further development of that theory.

A core model of seven factors does a reasonable job. We find that: 1. Firms that compete in industries in which the median firm has high leverage tend to have high leverage. 2. Firms that

have a high market-to-book ratio tend to have low levels of leverage. 3. Firms that have more collateral tend to have more leverage. 4. Firms that have more profits tend to have less leverage. 5. Firms that pay dividends tend to have less leverage than non-payers. 6. Larger firms tend to have high leverage. 7. When inflation is expected to be high firms tend to have high leverage.

For any of these seven factors it is possible to find a theory in the literature which predicts the observed sign. We are not aware of any model that simultaneously predicts the full set of reliable factors. Both the pecking order theory and the trade-off theory might be improved by providing more integrated accounts for the empirically significant roles of collateral and dividends.

The core factors are quite robust. The fact that the same factors have generally similar effects across classes of firms is encouraging. It suggests that a unified theory of leverage might not be beyond reach.

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Table 1: Variable Definitions

Leverage Measures

Long term debt/assets (LDA): LDA is the ratio of Compustat item 9, long-term debt to item 6, assets.

Long-term debt/market value of assets (LDM): LDM is the ratio of Compustat item 9, long term debt, to MVA, market value of assets. MVA is obtained as the sum of the market value of equity (item 199, price-close × item 54, shares outstanding) + item 34, debt in current liabilities + item 9, long-term debt + item 10, preferred- liquidation value, - item 35, deferred taxes and investment tax credit.

Total debt/assets (TDA): TDA is the ratio of total debt (item 34, debt in current liabilities + item 9, long-term debt) to item 6, assets.

Total debt/market value of assets (TDM): TDM is the ratio of total debt (item 34, debt in current liabilities + item 9, long-term debt) to MVA, market value of assets. MVA is obtained as the sum of market value of equity (item 199, price-close × item 54, shares outstanding) + item 34, debt in current liabilities + item 9, long-term debt + item 10, preferred- liquidation value, - item 35, deferred taxes and investment tax credit.

Interest coverage ratio (ICR): ICR is the ratio of Compustat item 13, operating income before depreciation, to item 15, interest expense.

Factors

Profitability - operating income before depreciation (Profit): Profit is the ratio of Compustat item 13, operating income before depreciation, to item 6, assets.

Market to Book ratio (Mktbk): Mktbk is the ratio of market value of assets (MVA) to Compustat item 6, assets. MVA is obtained as the sum of the market value of equity (item 199, price-close × item 54, shares outstanding) + item 34, debt in current liabilities + item 9, long-term debt + item 10, preferred- liquidation value, - item 35, deferred taxes and investment tax credit.

Log of Assets (Assets): Assets is the log of Compustat item 6, assets.

Log of Sales (Sales): Sales is the log of Compustat item 12, sales.

Mature firms (Mature): Mature is a dummy variable that takes a value of one if the firm has been listed on the Compustat database for more than 5 years.

Change in log assets (ChgAsset): ChgAsset is change in log of Compustat item 6, assets.

Change in log sales (ChgSales): ChgSales is change in log of Compustat item 12, sales.

Capital expenditure/assets (Capex): Capex is the ratio of Compustat item 128, capital expenditure, to item 6, assets.

Median industry leverage (IndustLev): IndustLev is the median of total debt to market value of assets by SIC code and by year. Industry is defined at the four-digit SIC code level. In the regressions with the interest coverage ratio as the dependent variable, median interest coverage is used in place of median total debt to market value ratio.

Median industry growth (IndustGr): IndustGr is the median of change in the log of Compustat item 6, assets, by SIC code and by year.

Regulated dummy (Regultd): Regultd is a dummy variable equal to one for firms in regulated industries and zero otherwise. Regulated industries include railroads (SIC code 4011) through 1980, trucking (4210 and

4213) through 1980, airlines (4512) through 1978, telecommunications (4812 and 4813) through 1982 and gas and electric utilities (4900 and 4939).

Uniqueness Dummy (Unique): Unique is a dummy variable that takes a value of one if the SIC code of the firm is between 3400 and 4000 (firms producing computers, semiconductors, chemicals and allied, aircraft, guided missiles, and space vehicles and other sensitive industries), and zero otherwise.

Advertising expense/sales (Advert): Advert is the ratio of Compustat item 45, advertising expenses, to item 12, sales.

RND Expense/sales (RND): RND is the ratio of Compustat item 45, research & development expense, to item 12, sales.

SGA Expense/Sales (SGA): SGA is the ratio of item 189, selling, general and administration expenses, to item 12, sales.

Collateral (Colltrl): Colltrl is the ratio of (Compustat item 3, inventory + item 8, net PPE) to item 6, assets.

Tangibility (Tang): Tang is the ratio of Compustat item 8, net property, plant and equipment, to item 6, assets.

Intangible assets/assets (Intang): Intang is the ratio of Compustat item 33, intangibles, to item 6, assets.

Top tax rate (TaxRate): TaxRate is the top statutory tax rate. It was 42 percent in 1950, 51 percent in 1951, 52 percent from 1952-1963, 50 percent in 1964, 48 percent from 1965 to 1967, 52.8 percent from 1968 to 1969, 49.2 percent in 1970, 48 percent from 1971 to 1978, 46 percent from 1979 to 1986, 40 percent in 1987, 34 percent from 1988 to 1992, and 35 percent from 1993 to 1998.

NOL carry forwards/assets (NOLCF): NOLCF is the ratio of item 52, net operating loss carry forward to item 6, assets.

Depreciation/assets (Depr): Depr is the ratio of Compustat item 125, depreciation expense, to item 6, assets.

Investment tax credit/assets (InvTaxCr): InvTaxCr is the ratio of Compustat item 208, investment tax credit-balance sheet to item 6, assets.

Dividend Paying Dummy (Dividend): Dividend is a dummy variable that takes a value of one if item 21, common dividends, is positive and it is otherwise zero.

Loss making dummy (Losses): Losses is a dummy variable that takes a value of one if the ratio of Compustat item 13, operating income before depreciation, to item 6, assets, is negative.

Debt rating dummy (Rating): Rating is a dummy variable that takes a value of one if Compustat item 280, senior debt rating, or item 320, subordinated debt rating, have a value of less than 13 (i.e., S&P rates the debt investment grade). *Rating* takes a value of zero if the debt is not rated or if it is rated less than investment grade. Compustat does not report data on bond ratings before 1985. Thus, the variable is set equal to zero for all firms prior to 1985.

Variance of asset returns (StockVar): StockVar is the annual variance of asset returns that is obtained by unleveraging the variance of equity returns. Return variance is coded as missing if CRSP has less than 100 valid daily return observations in a fiscal year.

Cumulative raw returns (StockRet): StockRet is cumulative annual raw stock return obtained by compounding monthly returns from CRSP.

Cumulative market returns (CrspRet): CrspRet is annual CRSP Value-Weighted Index return.

Term spread (TermSprd): TermSprd is the difference between the one-year interest series and the ten-year interest series. (Source: The Federal Reserve files are at http://www.federalreserve.gov/releases/.)

Quality spread (QualSprd): QualSprd is the difference between the discount rate series and the baa series (Source: The Federal Reserve files are at http://www.federalreserve.gov/releases/.).

Discount rate (TBill): TBill measures the short-term rate. (Source: The Federal Reserve files are at http://www.federalreserve.gov/releases/.)

Log purchasing managers index (MgrSenti): MgrSenti is the natural logarithm of the national manufacturing index based on a survey of purchasing executives at roughly 300 industrial companies. High values signal expansion and low values signal contraction (Source: National Association of Purchasing Management).

Expected inflation rate (Inflation): Inflation is the expected change in the consumer price index over the coming year using data from the Livingston Survey available at http://www.phil.frb.org/econ/liv/index.html

Growth in profit after tax- macro (MacroProf): MacroProf is the difference of logs of aggregate annual corporate profits after tax for non-financial firms. (Source: U.S. Department of Commerce, Bureau of Economic Analysis.)

Growth in GDP (MacroGr): MacroGr is the difference of logs of real Gross Domestic Product in 1996 dollars. (Source: U.S. Department of Commerce, Bureau of Economic Analysis.)

NBER recessions (NBER): NBER is a dummy variable that takes a value of 1 during National Bureau of Economic Research (NBER) recessions. (Source: The official NBER dates are at: http://www.nber.org/cycles.html. The NBER defines a recession as “a period of significant decline in total output, income, employment, and trade, usually lasting from six months to a year, and marked by widespread contractions in many sectors of the economy.")

Table 2. Predictions

Summary of predictions. When a theory is silent or when there is significant ambiguity regarding the appropriate interpretation the cell is left blank. In some cases different versions of the theory have different implications as well.

Varname	Variable	Pecking Order	Market Timing	Trade-off Theory
Value				
Profit	Operating inc. bef. depr	-		+
Mktbk	Market to book ratio		-	-
Size				
Assets	Log of assets			+
Sales	Log of sales			+
Mature	Mature firms			+
Growth				
ChgAsset	Change in log assets			+
ChgSales	Change in log sales			+
Capex	Capital expenditure/assets	+		
Industry				
IndustLev	Median industry leverage			+
IndustGr	Median industry growth			
Regultd	Regulated dummy			+
Unique	Uniqueness dummy			-
Nature of assets				
Advert	Advertising expense/sales			-
RND	RND expense/sales	+		-
SGA	SGA expenses/sales			?
Colltrl	Collateral			+
Tang	Tangibility			+
Intang	Intangible assets/assets	+		+

Varname	Variable	Pecking Order	Market Timing	Trade-off Theory
Taxes				
TaxRate	Top tax rate			+
NOLCF	NOL carryforwards/assets			-
Depr	Depreciation/assets			-
InvTaxCr	Investment tax credits/assets			-
Financial constraints				
Dividend	Dividend paying dummy	+		-
Losses	Loss making dummy			-
Rating	Invest. grade rating dummy	-		
Stock market				
StockVar	Variance of asset returns	+		-
StockRet	Cum. annual raw returns		-	
CrspRet	Cum. annual market returns		-	
Debt market conditions				
TermSprd	Term spread			
QualSprd	Quality spread			
TBill	Discount rate	-	-	+
Macroeconomics variables				
MgrSenti	Log purchasing mgrs index			+
Inflation	Expected inflation rate		+	+
MacroProf	Growth in profit after tax			+
MacroGr	Growth in GDP			+
NBER	NBER recessions		+	-

Table 3. Data Description

Descriptive statistics for leverage measures and factors. The leverage measures and factors (other than indicator and macro variables) are winsorized at the 0.50% level in both tails of the distribution. The sample period is 1950-2000. Financial firms are excluded. The variables are described in Table 1.

Varname	Variable	Observations	Mean	Median	25th percentile	75th percentile
Leverage measures						
TDA	Total debt/assets	220,670	0.29	0.24	0.08	0.40
TDM	Total debt/market value of assets	182,051	0.28	0.23	0.05	0.46
LDA	Long term debt/assets	225,239	0.20	0.15	0.02	0.30
LDM	Long term debt/market value of assets	182,051	0.20	0.14	0.01	0.34
ICR	Interest coverage ratio	197,370	15.13	4.77	1.50	12.04
Value						
Profit	Profitability-Operating inc bef dep	222,040	0.05	0.12	0.04	0.18
Mktbk	Market to book ratio	182,052	1.62	0.98	0.69	1.64
Size						
Assets	Log of assets	225,491	4.63	4.60	2.99	6.23
Sales	Log of sales	219,905	4.67	4.82	3.09	6.39
Mature	Mature firms	225,491	0.68	1.00	0.00	1.00
Growth						
ChgAsset	Change in log assets	204,759	0.06	<0.01	-0.09	0.14
ChgSales	Change in log sales	198,821	0.06	0.03	-0.07	0.16
Capex	Capital expenditure/assets	225,491	0.08	0.05	0.02	0.10
Industry						
IndustLev	Median industry leverage	17,331	0.25	0.24	0.16	0.33
IndustGr	Median industry growth	17,044	0.02	0.01	-0.04	0.06
Regultd	Regulated dummy	225,491	0.05	0.00	0.00	0.00
Unique	Uniqueness dummy	225,491	0.27	0.00	0.00	1.00
Nature of assets						
Advert	Advertising expense/sales	219,933	0.01	0.00	0.00	0.01
RND	RND expense/sales	219,933	0.11	0.00	0.00	0.02
SGA	SGA expenses/sales	219,933	0.34	0.18	0.08	0.31
Colltrl	Collateral	220,643	0.52	0.56	0.36	0.70
Tang	Tangibility	223,932	0.35	0.29	0.15	0.51
Intang	Intangible assets/assets	199,963	0.05	0.00	0.00	0.04
Taxes						
TaxRate	Top tax rate	51	0.45	0.48	0.35	0.52

Varname	Variable	Observations	Mean	Median	25th percentile	75th percentile
NOLCF	NOL carryforwards/assets	176,738	0.33	0.00	0.00	0.04
Depr	Depreciation/assets	225,491	0.04	0.03	0.01	0.06
InvTaxCr	Investment tax credits/assets	214,753	<0.01	0.00	0.00	0.00
Financial constraints						
Dividend	Dividend paying dummy	225,491	0.43	0.00	0.00	1.00
Losses	Loss making dummy	225,491	0.19	0.00	0.00	0.00
Rating	Investment grade debt rating dummy	225,491	0.05	0.00	0.00	0.00
Stock market						
StockVar	Variance of asset returns	146,103	0.25	0.12	0.06	0.27
StockRet	Cumulative annual raw returns	154,147	0.14	0.04	-0.24	0.35
CrspRet	Cumulative annual market returns	157,324	0.13	0.16	0.02	0.25
Debt market conditions						
TermSprd	Term spread	50	0.01	0.01	0.00	0.02
QualSprd	Quality spread	51	-0.03	-0.03	-0.04	-0.02
TBill	Discount rate	51	0.05	0.05	0.03	0.06
Macroeconomics variables						
MgrSenti	Log purchasing managers index	51	3.97	3.96	3.90	4.04
Inflation	Expected inflation rate	51	0.04	0.04	0.01	0.06
MacroProf	Growth in profit after tax-Macro	51	-0.01	-0.01	-0.12	0.10
MacroGr	Growth in GDP	51	0.04	0.04	0.02	0.05
NBER	NBER recessions	51	0.07	0.00	0.00	0.00

Table 4. Correlation between leverage ratios and independent variables

This table presents correlation coefficients between leverage measures and various leverage factors. In square brackets below the correlation coefficients, we present a summary of the decade-by decade correlations. A '+' indicates that the correlation was positive and significant in at least 2 out of 5 decades. A '++' indicates that the correlation was positive and significant in at least 4 out of 5 decades. A '+++' indicates that it was significant and positive in all of the decades. The -, --, and ---, are analogously defined for the negative and significant cases. A '-+' indicates that the correlations are negative and significant for at least two out of five decades and positive and significant for at least two other decades.

		TDA	TDM	LDA	LDM	ICR
Profit	Profitability-Operating income before depreciation	-0.239 [---]	0.032 [-+]	0.005 [-]	0.100 [-+]	0.071 [+++]
Mktbk	Market to book ratio	0.025 [-+]	-0.344 [---]	-0.107 [---]	-0.311 [---]	-0.015 [-+]
Assets	Log of assets	-0.045 [-+]	0.196 [+++]	0.188 [+++]	0.300 [+++]	0.103 [+]
Sales	Log of sales	-0.051 [-]	0.179 [+++]	0.129 [++]	0.256 [+++]	0.145 [+++]
Mature	Mature firms	0.0030 [+]	0.123 [+]	0.042 [+]	0.138 [++]	0.034 [++]
ChgAsset	Change in log assets	-0.150 [-+]	-0.161 [--]	-0.052 [-+]	-0.096 [--]	0.043 [+]
ChgSales	Change in log sales	-0.075 [-+]	-0.123 [--]	-0.019 [+]	-0.075 [--]	0.023 [+]
Capex	Capital expenditure/assets	0.041 [+++]	-0.027 [--]	0.078 [++]	0.026 [+]	-0.006 [0]
IndustLev	Median industry leverage	0.332 [+++]	0.449 [+++]	0.398 [+++]	0.442 [+++]	-0.054 [--]
IndustGr	Median industry growth	-0.060 [-+]	-0.172 [--]	-0.052 [-]	-0.145 [--]	0.013 [+]
Regultd	Regulated dummy	0.090 [+++]	0.192 [+++]	0.187 [+++]	0.246 [+++]	-0.020 [--]
Unique	Uniqueness dummy	-0.069 [---]	-0.106 [---]	-0.120 [---]	-0.141 [---]	0.027 [+]
Advert	Advertising expense/sales	-0.007 [--]	-0.069 [-]	-0.031 [---]	-0.075 [--]	-0.063 [-]
RnD	R&D expense/sales	-0.026 [-]	-0.131 [--]	-0.062 [---]	-0.120 [--]	-0.176 [-]

		TDA	TDM	LDA	LDM	ICR
SGA	SGA expenses/sales	0.015	-0.145	-0.072	-0.155	-0.162
		[+]	[---]	[---]	[--]	[-]
Colltrl	Collateral	0.152	0.314	0.223	0.326	0.013
		[+++]	[+++]	[+++]	[+++]	[--]
Tang	Tangibility	0.177	0.251	0.304	0.344	-0.014
		[+++]	[+++]	[+++]	[+++]	[-]
Intang	Intangible assets/assets	0.114	0.049	0.157	0.068	-0.041
		[+++]	[++]	[+++]	[++]	[--]
TaxRate	Top tax rate	-0.039	0.081	-0.002	0.088	0.061
		[-]	[0]	[-]	[-+]	[0]
NOLCF	NOL carryforwards/assets	0.280	-0.050	0.034	-0.100	-0.126
		[+++]	[-+]	[++]	[-]	[--]
Depr	Depreciation/assets	0.205	0.050	0.096	0.019	-0.065
		[+]	[+]	[+]	[+]	[-]
InvTaxCr	Investment tax credits/assets	0.037	0.145	0.098	0.192	-0.006
		[++]	[++]	[++]	[++]	[0]
Dividend	Dividend paying dummy	-0.131	-0.002	-0.012	0.084	0.122
		[---]	[-+]	[-]	[+]	[+++]
Losses	Loss making dummy	0.077	-0.105	-0.096	-0.191	-0.276
		[++]	[-+]	[-+]	[-]	[---]
Rating	Investment grade debt rating dummy	0.008	0.024	0.052	0.056	-0.012
		[0]	[+]	[+]	[+]	[0]
StockVar	Variance of asset returns	-0.135	-0.247	-0.187	-0.260	-0.098
		[--]	[---]	[---]	[---]	[-]
StockRet	Cumulative annual raw returns	-0.094	-0.186	-0.035	-0.118	0.074
		[--]	[---]	[---]	[---]	[+]
CrspRet	Cumulative annual market returns	-0.010	-0.076	0.006	-0.050	0.008
		[-]	[--]	[+]	[--]	[0]
TermSprd	Term spread	0.012	-0.064	-0.013	-0.067	-0.029
		[-]	[-]	[-]	[-]	[+]
QualSprd	Quality spread	-0.040	0.009	-0.009	0.017	0.043
		[0]	[+]	[0]	[+]	[-+]
TBill	Discount rate	0.047	0.146	0.033	0.124	-0.041
		[++]	[+++]	[++]	[+++]	[--]
MgrSenti	Log purchasing managers index	-0.027	-0.029	-0.015	-0.016	0.031
		[-]	[--]	[-]	[--]	[+]

		TDA	TDM	LDA	LDM	ICR
Inflation	Expected Inflation Rate	0.054	0.193	0.040	0.170	-0.028
		[-+]	[++]	[+]	[++]	[-+]
MacroProf	Growth in profit after tax-Macro	-0.012	-0.010	-0.010	-0.006	0.016
		[--]	[-]	[-]	[-]	[+]
MacroGr	Growth in GDP	-0.030	-0.074	-0.020	-0.057	0.022
		[-]	[--]	[-]	[--]	[+]
NBER	NBER recessions	-0.009	0.107	-0.002	0.087	0.003
		[-]	[+]	[-]	[+]	[0]

Table 5. Which factors are particularly important?

In this table leverage is defined as TDM – total debt to market value of assets. All factors are lagged one year. This table reports how much variation in leverage measures is explained by each of the factors. 'Own' reports the R^2 from simple univariate regressions. The 'Cumulative' reports R^2 from a regression that includes the variable listed, along with all variables listed above it in the Table. The variables are listed in the order of the amount of additional variation explained. We start with the regression that includes all variables. That R^2 goes in the cumulative column at the bottom of the Table. Then, we delete the variable that has performed worst and run the regression with the remaining variables. We report that R^2 in the second to the bottom cell in the table. We then continue in this manner all the way up the table. Bayesian Information Criterion (BIC) is defined as -2×log-likelihood+P×log(N), where P is the number of parameters and N is the number of observations.

Variable	Coefficient estimate in the last regression in which the variable was included	t-statistic in the last regression in which the variable was included	Own R^2	Cumul. R^2	BIC
IndustLev	0.873	199.2	0.19	0.19	-16153.1
Mktbk	-0.030	-110.6	0.10	0.24	-27763.0
Colltrl	0.161	62.6	0.09	0.26	-30173.2
Profit	-0.143	-64.1	0.00	0.28	-34221.9
Dividend	-0.053	-45.1	0.00	0.29	-36230.9
Assets	0.020	63.1	0.05	0.30	-40152.2
Inflation	1.262	55.7	0.03	0.32	-43215.8
Intang	0.250	40.6	0.00	0.32	-39896.8
StockVar	-0.067	-31.7	0.04	0.34	-35548.2
MgrSenti	-0.172	29.9	0.00	0.35	-36425.0
SGA	-0.025	-24.1	0.02	0.35	-36949.4
Capex	-0.149	-17.7	0.00	0.35	-37249.1
MacroProf	-0.083	-17.5	0.00	0.35	-37543.8
StockRet	-0.019	-17.1	0.03	0.36	-37825.6
NOLCF	-0.017	-14.4	0.00	0.35	-33615.8
Losses	-0.043	-14.6	0.01	0.35	-33816.1
Regultd	0.080	14.2	0.04	0.35	-34007.1
Unique	-0.018	-12.4	0.01	0.35	-34149.5
Advert	-0.289	-13.0	0.00	0.35	-34306.0
Rating	-0.042	-12.3	0.00	0.36	-34444.6
RnD	-0.016	-11.9	0.02	0.36	-34574.8
ChgAsset	0.024	10.2	0.01	0.36	-34512.1
NBER	0.019	8.5	0.01	0.36	-34572.8
CrspRet	0.041	7.4	0.00	0.36	-34615.8
TBill	-0.397	-7.8	0.02	0.36	-34664.4
QualSprd	-0.451	-8.2	0.00	0.36	-34719.7
Tang	-0.041	-7.9	0.06	0.36	-34770.0
ChgSales	-0.012	-5.2	0.01	0.36	-34816.6
TermSprd	-0.508	-5.1	0.01	0.36	-34831.7
InvTaxCr	-0.766	-3.7	0.02	0.36	-31646.7
MacroGr	-0.203	-3.2	0.00	0.36	-31645.4
Depr	-0.054	-2.5	0.00	0.36	-31640.5
IndustGr	-0.015	-2.0	0.01	0.36	-31632.9
Mature	0.004	1.9	0.02	0.36	-31625.3
Sales	-0.001	-0.5	0.03	0.36	-31614.2
TaxRate	-0.004	-0.3	0.01	0.36	-31602.9

Table 6. Robustness of Factor Selection to alternative Time Periods and to Random Group Formation

This table presents a summary of the results from robustness checks on the included firms and years. All factors are lagged by one year. Leverage is defined as TDM. The data is randomly divided into 10 equal sized groups and the procedure in Table 5 is repeated for each group. Under the heading "Group Positive%" the percent of the time that the given factor has a positive sign and is included by the BIC criterion. Under the heading "Group Negative%" the percent of the time that the given factor has a negative sign and is included by the BIC criterion. The data is also run on each of the 51 years independently. The headings "Year Positive%" and "Year Negative%" similarly list the instances in which the particular factor was included by the BIC criterion and had the regression coefficient had the indicated sign.

Factor	Group Positive%	Group Negative%	Year Positive%	Year Negative%
IndustLev	100.0	0.0	100.0	0.0
Mktbk	0.0	100.0	0.0	87.8
Colltrl	100.0	0.0	61.2	0.0
Profit	0.0	100.0	0.0	98.0
Dividend	0.0	100.0	0.0	65.3
Assets	100.0	0.0	42.9	0.0
Inflation	100.0	0.0	NA	NA
Intang	NA	NA	20.4	0.0
StockVar	NA	NA	0.0	24.5
MgrSenti	NA	NA	NA	NA
SGA	NA	NA	0.0	16.3
Capex	NA	NA	14.3	10.2
MacroProf	NA	NA	NA	NA
StockRet	NA	NA	2.0	18.4
NOLCF	NA	NA	NA	NA
Losses	NA	NA	0.0	22.5
Regultd	NA	NA	10.2	0.0
Unique	NA	NA	0.0	18.4
Advert	NA	NA	0.0	8.2
Rating	NA	NA	0.0	10.2
RnD	NA	NA	0.0	14.3
ChgAsset	NA	NA	12.2	0.0
NBER	NA	NA	NA	NA
CrspRet	NA	NA	2.0	0.0
TBill	NA	NA	NA	NA
QualSprd	NA	NA	NA	NA
Tang	NA	NA	0.0	4.1
ChgSales	NA	NA	4.1	0.0
TermSprd	NA	NA	NA	NA
InvTaxCr	NA	NA	2.0	2.0
MacroGr	NA	NA	NA	NA
Depr	NA	NA	2.0	4.1
IndustGr	NA	NA	NA	NA
Mature	NA	NA	8.2	4.1
Sales	NA	NA	22.5	4.1
TaxRate	NA	NA	NA	NA

Table 7a. Do different factors matter for firms in different circumstances?

This table presents a summary of the results from robustness checks for various classes of firms. All factors are lagged by one year. Leverage is defined as TDM. In this table, the classes we examine include (1) dividend-paying firms (dividend paying dummy=1); (2) non-dividend-paying firms (dividend-paying dummy=0); (3) mature firms (if firms have been listed on Compustat for 10 years or more); (4) young firms (if firms have been listed on Compustat for 5 years or less); (5) small firms (if assets are smaller than the 33rd percentile of all Compustat firms). The column headed "I" indicates a dummy variable that takes a value of 1 if the variable was included in the minimum BIC specification for that class. The columns headed "+%" and "-%" are generated by running the data for each of the 51 years independently. The headings "+%" and "-%" list the instances in which the particular factor was included by the BIC criterion and had the regression coefficient had the indicated sign.

	Div. Paying			Non Div. Paying			Mature Firms			Young Firms			Small Firms		
	I	+%	-%	I	+%	-%	I	+%	-%	I	+%	-%	I	+%	-%
IndustLev	1	100.0	0.0	1	83.0	0.00	1	100.0	0.0	1	79.2	0.0	1	77.6	0.0
Mktbk	1	0.0	47.0	1	0.0	80.9	1	0.0	81.0	1	0.0	58.3	1	0.0	57.1
Colltrl	1	59.2	0.0	1	63.8	0.00	1	64.3	0.0	1	52.1	0.0	1	79.6	0.0
Profit	1	0.0	100.0	1	0.0	66.0	1	0.0	97.6	1	0.0	47.9	1	0.0	63.3
Dividend	0	NA	NA	0	NA	NA	1	0.0	73.8	1	0.0	27.1	1	0.0	55.1
Assets	0	32.7	2.0	1	46.8	0.00	1	50.0	0.0	1	35.4	0.0	0	32.7	0.0
Inflation	1	NA	NA	1	NA	NA	1	NA	NA	1	NA	NA	1	NA	NA
Intang	0	8.2	0.0	1	29.8	0.0	1	23.8	0.0	1	18.8	0.0	0	26.5	0.0
StockVar	0	0.0	10.2	1	0.0	29.8	1	0.0	28.6	0	0.0	10.4	0	0.0	12.2
MgrSenti	1	NA	NA	1	NA	NA	1	NA	NA	0	NA	NA	0	NA	NA
SGA	0	0.0	18.4	1	0.0	4.3	1	0.0	21.4	0	0.0	2.1	0	0.0	4.1
Capex	0	12.2	0.0	1	2.1	21.3	1	7.1	11.9	0	6.3	4.2	0	0.0	6.1
MacroProf	0	NA	NA	1	NA	NA	1	NA	NA	0	NA	NA	0	NA	NA
StockRet	0	2.0	10.2	1	2.1	25.5	1	2.4	26.2	0	0.0	2.1	0	0.0	10.2
NOLCF	0	NA	NA	0	4.3	4.3	0	4.8	0.0	0	2.1	4.2	0	4.1	2.0
Losses	0	0.0	12.2	0	0.0	14.9	1	0.0	26.2	0	0.0	8.3	0	6.1	8.2
Regultd	1	16.3	0.0	0	2.1	0.0	1	19.1	0.0	0	4.2	0.0	0	4.1	0.0
Unique	0	NA	NA	1	2.1	31.9	1	0.0	7.1	0	0.0	6.3	0	0.0	6.1
Advert	0	0.0	2.0	1	NA	NA	1	0.0	7.1	0	NA	NA	0	2.0	0.0
Rating	0	0.0	2.0	1	0.0	8.5	1	0.0	16.7	0	NA	NA	0	NA	NA
RnD	0	2.0	20.4	1	0.0	8.5	1	0.0	33.3	0	0.0	8.3	0	2.0	2.0

	Div. Paying			Non Div. Paying			Mature Firms			Young Firms			Small Firms		
	I	+%	-%	I	+%	-%	I	+%	-%	I	+%	-%	I	+%	-%
ChgAsset	0	24.5	0.0	0	2.1	4.3	1	11.9	0.0	0	8.3	0.0	0	4.1	2.0
NBER	0	2.0	0.0	1	NA	NA	1	NA	NA	0	0.0	2.1	0	0.0	2.0
CrspRet	0	2.0	0.0	1	NA	NA	1	NA	NA	0	2.1	0.0	0	2.0	0.0
TBill	0	NA	NA	0	NA	NA	0	NA	NA	1	NA	NA	0	NA	NA
QualSprd	0	NA	NA	0	NA	NA	1	NA	NA	0	NA	NA	0	NA	NA
Tang	0	2.0	4.1	1	4.3	6.4	1	0.0	4.8	0	6.3	8.3	0	6.1	2.0
ChgSales	0	12.2	0.0	0	2.1	2.1	0	11.9	0.0	0	0.0	2.1	0	2.0	2.0
TermSprd	0	NA	NA	0	NA	NA	1	NA	NA	0	NA	NA	0	NA	NA
InvTaxCr	0	4.1	0.0	0	0.0	2.1	0	2.4	0.0	0	2.1	6.3	0	0.0	4.1
MacroGr	0	NA	NA	1	NA	NA	0	NA	NA	0	NA	NA	0	NA	NA
Depr	0	4.1	0.0	0	2.1	2.1	0	7.1	4.8	0	2.1	2.1	0	0.0	4.1
IndustGr	0	NA	NA	0	4.3	4.3	0	NA	NA	0	0.0	2.1	0	4.1	2.0
Mature	0	0.0	4.1	1	14.9	17.0	0	NA	NA	0	NA	NA	0	6.1	10.2
Sales	0	2.0	14.3	1	34.0	0.0	0	16.7	7.1	0	25.0	6.3	1	42.9	0.0
TaxRate	0	NA	NA	0	NA	NA	0	NA	NA	0	NA	NA	0	NA	NA

Table 7b. Do different factors matter for firms in different circumstances?

This table presents a summary of the results from robustness checks for various classes of firms. All factors are lagged by one year. Leverage is defined as TDM. In this table, the classes we examine include (1) large firms (if assets are larger than the 67th percentile of all Compustat firms); (2) low M/B firms (if the market-to-book assets ratio is smaller than the 33rd percentile of all firms on Compustat); (3) high M/B firms (if the market-to-book assets ratio is larger than the 67th percentile of all Compustat firms); (4) low profit firms (if *Profit* is less than the 33rd percentile of all Compustat firms); (5) high-profit firms (if *Profit* is greater than the 67th percentile of all Compustat firms). The column headed "I" indicates a dummy variable that takes a value of 1 if the variable was included in the minimum BIC specification for that class. The columns headed "+%" and "-%" are generated by running the data for each of the 51 years independently. The headings "+%" and "-%" list the instances in which the particular factor was included by the BIC criterion and had the regression coefficient had the indicated sign.

	Large Firms			Low M/B			High M/B			Low Profits			High Profits		
	I	+%	-%	I	+%	-%	I	+%	-%	I	+%	-%	I	+%	-%
IndustLev	1	100.0	0.0	1	98.0	0.0	1	93.9	0.0	1	100.0	0.0	1	98.0	0.0
Mktbk	1	0.0	67.4	1	6.1	12.2	1	0.0	26.5	1	0.0	63.3	1	0.0	61.2
Colltrl	1	44.9	0.0	1	75.5	0.0	1	28.6	0.0	1	57.1	0.0	1	42.9	0.0
Profit	1	0.0	100.0	1	0.0	73.5	1	0.0	59.2	1	0.0	14.3	1	0.0	65.3
Dividend	1	0.0	67.4	1	0.0	63.3	1	0.0	26.5	1	0.0	38.8	1	0.0	38.8
Assets	0	24.5	6.1	1	34.7	0.0	1	10.2	0.0	1	24.5	0.0	1	16.3	2.0
Inflation	1	NA	NA	1	NA	NA	1	NA	NA	1	NA	NA	1	NA	NA
Intang	0	2.0	0.0	1	42.9	0.0	0	6.1	0.0	1	20.4	0.0	1	12.2	0.0
StockVar	0	0.0	10.2	1	0.0	32.7	0	0.0	6.1	1	0.0	26.5	0	0.0	8.2
MgrSenti	1	NA	NA	1	NA	NA	1	NA	NA	1	NA	NA	1	NA	NA
SGA	0	0.0	10.2	1	0.0	12.2	0	0.0	6.1	0	2.0	2.0	1	0.0	8.2
Capex	0	20.4	0.0	0	16.3	4.1	0	6.1	0.0	0	12.2	0.0	0	14.3	10.2
MacroProf	0	NA	NA	1	NA	NA	0	NA	NA	1	NA	NA	1	NA	NA
StockRet	0	2.0	12.2	1	4.1	20.4	0	0.0	2.0	1	0.0	14.3	0	0.0	4.1
NOLCF	0	2.0	0.0	0	2.0	2.0	0	2.0	0.0	0	2.0	0.0	0	6.1	0.0
Losses	0	0.0	8.2	1	0.0	24.5	0	2.0	4.1	1	0.0	6.1	1	0.0	2.0
Regultd	1	22.5	2.0	1	4.1	0.0	1	4.1	0.0	0	0.0	4.1	1	14.3	0.0
Unique	0	0.0	6.1	1	0.0	8.2	0	NA	NA	1	0.0	6.1	0	4.1	2.0
Advert	0	0.0	4.1	1	0.0	2.0	0	NA	NA	0	NA	NA	0	NA	NA
Rating	0	0.0	6.1	1	0.0	2.0	0	NA	NA	0	NA	NA	0	0.0	2.0
RnD	0	0.0	22.5	1	2.0	12.2	0	0.0	14.3	0	0.0	2.0	0	0.0	8.2

	Large Firms			Low M/B			High M/B			Low Profits			High Profits		
	I	+%	-%	I	+%	-%	I	+%	-%	I	+%	-%	I	+%	-%
ChgAsset	0	6.1	0.0	1	22.5	0.0	0	4.1	0.0	0	6.1	0.0	0	4.1	2.0
NBER	0	2.0	0.0	1	0.0	2.0	0	2.0	0.0	1	NA	NA	0	NA	NA
CrspRet	0	2.0	0.0	1	2.0	0.0	0	2.0	0.0	1	6.1	0.0	0	NA	NA
TBill	0	NA	NA	0	NA	NA	0	NA	NA	0	NA	NA	0	NA	NA
QualSprd	0	NA	NA	0	NA	NA	0	NA	NA	1	NA	NA	0	NA	NA
Tang	0	0.0	8.2	1	0.0	10.2	0	10.2	2.0	1	0.0	22.5	1	32.7	0.0
ChgSales	0	6.1	2.0	0	10.2	0.0	0	2.0	0.0	0	4.1	2.0	0	6.1	0.0
TermSprd	0	NA	NA	0	NA	NA	0	NA	NA	0	NA	NA	0	NA	NA
InvTaxCr	0	2.0	0.0	0	0.0	2.0	0	NA	NA	0	NA	NA	0	NA	NA
MacroGr	0	NA	NA	0	NA	NA	0	NA	NA	0	NA	NA	0	NA	NA
Depr	0	2.0	2.0	0	2.0	2.0	0	4.1	0.0	0	0.0	6.1	1	22.5	0.0
IndustGr	0	2.0	2.0	0	6.1	2.0	0	2.0	0.0	0	0.0	2.0	0	0.0	2.0
Mature	0	0.0	2.0	0	2.0	10.2	0	2.0	2.0	0	6.1	8.2	0	NA	NA
Sales	0	0.0	22.5	1	26.5	2.0	0	4.1	4.1	1	42.9	0.0	0	4.1	10.2
TaxRate	0	NA	NA	1	NA	NA	0	NA	NA	1	NA	NA	0	NA	NA

Table 8. A Core Model of Leverage

Leverage is defined as TDM. All factors are lagged one year. Columns (1) and (3) to (7) reports the estimated coefficients from OLS regressions of TDM on core leverage factors. The t-statistics are reported below the coefficients in parentheses and the elasticities are reported in square brackets. Column (2) titled "Impute Missing" reports estimates based on the use of Multiple Imputation for the missing data. The imputation is done using the Method of Markov Chain Monte Carlo, as implemented in SAS 8.2 PROC MI. We impute 10 times and discard the initial 1000 observations for the burn in period. In Column (2), the t-statistics are reported in parentheses. The number of observations, AIC, BIC and Adjusted R^2 in Column (2) are averages from an analysis of 10 datasets.

	All Years	Impute Missing	1950-1959	1960-1969	1970-1979	1980-1989	1990-2000
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Intercept	-0.020	-0.014	0.194	0.144	0.144	-0.023	-0.037
	(-8.8)	(-5.8)	(13.0)	(19.5)	(18.9)	(-5.00)	(-8.4)
	[-]		[-]	[-]	[-]	[-]	[-]
IndustLev	0.646	0.660	0.658	0.476	0.633	0.680	0.618
	(139.6)	(154.7)	(32.7)	(43.8)	(54.9)	(69.3)	(87.6)
	[0.519]		[0.516]	[0.451]	[0.444]	[0.546]	[0.529]
Mktbk	-0.031	-0.031	-0.040	-0.023	-0.061	-0.035	-0.022
	(-108.2)	(-112.6)	(-13.5)	(-24.4)	(-54.8)	(-59.2)	(-57.5)
	[-0.170]		[-0.231]	[-0.173]	[-0.170]	[-0.167]	[-0.170]
Colltrl	0.183	0.177	0.091	0.129	0.176	0.226	0.175
	(71.2)	(74.7)	(6.1)	(15.6)	(25.4)	(45.3)	(46.6)
	[0.336]		[0.311]	[0.374]	[0.280]	[0.400]	[0.314]
Profit	-0.159	-0.156	-0.528	-0.561	-0.585	-0.164	-0.104
	(-68.9)	(-77.4)	(-20.8)	(-37.7)	(-51.9)	(-34.3)	(-34.8)
	[-0.044]		[-0.559]	[-0.442]	[-0.229]	[-0.040]	[-0.008]
Dividend	-0.099	-0.103	-0.011	-0.038	-0.098	-0.102	-0.092
	(-75.1)	(-83.5)	(-1.2)	(-11.1)	(-35.2)	(-39.5)	(-40.1)
	[-0.160]		[-0.056]	[-0.137]	[-0.164]	[-0.149]	[-0.106]
Assets	0.022	0.022	-0.002	0.007	0.021	0.024	0.021
	(70.3)	(74.8)	(-1.7)	(8.1)	(27.0)	(38.0)	(42.7)
	[0.077]		[-0.013]	[0.032]	[0.055]	[0.076]	[0.082]
Inflation	1.262	1.330	1.061	0.508	0.959	0.636	1.510
	(55.7)	(52.4)	(9.1)	(3.6)	(13.4)	(15.4)	(16.6)
	[0.211]		[0.052]	[0.050]	[0.157]	[0.138]	[0.222]

	All Years (1)	Impute Missing (2)	1950-1959 (3)	1960-1969 (4)	1970-1979 (5)	1980-1989 (6)	1990-2000 (7)
Number of obs.	158,525	225,476	4,465	14,453	32,876	43,587	63,144
AIC	-43,295.6	-675,049.6	-5,621.9	-14,397.3	-8,803.9	-11,410.9	-14,012.8
BIC	-43,215.8	-675,047.6	-5,570.7	-14,336.7	-8,736.7	-11,341.4	-13,940.4
Adj R-squared	0.32	0.31	0.41	0.37	0.35	0.30	0.29

Table 9. Core Model of Leverage (TDA)

Leverage is defined as TDA. All factors are lagged one year. Columns (1) and (3) to (7) reports the estimated coefficients. The t-statistics are reported below the coefficients in parentheses and the elasticities are reported in square brackets. Column (2) titled "Impute Missing" reports estimates based on the use of Multiple Imputation for the missing data. The imputation is done using the Method of Markov Chain Monte Carlo, as implemented in SAS 8.2 PROC MI. We impute 10 times and discard the initial 1000 observations for the burn in period. In Column (2), the t-statistics are reported in parentheses. The number of observations, AIC, BIC and Adjusted R^2 in Column (2) are averages from an analysis of 10 datasets.

	All Years	Impute Missing	1950-1959	1960-1969	1970-1979	1980-1989	1990-2000
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Intercept	0.028	0.037	0.057	0.097	0.063	0.038	0.038
	(11.4)	(13.8)	(4.8)	(14.2)	(11.3)	(7.4)	(7.0)
	[-]		[-]	[-]	[-]	[-]	[-]
IndustLev	0.643	0.708	0.670	0.638	0.588	0.598	0.649
	(128.9)	(144.26)	(41.3)	(63.7)	(69.0)	(55.8)	(73.4)
	[0.561]		[0.615]	[0.576]	[0.571]	[0.516]	[0.532]
Mktbk	-0.003	-0.001	0.002	-0.001	-0.000	-0.001	-0.002
	(-8.0)	(-3.3)	(0.7)	(-1.4)	(-0.5)	(-1.9)	(-3.3)
	[-0.015]		[0.012]	[-.009]	[-0.002]	[-0.006]	[-0.012]
Colltrl	0.160	0.165	0.109	0.106	0.132	0.202	0.157
	(57.6)	(60.1)	(9.1)	(14.0)	(25.7)	(36.4)	(33.5)
	[0.319]		[0.436]	[0.293]	[0.290]	[0.384]	[0.270]
Profit	-0.234	-0.214	-0.321	-0.433	-0.460	-0.241	-0.214
	(-95.6)	(-93.4)	(-15.7)	(-31.6)	(-57.5)	(-46.8)	(-57.8)
	[-0.067]		[-0.398]	[-0.325]	[-0.247]	[-0.059]	[-0.013]
Dividend	-0.090	-0.097	-0.024	-0.065	-0.081	-0.101	-0.078
	(-63.2)	(-64.8)	(-3.2)	(-20.8)	(-39.3)	(-35.0)	(-27.2)
	[-0.157]		[-0.145]	[-0.225]	[-0.186]	[-0.157]	[-0.086]
Assets	0.013	0.009	0.002	0.005	0.015	0.013	0.013
	(37.1)	(26.3)	(1.6)	(7.1)	(26.1)	(18.9)	(21.6)
	[0.048]		[0.011]	[0.025]	[0.055]	[0.045]	[0.050]

	All Years (1)	Impute Missing (2)	1950-1959 (3)	1960-1969 (4)	1970-1979 (5)	1980-1989 (6)	1990-2000 (7)
Inflation	0.127 (5.1) [0.023]	0.135 (4.9)	0.619 (6.6) [0.034]	1.102 (8.5) [0.104]	0.191 (3.6) [0.043]	-0.066 (-1.4) [-0.015]	-0.371 (-3.2) [-0.052]
Number of obs.	160,698	225,476	4,519	14,483	33,241	44,398	64,057
AIC	-15,371.9	-602,940.22	-7,589.9	-16,780.4	-28,552.1	-757.0	15,872.0
BIC	-15,292.0	-602,938.22	-7,538.6	-16,719.7	-28,484.8	-687.4	15,944.6
Adj R-squared	0.20	0.19	0.41	0.40	0.32	0.17	0.16

Table 10. Reintroducing the minor factors

This table presents regression coefficients and the associated t-statistics (in parenthesis) on the minor factors when included one at a time with the basic core leverage factors. For example, columns (1) and (4) present the estimated coefficients and t-stats on each of the minor factor when included one at a time together with IndustLev, Mktbk, Colltrl, Profit, Dividend, Assets, and Inflation. Columns (2) and (5) repeat this exercise after controlling for Mktbk, Colltr, Profit, Dividend, Assets, and Inflation. Columns (3) and (6) control for Mktbk, Colltrl, Inflation, Dividend, Assets, Profit, Intang, Regltd, StockVar, SGA, MgrSenti, Unique, MacroProf, RnD, and Losses.

	Total Debt to Market Assets (TDM)			Total Debt to Book Assets (TDA)		
	Included 7 Core Factors	Included 6 Core Factors (without IndustLev)	Included 15 Factors (min BIC list without Industry)	Included 7 Core Factors	Included 6 Core Factors (without IndustLev)	Included 15 Factors (min BIC list without Industry)
	(1)	(2)	(3)	(4)	(5)	(6)
Sales	0.012	0.005	-0.008	0.002	-0.004	-0.024
	(18.8)	(7.5)	(-8.6)	(3.5)	(-6.1)	(-28.2)
Mature	0.012	0.011	0.000	0.014	0.013	-0.003
	(9.2)	(8.3)	(0.3)	(9.9)	(9.1)	(-1.6)
NBER	0.011	0.012	0.027	-0.010	-0.009	-0.004
	(5.9)	(5.7)	(13.1)	(-4.9)	(-4.3)	(-2.1)
MacroGr	0.669	0.522	-0.650	0.378	0.233	0.304
	(24.8)	(18.3)	(-12.0)	(12.9)	(7.6)	(5.7)
Tbill	-0.407	-0.304	-0.053	0.311	0.416	0.570
	(-12.0)	(-8.5)	(-1.1)	(8.5)	(10.8)	(12.4)
QualSprd	0.312	-0.150	-0.333	0.034	-0.428	-0.523
	(7.7)	(-3.5)	(-6.6)	(0.8)	(-9.3)	(-10.7)
TermSprd	-0.450	-0.154	0.143	-0.054	0.244	0.381
	(-11.8)	(-3.8)	(3.0)	(-1.3)	(5.6)	(8.0)
CrspRet	-0.030	-0.036	-0.033	0.004	-0.002	-0.007
	(-8.3)	(-9.3)	(-8.2)	(1.2)	(-0.5)	(-1.8)

	Total Debt to Market Assets (TDM)			Total Debt to Book Assets (TDA)		
	Included 7 Core Factors	Included 6 Core Factors (without IndustLev)	Included 15 Factors (min BIC list without Industry)	Included 7 Core Factors	Included 6 Core Factors (without IndustLev)	Included 15 Factors (min BIC list without Industry)
	(1)	(2)	(3)	(4)	(5)	(6)
StockRet	-0.028	-0.029	-0.019	-0.011	-0.012	-0.002
	(-28.6)	(-28.1)	(-16.5)	(-10.9)	(-11.5)	(-1.4)
Rating	-0.037	-0.012	-0.027	0.008	0.032	0.011
	(-14.1)	(-4.5)	(-9.1)	(2.9)	(10.9)	(3.8)
InvTaxCr	1.504	3.200	-0.186	-0.715	0.993	-1.199
	(13.4)	(27.1)	(-1.2)	(-5.8)	(7.7)	(-7.9)
Depr	-0.042	0.036	-0.145	0.501	0.578	0.271
	(-3.4)	(2.7)	(-9.1)	(37.8)	(41.6)	(17.6)
NOLCF	-0.002	-0.002	-0.018	0.030	0.030	0.015
	(-2.5)	(-3.2)	(-14.7)	(43.8)	(41.4)	(14.1)
TaxRate	0.059	-0.042	-0.059	-0.031	-0.130	-0.076
	(6.8)	(-4.6)	(-5.0)	(-3.3)	(-13.2)	(-6.6)
Tang	-0.055	0.024	-0.028	0.033	0.109	0.097
	(-16.0)	(6.7)	(-6.2)	(8.8)	(28.1)	(22.4)
Advert	-0.255	-0.266	-0.273	-0.115	-0.128	-0.155
	(-15.0)	(-14.8)	(-12.9)	(-6.4)	(-6.7)	(-7.5)
IndustGr	0.012	-0.032	-0.051	0.059	0.014	0.013
	(2.4)	(-6.2)	(-8.1)	(11.2)	(2.5)	(2.1)
IndustLev	NA	0.646	0.547	NA	0.643	0.558
	(NA)	(139.6)	(95.9)	(NA)	(128.9)	(100.4)
Capex	-0.216	-0.179	-0.118	-0.001	0.034	0.134
	(-31.4)	(-24.6)	(-13.5)	(-0.1)	(4.3)	(15.7)

	Total Debt to Market Assets (TDM)			Total Debt to Book Assets (TDA)		
	Included 7 Core Factors	Included 6 Core Factors (without IndustLev)	Included 15 Factors (min BIC list without Industry)	Included 7 Core Factors	Included 6 Core Factors (without IndustLev)	Included 15 Factors (min BIC list without Industry)
	(1)	(2)	(3)	(4)	(5)	(6)
ChgSales	-0.002 (-1.23)	0.001 (0.6)	-0.008 (-4.4)	0.0009 (0.6)	0.003 (1.8)	-0.001 (-0.5)
ChgAssets	-0.001 (-0.5)	0.000 (0.1)	0.015 (7.1)	-0.009 (-5.3)	-0.008 (-4.9)	0.013 (6.3)
Intang	0.250 (40.6)	0.372 (58.0)		0.386 (58.1)	0.503 (73.7)	
Regltd	0.078 (26.1)	0.153 (49.7)		0.008 (2.4)	0.085 (25.5)	
StockVar	-0.065 (-32.9)	-0.084 (-40.3)		-0.040 (-20.6)	-0.059 (-28.7)	
SGA	-0.022 (-28.22)	-0.027 (-32.7)		-0.014 (-16.8)	-0.018 (-21.4)	
MgrSenti	0.162 (32.0)	0.135 (25.2)		0.038 (6.8)	0.012 (2.0)	
Unique	-0.017 (-14.5)	-0.042 (-33.9)		-0.008 (-6.0)	-0.033 (-24.6)	
MacroProf	0.018 (5.6)	0.006 (1.8)		-0.002 (-0.6)	-0.014 (-3.7)	
RnD	-0.018 (-21.5)	-0.026 (-29.4)		-0.027 (-30.0)	-0.035 (-36.9)	
Losses	-0.044 (-22.2)	-0.060 (-28.4)		-0.019 (-8.8)	-0.034 (-15.3)	

Appendix: Theory

Trade-off theory

The trade-off theory comes in several forms. An important distinction is between the static trade-off theory in which a firm is always at an optimal point, and the dynamic theory (Fischer, Heinkel, and Zechner, 1989) in which fixed costs of adjustment imply that firms allow leverage to fluctuate until it becomes too extreme, and only then releverage. A second distinction that is important is whether the benefit of debt stems from tax savings (Bradley, Jarrell and Kim, 1984) or from the control of agency conflicts (Jensen and Meckling, 1976, Jensen, 1986, and Morellec, 2004). Finally, many versions of the theory treat the underlying cash flows as exogenous, but in general investment is not separable from leverage. Thus, there are a variety of distinct models all of which are commonly termed trade-off theories.

The idea that an interior leverage optimum is determined by a balancing of the tax savings advantage of debt against the deadweight costs of bankruptcy is intuitively appealing. Bradley, Jarrell and Kim (1984) provide a useful treatment of the theory. However, it has long been questioned empirically. First, Miller (1977) and Graham (2000) argue that tax savings seem large and certain while the deadweight bankruptcy costs seem minor. This implies that many firms should be more highly levered than they really are. Second, Myers (1984) argued that if this theory were the key force, then the tax variables should show up powerfully in empirical work. Since the tax effects seem empirically to be fairly minor, he suggests that this theory is not grounded in evidence. Third, the theory predicts that more profitable firms should carry more debt since they have more profits that need to be protected from taxation. This prediction has often been criticized (see Myers, 1984; Titman and Wessels, 1988; and Fama and French, 2002). Thus, while the tax/bankruptcy costs trade-off theory remains the dominant model in textbooks, its ability to predict actual outcomes is widely questioned.

The agency theory of leverage has had less in the way of direct testing. Morellec (2004) suggests that dynamic agency conflict in which both taxes and agency concerns are present provides a reasonable account of some aspects of leverage.

The predictions are listed in Table 2. Higher profitability implies lower expected costs of financial distress and a greater desire for firms to shield profits from taxes, hence profitable firms are expected to have more debt relative to book assets. Predictions about how profitability affects market leverage ratios are unclear. Similarly, high market-to-book ratio implies higher growth opportunities and thus higher costs of financial distress. Less debt is therefore used.

Size, as measured by assets or sales, is an inverse proxy for volatility and for the costs of bankruptcy. Thus the trade-off theory predicts that larger and more mature firms use more debt. It is worth mentioning that sales might also be serving empirically as a proxy for profits that need to be sheltered from taxation. If this is the right interpretation of sales, then higher sales should be associated with more leverage.

Financial distress is more costly for high growth firms, which means such firms will use less debt. Change in assets, change in natural log of sales and capital expenditure are all proxies for growth. However, capital expenditure is typically in a form that can be used for collateral to support debt. Hence the predictions on capital expenditure are ambiguous.

Firms within an industry share exposure to many of the same forces and such forces will be lead to similar trade-offs. Furthermore, product market competition creates pressure for firms to mimic the leverage ratio of other firms in the industry. Regulated firms have more stable cash flows and lower expected costs of financial distress and thus have more debt.

Advertising and R&D often represent discretionary future investment opportunities, which are more difficult than ``hard'' assets for outsiders to value. The costs of financial distress are higher if a firm has more of these types of investments. The trade-off theory predicts a negative relation between these factors and leverage. Intangibles (under the Compustat definitions that we follow) include many well-defined rights that lack physical existence. As such, they can support debt claims in much the same way that collateral and tangible assets can support debt claims. Creditors can assert their rights in a default.

A higher marginal tax rate increases the tax-shield benefit of debt. Non-debt tax shields are a substitute for the interest deduction associated with debt and should be negatively related to leverage. Firms with more volatile cash flows face higher expected costs of financial distress and should use less debt. More volatile cash flows also reduce the probability that tax shields will be fully utilized.

If interest rates increase, existing equity and existing bonds will both drop in value. The effect of an increase in interest rates would be greater for equity than for debt. Thus, equity falls more, leaving the firm more highly levered. In a trade-off model, it seems that equity has become somewhat more expensive, and so there should be little or no offsetting actions. Thus, it is predicted that an increase in interest rate increases leverage. According to Taggart (1985) inflation makes debt more attractive due to the manner that it is treated in the tax code. As a result expected inflation is predicted to be positively related to debt.

Pecking order theory

This theory has long roots in the descriptive literature (Donaldson, 1961), and it was clearly articulated by Myers (1984).[1] Supposes there are three sources of funding available to firms - retained earnings, debt, and equity. Equity is subject to serious adverse selection, debt has only minor adverse selection problems, and retained earnings avoid the problem. From the point of view of an outside investor, equity is strictly riskier than debt. Both have an adverse selection risk premium, but that premium is larger on equity. Therefore, an outside investor will demand a higher rate of return on equity than on debt. From the perspective of those inside the firm, retained earnings are a better source of funds than outside financing. Therefore, retained earnings are used when possible. If there is an inadequate amount of retained earnings, then debt financing will be used. Only in extreme circumstances is equity used. This is a theory of leverage in which there is no notion of an optimal leverage ratio.

In Table 2, the predicted negative sign on profits is clear. The firm size variables are ambiguous. On the one hand, larger firms might have more assets in place and thus a greater damage is inflicted by adverse selection as in Myers and Majluf (1984). On the other hand, larger firms might have less asymmetric information and thus will suffer less damage by adverse selection as suggested by Fama and French (2002). If sales are more closely connected to profits than just to size, then one might be inclined to expect a negative coefficient on log sales.

Capital expenditures need to be paid for and they directly enter the financing deficit as discussed in Shyam-Sunder and Myers (1999). This implies that capital expenditures should be positively related to debt. R&D expenditures are likely to be better assessed by insiders and are particularly prone to adverse selection problems. Thus, the prediction is that R&D is positively related to leverage. Like capital expenditures, dividends are part of the financing deficit (see

[1] Myers (1984) justifies the pecking order by adverse selection. However in models with adverse selection the details matter, and the standard pecking order is not a theoretically robust prediction, see Noe (1988) and Cadsby, Frank and Maksimovic (1998).

Shyam-Sunder and Myers, 1999). It is therefore expected that a dividend-paying firm will use more debt.

A credit rating involves a process of information revelation by the rating agency. Thus, a firm with an investment grade debt rating should have less of a problem with adverse selection. Accordingly, firms with such ratings should use less debt and more equity. Finally we might expect that firms with volatile stocks are firms about which beliefs are quite volatile. It seems plausible that such firms suffer more from adverse selection. If so, then such firms would have higher leverage.

An increase in the Treasury bill rate should have no effect as long as the firm has not yet reached its debt capacity. However, the debt capacity might plausibly be a decreasing function of the interest rate. When a firm reaches its debt capacity, it is supposed to turn to more expensive equity financing under the pecking order theory. Thus, there is no effect, or else an increase in the interest rate will tend to reduce leverage under the pecking order theory.

Market timing

As discussed by Myers (1984), market timing is a relatively old idea that is having a new surge of popularity in the academic literature.[2] In surveys, managers continue to offer at least some support for the idea (see Graham and Harvey, 2001). Hovakimian, Opler and Titman (2001) have shown that firms tend to issue equity after the value of their stock has increased.[3] Baker and Wurgler (2002) argue that corporate finance is best understood as the cumulative effect of past attempts to time the market.

The basic idea is that managers look at current conditions in both debt markets and equity markets. If they need financing, then they will use whichever market looks more favorable currently. If neither market looks favorable, then fund raising may be deferred. Alternatively, if current conditions look unusually favorable, then funds may be raised even if they are not currently required.

This idea seems plausible. However, it has nothing to say about most of the factors that are traditionally considered in studies of corporate leverage. It does suggest that if the equity market has been relatively favorable, as when the market to book ratio is high, then firms will tend to issue more equity. It also seems to suggest that if the debt market conditions are relatively unfavorable with high Treasury bill rates, then firms will tend to reduce their use of debt financing. In a recession, firms presumably tend to become more leveraged.

If inflation is expected, then a manager timing the market will increase debt to pay off the debt in devalued dollars. If the market to book ratio is high, then issuing equity seems attractive and thus leverage will decline. If the interest rates are high then debt is unattractive and leverage will fall. A related idea has recently been advanced by Welch (2004). He argues that past stock returns "are considerably more important in explaining debt-equity ratios than all previously identified proxies together." According to this hypothesis, past stock return factor dominates other factors.

[2] Lucas and MacDonald (1990) provide a theoretical formulation of the idea based on asymmetric information. Their analysis is something like a cross between the pecking order and the market timing theories.

[3] However, Frank and Goyal (2004) find that this effect is not strong enough to be significant in aggregate data. Instead they find that firms tend to issue debt following an equity increase.

Table A1. Common-size balance sheet for US industrial firms

This table presents average balance sheets for US industrial firms for selected years. Financial firms and utilities are excluded. The value of each balance-sheet item is calculated as a percentage of the book value of total assets and then averaged across each firm reporting data on Compustat in that year.

	Average balance sheet item as a percent of total assets				
Year	1950-1959	1960-1969	1970-1979	1989-1989	1990-2000
Number of observations	7690	22770	46096	60737	88093
Assets:					
	0.166	0.111	0.090	0.133	0.173
	(0.144)	(0.077)	(0.053)	(0.059)	(0.070)
Cash and short-term receivables (#1)	[0.084, 0.225]	[0.043, 0.145]	[0.026, 0.112]	[0.019, 0.171]	[0.017, 0.239]
	0.153	0.194	0.207	0.191	0.176
	(0.136)	(0.181)	(0.197)	(0.173)	(0.148)
+ Receivables – total (#2)	[0.081, 0.203]	[0.107, 0.259]	[0.110, 0.278]	[0.081, 0.268]	[0.060, 0.254]
	0.264	0.252	0.234	0.178	0.134
	(0.257)	(0.257)	(0.234)	(0.147)	(0.079)
+ Inventories – total (#3)	[0.149, 0.361]	[0.119, 0.364]	[0.069, 0.358]	[0.021, 0.289]	[0.005, 0.214]
	0.008	0.013	0.018	0.023	0.031
	(0.005)	(0.008)	(0.012)	(0.013)	(0.021)
+ Current assets – other (#68)	[0.000, 0.011]	[0.002, 0.016]	[0.005, 0.021]	[0.005, 0.027]	[0.009, 0.040]
	0.591	0.540	0.547	0.528	0.515
	(0.619)	(0.587)	(0.590)	(0.562)	(0.530)
= Current assets – Total (#4)	[0.461, 0.731]	[0.372, 0.723]	[0.375, 0.730]	[0.321, 0.732]	[0.292, 0.738]
	0.358	0.384	0.363	0.363	0.318
	(0.327)	(0.326)	(0.312)	(0.305)	(0.241)
+ Net property, plant, and equipment-total (#8)	[0.227, 0.476]	[0.208, 0.521]	[0.187, 0.501]	[0.163, 0.534]	[0.107, 0.485]
	0.017	0.016	0.014	0.015	0.011
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
+ Investments and advances – equity method (#31)	[0.000, 0.016]	[0.000, 0.010]	[0.000, 0.003]	[0.000, 0.000]	[0.000, 0.000]
	0.012	0.021	0.029	0.033	0.026
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
+ Investment and advances – other (#32)	[0.000, 0.010]	[0.000, 0.017]	[0.000, 0.019]	[0.000, 0.020]	[0.000, 0.010]
	0.006	0.020	0.030	0.035	0.080
	(0.000)	(0.000)	(0.000)	(0.000)	(0.005)
+ Intangibles (#33)	[0.000, 0.002]	[0.000, 0.015]	[0.000, 0.028]	[0.000, 0.025]	[0.000, 0.099]
	0.017	0.022	0.024	0.038	0.061
	(0.008)	(0.011)	(0.012)	(0.016)	(0.027)
+ Assets – other (#69)	[0.001, 0.019]	[0.003, 0.025]	[0.005, 0.026]	[0.005, 0.038]	[0.008, 0.068]
	1.000	1.000	1.000	1.000	1.000
	(1.000)	(1.000)	(1.000)	(1.000)	(1.000)
= Total assets (#6)	[1.000, 1.000]	[1.000, 1.000]	[1.000, 1.000]	[1.000, 1.000]	[1.000, 1.000]
Liabilities:					

	Average balance sheet item as a percent of total assets				
Year	1950-1959	1960-1969	1970-1979	1989-1989	1990-2000
	0.035	0.059	0.087	0.098	0.090
	(0.008)	(0.028)	(0.044)	(0.035)	(0.024)
+ Debt in current liabilities (#34)	[0.000, 0.035]	[0.006, 0.081]	[0.013, 0.108]	[0.008, 0.107]	[0.002, 0.087]
	-	0.097	0.111	0.116	0.114
	(-)	(0.078)	(0.087)	(0.082)	(0.076)
+ Account payable (#70)	[-, -]	[0.046, 0.126]	[0.052, 0.142]	[0.046, 0.142]	[0.041, 0.137]
	-	0.031	0.019	0.011	0.007
	(-)	(0.024)	(0.012)	(0.002)	(0.000)
+ Income taxes payable (#71)	[-, -]	[0.008, 0.046]	[0.001, 0.028]	[0.000, 0.015]	[0.000, 0.008]
	-	0.055	0.076	0.093	0.115
	(-)	(0.045)	(0.057)	(0.067)	(0.076)
+ Current liabilities – other (#72)	[-, -]	[0.024, 0.070]	[0.033, 0.091]	[0.033, 0.113]	[0.037, 0.136]
	0.232	0.238	0.293	0.325	0.338
	(0.213)	(0.212)	(0.250)	(0.248)	(0.236)
= Current liabilities – total (#5)	[0.153, 0.285]	[0.144, 0.304]	[0.170, 0.357]	[0.156, 0.379]	[0.144, 0.379]
	0.163	0.182	0.208	0.201	0.192
	(0.129)	(0.152)	(0.180)	(0.156)	(0.114)
+ Long-term debt – total (#9)	[0.009, 0.245]	[0.043, 0.274]	[0.066, 0.302]	[0.030, 0.303]	[0.004, 0.301]
	0.012	0.012	0.015	0.026	0.039
	(0.001)	(0.000)	(0.000)	(0.000)	(0.004)
+ Liabilities – other (#75)	[0.000, 0.008]	[0.000, 0.009]	[0.000, 0.011]	[0.000, 0.020]	[0.000, 0.039]
	0.002	0.013	0.021	0.026	0.017
	(0.000)	(0.000)	(0.009)	(0.004)	(0.000)
+ Deferred taxes and ITC (#35)	[0.000, 0.000]	[0.000, 0.018)	[0.000, 0.029]	[0.000, 0.035]	[0.000, 0.018]
	0.004	0.003	0.003	0.004	0.006
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
+ Minority Interest (#38)	[0.000, 0.000]	[0.000, 0.000]	[0.000, 0.000]	[0.000, 0.000]	[0.000, 0.000]
	0.366	0.447	0.542	0.592	0.606
	(0.359)	(0.442)	(0.526)	(0.551)	(0.533)
= Liabilities – total (#181)	[0.259, 0.455]	[0.309, 0.575]	[0.387, 0.650]	[0.368, 0.704]	[0.311, 0.722]
	-	0.017	0.013	0.019	0.040
	(-)	(0.000)	(0.000)	(0.000)	(0.000)
+ Preferred stock – carrying value (#130)	[-, -]	[0.000, 0.005]	[0.000, 0.000]	[0.000, 0.000]	[0.000, 0.000]
	-	0.519	0.443	0.383	0.338
	(-)	(0.522)	(0.465)	(0.439)	(0.449)
+ Common equity – total (#60)	[-, -]	[0.376, 0.659]	[0.327, 0.608]	[0.276, 0.626]	[0.247, 0.677]
	-	0.535	0.457	0.407	0.392
	(-)	(0.530)	(0.473)	(0.449)	(0.468)
= Stockholders' equity – total (#216) = (#130+#60)	[-, -]	[0.413, 0.661)	[0.350, 0.611]	[0.296, 0.632]	[0.278, 0.689]
	-	1.000	1.000	1.000	1.000
	(-)	(1.000)	(1.000)	(1.000)	(1.000)
= Total liabilities and stockholders' equity (#6)	[-, -]	[1.000, 1.000]	[1.000, 1.000]	[1.000, 1.000]	[1.000, 1.000]

Table A2. Average Corporate Statement of Cash Flows - Disaggregated

This table presents average cash flow statement for US industrial firms for selected years. The data is from Compustat. For years up to and including 1985 Compustat format codes 1,2 and 3 are used. Starting in year 1990 format code 7 is used. These formats have different standard presentations. We have followed format 7 to the extent possible. Financial firms and utilities are excluded. Also excluded are firms involved in major mergers. The value of each income statement and cash flow item is expressed as a fraction of total assets for each firm and then averaged across firms.

	Average statement of cash flow items as a percent of total assets				
Year	1950-1959	1960-1969	1970-1979	1980-1989	1990-2000
Number of observations	7708	22782	46101	60763	88137
Income					
	1.426	1.478	1.518	1.274	1.149
	(1.292)	(1.349)	(1.375)	(1.131)	(0.979)
+ Sales (#12)	[0.791, 1.756]	[0.845, 1.802]	[0.913, 1.863]	[0.586, 1.678]	[0.477, 1.545]
	1.195	1.098	1.111	0.922	0.821
	(0.981)	(0.931)	(0.948)	(0.739)	(0.616)
- Cost of goods sold (#41)	[0.629, 1.410]	[0.539, 1.357]	[0.567, 1.380]	[0.358, 1.210]	[0.280, 1.080]
	0.152	0.226	0.275	0.307	0.343
	(0.090)	(0.178)	(0.222)	(0.227)	(0.227)
- Selling, general and Admin. Expenses (#189)	[0.000, 0.214]	[0.062, 0.318]	[0.097, 0.375]	[0.075, 0.417]	[0.063, 0.460]
	0.192	0.158	0.132	0.044	-0.017
	(0.182)	(0.149)	(0.141)	(0.112)	(0.098)
= Operating Income before depreciation (#13)	[0.131, 0.242]	[0.106, 0.208]	[0.087, 0.199]	[0.019, 0.177]	[-0.027, 0.163]
	0.036	0.039	0.040	0.049	0.053
	(0.030)	(0.034)	(0.033)	(0.039)	(0.042)
- Depreciation and amortization (#14)	[0.022, 0.043]	[0.023, 0.048]	[0.022, 0.049]	[0.024, 0.059]	[0.026, 0.064]
	0.151	0.120	0.092	-0.008	-0.073
	(0.141)	(0.110)	(0.101)	(0.070)	(0.053)
= Operating income after depreciation (#178)	[0.094, 0.196]	[0.070, 0.167]	[0.053, 0.157]	[-0.023, 0.128]	[-0.073, 0.111]
	0.007	0.013	0.025	0.034	0.028
	(0.006)	(0.011)	(0.021)	(0.026)	(0.018)
- Interest expense (#15)	[0.001, 0.012]	[0.003, 0.018]	[0.010, 0.033)	[0.010, 0.045]	[0.004, 0.035]
	0.007	0.008	0.011	0.010	-0.010
	(0.005)	(0.005)	(0.007)	(0.011)	(0.004)
+ Non operating income and special items (#61+ #17)	[0.001, 0.011]	[0.000, 0.012]	[0.000, 0.017]	[0.001, 0.028]	[-0.004, 0.016]
	0.145	0.115	0.077	-0.034	-0.116
	(0.131)	(0.103)	(0.086)	(0.052)	(0.030)
= Pre tax income (#170)	[0.081, 0.192]	[0.061, 0.165]	[0.035, 0.149]	[-0.046, 0.117]	[-0.114, 0.096]
	0.072	0.054	0.044	0.027	0.017
	(0.063)	(0.046)	(0.036)	(0.016)	(0.007)
- Income taxes – total (#16)	[0.037, 0.098]	[0.021, 0.079]	[0.010, 0.068]	[0.000, 0.046]	[0.000, 0.031]
	<0.001	<0.001	<0.001	<0.001	<0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
- Minority interest (#49)	[0.000, 0.000]	[0.000, 0.000]	[0.000, 0.000]	[0.000, 0.000]	[0.000, 0.000]

	Average statement of cash flow items as a percent of total assets				
Year	1950-1959	1960-1969	1970-1979	1980-1989	1990-2000
	0.072	0.060	0.033	-0.060	-0.134
	(0.065)	(0.057)	(0.049)	(0.033)	(0.019)
= Income before extra ordinary items (#18)	[0.043, 0.094]	[0.036, 0.088]	[0.021, 0.081]	[-0.037, 0.071]	[-0.107, 0.065]
	0.002	0.001	0.001	0.001	0.003
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
- Dividend: Preferred (#19)	[0.000, 0.003]	[0.000, 0.001]	[0.000, 0.000]	[0.000, 0.000]	[0.000, 0.000]
	-	<0.001	<0.001	<0.001	<0.001
	(-)	(0.000)	(0.000)	(0.000)	(0.000)
+ Common Stock Equivalents – Dollar Savings (#191)	[-, -]	[0.000, 0.000]	[0.000, 0.000]	[0.000, 0.000]	[0.000, 0.000]
	-	0.001	0.002	0.002	<0.001
	(-)	(0.000)	(0.000)	(0.000)	(0.000)
+ Extraordinary Items and Discontinued Operations (#48)	[-, -]	[0.000, 0.000]	[0.000, 0.000]	[0.000, 0.000]	[0.000, 0.000]
	0.077	0.061	0.035	-0.058	-0.135
	(0.071)	(0.059)	(0.051)	(0.036)	(0.019)
Net Income (#172)	[0.050, 0.099)	[0.037, 0.090]	[0.022, 0.085]	[-0.040, 0.075]	[-0.110, 0.067]
Indirect Operating Activities					
	-	-	0.034	-0.062	-0.138
	(-)	(-)	(0.050)	(0.033)	(0.020)
= Income before extra ordinary items (#123)	[-, -]	[-, -]	[0.021, 0.083]	[-0.037, 0.071]	[-0.105, 0.065]
	-	-	0.037	0.052	0.058
	(-)	(-)	(0.032)	(0.040)	(0.045)
+ Depreciation and amortization (#125)	[-,-]	[-, -]	[0.018, 0.484]	[0.025, 0.062]	[0.027, 0.069]
	-	-	0.011	0.021	0.037
	(-)	(-)	(0.002)	(0.004)	(0.005)
+ Other funds from operation [a] (#124+#126+#106+#213+#217)	[-, -]	[-, -]	[0.000, 0.011]	[0.000, 0.018]	[-0.002, 0.027]
	-	-	0.087	0.016	-0.034
	(-)	(-)	(0.098)	(0.083)	(0.070)
= Funds from operations – Total (#110)	[-, -]	[-, -]	[0.060, 0.138]	[0.010, 0.134]	[-0.029, 0.128]
	-	-	-	-0.015	-0.016
	(-)	(-)	(-)	(-0.006)	(-0.006)
+ Accounts Receivables – Dec. (Inc.) (#302)	[-, -]	[-, -]	[-, -]	[-0.035, 0.003]	[-0.036, 0.003]
	-	-	-	-0.011	-0.008
	(-)	(-)	(-)	(0.000)	(0.000)
+ Inventory – Decrease (Increase) (#303)	[-, -]	[-, -]	[-, -]	[-0.022, 0.000]	[-.0.016, 0.001]
	-	-	-	0.016	0.018
+ Accounts payable and accrued liabilities –Increase (Decrease)	(-)	(-)	(-)	(0.002)	(0.000)
(#304)	[-, -]	[-, -]	[-, -]	[-0.002, 0.028]	[-0.002, 0.028]
	-	-	-	<0.000	0.001
	(-)	(-)	(-)	(0.000)	(0.000)
+ Income taxes - accrued – Increase (Decrease) (#305)	[-, -]	[-, -]	[-, -]	[0.000, 0.000]	[0.000, 0.000]
	-	-	-	0.003	0.003
	(-)	(-)	(-)	(0.000)	(0.000)
+ Asset & liabilities – other (Net change) (#307)	[-, -]	[-, -]	[-, -]	[-0.013, -0.011]	[-0.013. 0.012]

	Average statement of cash flow items as a percent of total assets				
Year	1950-1959	1960-1969	1970-1979	1980-1989	1990-2000
	-	-	-	-0.009	-0.040
	(-)	(-)	(-)	(0.052)	(0.050)
= **Operating activities - Net cash flow (#308)**	[-, -]	[-, -]	[-, -]	[-0.031, 0.115]	[-0.050, 0.114]
Investing Activities					
	-	-	0.007	0.014	0.018
	(-)	(-)	(0.000)	(0.000)	(0.000)
- Increase in investment (#113)	[-, -]	[-, -]	[0.000, 0.000]	[0.000, 0.000]	[0.000, 0.000]
	-	-	0.005	0.009	0.014
	(-)	(-)	(0.000)	(0.000)	(0.000)
+ Sale of investment (#109)	[-, -]	[-, -]	[0.000, 0.000]	[0.000, 0.000]	[0.000, 0.000]
	0.057	0.059	0.078	0.087	0.073
	(0.041)	(0.042)	(0.056)	(0.058)	(0.047)
- Capital expenditure (#128)	[0.000, 0.079]	[0.000, 0.085]	[0.028, 0.102]	[0.027, 0.110]	[0.021, 0.089]
	-	-	0.009	0.012	0.006
	(-)	(-)	(0.000)	(0.000)	(0.000)
+ Sale of property, plant and equipment (#107)	[-, -]	[-, -]	[0.000, 0.005]	[0.000, 0.005]	[0.000, 0.001]
	-	-	0.006	0.014	0.020
	(-)	(-)	(0.000)	(0.000)	(0.000)
- Acquisitions (#129)	[-, -]	[-, -]	[0.000, 0.000]	[0.000, 0.000]	[0.000, 0.000]
	-	-	-	0.008	-0.002
+ Short term investment – change, and investing activities - other	(-)	(-)	(-)	(0.000)	(0.000)
(#309 + #310)	[-, -]	[-, -]	[-, -]	[-0.004, 0.003]	[-0.008, 0.002]
	-	-	-	-0.073	-0.093
	(-)	(-)	(-)	(-0.059)	(-0.069)
= Investing activities – Net cash flow (#311)	[-, -]	[-, -]	[-, -]	[-0.125, -0.017]	[-0.149, -0.022]
Financing Activities					
	-	-	0.019	0.083	0.128
	(-)	(-)	(0.000)	(0.001)	(0.003)
+ Sale of common and preferred stock (#108)	[-, -]	[-, -]	[0.000, 0.003]	[0.000, 0.022]	[0.000, 0.063]
	-	-	0.004	0.007	0.008
	(-)	(-)	(0.000)	(0.000)	(0.000)
- Purchase of common and preferred stock (#115)	[-, -]	[-, -]	[0.000, 0.000]	[0.000, 0.000]	[0.000, 0.000]
	-	-	0.011	0.011	0.008
	(-)	(-)	(0.002)	(0.000)	(0.000)
- Cash dividends (#127)	[-, -]	[-, -]	[0.000, 0.019]	[0.000, 0.015]	[0.000, 0.006]
	-	-	0.061	0.081	0.105
	(-)	(-)	(0.014)	(0.013)	(0.008)
+ Long term debt – issuance (#111)	[-, -]	[-, -]	[0.000, 0.080]	[0.000, 0.093]	[0.000, 0.106]
	-	-	0.043	0.064	0.082
	(-)	(-)	(0.014)	(0.018)	(0.017)
- Long term debt – reduction (#114)	[-, -]	[-, -]	[0.000, 0.045]	[0.001, 0.062]	[0.000, 0.073]

	Average statement of cash flow items as a percent of total assets				
Year	1950-1959	1960-1969	1970-1979	1980-1989	1990-2000
	-	-	-	-0.006	-0.005
	(-)	(-)	(-)	(0.000)	(0.000)
+ Changes in current debt (#301)	[-, -]	[-, -]	[-, -]	[0.000, 0.000]	[0.000, 0.000]
	-	-	-	0.004	0.003
	(-)	(-)	(-)	(0.000)	(0.000)
+ Financing activities - other (#312)	[-, -]	[-, -]	[-, -]	[0.000, 0.000]	[0.000, 0.000]
	-	-	-	0.074	0.140
	(-)	(-)	(-)	(0.001)	(0.016)
= Financing activities - Net cash flow (#313)	[-, -]	[-, -]	[-, -]	[-0.043, 0.100]	[-0.032, 0.166]
	-	-	-	<0.000	<0.000
	(-)	(-)	(-)	(0.000)	(0.000)
+ Exchange rate effect (#314)	[-, -]	[-, -]	[-, -]	[0.000, 0.000]	[0.000, 0.000]
	-	-	-	0.002	0.014
	(-)	(-)	(-)	(0.000)	(0.001)
= Cash and cash equivalent – Inc. (Dec.) (#274)	[-, -]	[-, -]	[-, -]	[-0.006, 0.010]	[-0.019, 0.037]
	-	-	0.017	0.033	-
	(-)	(-)	(0.001)	(0.001)	(-)
Sources of funds – other (#218)	[-, -]	[-, -]	[0.000, 0.008]	[0.000, 0.017]	[-, -]
	-	-	0.017	0.030	-
	(-)	(-)	(0.002)	(0.004)	(-)
Uses of funds – other (#219)	[-, -]	[-, -]	[0.000, 0.010]	[0.000, 0.022]	[-, -]
	-	-	0.025	0.014	-
	(-)	(-)	(0.019)	(0.005)	(-)
Working capital change – other (#236)	[-, -]	[-, -]	[-0.007, 0.063]	[-0.022, 0.063]	[-, -]

[a] Other fund from operation aggregates extraordinary items, deferred tax, equity in net loss, loss (gain) on sale of PPE and sale of investments, and funds from operations – other.

Table A3a. Do different factors matter for firms in different circumstances? (Without IndustLev & IndustGr)

This table presents a summary of the results from robustness checks for various classes of firms. All factors are lagged by one year. Leverage is defined as TDM. In this table, the classes we examine include (1) dividend-paying firms (dividend paying dummy=1); (2) non-dividend-paying firms (dividend-paying dummy=0); (3) mature firms (if firms have been listed on Compustat for 10 years or more); (4) young firms (if firms have been listed on Compustat for 5 years or less); (5) small firms (if assets are smaller than the 33rd percentile of all Compustat firms). The column headed "I" indicates a dummy variable that takes a value of 1 if the variable was included in the minimum BIC specification for that class. The columns headed "+%" and "-%" are generated by running the data for each of the 51 years independently. The headings ``+%" and ``-%" list the instances in which the particular factor was included by the BIC criterion and had the regression coefficient had the indicated sign.

	Div. Paying			Non Div. Paying			Mature Firms			Young Firms			Small Firms		
	I	+%	-%	I	+%	-%	I	+%	-%	I	+%	-%	I	+%	-%
Mktbk	1	0.0	46.9	1	0.0	81.6	1	0.0	76.2	1	0.0	56.3	1	0.0	57.1
Colltrl	1	69.4	0.0	1	67.4	0.0	1	71.4	0.0	1	62.5	0.0	1	79.6	0.0
Inflation	1	NA	NA	1	NA	NA	1	NA	NA	1	NA	NA	1	NA	NA
Dividend	0	NA	NA	0	NA	NA	1	0.0	76.2	1	0.0	27.1	1	0.0	63.3
Assets	0	32.7	0.0	1	61.2	0.0	1	54.8	0.0	1	47.9	0.0	0	26.5	0.0
Profit	1	0.0	100.0	1	0.0	77.6	1	0.0	97.6	1	0.0	54.2	1	0.0	59.2
Intang	1	12.2	0.0	1	49.0	0.0	1	33.3	0.0	1	33.3	0.0	0	30.6	0.0
Regultd	1	46.9	0.0	1	10.2	0.0	1	54.8	0.0	0	12.5	0.0	0	16.3	0.0
StockVar	0	0.0	8.2	1	0.0	34.7	1	0.0	42.9	0	0.0	12.5	0	0.0	16.3
SGA	1	0.0	34.7	1	0.0	10.2	1	0.0	33.3	0	0.0	8.3	0	2.0	4.1
MgrSenti	1	NA	NA	1	NA	NA	1	NA	NA	0	NA	NA	0	NA	NA
Unique	0	0.0	4.1	1	4.1	55.1	1	0.0	28.6	0	0.0	12.5	0	0.0	10.2
MacroProf	0	NA	NA	1	NA	NA	1	NA	NA	0	NA	NA	0	NA	NA
RnD	0	0.0	32.7	1	0.0	16.3	1	0.0	47.6	0	0.0	8.3	0	2.0	2.0
Losses	0	0.0	16.3	0	2.0	14.3	1	0.0	28.6	0	0.0	8.3	0	4.1	8.2
NOLCF	0	2.0	0.0	0	8.2	8.2	0	2.4	0.0	0	2.1	8.3	0	8.2	2.0
StockRet	0	2.0	10.2	1	2.0	26.5	1	4.8	16.7	0	0.0	6.3	0	0.0	10.2
Advert	0	0.0	4.1	0	2.0	6.1	1	0.0	9.5	0	0.0	2.1	0	2.0	0.0
Capex	0	20.4	0.0	1	2.0	22.5	1	14.3	9.5	0	10.4	6.3	0	2.0	0.0
NBER	0	NA	NA	1	NA	NA	1	NA	NA	0	0.0	2.1	0	NA	NA
QualSprd	0	NA	NA	0	NA	NA	1	NA	NA	0	NA	NA	0	NA	NA

	Div. Paying			Non Div. Paying			Mature Firms			Young Firms			Small Firms		
	I	+%	-%	I	+%	-%	I	+%	-%	I	+%	-%	I	+%	-%
ChgAsset	0	28.6	0.0	0	6.1	6.1	1	19.1	0.0	0	4.2	2.1	0	14.3	2.0
TBill	0	NA	NA	0	NA	NA	0	NA	NA	0	NA	NA	0	NA	NA
Rating	0	0.0	4.1	1	0.0	18.4	1	0.0	14.3	0	NA	NA	0	NA	NA
TermSprd	0	NA	NA	0	NA	NA	1	NA	NA	0	NA	NA	0	NA	NA
Sales	0	0.0	16.3	0	34.7	0.0	0	16.7	9.5	0	16.7	8.3	1	46.9	0.0
Depr	0	4.1	0.0	0	4.1	8.2	0	9.5	7.1	0	2.1	2.1	0	0.0	4.1
TaxRate	0	NA	NA	0	NA	NA	0	NA	NA	0	NA	NA	0	NA	NA
ChgSales	0	12.2	0.0	0	2.0	6.1	0	9.5	0.0	0	6.3	4.2	0	2.0	2.0
MacroGr	0	NA	NA	1	NA	NA	0	NA	NA	0	NA	NA	0	NA	NA
CrspRet	0	NA	NA	1	2.0	0.0	0	NA	NA	0	4.2	0.0	0	2.0	2.0
InvTaxCr	0	4.1	0.0	0	4.1	2.0	0	2.4	0.0	0	0.0	2.1	0	0.0	2.0
Tang	0	2.0	4.1	0	10.2	6.1	0	2.4	4.8	0	6.3	6.3	0	8.2	2.0
Mature	0	0.0	8.2	0	16.3	16.3	0	NA	NA	0	NA	NA	0	8.2	8.2

Table A3b. Do different factors matter for firms in different circumstances? (Without IndustLev & IndustGr)

This table presents a summary of the results from robustness checks for various classes of firms. All factors are lagged by one year. Leverage is defined as TDM. In this table, the classes we examine include (1) large firms (if assets are larger than the 67th percentile of all Compustat firms); (2) low M/B firms (if the market-to-book assets ratio is smaller than the 33rd percentile of all firms on Compustat); (3) high M/B firms (if the market-to-book assets ratio is larger than the 67th percentile of all Compustat firms); (4) low profit firms (if *Profit* is less than the 33rd percentile of all Compustat firms); (5) high-profit firms (if *Profit* is greater than the 67th percentile of all Compustat firms). The column headed "I" indicates a dummy variable that takes a value of 1 if the variable was included in the minimum BIC specification for that class. The columns headed "+%" and "-%" are generated by running the data for each of the 51 years independently. The headings ``+%" and ``-%" list the instances in which the particular factor was included by the BIC criterion and had the regression coefficient had the indicated sign.

	Large Firms			Low M/B			High M/B			Low Profits			High Profits		
	I	+%	-%	I	+%	-%	I	+%	-%	I	+%	-%	I	+%	-%
Mktbk	1	0.0	65.3	1	20.4	12.2	1	0.0	26.5	1	0.0	67.4	1	0.0	63.3
Colltrl	0	65.3	0.0	1	69.4	0.0	1	57.1	0.0	1	63.3	0.0	1	51.0	0.0
Inflation	1	NA	NA	1	NA	NA	1	NA	NA	1	NA	NA	1	NA	NA
Dividend	1	0.0	61.2	1	0.0	67.4	1	2.0	30.6	1	0.0	40.8	1	0.0	40.8
Assets	0	28.6	0.0	1	42.9	2.0	1	12.2	0.0	1	38.8	0.0	1	14.3	4.1
Profit	1	0.0	98.0	1	0.0	77.6	1	0.0	63.3	1	0.0	16.3	1	0.0	69.4
Intang	0	14.3	0.0	1	49.0	0.0	0	16.3	0.0	1	34.7	0.0	1	24.5	0.0
Regultd	1	46.9	0.0	1	38.8	2.0	1	14.3	0.0	1	4.1	0.0	1	24.5	0.0
StockVar	0	0.0	18.4	1	0.0	40.8	0	0.0	10.2	1	0.0	30.6	0	0.0	8.2
SGA	0	0.0	26.5	1	0.0	18.4	0	0.0	10.2	0	0.0	4.1	1	0.0	18.4
MgrSenti	0	NA	NA	1	NA	NA	0	NA	NA	1	NA	NA	1	NA	NA
Unique	0	0.0	8.2	1	0.0	22.5	0	0.0	2.0	1	0.0	22.5	0	2.0	4.1
MacroProf	0	NA	NA	1	NA	NA	0	NA	NA	1	NA	NA	1	NA	NA
RnD	0	0.0	38.8	1	0.0	22.5	0	0.0	14.3	0	2.0	4.1	1	0.0	20.4
Losses	0	0.0	10.2	1	0.0	28.6	0	NA	NA	1	0.0	4.1	1	0.0	6.1
NOLCF	0	NA	NA	0	2.0	6.1	0	8.2	0.0	0	2.0	0.0	0	8.2	0.0
StockRet	0	2.0	16.3	1	4.1	24.5	0	2.0	2.0	1	2.0	14.3	0	0.0	6.1
Advert	0	0.0	4.1	1	0.0	10.2	0	NA	NA	0	NA	NA	0	NA	NA
Capex	0	26.5	0.0	0	22.5	4.1	0	8.2	0.0	0	14.3	0.0	0	20.4	6.1
NBER	0	2.0	0.0	1	NA	NA	0	NA	NA	0	2.0	0.0	0	NA	NA
QualSprd	0	NA	NA	1	NA	NA	0	NA	NA	1	NA	NA	0	NA	NA

	Large Firms			Low M/B			High M/B			Low Profits			High Profits		
	I	+%	-%	I	+%	-%	I	+%	-%	I	+%	-%	I	+%	-%
ChgAsset	0	6.1	0.0	1	32.7	0.0	0	8.2	2.0	0	10.2	0.0	0	10.2	0.0
TBill	0	NA	NA	0	NA	NA	0	NA	NA	0	NA	NA	0	NA	NA
Rating	0	0.0	6.1	1	0.0	6.1	0	NA	NA	0	NA	NA	0	0.0	2.0
TermSprd	0	NA	NA	0	NA	NA	0	NA	NA	0	NA	NA	0	NA	NA
Sales	0	0.0	34.7	0	22.5	4.1	0	4.1	6.1	1	38.8	0.0	0	4.1	8.2
Depr	0	0.0	4.1	0	2.0	6.1	0	4.1	0.0	0	0.0	6.1	1	28.6	0.0
TaxRate	0	NA	NA	1	NA	NA	0	NA	NA	1	NA	NA	0	NA	NA
ChgSales	0	26.5	0.0	0	8.2	2.0	0	4.1	0.0	0	6.1	2.0	0	10.2	0.0
MacroGr	0	NA	NA	0	NA	NA	0	NA	NA	1	NA	NA	0	NA	NA
CrspRet	0	2.0	0.0	1	2.0	0.0	0	NA	NA	0	6.1	0.0	0	NA	NA
InvTaxCr	0	NA	NA	0	4.1	2.0	0	NA	NA	0	NA	NA	0	NA	NA
Tang	0	2.0	6.1	1	2.0	4.1	0	18.4	2.0	1	0.0	14.3	1	38.8	0.0
Mature	0	0.0	2.0	1	0.0	14.3	0	2.0	2.0	0	8.2	8.2	0	NA	NA

Table A4. Core Model of Leverage without IndustLev and IndustGr (TDM)

Leverage is defined as TDM. All factors are lagged one year. Columns (1) and (3) to (7) reports the estimated coefficients. The t-statistics are reported below the coefficients in parentheses and the elasticities are reported in square brackets. Column (2) titled "Impute Missing" reports estimates based on the use of Multiple Imputation for the missing data. The imputation is done using the Method of Markov Chain Monte Carlo, as implemented in SAS 8.2 PROC MI. We impute 10 times and discard the initial 1000 observations for the burn in period. In Column (2), the t-statistics are reported in parentheses. The number of observations, AIC, BIC and Adjusted R^2 in Column (2) are averages from an analysis of 10 datasets.

	All Years	Imputed Missing	1950-1959	1960-1969	1970-1979	1980-1989	1990-2000
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Intercept	-0.837	-0.714	-0.651	0.004	-0.508	-0.266	-0.468
	(-27.25)	(-28.1)	(-4.0)	(0.0)	(-7.5)	(-4.8)	(-6.2)
	[-]		[-]	[-]	[-]	[-]	[-]
Mktbk	-0.039	-0.030	-0.041	-0.019	-0.059	-0.038	-0.030
	(-94.5)	(-98.5)	(-9.3)	(-12.3)	(-38.5)	(-49.5)	(-53.9)
	[-0.186]		[-0.238]	[-0.137]	[-0.146]	[-0.173]	[-0.200]
Colltrl	0.280	0.262	0.250	0.194	0.243	0.294	0.305
	(82.0)	(98.0)	(11.7)	(17.3)	(29.3)	(47.4)	(60.0)
	[0.502]		[0.863]	[0.566]	[0.377]	[0.522]	[0.537]
Inflation	1.880	1.998	-0.015	3.231	1.345	0.936	1.559
	(70.5)	(77.0)	(-0.1)	(13.9)	(15.3)	(18.7)	(13.2)
	[0.314]		[-0.001]	[0.322]	[0.223]	[0.204]	[0.219]
Dividend	-0.121	-0.124	-0.034	-0.051	-0.129	-0.118	-0.095
	(-75.8)	(-95.7)	(-1.9)	(-11.2)	(-40.8)	(-39.3)	(-34.8)
	[-0.202]		[-0.184]	[-0.190]	[-0.216]	[-0.181]	[-0.120]
Assets	0.017	0.017	0.002	0.006	0.013	0.019	0.018
	(42.9)	(51.3)	(0.8)	(5.7)	(14.5)	(24.5)	(27.0)
	[0.057]		[0.009]	[0.030]	[0.033]	[0.060]	[0.066]
Profit	-0.282	-0.233	-0.849	-0.748	-0.887	-0.265	-0.172
	(-66.1)	(-80.2)	(-22.8)	(-32.6)	(-56.0)	(-34.3)	(-29.7)
	[-0.090]		[-0.882]	[-0.566]	[-0.342]	[-0.072]	[-0.034]
Intang	0.369	0.365	0.013	0.394	0.478	0.349	0.350
	(52.8)	(59.5)	(0.1)	(11.5)	(21.7)	(20.7)	(39.6)
	[0.058]		[0.000]	[0.034]	[0.038]	[0.035]	[0.103]
Regultd	0.147	0.133	0.109	0.161	0.109	0.142	0.141
	(44.4)	(50.3)	(3.6)	(15.9)	(18.1)	(23.4)	(24.3)
	[0.020]		[0.004]	[0.019]	[0.015]	[0.020]	[0.020]

	All Years	Imputed Missing	1950-1959	1960-1969	1970-1979	1980-1989	1990-2000
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
StockVar	-0.76	-0.084	0.117	-0.040	-0.164	-0.075	-0.058
	(-34.3)	(-34.2)	(2.0)	(-3.6)	(-25.3)	(-18.2)	(-19.3)
	[-0.057]		[0.031]	[-0.022]	[-0.074]	[-0.057]	[-0.061]
SGA	-0.024	-0.018	-0.062	-0.093	-0.070	-0.025	-0.014
	(-22.5)	(-23.8)	(-2.2)	(-6.1)	(-12.6)	(-14.1)	(-9.8)
	[-0.023]		[-0.038]	[-0.068]	[-0.032]	[-0.026]	[-0.019]
MgrSenti	0.244	0.212	0.227	0.046	0.224	0.108	0.140
	(31.6)	(33.4)	(5.6)	(1.3)	(13.6)	(7.8)	(7.2)
	[3.207]		[4.928]	[0.864]	[2.307]	[1.367]	[2.055]
Unique	-0.034	-0.036	0.005	-0.018	-0.029	-0.049	-0.027
	(-24.2)	(-28.4)	(0.8)	(-5.3)	(-10.1)	(-18.8)	(-11.4)
	[-0.033]		[-0.007]	[-0.027]	[-0.022]	[-0.048]	[-0.028]
MacroProf	-0.091	-0.075	-0.114	0.206	0.111	-0.044	-0.254
	(-18.5)	(-19.3)	(-5.4)	(6.2)	(6.2)	(-6.5)	(-23.5)
	[0.001]		[0.032]	[0.010]	[0.008]	[0.007]	[-0.007]
RnD	-0.021	-0.023	0.616	-0.313	-0.108	-0.016	-0.015
	(-18.4)	(-25.1)	(2.6)	(3.1)	(-7.1)	(-6.1)	(-11.4)
	[-0.006]		[0.009]	[-0.007]	[-0.003]	[-0.004]	[-0.010]
Losses	-0.041	-0.035	-0.152	-0.094	-0.111	-0.030	-0.022
	(-15.8)	(-17.2)	(-5.1)	(-7.9)	(-14.6)	(-6.7)	(-5.8)
	[-0.018]		[-0.007]	[-0.010]	[-0.013]	[-0.016]	[-0.016]
Number of obs.	112,352	225,468	2,862	8,957	25,767	32,368	42,398
AIC	-29,754.8	-665,140.5	-3,272.7	-9,180.4	-8,190.9	-8,502.8	-10,154.5
BIC	-29,600.7	-665,138.5	-3,177.3	-9,066.8	-8,060.4	-8,368.6	-10,016.1
Adj R-squared	0.31	0.28	0.34	0.35	0.38	0.28	0.30

Table A5. Core Model of Leverage without IndustLev and IndustGr (TDA)

Leverage is defined as TDA. All factors are lagged one year. Columns (1) and (3) to (7) reports the estimated coefficients. The t-statistics are reported below the coefficients in parentheses and the elasticities are reported in square brackets. Column (2) titled "Impute Missing" reports estimates based on the use of Multiple Imputation for the missing data. The imputation is done using the Method of Markov Chain Monte Carlo, as implemented in SAS 8.2 PROC MI. We impute 10 times and discard the initial 1000 observations for the burn in period. In Column (2), the t-statistics are reported in parentheses. The number of observations, AIC, BIC and Adjusted R^2 in Column (2) are averages from an analysis of 10 datasets.

	All Years	Imputed Missing	1950-1959	1960-1969	1970-1979	1980-1989	1990-2000
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Intercept	-0.150	-0.037	-0.202	-0.386	-0.206	-0.083	0.071
	(-5.0)	(-1.2)	(-1.6)	(-2.9)	(-4.0)	(-1.4)	(0.9)
	[-]		[-]	[-]	[-]	[-]	[-]
Mktbk	-0.005	-0.001	0.005	0.006	0.007	-0.002	-0.07
	(-13.1)	(-1.6)	(1.3)	(3.6)	(5.6)	(-2.9)	(-10.9)
	[-0.028]		[0.032]	[0.037]	[0.023]	[-0.011]	[-0.044]
Colltrl	0.285	0.289	0.252	0.217	0.211	0.295	0.314
	(85.7)	(93.3)	(15.0)	(19.8)	(33.3)	(46.0)	(57.4)
	[0.582]		[1.038]	[0.604]	[0.466]	[0.579]	[0.563]
Inflation	0.723	0.787	0.071	3.144	0.734	0.194	0.066
	(27.7)	(28.9)	(0.4)	(13.8)	(10.9)	(3.7)	(0.5)
	[0.138]		[0.004]	[0.300]	[0.173]	[0.046]	[0.009]
Dividend	-0.101	-0.107	0.008	-0.073	-0.098	-0.106	-0.078
	(-64.8)	(-65.3)	(0.5)	(-16.4)	(-40.6)	(-33.8)	(-26.4)
	[-0.191]		[0.048]	[-0.262]	[-0.232]	[-0.179]	[-0.099]
Assets	0.013	0.007	0.01	0.007	0.013	0.012	0.016
	(32.0)	(17.0)	(6.5)	(6.2)	(19.3)	(14.7)	(22.4)
	[0.048]		[0.072]	[0.030]	[0.048]	[0.041]	[0.060]
Profit	-0.296	-0.280	-0.595	-0.644	-0.580	-0.308	-0.241
	(-72.8)	(-97.1)	(-20.3)	(-28.7)	(-49.2)	(-39.9)	(-39.2)
	[-0.106]		[-0.736]	[-0.466]	[-0.316]	[-0.089]	[-0.047]
Intang	0.492	0.514	0.171	0.636	0.443	0.574	0.464
	(72.3)	(81.1)	(1.6)	(19.1)	(26.3)	(33.1)	(48.7)
	[0.089]		[0.006]	[0.052]	[0.050]	[0.065]	[0.139]
Regultd	0.075	0.104	0.126	0.167	0.093	0.041	0.051
	(23.1)	(34.0)	(5.3)	(16.9)	(20.2)	(6.5)	(8.1)
	[0.012]		[0.006]	[0.019]	[0.019]	[0.006]	[0.007]

	All Years	Imputed Missing	1950-1959	1960-1969	1970-1979	1980-1989	1990-2000
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
StockVar	-0.055	-0.056	0.173	0.028	-0.075	-0.042	-0.052
	(-25.4)	(-17.1)	(3.7)	(2.5)	(-15.1)	(-9.8)	(-16.3)
	[-0.047]		[0.054]	[0.014]	[-0.048]	[-0.036]	[-0.057]
SGA	-0.012	-0.014	-0.027	-0.038	-0.027	-0.02	-0.004
	(-11.1)	(-15.6)	(-1.2)	(-2.6)	(-6.6)	(-9.2)	(-2.8)
	[-0.012]		[-0.020]	[-0.027]	[-0.018]	[-0.020]	[-0.006]
MgrSenti	0.062	0.043	0.052	0.127	0.095	0.057	0.002
	(8.3)	(5.7)	(1.6)	(3.8)	(7.6)	(4.0)	(0.1)
	[0.932]		[1.347]	[2.298]	[1.396]	[0.792]	[0.035]
Unique	-0.025	-0.028	0.000	-0.008	-0.014	-0.034	-0.027
	(-17.6)	(-19.6)	(0.1)	(-2.5)	(-6.1)	(-12.6)	(-10.6)
	[-0.027]		[0.001]	[-0.012]	[-0.015]	[-0.036]	[-0.029]
MacroProf	-0.037	-0.021	-0.030	0.006	-0.068	-0.010	-0.103
	(-7.6)	(-4.4)	(-1.8)	(0.2)	(-4.9)	(-1.5)	(-8.9)
	[0.001]		[0.010]	[0.000]	[-0.007]	[0.002]	[-0.003]
RnD	-0.027	-0.037	0.135	-0.410	0.035	-0.026	-0.020
	(-24.3)	(-37.1)	(0.7)	(-4.2)	(3.6)	(-9.8)	(-14.5)
	[-0.009]		[0.002]	[-0.008]	[0.002]	[-0.007]	[-0.014]
Losses	-0.012	-0.010	-0.140	-0.067	-0.030	-0.018	-0.003
	(-4.9)	(-4.3)	(-5.9)	(-2.9)	(-4.0)	(-1.4)	(-0.9)
	[-0.006]		[-0.008]	[-0.007]	[-0.005]	[-0.011]	[-0.002]
Number of obs.	113,350	225,468	2,899	8,970	25,972	32,687	42,822
AIC	-34,237.7	-593,733.7	-4,670.1	-9,615.2	-21,971.4	-5,698.0	-3,149.9
BIC	-34,083.5	-593,731.7	-4,574.5	-9,501.6	-21,840.7	-5,563.7	-3,011.3
Adj R-squared	0.19	0.15	0.27	0.29	0.27	0.17	0.18