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COLUMBUS' EGG: STOCK RETURNS ARE THE REAL DETERMINANT OF CAPITAL STRUCTURE

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Abstract

This paper shows that the typical firm's capital structure is not caused by attempts to time the market, by attempts to minimize taxes or bankruptcy costs, or by any other attempts at firm-value maximization. Instead, firms appear to be passive. Thus, current capital structure is best predicted by (past capital structure adjusted for) intervening stock return appreciation. Consequently, one should conclude that observed U.S. capital structure is defacto determined primarily by external stock market influences, and not by deliberate internal corporate decision-making.

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Columbus' Egg is a myth in many non-English languages. Supposedly, at a dinner banquet in honor of Columbus' discovery of the Americas, some guests claimed that anyone could have discovered a continent as big as the New World. In response, Columbus challenged them to balance an egg on the table. Everyone tried and failed. Columbus then cracked the egg on one side, so that it would easily stand. The point of this anecdote is to describe how difficult the obvious can be before it is pointed out.

I Introduction

Inertia is often a difficult phenomenon for empiricists to measure. Observing the same behavior as in the past can simply be due to the fact that the same behavior that was optimal in the past continues to be optimal in the future. Thus, to test a theory of inertia, it is important to identify a situation in which the empiricist can measure the underlying causes that should cause an optimizer to change course.

Capital structure, that is a firm's choice of financing between debt and equity, is a good candidate for testing inertia. Not only are there good data on firm's financing structure and well established theories to give guidance on optimal active firm behavior (Harris and Raviv (1991)), but if the firm does not counteract external stock market forces, they will whipsaw its capital structure.

Moreover, this whipsaw effect is opposite of that suggested by most economic theories of firm value maximization. Firms which experience positive shocks to their enterprise values should not take on lower debt/equity ratios: ceteris paribus, when (most) firms become worth more, they are less likely to go bankrupt and thus have lower expected bankruptcy costs. Weighing these lower expected bankruptcy costs against any preexisting benefits of debt (e.g., from the tax shield), this increase in enterprise value by itself should be sufficient to imply that the firm should readjust, i.e., issue *more* debt in order to retain at least as high a debt/equity ratio as it had before.[1]

[1] "Opportunistic" managerial behavior may be an exception. Baker and Wurgler (2002) argue that firms may issue more equity when share prices increase. However, our results will show that opportunistic behavior is not a major determinant, either. Barclay, Morellec, and Smith (2001) is discussed below.

In contrast, an inert firm which does not respond to positive stock returns—which causes an increase in its public market equity value—will mechanistically find itself with a lower debt/equity ratio. Unlike many other behavioral finance hypotheses (but not all; see Benartzi and Thaler (2001)), the inertia hypothesis has a specific *quantitative* prediction on the debt ratio: the inert firm's debt-equity ratio would change exactly according to the equity value change implied by its historical stock returns. This specificity of the behavioral alternative allows our paper to evaluate the relative importance of inertia vs. a tax-bankruptcy optimization perspective. Our paper is unusual in that our definition of the inert capital structure ratio allows us to focus primarily on the *quantitative* and not just on the qualitative dimension of capital structure choice.

We find that firms experiencing changes in equity market value show no movement to return towards their original debt ratio. Instead, firms' capital structures are practically perfectly in line with that mechanistically induced by their stock returns. The effect is long-lasting, at least 4 to 5 years. We can thus conclude that capital structure is primarily determined exogenously by raw stock returns—and not by one of the many favorite information and tax theories proposed by financial economists, such as managerial optimization with respect to tax rates, bankruptcy costs, earnings, profitability, or even market timing and the exploitation of undervaluation. These theories stand up well in terms of normative value, but they have at best only minor positive descriptive ability.

Observed inertia may not come as a surprise to readers of the pecking order literature (e.g., Shyam-Sunder and Myers (1999), Fama and French (2002)). The primary contribution of our paper relative to the existing empirical literature on capital structure is not so much our pointing out the presence of inertia, as it is our pointing out that corporate inertia causes stock returns to become the primary driver of observed capital structure. Our paper also does not take a stance on whether inertia itself is the outcome of an agency problem, a memory problem (e.g., Hirshleifer and Welch (2002)), an influence problem (e.g., Rajan and Zingales (2000)), financial transaction costs and markets frictions (e.g., Fischer, Heinkel, and Zechner (1989), Leland (1994)), a near-rational or irrational behavior pattern (e.g., Samuelson and

Zeckhauser (1988), Benartzi and Thaler (2001)), or the pecking-order theory (Myers (1984), Myers and Majluf (1984), Shyam-Sunder and Myers (1999)). Thus, we leave the inertia hypothesis under the general rubric of "behavioral finance," which can cover both rational and irrational behavior. For simplicity, we shall just name the two contrasting hypotheses "optimizing" and "inert" behavior, respectively—even if there is a sense in which inert behavior is likely to be itself the result of *some* optimization, be it of firm value or managerial utility. Indeed, Barclay, Morellec, and Smith (2001) even argue that traditional capital structure theory tradeoffs can predict that the optimal capital structure can suggest *lower* debt ratios when firms experience stock price increases. They argue that corporate value changes can be driven by growth options. Still, it is unclear whether the resulting changed optimum can produce the overwhelming one-to-one inertia, which could be dubbed "auto-pilot optimality," especially among value firms.

A reader who objects to our characterization of the alternative as "optimizing" is welcome to replace this phrase with the term "proactive readjustment" instead. Our paper confirms that firms are inert and not readjusting, and points out that their inertia causes stock returns to be the primary determinants of observed capital structure.

Transaction costs also deserve a special mention. In particular, it is plausible that it is expensive for firms to issue equity to reduce their debt ratio in response to falling enterprise valuation. However, a debt ratio can also be reduced by selling off assets to pay off debt or by using former dividends to repurchase debt.[2] More importantly, we find inert behavior also when firms' values increase, and issuing more debt to repurchase equity is unlikely to incur dramatic transaction costs. Nevertheless, as just mentioned, one can relabel inertia to be equivalent to some form of transaction costs, be they real or imaginary. Although Titman (2001) agrees with practitioners that the direct financial capital structure rearrangement transaction costs are small in the United States, simple back-of-the-envelope-calculations (in Section III.B) suggest that transaction costs alone are unlikely to explain inertia.

[2]Because equity values have already fallen significantly, this again should lead to an increase in enterprise value, not a decrease. Thus, absent frictions, a debt-equity swap (e.g., with existing creditors) is now optimal to avoid bankruptcy costs.

Our personal view is that the cause of inertia is consistent with some (avoidable) transaction costs, plus a dual perspective: First, managers may not want to repurchase equity to issue more debt when their equity value has recently increased, be it because they fail to recognize the potential benefits of debt, be it because they feel their equity is now overvalued, or be it that they are now harder to dislodge.[3] Second, managers may want to issue more equity to retire debt when the firm falls on hard times, i.e., when their equity value has dropped. It may be at precisely these times that they feel that their equity is undervalued and thus that issuing more equity is not in their interest. Editorializing, if contracting (not transaction!) costs are modest (Schwartz and Watson (2000)), the natural solution to improving firms' capital structure would be for them to issue securities that convert into debt as their values increase and into equity as their values decrease—the opposite of convertible securities.

Our paper now proceeds as follows: Section II defines our variables. It also explains our use of book values instead of market values, if only to deflect the criticism that our market-based measure has been chosen to suit our purpose. Section III shows our main result in simple classification tables: past stock returns seem to be the primary determinants of observed market-based debt ratios. Section IV uses regressions to decompose capital structure into inertia and readjustment (towards the prior capital structure). We find no readjustment tendency, either in levels or differences. The results are robust to different debt definitions. The section also explores the longevity of the influence of past equity movements before managers begin to take readjustment actions. Even over a 5-year horizon, we find barely any evidence that managers counteract the influence of stock returns. In Section V we explore whether at least some firms are more inclined to rebalance, for example firms that are debt constrained, small firms, value firms, lower volatility firms, firms experiencing only transient changes in market value, higher tax firms, firms with low interest coverage (and negative returns), and firms with low dividend interest ratios. We find any heterogeneity among such classifications to be of second-order

[3] Zwiebel (1995) explicitly considers capital structure, arguing that positive value shocks entrench managers. This means that they have the ability to avoid fully rebalancing with its disciplinary implications.

only. The least inert firms appear to be firms experiencing negative cash flows and negative returns: they do show some mild attempts to reduce leverage. Section VI adds some other variables popular in the literature to our regressions, such as tax rates, uniqueness, growth opportunities, and profitability. It also introduces herding towards industry ratios. The three most important non-inertia components are industry herding, stock return volatility, and tax rates, even though all three are dwarfed in importance by simple inertia. If nothing else, our study shows that the variables prominently featured in some other studies as explanators of capital structures—specifically uniqueness measures, profitability ratios, and book/market values—seem to function only through their mechanistic correlation with (past) returns and equity capitalization. Once we include our mechanistic inertia debt ratio, these variables lose their power. Section VII puts our results into the context of the literature. Section VIII concludes.

II The Data and Variables

Unlike many other economic literatures, the capital structure literature has traditionally entertained both the *Market Value of Equity* and the *Book Value of Equity*. Our tests rely only on the former. Welch and Hoberg (2002) find that the *Book Value of Equity* is a problematic measure: it is a "plug number" to equalize assets and liabilities; it primarily comes about as the result of *past* earnings and *past* depreciation rules (what are tests explaining?); it can be negative and significantly so (especially among international firms); and it has varying levels of correlations with market values (small growth firms have zero correlation; big firms have about 20% to 30% correlation [5% explanatory power for firms' market values]).

One common argument in favor of book value is that it may measure assets in place and/or soon-to-be earnings generated therefrom, while market-value measures far-away growth options. If so, book value may better measure the relative benefits of common debt (useful tax deductions) and relative costs of debt (avoidance of liquidity and bankruptcy concerns). However, preliminary evidence in Welch and Hoberg (2002) indicates that the market value of equity predicts even soon-to-be cash flows better than the book value of equity for most firms, *except* for a set of identifiable "growth firms" where zero may be the best predictor. Thus, the market value may even reflect current assets-in-place better than the book-value.[4]

Define the **a**ctual **d**ebt **r**atio as

$$\mathsf{ADR}_t \equiv \frac{D_t}{D_t + E_t} \quad , \tag{1}$$

where D_t is the book value of debt, defined as the sum of long-term debt and debt in current liabilities (Compustat items [9]+[34]), and E_t is the *market* value of equity (computed from CRSP as the number of outstanding shares times price). (In Table 5, we explore other debt definitions, using also accounts payables [70] and convertible securities [79].) ADR_t is our dependent variable.

Define the **i**nert **d**ebt **r**atio that will result if the firm does nothing, i.e., neither issues nor retires debt or equity, as

$$\mathsf{IDR}_{t-1,t} \equiv \frac{D_{t-1}}{D_{t-1} + E_{t-1} \cdot (1 + \mathsf{R}_{t-1,t})} \quad , \tag{2}$$

where D_{t-1} and E_{t-1} are as defined above, and $\mathsf{R}_{t-1,t}$ is the external stock return experienced by the firm's equity from $t-1$ to t, as obtained from CRSP. (Prices were cross-checked with those reported by Compustat item [199].) Note that our market value at time $t-1$ grossed up by the stock market return from $t-1$ to t can be different from the market value of equity at time t. The differences are dividend payments, share repurchases and equity issuing activity. For example, if the firm pays dividends, the IDR variable will be based on a higher imputed equity value (lower debt ratio) than on its actual equity value (higher debt ratio). By design, IDR moves mechanistically with equity (enterprise) value changes, and not with managerial capital structure choices. Even though IDR relies on *lagged* capital structure, the stock return causes IDR's subscript to read from $t-1$ to t.

[4]To address the concern that our results are not driven by growth option/stock market value changes from the far-off future, our paper explores whether the role of stock returns is equally important among subsets of firms, such as value firms.

Our definition of IDR has the shortcoming that it ignores that the market and book values of debt are also different, but cross-sectionally heterogeneous changes in debt value are *much* smaller than cross-sectionally heterogeneous changes in equity values. Thus, they are likely to be minor in a cross-sectional study (see also Bowman (1980)).

Our tests boil down to asking the question of whether ADR_1 (timed at $t = 1$) is better explained by its own lagged value ADR_0, or whether it is better explained by return-whipsawed lagged capital structure, $\text{IDR}_{0,1}$. Under the NULL hypothesis of readjusting—or at least deliberate—behavior, lagged ADR should reflect a target that managers wish to achieve and thus wish to readjust to.[5]

Finally, we also entertain additional variables, some suggested by the existing literature:

Uniqueness Titman and Wessels (1988) finds that measures of uniqueness help explain capital structure. We follow their definitions:

- RD_0/SLS_0: The ratio of R&D [46] as a function of sales [12]. When missing, in relevant regressions, the firm-year is ignored.
- $\text{SLEXP}_0/\text{SLS}_0$: Selling expense [189] divided by sales [12].

Both variables were truncated at their 5th and 95th percentiles. There are a large number of firms with almost no sales and significant R&D expenses. (We also experimented with other filters, most yielding similar results.)

Taxes The tax-bankruptcy tradeoff is perhaps the defining tradeoff of normative capital structure theory. We explore the role of

- TAXRATE_0^G: The tax rate, kindly provided by John Graham and used in his papers described below in more detail. (The "B" version is based on income before interest expense [as in Graham, Lemmon, and Schallheim

[5] Note that this target adjustment is intra-year: managers can be inert with respect to current-period stock price changes, and instead seek to undo past changes. This will be further investigated below.

(1998), and predicts better]; the "A" version is based on income after interest expense).

- $\mathsf{TAX}_0/(\mathsf{EARN}_0+\mathsf{TAX}_0)$: A more naïve tax-rate, defined as total income taxes [16] (or [317]), divided by earnings plus total income taxes ([53]·[54]+[16]). This variable is truncated to lie within –1 and +2 in order to reduce the influence of some extreme observations.
- $\mathsf{TAX}_0/\mathsf{TA}_0$: Taxes paid, defined as income taxes [16] (or [317]), divided by total assets [6].

Profitability and Growth Profitability and growth have been a variable of some importance in the empirical literature (e.g., Titman and Wessels (1988)). The most common definitions are

- $\mathsf{OI}_0/\mathsf{SLS}_0$, the ratio of operating income [13] divided by sales [12]
- $\mathsf{OI}_0/\mathsf{TA}_0$, the ratio of operating income [13] divided by total assets [6]
- $\mathsf{BVE}_0/\mathsf{MVE}_0$, the ratio of the book value of equity [60] divided by the market value of equity (where book value is used as a a lagged and thus admissible predictor), is often used as a measure of growth opportunities.

We also tried some other definitions, not reported in the tables, but described in the text.

Debt Constraints Interest rate coverage, defined as interest payments divided by operating income before depreciation ([15]/[13]), measures how much leeway firms have in adjusting with their capital structure. We also use RISKY_0, the S&P credit rating.

Firm and Equity Volatility Firm volatility ($\mathsf{FVOL}_{-1,0}$) and equity volatility ($\mathsf{EVOL}_{-1,0}$) are computed as the simple standard deviation of log-returns over the 12 months preceding the measurement period, using CRSP data. Firm volatility is computed by adjusting equity volatility with end-of-period capital structure.

Industry Herding Perhaps, managers are inclined to adjust towards their own industry ratio (Bikhchandani, Hirshleifer, and Welch (1998) provide an overview over some of the voluminous herding literature). Thus, we compute average debt ratios in year 0, either over 2-digit SIC industries or over 3-digit SIC industries. (The industry includes the firm itself.) Our variable is the difference between the firm's debt ratio and this industry's debt ratio. The variables are called $\text{IARD}_0{}^{2d}$ and $\text{IARD}_0{}^{3d}$, respectively.

We sometimes report $\text{NR}_{0,1}$, the S&P index adjusted net return; and $\%\Delta V_{0,1}$, the percent change in the total value of the firm (the sum of debt and the market value of equity).

Finally, we exclude firm-years in which *one year prior to their use* the firm did not have at least a market equity capitalization of the level of the S&P500 divided by 10. In other words, to be included in year 2000 statistics, a firm with a December fiscal year end would have had to have a market capitalization of at least $146.9 million in December 1999 (the S&P500 index finished 1999 at 1,469.25). This selection rule is introduced to avoid the concern that tiny firms are driving the results.

A Descriptive Statistics

Our data is from the period 1975 to 2000, which is determined by the availability of Compustat data. All variables are measured in percent, unless otherwise indicated.

Insert Table 1 Here:
Descriptive Statistics

Table 1 provides the descriptive statistics for the variables used in this paper. Firms typically have debt ratios of about 25% to 30%.[6] Adding accounts payables increases this figure by another 10%. Firms earn about 4% to 5% on assets after depreciation, 12% before depreciation. They averaged about 3.7 times the size of the S&P500 level, i.e., about $4 billion in market cap in recent years. However, the median market cap is significantly smaller. Similarly, the firms' accounting assets

[6] The –18.9% reported for "long-term debt only" is not our mistake, but most likely a Compustat error. It does not affect our results.

averaged $4 billion, but only $400 million in median. 25% of our firm-years have debt ratings, and of these, two-thirds are not of investment grade quality. Firms had an average tax rate of 30-35%, and paid about 2.5 to 3.3% of their assets to Uncle Sam.

The mean R&D divided by sales is 6.6% when truncated at the 5th and 95th percentile. Without truncation, the uniqueness measures are problematic (the mean R&D ratio above is 85% when not truncated!), The median R&D sales ratio is 2.2%. Selling expenses have a mean of 23.2% of sales, and similar medians, but we had to again truncate to eliminate huge outliers at the upper end.

Firms in our sample increased in enterprise value (sum of debt and equity), either through good performance or by raising capital, by about 10% to 20% per year. Raw returns were about 11% to 17% per year, and about –1.6% to 3.6% after subtracting the S&P500 index percent change.

In terms of means, the market value represents about 1.2 times firms' total accounting assets, the book value of equity only about 0.4 times. However, in medians, the difference is less pronounced, because book values have fewer outliers. Debt represents about 20% of firms' assets.

III Simple Evidence

A Bivariate Tables

Insert Table 2 Here:
Categorized Average Value Change, Actual and Implied Debt Ratios, and Returns

The main research question of this paper is whether $\mathsf{IDR}_{0,1}$ or ADR_0 is a better predictor of ADR_1, i.e., whether debt ratios are caused primarily by external stock returns, or by intentional managerial choices to readjust to their old target ratio (or, preferably, to "over-rebalance" it to reach the new tradeoff optimum).

Table 2 categorizes all firm-years into deciles based on net returns $\mathsf{NR}_{0,1}$ in Panel A; lagged debt ratio ADR_0 in Panel B; implied debt ratio $\mathsf{IDR}_{0,1}$ (computed from lagged capital structure and raw stock returns over the year) in Panel C; and current debt ratio ADR_1 (the variable to be explained in this study). Each panel displays ADR_0, ADR_1, $\mathsf{IDR}_{0,1}$, and a set of variables measuring firm size change and stock performance over the year (from 0 to 1).

All panels show that implied debt ratio $\mathsf{IDR}_{0,1}$ lines up better with future debt ratio ADR_1 than does the lagged debt ratio ADR_0. This shows up strongest in Panel A—which gives the best spread of returns (i.e., discrepancy between $\mathsf{IDR}_{0,1}$ and ADR_0)—and in Panel D—which gives the best spread in the variable to be explained. All power to distinguish between readjusting and inert behavior must come from firms experiencing either very positive or very negative returns. For firms with small returns, the two hypotheses are both statistically and economically indistinguishable. (This also applies to our regressions; the ADR and IDR variables are necessarily somewhat collinear.) Spreading either by ADR_0 in Panel B or by $\mathsf{IDR}_{0,1}$ in Panel C does not offer as much power, simply because these panels lump firm-years into the same categories too often.

There is some mild evidence that firms that experience good times are more likely to show a capital structure even more equity-heavy than implied by their returns: if they actively adjust capital structure, they do not do so to rebalance it to return to their earlier ratio or to adopt a higher leverage ratio. Instead, they seem to move further away from their past leverage ratio (Baker and Wurgler (2002)). Firms that experience bad times do show some rebalancing tendency. At least, when they do adjust, they do so to nudge towards their earlier ratios. But first and foremost, firms just do not adjust.

Insert Table 3 Here:

Value Change, Actual and Implied Debt Ratios, and Returns By Net Return: Equal Number of Firms per Year, December Firms Only, and Medians

Table 3 implements some robustness checks on the equivalent tabulation of Panel A in Table 2 (i.e., sorted by net returns $\mathsf{NR}_{0,1}$). In Panel A, we sort an equal number of firms from each year into each decile bin. In Panel B, we use only firms with a fiscal year ending in December, thus avoiding some returns overlap. In Panel C, we report medians instead of means within each cell.

All panels support our basic assertion: firms' capital structure seems to be driven more by external stock returns than by a conscious return to a prior capital structure (and certainly not by an intention to increase leverage as the firm grows).

B The Transaction Cost Interpretation Revisited

First, note that even for large changes in capital structure, firms do very little readjustment. This indicates that inventory-type models (under which one should observe more readjustment for larger deviations from the optimum) are not likely to be of significant explanatory power.

We can perform some rough conservative back-of-the-envelope computations to see if financial transaction costs can account for the inertia. The median firm in our sample had a market capitalization of about \$500 million and a debt-ratio of about 25% (i.e., about \$165 million in debt for \$500 million in equity). Let us presume that such a firm experienced raw returns such that its debt-ratio changed by 5%. Holding market cap constant, this implies that its debt capitalization changed by about \$40 million. If the firm paid as low an interest rate as 6% on its debt, interest would come to roughly $2.5 million over one year. At the median tax rate of about 30%, the adjustment represents a tax saving of $750,000 in the first year, $12 million if it were a perpetuity. The first year tax savings represent about 1.8% of the market capitalization of the debt. This is higher than the transaction costs for short-term debt. Still, it is legitimate to take the view that direct financial transaction costs help explain the short-term inertia of corporations, especially those only moderately affected by their equity returns. Financial transaction costs are less likely to explain multi-year correction failure, especially among firms experiencing extreme stock returns. Similarly, Graham (2000) suggests that even the average firm could gain about 10% *in firm value* if it optimized its debt ratio, a number unlikely to be outweighed by direct transaction costs.

As noted in the introduction, inertia is likely to be the outcome of many potential factors, ranging the spectrum from rational transaction cost, to behavioral irrationality (making it cognitively expensive to react), to automatic optimality. The point of our paper is to point out that it is the observed inertia which causes debt ratios to be determined *primarily* by outside stock returns. This remains the case even if inertia were purely the outcome of transaction costs.

IV Decomposing Influences Using Regressions

A Method

We can use regressions to decompose firms' behavior into "readjustment behavior" (the return to the previous debt ratio) and inert behavior. The test centers on the question of whether $\mathsf{IDR}_{t-1,t}$ offers marginal explanatory power in a regression explaining ADR_t

$$\mathsf{ADR}_t = \alpha_0 + \alpha_1 \cdot \mathsf{ADR}_{t-1} + \alpha_2 \cdot \mathsf{IDR}_{t-1,t} + \epsilon_t \qquad . \tag{3}$$

The hypotheses are

$$\text{Readjustment Hypothesis:} \qquad \alpha_1 \geq 1 \ , \ \alpha_2 \leq 0 \tag{4}$$

$$\text{Perfect Inertia Hypothesis:} \qquad \alpha_1 = 0 \ , \ \alpha_2 = 1 \tag{5}$$

Naturally, firms could also adopt a convex combination strategy. Note that these hypothesis can distinguish only between corporate changes made during the current year.[7]

All regressions are ordinary least squares. Most (or all) of the explanatory power derives from the cross-section of firms, not the time-series of years. When we report "F-M" numbers, we mean the yearly averages of cross-sectional statistics. When we report "pooled" numbers, we simply lump all firms into one large regression.

All standard errors are White-Hansen heteroskedasticity adjusted. The F-M numbers report just yearly averages, even over the standard errors, which are thus most likely overstated by a factor of 5 (because they are averages over 25 years). The reason is that we have so many observations that the economic significance of the coefficients is our first concern, not the statistical significance. The residuals in our regressions have a nice bell shape, and seem generally well behaved.

[7] The referee pointed out that firms could adjust relative to the previous measurement period. In this case, one would observe a negative marginal coefficient on lagged actual debt ratios (mean reversion). If there is no concurrent period adjustment, the coefficient on $\mathsf{IDR}_{t-1,t}$, which measures *concurrent* presence or absence adjustment, would still be 1.

Because most of the power comes from the cross-section, we do not need to be concerned about unit roots. If the regressions set the coefficient on ADR_0 to be equal to 1, it would mean that firms that had a high or low debt ratio in cross-section (i.e., relative) would continue to have a high or low ratio in cross-section the following year. Moreover, if the regression sets the α_1 coefficient to 1, our regressions can be interpreted to be similar to change regressions, as reported, e.g., in Baker and Wurgler (2002).

B The Base Regressions: Are Firms Rebalancing or Inert?

Insert Table 4 Here:
Year By Year Base Regressions

Table 4 reports the results of annual cross-sectional regressions based on Compustat year classifications. (A year is defined from the fiscal year reporting date. Thus, a year begins in July and ends in June of the following year.) In addition, the table reports the averages of the cross-sectional statistics (loosely called F-M) and the results of a pooled regression in which each firm-year is one observation.

Table 4 shows that firms' capital structures are primarily determined by the raw stock returns they experience, not by adjustments to a previous debt ratio. The coefficient on $\mathsf{IDR}_{0,1}$ is close to 1 (100%). In contrast, firms show no tendency to counterbalance market movements in order to return to their prior debt ratio. The coefficient on ADR_0 is practically zero. (Even if it is statistically significantly negative, it is economically close to zero). The constant indicates that all firms showed a *marginal* increase in debt ratios over the sample period. (Variables were not demeaned!) In order to avoid any overlap in the stock returns, Panel B reports just the overall F-M and Pooled statistics when we use only firms with December fiscal year ends. The results are basically the same.[8]

[8] Not reported, there is some mild evidence that firms are slightly more inert in years in which the S&P500 advanced [IDR coefficient of about 106%], and less inert in years in which the S&P500 declined [IDR coefficient of about 98%]. There is no evidence that high or low interest had much influence.

C Changes in Capital Structure

Although the focus of our paper is to explain levels of capital structure—after all, we want to determine the original cause for any "capital structure snapshot" taken by a researcher—it is interesting to see if we can explain *changes* in capital structure, too. Unlike the levels regression, which derives its power primarily from the cross-section of capital structure, the differences regressions derive their power from firms' experiencing changes in their capital structure, either intentional or through the mechanistic influence of stock returns.

A simple regression specification yields

$$(\mathsf{ADR}_t - \mathsf{ADR}_{t-1}) = 0.8\% + (-3.5\%) \cdot (\mathsf{ADR}_{t-1} - \mathsf{ADR}_{t-2}) + \epsilon_t \tag{6}$$

in the F-M specification, without much explanatory power. However, this is not surprising: This regression tests if *lagged* changes in capital structure changes predict future changes. A positive coefficient less than 1 could have indicated slow multi-year reversion, whereas a negative coefficient could have indicated more immediate reversion.

A similar experiment tests if actual changes in capital structure are predicted by *lagged* implied capital structure.

$$(\mathsf{ADR}_t - \mathsf{ADR}_{t-1}) = 0.4\% + 37.1\% \cdot (\mathsf{IDR}_{t-1,t} - \mathsf{IDR}_{t-2,t-1}) + \epsilon_t \quad . \tag{7}$$

For a change regression, the R^2 is a remarkable 15%. The lagged implied change variable is significant. Yet, this is a strange experiment, because we introduce noise in both components of the difference. After all, standing at time $t-1$, we know the $t-1$ ADR when we want to predict its change from $t-1$ to t. Thus, a better experiment initiates both the dependent and the independent variable with the lagged and *known* base variable ADR_{t-1}

$$(\mathsf{ADR}_t - \mathsf{ADR}_{t-1}) = 1.9\% + 100.9\% \cdot (\mathsf{IDR}_{t-1,t} - \mathsf{ADR}_{t-1}) + \epsilon_t \quad . \tag{8}$$

The regression has an R^2 of about 40%. Adding past changes in ADR ($\text{ADR}_{t-1} - \text{ADR}_{t-2}$) to this regression adds no power, and ADR remains irrelevant.

$$(\text{ADR}_t - \text{ADR}_{t-1}) = 1.9\% + 100.6\% \cdot (\text{IDR}_{t-1,t} - \text{ADR}_{t-1}) + (-5.4\%) \cdot (\text{ADR}_{t-1} - \text{ADR}_{t-2}) + \epsilon_t \tag{9}$$

We conclude that next year's deviation from today's capital structure is fully predicted by the "$t-1$ to t stock-return" adjusted lagged capital ratio.

D Does the Form of Debt Matter?

Insert Table 5 Here:

Alternative Debt Definitions

Another interesting question is whether the form of debt matters. After all, we failed to have access to changes in the value of the underlying debt. It was comforting to know that even investment-grade, large firms (i.e., those firms which should show practically no cross-sectional change in the value of their debt in response to changes in the value of their equity) have similar coefficients.

We also know that convertible debt is more like equity. Thus, we would be further comforted if our method determined a lower $\text{IDR}_{0,1}$ coefficient and higher ADR_0 coefficient when we determine a debt ratio based solely on convertible debt. Indeed, Table 5 supports this conjecture. Interestingly, firms do not even seem to adjust their short-term debt ratios in response to changes in their equity value, i.e., where one would expect debt changes to be easiest. Finally, the expansion of debt to include accounts payables (a major source of variability in firms' year to year borrowing) also makes no difference.

E How Long-lasting is Inertia?

In this subsection, we redefine our variables IDR and ADR to be based on capital structure more than just one year ago. Necessarily, IDR is thus relying not on 1-year raw returns, but on multiple-year raw returns:

$$\mathsf{ADR}_{t-a} \equiv \frac{D_{t-a}}{D_{t-a} + E_{t-a}} \quad , \tag{10}$$

$$\mathsf{IDR}_{t-a,t} \equiv \frac{D_{t-a}}{D_{t-a} + E_{t-a} \cdot (1 + \mathsf{R}_{t-a,t})} \quad . \tag{11}$$

This allows us to investigate how persistent the influence of external market returns is, or whether firms eventually readjust in order to return to their former capital structure.

Insert Table 6 Here:
The Longevity of Inertia
/ And the External Determination of Capital Structure

Table 6 shows that ADR begins to show a positive coefficient after about five years. That is, firms finally begin to show some tendency to try to nudge back towards their past debt ratios. Still, despite a decline in its coefficient (and the R^2 of the regression), IDR remains the dominant variable. Even after five years, a time span during which the average equity size more than doubled, we can still explain a remarkable 65% of the capital structure variation across firms! Finally, after ten years, and an average quadrupling in equity value, and after the number of observations has notably dropped off, the coefficient on IDR drops, albeit to a respectable 50%. Both the intercept and the coefficient on ADR (about half of the IDR coefficient) are beginning to play an important role. Thus, firms wish to re-obtain some debt after their market capitalization has sufficiently increased after about 10 years. The R^2 is still a respectable 50%, even though it is now driven by both debt ratio variables, not just the inert ratio.[9]

[9]It could be possible to derive a model to calibrate this time-series coefficient structure to the implied speed of adjustment. This is left for future research.

An interesting thought experiment is to ask how much explanatory power can be attributed to returns alone, without *any* prior knowledge of a firm's debt ratio. That is, even a firm with zero debt some years ago would be presumed to have started with roughly a 40% debt ratio (the sample average),[10] and a negative return would thus incorrectly predict an even higher debt ratio next year—although this would now no longer be the appropriate mechanistic ratio implication (which would still be zero). (Naturally, representing lagged debt ratios alone, ADR is now likely to pick up some power due to managerial nonaction.)

Consequently, we repeated a regressions which considers how well raw returns alone, without even any aid of the companies previous capital structure, can explain capital structure. In a regression similar to that in Table 6, but with IDR replaced with the handicapped variable (using the unconditional debt ratio as the starting value for all firms), over a 5-year horizon, IDR still retains a coefficient of above 60% on all horizons. However, now ADR gains some of the power previously allowed to be allocated to either ADR or IDR. Thus, ADR obtains coefficients of about 90% on the 1-year horizon and 70% to 75% on the 5-year horizon.

F Early Versus Late Adjustment

A related question is whether firms can adjust to returns occurring early in the measurement period, but not late in the measurement period. That is, we could adjust the implied debt ratio only by the returns during the first half or the second half of the time period.

$$\text{First 6 Months:} \quad \mathsf{ADR}_t = 3.0 + 102.8\% \cdot \mathsf{IDR}_{t-1,t} + (-7.3) \cdot \mathsf{ADR}_{t-1} + \epsilon \quad (12)$$

$$\text{Second 6 Months:} \quad \mathsf{ADR}_t = 2.8 + 103.8\% \cdot \mathsf{IDR}_{t-1,t} + (-9.8) \cdot \mathsf{ADR}_{t-1} + \epsilon \quad (13)$$

The fact that there is no difference in coefficients suggests it is not lack of time that prevents corporations from adjusting their capital structure at the last moment. (The same results holds if we use years rather than 6-month periods.)

[10] Naturally, a regression using industry averages as starting points would do even better explaining future capital structure than the unconditional aggregate sample averages.

V Classifications

A reasonable question is whether firms tend not to return to their previous (presumably then optimal) capital structure because they do not need to: maybe they do not pay attention, because they are too large too fail; or because they have high interest coverage ratios; or because they are too profitable to pay attention; or because their tax rate is not high enough to reduce taxes; or because their bankruptcy risk is too low to be meaningfully influenced by value changes.

A Are Debt-Constrained Firms Less Inert?

Insert Table 7 Here:
Pooled Regressions Categorized By Interest Coverage Ratio

Practitioners seem very concerned with interest coverage ratios (Graham and Harvey (2001)). Panel A of Table 7 shows that the firms that are most debt constrained are less inert. Panels B and C show why. Panel B shows that more debt constrained firms seem to take advantage of increasing equity valuations and issue equity (Baker and Wurgler (2002)). But debt constrained firms really show some activity when they experience negative returns, especially when they also experience negative operating cash flows. Still, even their coefficient is only about 80%, not 0%, still indicating inertia; and such negative cash-flows/negative return years only constitute about 5% of all firm-years. This is why, in the grand scheme, inertia and stock returns remain so overwhelming.

B Other Classifications

Insert Table 8 Here:
Pooled Regressions Categorized By Third Variables

Table 8 shows that there is some mild evidence that smaller and more unprofitable firms are less inert than larger and medium profitable firms. However, neither a high tax rate (and profitability), nor the credit rating (bankruptcy risk), the two primary variables used in the theoretical literature, show much influence. Naturally, these classifications also identify firms that have significant assets-in-place, generating much cash flow (today) *and* in the near future. For these firms, the market-value of equity is a better measure of assets-in-place than the book value. But, if anything, it is low-tax firms which are more inclined to readjust their capital structure towards prior levels. As before, "more inclined" is still not "very inclined." The $\mathsf{IDR}_{0,1}$ coefficient is always above 90%, the ADR_0 coefficient is never above 5%. The book or value characteristic of the firm similarly does not matter.

The last two panels of the table consider the role of firm volatility and equity volatility. Because there is such a high correlation between firm size and volatility, firms are first sorted into quintiles based on total assets, and then sorted (within each group of five similar-sized firms) into the five volatility bins. This keeps firm-size constant, and still retains a spread across volatility quintiles. There is some mild evidence that firms that are more volatile are also more inert. However, the effect is miniscule. Even the least volatile firms have coefficients of about 95%—and practically no tendency to revert.

C Do Managers Fail To React Because They Know Something?

Perhaps managers do not target the market-based debt ratio because they believe that market values are transitory. If this is the case, and managers have inside information (so that this belief is justified), we would expect managers to be more eager to embrace capital structure change if the value change later turns out to be permanent. Thus, in the *only* classification using ex-post variables, Table 9 classifies firms into a 5 by 5 grid based on current stock returns (used to compute $\mathsf{IDR}_{0,1}$) and future stock returns. Firms in the left top and right bottom corners are those that experience further changes in the same direction, and would thus benefit even more from a proactive capital structure policy. Firms in the right top and left bottom corners are those that experience return reversals, and would thus least benefit from a more proactive capital structure policy.

Insert Table 9 Here:
By Current and Future Net Returns

Table 9 shows that firms experiencing reversals behave similarly to firms experiencing continuations. In the F-M regressions, there is some mild evidence that firms that dropped for one year and then recovered display slightly *lower* inertia (contrary to what would be the case if managers had expected the reversal). Firms that experience extreme returns with continuation thereof in the following year show almost 100% inertia. In the Pooled regressions, the firms that improved for one year and then deteriorated displayed slightly higher inertia, but both firms that experience extreme return continuations have higher inertia than firms that first experience high return and then low returns.

In any case, there is no dramatic difference among firms insofar as inertia is concerned: if managers fail to act because they believe their stock market returns to be transitory, the rationality of this belief is not borne out by the data.

VI The Influence of Other Variables

Insert Table 10 Here:
The Influence Of Third Variables

Table 10 examines the role of other corporate reasons that may influence capital structure, above and beyond the mechanistic influence of firms' stock returns.

Panel A examines whether taxes induce firms to lever up. The answer is yes. Graham's simulated tax variables perform quite well and are statistically significant. A more naïve tax/earnings rate is less significant. A tax/asset ratio (results not reported) is insignificant.

Panel B explores whether profitability or growth induce a firm to adjust its debt ratio. In sum, we find no important influence of profitability or growth on debt ratios. We also tried earnings over sales, as well as changes in all ratios. None had any important influence on debt ratios.[11] It appears as if previous papers' findings of significance of earnings are primarily due to their correlation with stock returns. Firms with positive earnings are likely to also have experienced positive returns, which in turn mechanistically lower their debt ratios. Similarly, the book/market ratio of equity, an important variable in other studies, has no explanatory power above and beyond the mechanistic influence of returns on capital ratios.

Panel C explores uniqueness Titman and Wessels (1988). Again, there is little economic significance here, even though there is some statistical significance for the F-M RD_0/SLS_0 variable. (And we selected the truncated version of these variables for best results. We also tried changes in uniqueness, and restricting our data set to even larger firms, only. Neither resulted in significance.)

Panel D explores the role of own volatility, both pure equity and implied firm volatility. The regressions indicate that firms experiencing high equity volatilities lower their debt ratios. Although this influence does not moderate the importance of inertia, it does hint that firms may not readjust towards their previous debt ratios, but towards debt ratios conservative enough to be "in line" with their experienced volatilities.

Panel E explores a behavioral hypothesis: that firms are inclined to adjust their capital structure towards that of their industry. Thus, our variable is the difference between the firm's own lagged debt ratio and the industry's lagged debt ratio. The negative coefficients on the $IARD_0$ variables imply that firms are indeed inclined to correct towards their industries' debt ratios. The coefficients are always highly statistically significant, and in terms of importance at least the equals of the tax ratio coefficients.

Thus we conclude that if there are any variables that induce firms to change their capital structure, above and beyond what is caused by mechanistic changes in firms' stock returns, they are first the capital structure in firms' peer industries and firms' own equity volatilities, followed by firms' own tax rates (with higher

[11] We also tried the inverse of interest coverage ratios (earnings can be negative!). It has no marginal explanatory power, primarily due to outliers. When interest coverage is truncated at the 5% and 95%, this inverse gets a positive coefficient of about 0.4, with a T-statistic of about 2 to 3. The coefficients on IDR and ADR remain the same.

tax rates producing higher leverage). Other variables popular in the literature—specifically uniqueness measures, profitability ratios, and book/market values—seem to function primarily through their mechanistic correlation with (past) returns and equity capitalization. Once we include our mechanistic inertia debt ratio, these variables lose power.

VII Related Literature

As far as we know, no study has entertained the use of stock returns to directly compute the resulting capital structure. Stock return adjusted capital structure is the singularly best variable describing actual capital structure, and its coefficient's magnitude permits a *quantitative* and not just a *qualitative* test of inertia.

The most prominent study of capital structure may well be Titman and Wessels (1988). They predict debt (long-term, short-term, and convertible debt) divided either by the market-value of equity or by the book value of debt. (Not surprisingly, some of their results are sensitive to this definition.) Most of the factors they examined did not seem particularly robust even in their own study. Only "uniqueness" (measured by R&D/sales, high selling expenses, and employees with low quit rates) is consistently negative, with T-statistics of around –2 to –3. When they use the market value of equity, profitability (operating income) matters. As pointed out, we believe that this was partly a mechanistic relation, because profitability is correlated with stock return performance.

Fischer, Heinkel, and Zechner (1989) use option pricing theory to explore the role of transaction costs. They find that even small recapitalization costs lead to wide swings in debt ratios. The study is not immediately comparable, because their empirical section predicts capital structure *ranges*, not capital structure itself.

Barclay, Smith, and Watts (1995) find that debt ratios are negatively related to market/book ratios, but—like much of the literature—interpret this to reflect growth opportunities which cause underinvestment concerns due to bankruptcy risk. Barclay, Morellec, and Smith (2001) argue that firms are inert because they do not have to respond: they suggest bankruptcy costs increase in roughly the correct proportion to permit firms not having to respond. Our main point, that stock returns are driving observed capital structure is therefore also raised in their work, albeit in support of a more specific view about inertia than our own.[12]

Rajan and Zingales (1995) offer the definite description of OECD capital structure in light of well-known theories. They, too, find a strong negative correlation between market-book ratios and leverage—but also consider this to be evidence of a proactive choice.[13]

Graham has produced a series of influential papers on the tax aspects of capital structure. In Graham (2000), he laments that especially large firms seem to fail taking advantage of the tax shelter provided by debt. Our own paper merely points out that this is a symptom from some underlying cause of inertia: firms capital structure is not driven by active considerations (tax or otherwise), but by external market values. As firms become larger and larger, they continue to fail even in returning to, much less in updating their debt ratio to where it should be. Graham, Lemmon, and Schallheim (1998) use an almost identical dependent variable as we do (except they add operating leases to the denominator). But they focus on tax rates, and thus do not include our inertia variable as a control.[14]

There is also a large literature on what determines the issuing activity of corporations. This is a very interesting topic in itself. However, as our paper shows, it is not that issuing activity is interesting *because* it is of prime importance as a determinant of capital structure. Issuing activity could and should potentially be

[12] The fact that we observe *similar* coefficient values among large firms with high current earnings and low leverage (who are unlikely to go bankrupt) as we find among small firms with low current earnings and high leverage, renders this perspective alone less plausible than a more general view of inertia (which includes this perspective). In addition, we find that book/market values disappear as an important predictor once the mechanistic influence of stock returns on debt ratios is accounted for.

[13] Because Japan has an insignificant market-book coefficient, it would be interesting to see if these firms are similarly inert. In addition, our finding that market-book ratios function only insofar as they are picking up mechanistic changes in equity value applies only to U.S. data. It would be interesting to find out whether this is also the case in their international sample.

[14] Graham, Lemmon, and Schallheim (1998) do mention transaction costs as a reason for the significance of a market-book ratio variable. Thanks to John Graham's generous provision of his simulated tax rate data, we were able to confirm his findings.

such a determinant, but empirically it is not. Still, the theoretical hypothesized influences for issuing activity are the same as those for capital structure, and thus such studies are related to our own.

Our evidence is also in line with the survey evidence presented in Graham and Harvey (2001): queried executives apparently care little about most theories of optimal capital structure. To the extent that they do care *when actively issuing*, managers claim it is about financial flexibility and credit ratings for debt issues; and about earnings dilution and past stock price appreciation for equity issues. On the other hand, executives claim that they issue equity to maintain a target debt-equity ratio, especially if their firm is highly levered. We find little evidence thereto. Graham and Harvey (2001) even imply our inertia hypothesis, asking executives for the importance of rebalancing when their equity value changes—and find that executives attach no importance thereto. Managers also do not claim to be much concerned with transaction costs.

Baker and Wurgler (2002), Havakimian, Opler, and Titman (2001) and Shyam-Sunder and Myers (1999) are the closest relatives of our paper. The first is interested primarily in the role of stock returns on inducing issuing activity, while the latter are interested in the readjustment towards an optimal capital ratio.

Baker and Wurgler (2002) investigates the influence of past market returns. But their point is to argue that past market returns influence the *active* financing decisions of firms. This means that they do not explore the direct role of the past stock returns themselves (just their induced financing choices) in what determines firms' capital structures. Our paper is not rejecting their view point. On the contrary, we believe that firms may be acting just as Baker and Wurgler (2002) suggest. Our point is merely that firms' proactive behavior is merely the second-order effect. Indeed, if the Baker and Wurgler (2002) effect had been of primary importance in the set of firms in our study, we should have seen IDR coefficients significantly above 1 (and negative ADR coefficients). But, the data do not suggest a significant tendency of firms to “overshoot.”[15,16]

Havakimian, Opler, and Titman (2001) find a mild tendency of firms to return to a target debt-equity accounting ratio. But, they use only accounting ratios in their first-stage regressions in an attempt to establish a target debt-equity ratio. By using a market-based value of equity rather than a debt-asset ratio based variable, and by introducing our direct inertia debt target ratio, we find that it subsumes almost all explanatory power of their variables as a determinant of economic capital structure.[17] Thus, we come to quite a different conclusion: we believe that there is very little capital structure adjustment. In fairness, Havakimian, Opler, and Titman (2001) are more interested in what firms ultimately choose to issue *when* they choose to issue. And, like Baker and Wurgler (2002), they find that high stock returns surprisingly lead firms to issue more equity, not more debt. Our paper is more interested with the failure of firms to choose anything at all, and the consequent strong relation between lagged stock returns and capital structure.[18]

Shyam-Sunder and Myers (1999) are similarly interested in whether issuing activity leads to a return towards historical debt ratios (defined in term of book values). They find little evidence that firms make proactive choices to return to their historical debt ratios. The pecking order hypothesis by Myers and Majluf (1984) and Myers (1984)) deserves a brief diversion: even though pecking-order is the single most appealing explanation of inertia, it is not the only theory.[19] Further, although Myers and Majluf (1984) is formulated in terms of an inside information component

[15]As already mentioned, the *active timing* hypothesis is also the primary “theory” not predicting a constant or increasing debt ratio as firm value increases. Although this theory is a more difficult test, given that the mechanistic relation is so strong, even this active theory is not going to be a first-order determinant of capital structure levels.

[16]We also tested if our tests mask expansion of firms in response to increasing equity returns: after all, they could issue both equity and debt. In the top decile of firms experiencing high stock returns, we found some minor evidence thereto. The emphasis is on *minor*.

[17]Their Table 3 regressions report OLS R^2 of about 0.4. Our debt ratio would not assume *all* power if we used accounting capital structure, though it would still be important because earnings correlate with stock returns. Then, again, it is not clear what the accounting debt/asset ratio really means, as described in Section II.

[18]Fama and French (1998) does not predict equity ratios, but firm value. (or firm value minus assets) instead.

[19]The elimination of agency constraints when firms receive more cash can explain the negative stock price reaction at the issuance of equity.

specifically about assets-in-place, managers probably have *more* relative inside information about their future plans than they have about the current position of the firm. In any case, the primary contribution of our paper relative to the existing pecking order empirical literature is not so much our pointing out the presence of inertia (e.g., Fama and French (2002)), as it is in our pointing out that this corporate inertia causes stock returns to become the primary driver of observed capital structure.

Finally, there is another corporate finance paper similar in spirit to our own: Thaler, Michaely, and Benartzi (1997) find that, in contrast to optimizing theories of dividend payments, managers seem to pay dividends more in response to *past* earnings than in response to an expectation of future earnings. Thus, their actions are better explained as a non-rational behavioral status-quo bias. The evidence presented in our paper is in line with a view of the CFO acting less in line with value optimization and more in line with the status quo.

VIII Conclusion

This paper has introduced a specific variable measuring inertia, which allowed us to explore its magnitude, explanatory power, and longevity, rather than just its directional influence. In the capital structure context, inert behavior leads to debt ratios whipsawed by external stock returns. We found that firms showed little inclination to try to counteract the whipsawing in order to return to an optimal (i.e., previously chosen) debt ratio. The inertia effects are orders of magnitude greater than any activist choices or any third variables proposed in the literature. Thus, we conclude that firms' capital structures reflect less a deliberate (tax-bankruptcy or timing) optimization policy than a primarily inert structure. The main contribution of our paper is that

Inertia causes observed corporate capital structure to be primarily driven by external stock returns, and not by managerial activity.

Capital structure is what it is simply because managers do not adjust their capital structures in response to stock returns, which naturally typically accrue to and thus increase firms' equity values in the absence of rebalancing action.

Consequently, to explain capital structure, "all" one needs to do is to predict raw returns. Or, put differently, if a corporate theorist wanted to use internal corporate data to explain a firm's capital structure, any such influence would first and foremost have to flow through the ability of such variables to predict the firm's stock return.

In contrast to inertia, most theories of capital structure optimization, which trade off the default disadvantage against *any* advantage of debt, stand no chance. In most such theories, growth (an increase in the firm's equity or enterprise value) should not induce a decrease but an increase in the firm's leverage ratio. Such theories of optimization are normative, but not descriptive: observed capital structure choice is inert to the point that we can usually detect *practically no* movement towards such a more optimal capital structure in response to firm value changes.

Perhaps this is also why the average finance curriculum spends more time on optimal theories than on describing the actual capital structure evidence.

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Table 1. Descriptive Statistics

Abbrev	Description	Mean	Std.Dev.	Min	Qrt1	Median	Qrt3	Max	Autocorr	N
	Main Debt Ratios									
ADR_1	Actual Debt Ratio	29.4	25.3	0.0	6.8	24.2	46.7	100.0	78.4	51,364
$IDR_{-1,0}$	Implied Inertia Ratio, 1 Year Prior	27.4	24.8	21.5	99.9	5.4	0.0	43.9	90.7	51,364
$IDR_{-2,0}$	Implied Inertia Ratio, 2 Years Prior	25.9	24.2	19.4	100.0	5.0	0.0	41.1	91.4	45,494
$IDR_{-3,0}$	Implied Inertia Ratio, 3 Years Prior	24.5	23.5	17.6	100.0	4.6	0.0	38.4	91.8	40,269
$IDR_{-4,0}$	Implied Inertia Ratio, 4 Years Prior	23.2	22.9	16.2	100.0	4.3	0.0	35.8	92.0	35,684
$IDR_{-5,0}$	Implied Inertia Ratio, 5 Years Prior	22.0	22.3	14.9	100.0	4.0	0.0	33.5	92.1	31,768
	Alternative Debt Definitions									
ADR^{+ACCT}	Adding Accounts Payables	37.2	28.1	0.0	12.7	32.4	56.6	99.9	93.2	50,421
ADR^{CV}	Convertible Only	2.5	8.9	0.0	0.0	0.0	0.0	99.4	82.1	46,004
ADR^{LT}	Long-Term Only	24.1	23.1	-18.9	3.4	18.1	38.5	99.9	89.3	51,364
ADR^{ST}	Short-Term Only	11.0	19.0	0.0	0.3	3.0	11.6	99.9	88.1	51,364
	Profitability and Growth									
OI_0/SLS_0	Operating Income/Sales	-45.0	4,846.6	-9918.0	8.4	14.4	23.9	1,113.7	6.5	49,995
OI_0/TA_0	Operating Income/TA	12.4	20.3	-1,177.2	6.7	12.9	18.7	660.0	79.7	50,117
BVE_0/MVE_0	Equity Book Value/Market Value/100	1.4	14.5	-256.2	0.3	0.6	0.9	1605.4	50.2	51,346
	Firm Size									
$MCAP_0/SP500_0$	Market Cap divided by S&P Index	3.7	14.4	0.1	0.2	0.6	2.2	579.7	94.7	51,364
$Assets_0$	(TA) Total Assets (in million $)	3,911.9	20,263.4	0.2	116.4	408.2	1,841.9	902,210.0	98.1	51,364
	Credit and Interest Coverage									
$RISKY_0$	Not Investment Grade	70.9	45.4	0.0	0.0	1.0	1.0	1.0	92.3	13,180
ICR_{-1}	Interest Coverage Ratio	27.8	26.4	-225,300	5,000,200	3.5	12.0	24.5	-0.1	44,333
	Taxes									
$TAXRATE_0^{GA}$	Graham's Tax-Rate A	28.1	16.4	0.0	16.5	34.0	37.2	51.	71.5	35,169
$TAXRATE_0^{GB}$	Graham's Tax-Rate B	35.0	10.2	0.0	34.	35.	44.0	51.	77.9	33,883
$TAX_0/(EARN_0+TAX_0)$	Naïve Tax Rate	31.6	27.8	-100.0	24.3	36.4	42.7	200.0	23.4	51,259
TAX_0/TA_0	Asset-Normalized Taxes	3.3	4.0	-54.1	0.5	2.5	5.2	46.2	66.3	51,306
	Uniqueness									
RD_0/SLS_0	R&D/Sales	6.6	11.5	0.0	0.0	2.2	7.1	53.0	93.5	23,929
$SLEXP_0/SLS_0$	Selling Expense/Sales	23.2	15.0	-5.3	12.2	20.4	29.9	70.0	95.2	40,216
	Industry Ratios									
$IARD_0{}^{2d}$	Deviation from 2-digit SIC ADR	-2.3	21.2	-64.3	-16.8	-6.3	10.3	82.1	89.4	45,494
$IARD_0{}^{3d}$	Deviation from 3-digit SIC ADR	-2.5	20.2	-64.1	-15.9	-6.1	9.2	88.4	88.4	45,494
	Value Changes and Returns									
$\%\Delta V_{0,1}$	Corporate Value Change	119.1	62.9	0.1	91.7	109.3	132.2	2,903.9	1.6	51,364
$R_{0,1}$	Raw Stock Return$_{t=0,1}$	17.3	55.9	-99.1	-12.5	10.8	36.8	1,543.8	-0.5	51,364
$NR_{0,1}$	Raw Return$_{0,1}$ - $\%\Delta s\&p_{0,1}$	3.6	54.9	-123.9	-25.4	-1.6	23.1	1,524.3	4.2	51,364
$EVOL_{-1,0}$	Equity Volatility (Log Returns)	10.1	5.4	0.5	6.3	8.9	12.6	73.3	57.8	51,364
$FVOL_{-1,0}$	Firm Volatility	7.5	5.5	0.0	3.8	6.2	9.8	61.9	71.1	51,364
	Background Definitions									
MVE/TA	Equity Market Value/TA	123.7	258.9	0.0	33.1	67.0	133.5	13,933.0	77.1	51,364
BVE/TA	Book Value/TA	43.8	25.3	-536.9	28.2	43.6	61.3	100.6	88.7	51,346
TDBT/TA	Debt/TA	23.6	19.8	0.0	7.6	21.1	35.3	423.4	86.8	51,364

Table 2. Categorized Average Value Change, Actual and Implied Debt Ratios, and Returns

Panel A: Categorized by Net Return ($NR_{0,1}$)

	$ADR_0 \rightarrow$	ADR_1	$\leftarrow IDR_{0,1}$	$\%\Delta V_{0,1}$	$R_{0,1}$	$NR_{0,1}$
1	21.6	32.8	30.5	68.0	-49.6	-67.9
2	25.8	32.0	29.7	88.8	-23.4	-39.8
3	27.1	30.9	28.7	97.9	-10.2	-25.5
4	28.4	30.9	28.8	104.5	-1.3	-14.9
5	29.1	30.5	28.3	110.0	6.7	-5.9
6	30.5	30.4	28.5	115.3	15.0	2.7
7	30.7	29.5	27.7	121.4	23.5	12.0
8	31.9	29.4	27.7	128.9	34.4	23.3
9	30.8	26.7	25.1	145.1	52.3	40.8
10	28.0	20.4	19.2	210.9	126.0	111.7

Panel B: Categorized by To Be Lagged Debt Ratio (ADR_0)

	$ADR_0 \rightarrow$	ADR_1	$\leftarrow IDR_{0,1}$	$\%\Delta V_{0,1}$	$R_{0,1}$	$NR_{0,1}$
1	0.0	1.8	0.0	123.7	17.0	2.1
2	1.5	4.1	1.7	122.5	14.6	0.6
3	6.0	8.9	6.3	122.4	17.0	3.3
4	12.2	15.3	12.3	121.7	16.2	2.3
5	19.2	21.6	18.9	120.0	16.3	2.5
6	27.0	28.7	26.2	119.0	15.7	1.9
7	35.7	36.3	34.2	117.8	16.9	3.2
8	45.6	44.8	43.4	115.8	17.7	4.3
9	58.3	56.4	55.4	115.0	19.1	6.3
10	78.5	75.6	75.8	113.1	22.9	10.0

Panel C: Categorized by Implied Debt Ratio ($IDR_{0,1}$)

	$ADR_0 \rightarrow$	ADR_1	$\leftarrow IDR_{0,1}$	$\%\Delta V_{0,1}$	$R_{0,1}$	$NR_{0,1}$
1	0.0	1.8	0.0	130.5	22.9	7.8
2	1.7	3.6	1.4	136.2	28.0	13.0
3	6.7	8.1	5.5	130.2	26.5	12.0
4	13.2	14.1	11.3	124.1	22.9	8.5
5	20.1	20.5	17.9	119.4	19.1	5.2
6	27.9	28.1	25.4	117.1	17.9	4.3
7	35.8	36.3	33.9	111.9	13.7	0.1
8	45.4	45.5	44.0	109.4	12.0	-1.1
9	57.0	57.8	56.7	108.2	9.1	-3.0
10	76.0	77.8	78.2	104.0	1.3	-10.3

Panel D: Categorized by Debt Ratio To Explain (ADR_1)

	$ADR_0 \rightarrow$	ADR_1	$\leftarrow IDR_{0,1}$	$\%\Delta V_{0,1}$	$R_{0,1}$	$NR_{0,1}$
1	0.9	0.0	0.9	129.5	25.4	10.3
2	3.1	1.8	2.6	133.4	29.1	14.0
3	8.2	6.8	6.9	125.4	25.7	11.5
4	14.6	13.3	12.5	122.5	23.8	9.4
5	20.7	20.4	18.4	118.2	19.7	5.4
6	27.7	28.3	25.6	114.3	16.3	2.7
7	35.5	37.0	33.7	111.9	13.2	-0.2
8	43.9	46.9	42.8	111.3	10.6	-2.7
9	55.4	59.3	55.3	110.4	8.1	-4.0
10	73.8	79.7	75.8	114.1	1.6	-10.1

Explanation: The sample are the 1975–2000 Compustat tapes, excluding tiny firms (see Page 5). $\%\Delta V_{0,1}$ is the relative change in the enterprise value (market value of equity plus debt). ADR_0 is the lagged debt ratio, defined as debt (the sum of long-term debt and debt in current liabilities) divided by debt plus the market value of equity. ADR_1 is the current debt ratio, i.e., the variable to be explained. $IDR_{0,1}$ is the implied debt ratio, i.e., the lagged debt ratio but with the market value of equity grossed up by the raw stock return over this current year (called $R_{0,1}$). $NR_{0,1}$ subtracts the return of the S&P500 index (without dividends) from the raw return. The table reports means. All variables are quoted in percent.

Interpretation: The Implied Debt Ratio ($IDR_{0,1}$) lines up much better with the Actual Debt Ratio (ADR_1) than with the lagged debt ratio (ADR_0). The clearest difference between the explanatory abilities of the two measures emerges among firms with extreme returns ($R_{0,1}$) and when firms are sorted based on the value to be explained (ADR_1). Panel A: The implied debt ratio is a good predictor both on the top end and at the bottom end, even though firms seem to "correct" slightly when they experience good times (raise some debt) and "overshoot" when they experience bad times (raise some debt, too). Panel D: Firms predicted to have the highest debt ratio seem to raise their debt ratio even more than predicted by the implied ratio.

Table 3. Value Change, Actual and Implied Debt Ratios, and Returns By Net Return: Equal Number of Firms per Year, December Firms Only, and Medians

Panel A: Equal Number of Firms

	$ADR_0\rightarrow$	ADR_1	$\leftarrow IDR_{0,1}$	$\%\Delta V_{0,1}$	$R_{0,1}$	$NR_{0,1}$
1	23.1	33.7	31.7	68.3	-48.0	-62.0
2	25.5	31.6	29.4	87.4	-23.6	-37.5
3	27.8	31.8	29.6	97.3	-11.0	-24.7
4	29.2	31.8	29.6	103.6	-1.7	-15.3
5	29.5	30.8	28.6	110.1	6.6	-6.8
6	30.9	30.8	28.9	115.0	14.8	1.7
7	30.7	29.5	27.6	122.5	23.9	10.7
8	30.9	28.4	26.6	129.8	35.4	22.2
9	29.7	25.5	23.9	146.2	53.7	40.0
10	26.7	19.7	18.4	210.5	122.9	107.8

Panel B: December Fiscal Year End Firms Only

	$ADR_0\rightarrow$	ADR_1	$\leftarrow IDR_{0,1}$	$\%\Delta V_{0,1}$	$R_{0,1}$	$NR_{0,1}$
1	23.9	35.3	33.1	69.5	-49.3	-67.4
2	27.9	34.0	31.6	91.2	-21.5	-38.5
3	30.0	33.7	31.4	100.3	-8.1	-24.2
4	30.8	33.1	31.0	105.4	0.1	-13.7
5	32.2	33.5	31.2	111.2	7.9	-4.8
6	32.8	32.5	30.6	115.9	15.9	3.3
7	33.3	31.9	30.1	120.6	23.5	12.0
8	35.5	32.8	31.1	127.4	33.4	22.6
9	34.0	30.1	28.2	141.3	49.9	38.8
10	31.5	23.6	22.4	201.1	117.3	104.6

Panel C: Medians

	$ADR_0\rightarrow$	ADR_1	$\leftarrow IDR_{0,1}$	$\%\Delta V_{0,1}$	$R_{0,1}$	$NR_{0,1}$
1	14.3	29.1	24.7	67.1	-48.0	-61.2
2	19.0	27.3	23.5	86.1	-22.6	-36.7
3	22.0	28.0	24.5	94.7	-8.9	-24.6
4	24.3	28.1	24.8	101.4	0.6	-15.1
5	25.4	27.4	24.3	106.7	8.5	-6.1
6	27.3	27.3	24.6	111.4	15.8	1.9
7	26.8	25.6	22.9	117.9	24.4	10.0
8	26.4	23.3	21.3	126.1	35.5	20.6
9	24.4	19.7	17.4	140.7	54.3	38.0
10	18.8	11.7	10.1	182.1	100.0	83.8

Explanation: See Table 2.

Interpretation: The main result from Table 2 is robust: the implied debt ratio ($IDR_{0,1}$) lines up better with the actual debt ratio (ADR_1) than the lagged debt ratio (ADR_0).

Table 4. Year By Year Base Regressions

year	con.	$IDR_{0,1}$	ADR_0	σ_c	σ_{IDR}	σ_{ADR}	R^2	N
1976	1.6	104.1	-4.3	0.3	4.5	4.2	95.7	804
1977	3.0	98.2	-0.4	0.3	6.1	5.9	93.5	1,292
1978	3.9	99.9	-1.9	0.3	5.1	5.2	92.2	1,414
1979	3.8	106.6	-7.7	0.3	3.9	3.9	93.2	1,498
1980	2.7	103.3	-5.1	0.3	3.1	3.2	93.6	1,535
1981	2.7	100.7	-2.3	0.3	3.0	3.0	93.2	1,511
1982	2.9	105.4	-8.6	0.3	3.2	2.9	92.0	1,580
1983	1.4	100.9	-4.3	0.3	3.5	3.3	91.0	1,652
1984	3.4	97.9	-2.6	0.3	4.9	4.7	88.0	1,763
1985	3.2	83.2	11.9	0.3	4.2	3.7	88.4	1,786
1986	4.0	86.0	7.3	0.3	4.3	4.2	84.3	1,839
1987	3.7	99.8	-6.0	0.3	4.2	4.5	86.3	1,844
1988	4.0	78.9	15.7	0.3	7.0	6.4	85.0	1,855
1989	3.4	99.2	-2.7	0.3	3.7	3.7	88.3	2,006
1990	3.0	92.3	3.8	0.3	4.5	4.8	91.0	2,010
1991	1.8	98.9	-2.9	0.3	7.0	6.5	92.2	1,932
1992	1.7	108.3	-12.2	0.2	3.5	3.5	91.6	2,018
1993	1.6	96.4	-0.2	0.2	5.6	5.3	92.0	2,204
1994	2.4	95.4	1.8	0.2	4.3	4.3	91.1	2,642
1995	2.9	102.5	-6.4	0.2	3.6	3.4	89.3	2,925
1996	2.3	89.9	7.1	0.2	4.7	4.4	89.9	3,124
1997	2.7	90.9	6.2	0.2	3.1	2.9	89.3	3,186
1998	3.7	99.4	-2.3	0.2	3.4	3.5	88.1	3,288
1999	3.2	108.0	-10.5	0.2	2.1	2.3	91.3	2,977
2000	2.4	96.6	0.8	0.2	2.3	2.3	91.4	2,679
F-M	2.9	97.7	-1.0	0.3	4.2	4.1	90.5	25
Pooled	2.8	98.9	-2.1	0.1	0.8	0.8	90.4	51,364

Panel B: December Firms Only

year	con.	$IDR_{0,1}$	ADR_0	σ_c	σ_{IDR}	σ_{ADR}	R^2	N
F-M	3.0	96.6	0.0	0.3	5.2	5.1	91.0	25
Pooled	3.0	98.4	-1.6	0.1	0.9	0.9	90.8	33,709

Explanation: The sample are the 1975–2000 Compustat tapes, excluding tiny firms (see Page 5). The table presents the results of annual cross-sectional regressions explaining firms' debt ratios (debt divided by debt plus the market value of equity) with the "inert" debt ratio IDR (where the lagged market value of equity is grossed up by the raw total stock return over the year) and the firm's own lagged debt ratio ADR. If firms follow an optimizing process in which higher firm value should induce higher debt ratios, the coefficient on ADR should be 100 (percent). If firms are entirely inert, which means that their debt ratio is driven mechanistically by stock returns, then the coefficient on IDR should be 100 (percent). Fama-MacBeth statistics (F-M) report column averages. Pooled Regressions (Pooled) simply use all observations, regardless of year, in one regression. All standard deviations are heteroskedasticity adjusted.

Interpretation: Firms are practically inert. They show no tendency to return to their prior debt ratios in response to changing firm values.

Table 5. Alternative Debt Definitions

Benchmark Case: Long-Term Debt and Debt in Current Liabilities (ADR)

Method	con.	$\mathrm{IDR}_{0,1}$	ADR_0	σ_c	σ_{IDR}	σ_{ADR}	R^2	N
F-M	2.9	97.7	-1.0	0.3	4.2	4.1	90.5	25
Pooled	2.8	98.9	-2.1	0.1	0.8	0.8	90.4	51,364

Adding Accounts Payables (ADR^{+ACCT})

Method	con.	$\mathrm{IDR}_{0,1}$	ADR_0	σ_c	σ_{IDR}	σ_{ADR}	R^2	N
F-M	3.0	95.8	1.2	0.3	3.3	3.3	93.9	25
Pooled	2.9	97.0	0.2	0.0	0.6	0.6	90.5	51,357

Long-Term Debt Only (ADR^{LT})

Method	con.	$\mathrm{IDR}_{0,1}$	ADR_0	σ_c	σ_{IDR}	σ_{ADR}	R^2	N
F-M	2.6	90.8	4.8	0.3	5.5	5.2	87.5	25
Pooled	2.6	92.6	3.2	0.0	1.1	1.0	87.4	51,364

Convertible Debt Only (ADR^{CV})

Method	con.	$\mathrm{IDR}_{0,1}$	ADR_0	σ_c	σ_{IDR}	σ_{ADR}	R^2	N
F-M	0.4	83.0	7.4	0.1	17.8	16.7	75.8	25
Pooled	0.4	84.4	5.6	0.0	3.6	3.4	76.1	45,832

Short-Term Debt Only (ADR^{ST})

Method	con.	$\mathrm{IDR}_{0,1}$	ADR_0	σ_c	σ_{IDR}	σ_{ADR}	R^2	N
F-M	1.4	97.4	-2.7	0.2	11.9	11.3	82.9	25
Pooled	1.4	94.7	-0.2	0.0	2.3	2.1	82.7	51,364

Explanation: For a description, see Table 4. This table differs in that it uses different definitions of debt.

Interpretation: Because the value of convertible debt covaries with the value of equity, and because we do not have market valuations for convertible debt, this table can only serve as a check for the quality of the regressions. We should see lagged implied debt ratios (IDR) have lesser influence on the ratio of convertible debt divided by convertible debt plus the market value of equity. Indeed, this is borne out by these regressions.

Table 6. The Longevity of Inertia
/ And the External Determination of Capital Structure

Non-Overlapping Regressions								
Method	con.	$IDR_{t-a,t}$	ADR_{t-a}	σ_c	σ_{IDR}	σ_{ADR}	R^2	N
1-Year F-M	2.9	97.7	-1.0	0.3	4.2	4.1	90.5	25
2-Year F-M	5.5	96.3	-2.9	0.4	4.2	3.9	81.8	12
3-Year F-M	7.0	87.1	4.6	0.4	4.3	3.9	76.1	8
4-Year F-M	8.6	86.0	4.0	0.5	4.1	3.6	70.4	6
5-Year F-M	9.6	84.1	6.7	0.6	4.0	3.6	68.6	5
10-Year F-M	13.5	63.7	22.1	0.9	4.7	3.3	52.1	2
1-Year Pooled	2.8	98.9	-2.1	0.1	0.8	0.8	90.4	51,364
2-Year Pooled	5.4	97.7	-4.1	0.1	1.1	1.0	81.8	23,328
3-Year Pooled	6.9	90.4	1.9	0.2	1.4	1.2	76.0	14,330
4-Year Pooled	8.5	88.3	2.1	0.2	1.7	1.5	69.8	9,811
5-Year Pooled	9.8	85.2	4.4	0.3	1.8	1.5	66.5	7,170
10-Year Pooled	13.4	63.5	22.1	0.6	3.3	2.4	51.8	2,167

Overlapping Regressions								
Method	con.	$IDR_{t-a,t}$	ADR_{t-a}	σ_c	σ_{IDR}	σ_{ADR}	R^2	N
1-Year F-M	2.9	97.7	-1.0	0.3	4.2	4.1	90.5	25
2-Year F-M	5.3	95.7	-1.9	0.4	4.0	3.8	82.4	24
3-Year F-M	7.2	90.1	1.5	0.5	4.2	3.8	75.7	23
4-Year F-M	8.4	84.0	5.8	0.5	4.3	3.7	70.5	22
5-Year F-M	9.3	77.8	10.4	0.6	4.6	3.7	65.7	21
10-Year F-M	11.8	50.0	28.4	0.8	6.0	3.7	46.9	20
1-Year Pooled	2.8	98.9	-2.1	0.1	0.8	0.8	90.4	51,364
2-Year Pooled	5.3	97.1	-3.1	0.1	0.8	0.7	82.2	45,494
3-Year Pooled	7.1	91.6	0.2	0.1	0.8	0.8	75.2	40,269
4-Year Pooled	8.3	84.6	5.2	0.1	0.9	0.8	69.6	35,684
5-Year Pooled	9.2	77.6	10.2	0.1	1.0	0.8	64.5	31,768
10-Year Pooled	11.4	48.3	29.6	0.2	1.5	0.9	46.7	17,850

Explanation: For a basic description, see Table 4. This table differs in that it explains debt ratio using debt ratios lagged by a years. Thus $IDR_{t-a,t}$ uses a year raw stock returns to gross up the a year lagged debt ratio in a mechanistic fashion (determined by stock price movements).

Interpretation: $IDR_{t-a,t}$ continues to dominate lagged debt ratios even after five years. However after about four years, companies begin to try to somewhat correct some of their capital structure back to a prior ratio (not determined purely by the stock market change). Still, the coefficient of ADR is far below that of IDR. Moreover, it is outright remarkable that 65% to 70% of the variation in capital structure after 5 years can still be explained primarily by non-action.

Table 7. Pooled Regressions Categorized By Interest Coverage Ratio

Panel A: By ICR_{-1}: Interest Coverage

$\frac{\text{Interest}}{\text{Cash Flow}}$		con.	$\text{IDR}_{0,1}$	ADR_0	σ_c	σ_{IDR}	σ_{ADR}	R^2	N
→ Unconstrained	0%... 5%	2.6	109.1	-9.3	0.1	7.1	6.8	56.1	8,454
	5%...10%	3.4	109.9	-12.5	0.2	2.3	2.3	74.9	6,606
	10%...20%	3.1	104.0	-6.5	0.2	1.7	1.6	82.6	10,319
	20%...30%	3.5	103.0	-7.0	0.3	1.3	1.4	84.7	5,980
	30%...40%	3.5	101.6	-6.7	0.5	2.3	2.4	83.3	3,146
	40%...60%	2.0	101.6	-5.0	0.5	1.9	2.0	85.8	2,642
Constrained 60%...		1.7	93.4	2.0	0.5	2.4	2.3	86.1	2,513
	Neg Cash Flow < 0%	1.6	85.6	6.0	0.1	3.8	3.7	81.9	4,673

Panel B: By ICR_{-1}: Interest Coverage and Positive Returns in IDR Computation

$\frac{\text{Interest}}{\text{Cash Flow}}$		con.	$\text{IDR}_{0,1}$	ADR_0	σ_c	σ_{IDR}	σ_{ADR}	R^2	N
→ Unconstrained	0%... 5%	2.0	96.4	4.9	0.1	7.7	7.5	60.9	5,216
	5%...10%	2.8	100.9	-2.9	0.2	4.3	3.8	74.9	4,184
	10%...20%	2.5	104.3	-5.4	0.2	2.5	2.4	83.4	6,682
	20%...30%	2.5	100.5	-2.8	0.4	2.6	2.7	84.4	3,896
	30%...40%	4.1	110.4	-15.4	0.8	4.0	4.3	82.5	1,988
	40%...60%	2.6	111.8	-15.0	0.7	3.7	3.9	85.4	1,595
Constrained 60%...		2.0	109.3	-12.2	0.8	4.4	4.6	89.3	1,370
	Neg Cash Flow < 0%	1.0	90.4	3.0	0.1	7.4	6.3	83.4	2,371

Panel C: By ICR_{-1}: Interest Coverage and Negative Returns in IDR Computation

$\frac{\text{Interest}}{\text{Cash Flow}}$		con.	$\text{IDR}_{0,1}$	ADR_0	σ_c	σ_{IDR}	σ_{ADR}	R^2	N
→ Unconstrained	0%... 5%	3.4	109.3	-15.3	0.2	13.9	15.9	50.2	3,238
	5%...10%	4.0	109.9	-15.1	0.3	4.2	4.7	72.9	2,422
	10%...20%	4.2	99.0	-3.9	0.3	4.2	4.2	79.5	3,637
	20%...30%	5.1	98.5	-5.2	0.5	2.5	2.6	83.3	2,084
	30%...40%	3.8	96.2	-1.4	0.8	5.7	6.0	82.6	1,158
	40%...60%	2.8	91.6	4.8	0.8	4.2	4.3	84.7	1,047
Constrained 60%...		3.1	88.3	4.9	0.9	4.7	4.6	82.1	1,143
	Neg Cash Flow < 0%	2.3	81.0	10.4	0.2	5.6	6.7	80.5	2,302

Explanation: For a description, see Table 4. This table differs in that it reports pooled regression results by subcategories, based on interest rate coverage (operating cash flow divided by earnings).

Interpretation: Firms with negative earnings and negative returns show some relative tendency to return to their prior capital structure. Still, even they show more inert tendency than activist tendency—and they represent only about 5% of all firm-years.

Table 8. Pooled Regressions Categorized By Third Variables

Panel A: By Assets_0: Lagged Assets

Assets_0	con.	$\text{IDR}_{0,1}$	ADR_0	σ_c	σ_{IDR}	σ_{ADR}	R^2	N
small 1	2.2	95.1	1.8	0.1	2.5	2.4	73.3	10,262
2	3.0	101.4	−5.9	0.1	1.5	1.5	85.3	10,273
3	3.5	99.8	−5.4	0.1	1.7	1.6	88.1	10,274
4	3.5	100.0	−4.3	0.1	1.5	1.5	89.5	10,273
large 5	3.5	98.0	−1.4	0.1	1.6	1.6	93.4	10,282

Panel B: By $\text{MCAP}_0/\text{SP500}_0$: Lagged(!) Equity Cap Divided by S&P500

$\text{MCAP}_0/\text{SP500}_0$	con.	$\text{IDR}_{0,1}$	ADR_0	σ_c	σ_{IDR}	σ_{ADR}	R^2	N
small 1	3.0	95.7	−0.8	0.1	1.5	1.5	88.2	10,272
2	2.9	99.5	−4.0	0.1	1.6	1.5	89.2	10,273
3	2.8	99.3	−1.9	0.1	2.1	2.0	91.3	10,273
4	2.7	101.4	−3.3	0.1	1.5	1.5	92.1	10,273
large 5	2.5	102.5	−3.7	0.1	1.8	1.8	92.3	10,273

Panel C: By OI_0/SLS_0: Profitability (Operating Income Divided By Sales)

OI_0/SLS_0	con.	$\text{IDR}_{0,1}$	ADR_0	σ_c	σ_{IDR}	σ_{ADR}	R^2	N
unprftbl. 1	3.0	93.9	−0.2	0.1	1.8	1.7	86.5	10,272
2	3.1	102.9	−7.4	0.1	1.3	1.3	89.4	10,273
3	3.0	104.4	−7.6	0.1	1.5	1.6	90.6	10,273
4	2.4	100.1	−1.5	0.1	1.7	1.7	92.8	10,273
prftbl. 5	3.1	98.3	−0.3	0.1	1.9	1.8	91.9	10,273

Panel D: By $\text{TAX}_0/(\text{EARN}_0+\text{TAX}_0)$: Tax Rate (Taxes Divided by Earnings Plus Taxes)

TAXRATE_0^G	con.	$\text{IDR}_{0,1}$	ADR_0	σ_c	σ_{IDR}	σ_{ADR}	R^2	N
low-tax 1	2.4	92.8	3.1	0.1	1.8	1.7	90.3	10,272
2	2.9	101.7	−4.0	0.1	1.4	1.4	91.6	10,273
3	2.8	100.8	−3.2	0.1	1.7	1.6	89.7	10,273
4	2.9	104.1	−6.6	0.1	1.7	1.7	89.6	10,273
high-tax 5	3.1	100.7	−4.6	0.1	1.5	1.5	90.1	10,273

(Table 8 continued)

Panel E: By BVE_0/MVE_0: Value vs Growth

BVE_0/MVE_0	con.	$IDR_{0,1}$	ADR_0	σ_c	σ_{IDR}	σ_{ADR}	R^2	N
growth 1	1.9	100.0	-3.8	0.1	2.0	2.0	88.1	10,272
2	2.7	102.1	-4.3	0.1	2.2	2.2	84.6	10,273
3	3.5	99.0	-2.9	0.1	1.6	1.6	85.9	10,273
4	3.8	96.8	-1.7	0.2	1.7	1.6	87.0	10,273
value 5	3.9	100.3	-5.2	0.2	1.8	1.8	90.1	10,273

Panel F: By $RISKY_0$: Credit Rating

Credit Rating	con.	$IDR_{0,1}$	ADR_0	σ_c	σ_{IDR}	σ_{ADR}	R^2	N
Investment Grade (– BBB)	3.8	99.7	-7.7	0.4	1.8	1.8	85.5	3,344
Non-Investment Grade (BB+ –)	3.3	100.3	-3.5	0.1	1.9	1.9	92.3	8,479
Unrated	2.7	98.9	-1.6	0.1	1.0	0.9	89.8	39,541

Panel G: By $EVOL_{-1,0}$: Asset-Adjusted Equity Volatility

$EVOL_{-1,0}$	con.	$IDR_{0,1}$	ADR_0	σ_c	σ_{IDR}	σ_{ADR}	R^2	N
low volatility 1	2.5	97.6	0.9	0.1	2.2	2.1	91.5	10,273
2	2.7	100.3	-2.5	0.1	1.8	1.8	90.5	10,273
3	2.9	98.6	-1.9	0.1	2.1	2.0	89.8	10,273
4	2.9	99.8	-3.4	0.1	1.7	1.7	90.4	10,273
high volatility 5	3.0	99.3	-4.1	0.1	1.3	1.3	90.1	10,272

Panel H: By $FVOL_{-1,0}$: Asset-Adjusted Firm Volatility

$FVOL_{-1,0}$	con.	$IDR_{0,1}$	ADR_0	σ_c	σ_{IDR}	σ_{ADR}	R^2	N
low volatility 1	2.7	94.5	2.0	0.1	2.0	1.9	92.7	10,273
2	2.7	97.1	-0.2	0.1	1.5	1.5	90.7	10,273
3	2.7	100.7	-3.3	0.1	2.0	2.0	88.3	10,273
4	2.7	98.9	-1.4	0.1	1.6	1.6	84.8	10,273
high volatility 5	3.0	102.5	-5.2	0.1	1.7	1.7	77.3	10,272

Explanation: For a description, see Table 4. This table differs in that it reports pooled regression results by subcategories, based on firm-year observations one year prior. Asset-adjusted denotes a sort first by size and then into bins based on volatility.

Interpretation: Low-tax, smaller firms show a mildly lesser tendency to actively deviate from their inert implied debt ratio. However, even these firms fail to show a significant positive coefficient on their own lagged debt ratio. Higher volatility firms (but not higher equity volatility firms) show a mildly higher tendency to remain inert.

Table 9. By Current and Future Net Returns

Panel A: F-M Regressions

Future Returns		Current Returns: Lowest	Low	Medium	High	Highest
	Lowest	101.0	94.6	91.0	96.6	98.7
		-9.1	-3.0	5.2	-3.1	-5.2
	Low	84.6	119.2	105.1	85.1	107.5
		9.0	-22.8	-8.8	10.8	-12.8
	Medium	121.8	94.2	96.3	110.2	97.9
		-24.8	3.8	1.2	-12.8	-2.7
	High	66.5	69.9	77.8	82.6	110.2
		27.6	27.4	18.8	13.7	-12.5
	Highest	98.3	99.3	95.1	101.1	100.8
		-2.1	-1.7	2.2	-3.9	-3.3

Panel B: Pooled Regressions

Future Returns		Current Returns: Lowest	Low	Medium	High	Highest
	Lowest	98.8	97.1	91.3	96.6	95.1
		-5.9	-3.6	4.3	-2.1	-1.3
	Low	113.7	124.8	121.8	109.9	103.3
		-17.5	-27.5	-24.2	-13.0	-7.4
	Medium	109.3	123.7	120.8	109.7	102.0
		-11.0	-24.2	-21.7	-11.4	-5.7
	High	82.5	99.6	96.9	91.2	95.1
		12.6	-1.4	0.7	6.2	2.5
	Highest	101.3	97.4	98.9	101.3	98.3
		-3.6	0.3	-0.7	-3.6	-0.5

Explanation: For a description of the underlying regressions, see Table 4. The classification is based on the current net return (timed the same as the raw return used to compute IDR), and on the subsequent year's net return. The top number in each cell reports the coefficient on $IDR_{0,1}$, the bottom number in each cell reports the coefficient on ADR_0. The number of observations in a cell ranges from 1,337 to 2,704. The constant, standard errors, and r-square are not reported due to lack of space.

Interpretation: The table shows that firms that experience subsequent reversals (top right, bottom left) are not economically significantly more inert.

Table 10. The Influence Of Third Variables

Panel A: Tax Variables

Method	Variable	con.	$IDR_{0,1}$	ADR_0	Var	σ_c	σ_{IDR}	σ_{ADR}	σ_{Var}	N	R^2
F-M	$TAXRATE_0^G A$	1.3	99.7	-2.9	4.2	0.5	4.3	4.2	1.3	25	90.0
F-M	$TAXRATE_0^G B$	0.3	99.4	-3.2	6.7	0.9	4.3	4.2	2.4	25	89.9
F-M	$TAX_0/(EARN_0+TAX_0)$	2.8	97.8	-1.1	0.3	0.4	4.2	4.1	0.7	25	90.5
F-M	TAX_0/TA_0	3.0	97.7	-1.2	-1.9	0.4	4.2	4.1	5.3	25	90.5
Pooled	$TAXRATE_0^G A$	1.4	102.0	-5.3	4.2	0.1	0.8	0.8	0.3	35,169	90.1
Pooled	$TAXRATE_0^G B$	0.8	101.8	-5.7	5.5	0.1	0.9	0.9	0.4	33,883	90.0
Pooled	$TAX_0/(EARN_0+TAX_0)$	2.7	99.0	-2.1	0.5	0.1	0.8	0.8	0.1	51,259	90.4
Pooled	TAX_0/TA_0	2.8	99.0	-2.1	1.5	0.1	0.8	0.8	1.0	51,306	90.4

Panel B: Profitability and Growth

Method	Variable	con.	$IDR_{0,1}$	ADR_0	Var	σ_c	σ_{IDR}	σ_{ADR}	σ_{Var}	N	R^2
F-M	OI_0/SLS_0	2.8	97.7	-1.1	0.1	0.3	4.2	4.1	0.3	25	90.5
F-M	OI_0/TA_0	2.9	97.7	-1.1	-0.4	0.3	4.2	4.1	0.8	25	90.5
F-M	BVE_0/MVE_0	2.9	97.7	-1.1	0.4	0.3	4.2	4.1	1.6	25	90.5
Pooled	OI_0/SLS_0	2.8	98.8	-2.0	0.0	0.1	0.8	0.8	0.0	49,990	90.4
Pooled	OI_0/TA_0	2.8	98.8	-2.0	0.1	0.1	0.8	0.8	0.1	50,130	90.4
Pooled	BVE_0/MVE_0	2.8	98.8	-2.1	0.1	0.1	0.8	0.8	0.2	51,352	90.4

Panel C: Uniqueness

Method	Variable	con.	$IDR_{0,1}$	ADR_0	Var	σ_c	σ_{IDR}	σ_{ADR}	σ_{Var}	N	R^2
F-M	RD_0/SLS_0	3.1	100.2	-5.0	-8.3	0.4	6.3	6.2	3.5	25	89.2
F-M	$SLEXP_0/SLS_0$	3.6	98.7	-2.8	-2.9	0.5	4.5	4.5	1.5	25	89.6
Pooled	RD_0/SLS_0	2.4	100.9	-4.5	-0.0	0.1	1.3	1.2	0.0	23,936	89.4
Pooled	$SLEXP_0/SLS_0$	2.9	99.4	-3.0	-0.0	0.1	0.9	0.8	0.0	40,204	89.3

(Table 10 continued)

Panel D: Volatility

Method	Variable	con.	$IDR_{0,1}$	ADR_0	Var	σ_c	σ_{IDR}	σ_{ADR}	σ_{Var}	N	R^2
F-M	$EVOL_{-1,0}$	3.9	98.5	-2.2	-9.5	0.5	4.2	4.1	4.3	25	90.5
F-M	$FVOL_{-1,0}$	3.6	98.1	-2.3	-6.6	0.6	4.2	4.2	5.4	25	90.5
Pooled	$EVOL_{-1,0}$	4.0	99.9	-3.5	-10.4	0.1	0.8	0.8	0.7	51,364	90.4
Pooled	$FVOL_{-1,0}$	3.9	99.5	-3.9	-9.1	0.1	0.8	0.8	0.9	51,364	90.4

Panel E: Deviation from Industry Debt Ratio

Method	Variable	con.	$IDR_{0,1}$	ADR_0	Var	σ_c	σ_{IDR}	σ_{ADR}	σ_{Var}	N	R^2
F-M	$IARD_0{}^{2d}$ 2-digit	0.5	98.3	5.7	-9.8	0.5	4.3	4.4	1.9	25	90.8
F-M	$IARD_0{}^{3d}$ 3-digit	0.4	98.4	5.5	-10.7	0.4	4.3	4.3	1.8	25	90.8
Pooled	$IARD_0{}^{2d}$ 2-digit	0.2	99.4	5.3	-10.5	0.1	0.8	0.9	0.4	45,494	90.8
Pooled	$IARD_0{}^{3d}$ 3-digit	0.2	99.4	5.2	-11.2	0.1	0.8	0.9	0.4	45,494	90.9

Explanation: For a basic description, see Table 4. This table differs in that it includes one additional variable, called a "third variable." As indicated by time subscript 0, third variables are lagged by one year (one financial statement).

Interpretation: Taxes: All tax variables correlate positively with debt ratio, in line with the theory. The Graham simulated tax variable is the best predictor of debt ratio. However, tax rate is only a mild predictor when compared with the implied debt ratio. Profitability and Growth: These variables are not robustly important. Uniqueness: not too important as a determinant of debt ratio. Volatility: Firms that are more volatile tend to adopt lower debt ratios. Industry: Except for IDR, the industry debt ratio appears to be the best predictor of a firm's debt ratio: firms seem to try to adjust towards their industry's debt ratio.