CAPITAL STRUCTURE AND STOCK RETURNS

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Abstract

U.S. corporations do not issue and repurchase debt and equity to counteract the mechanistic effects of stock returns on their debt equity ratios. Thus, over 1–5 year horizons, stock returns can explain about 40% of debt ratio dynamics. Although corporate net issuing activity is lively, and although it can explain 60% of debt ratio dynamics (long-term debt issuing activity being most capital structure relevant), corporate issuing motives remain largely a mystery. When stock returns are accounted for, many other proxies used in the literature, play a much lesser role in explaining capital structure.

I Introduction

This paper shows that U.S. corporations do little to counteract the influence of stock price changes on their capital structures. As a consequence, their debt equity ratios vary closely with fluctuations in their own stock prices. The stock price effects are often large and long-lasting, at least several years.

This paper decomposes capital structure changes into effects caused by corporate issuing net of retirement activity (henceforth, called "net issuing" or just "issuing"), and into effects caused by stock returns. While all stock-return caused equity growth can explain about 40% of capital structure dynamics, all corporate issuing activity together can explain about 60% to 70%. Long-term debt issuing is the most capital-structure relevant corporate activity, explaining about 30% of the variation in corporate debt ratio changes.

However, the corporate issuing motives themselves remain largely a mystery. Issuing activities are *not* used to counterbalance stock-return induced equity value changes. The better known proxy variables used in the literature—such as tax costs, expected bankruptcy costs, earnings, profitability, market-book ratios, uniqueness, market timing, or the exploitation of undervaluation—also fail to explain much capital structure dynamics when stock value mechanics are accounted for. In previous work, these proxies passively correlated with debt ratios primarily *indirectly*, because they correlated with omitted stock return caused dynamics. Put differently, these proxies have not so much induced managers to *actively engage* in altering their capital structures, as much as they have allowed firms to *experience* different equity values and therefore different capital structures. The proactive managerial component in capital structure remains largely unexplained.

The paper concludes that over reasonably long time frames, the stock price effects are considerably more important in explaining debt-equity ratios than previously identified proxies. Stock returns are the primary known component of capital structure and capital structure changes.

II   Capital Structure Ratios

My paper investigates whether actual debt ratios by-and-large behave as if firms readjust to their previous debt ratios (targeting a largely static target), or whether they permit their debt ratios to fluctuate with stock prices. The basic specification estimates

$$ADR_{t+k} \;\; = \;\; \alpha_0 + \alpha_1 \cdot ADR_t + \alpha_2 \cdot IDR_{t,t+k} + \epsilon_t \quad . \tag{1}$$

ADR is the actual corporate debt ratio, defined as the value of debt (D) divided by the value of debt plus equity (E),

$$ADR_t \equiv \frac{D_t}{E_t + D_t} \quad , \tag{2}$$

and has been the dependent variable in many capital structure papers. ADR is also a component of the weighted average cost of capital (WACC). IDR is the implied debt ratio that comes about if the corporation issues (net) neither debt nor equity,

$$IDR_{t,t+k} \equiv \frac{D_t}{E_t \cdot (1 + x_{t,t+k}) + D_t} \quad , \tag{3}$$

where x is the stock return net of dividends. (Whether dividends are included matters little in this study.)

The *stark* hypotheses are

$$
\begin{array}{lll}
\text{Perfect Readjustment Hypothesis:} & \alpha_1 = 1 \quad \alpha_2 = 0 & , \\
\text{Perfect Non-Readjustment Hypothesis:} & \alpha_1 = 0 \quad \alpha_2 = 1 & .
\end{array}
\tag{4}
$$

Firms could also adopt convex combination strategies, more appropriate than these two "straw man" extremes, and different firms could behave differently. If included, the intercept α_0 can capture a constant target debt ratio. The empirical specifications are primarily cross-sectional.

The dynamics of capital structure that underlie specification (1) can be expressed as follows. The amount of debt changes with new debt issues, debt retirements, coupon payments, and debt value changes. Corporate debt evolves as

$$D_{t+k} \equiv D_t + \text{TDNI}_{t,t+k} \quad , \tag{5}$$

where TDNI is the total debt net issuing activity. Equivalently, the amount of corporate equity changes with stock returns (net of dividends), and new equity issues net of equity repurchases. Corporate equity evolves as

$$E_{t+k} \equiv E_t \cdot (1 + x_{t,t+k}) + \text{ENI}_{t,t+k} \quad , \tag{6}$$

where ENI is net equity issuing and stock repurchasing activity. Using these definitions, debt ratios evolve as

$$\text{ADR}_{t+k} \;=\; \frac{D_{t+k}}{E_{t+k} + D_{t+k}} \;=\; \frac{D_t + \text{TDNI}_{t,t+k}}{D_t + \text{TDNI}_{t,t+k} \;+\; E_t \cdot (1 + x_{t,t+k}) + \text{ENI}_{t,t+k}} \;. \tag{7}$$

Mathematically, if the corporation issues debt and equity so that

$$\frac{\text{ENI}_{t,t+k}}{E_t} \;=\; \left(\frac{\text{TDNI}_{t,t+k}}{D_t} \right) \;-\; x_{t,t+k} \quad , \tag{8}$$

then ADR remains perfectly constant across periods ($\text{ADR}_{t+k} = \text{ADR}_t \Rightarrow \alpha_1 = 1, \alpha_2 = 0$). In contrast, if the corporation issues debt and equity so that

$$\frac{\text{ENI}_{t,t+k}}{E_t} \;=\; \left(\frac{\text{TDNI}_{t,t+k}}{D_t} \right) \;+\; x_{t,t+k} \cdot \left(\frac{\text{TDNI}_{t,t+k}}{D_t} \right) \quad , \tag{9}$$

then IDR perfectly predicts debt ratios ($\text{IDR}_{t,t+k} = \text{ADR}_t \Rightarrow \alpha_1 = 0, \alpha_2 = 1$). Unfortunately, equations 8 and 9 are unsuitable for direct cross-sectional estimation, because many firms have zero or tiny debt levels.

III   Data

My data set begins with all publicly traded U.S. corporations from the period 1962 to 2000 from the *Annual Compustat* and *CRSP* files. The paper predicts debt ratios for all firm-years that have an *initial* equity market capitalization of at least the S&P500 level divided by 10 (*in year t, not t + k!*). So, in 1964, the first year for which I predict debt ratios, the minimum market capitalization is $75 million; in 2000, it is $1.47 billion. Nevertheless, the number of sample firms grows from 412 in 1964 to 2,679 in 2000. In total, 60,317 firm-years qualify, but only 54,211 firm-years have data in two consecutive years, and only 40,080 firm-years have data over five years. The results are robust when the firm size filter is varied or even eliminated.

D is the Compustat book value of debt. E is the CRSP market value of equity. x is the CRSP percent price change in the market-value of equity and differs slightly from r (the stock rate of return) due to dividends. In Tables 1, 2, and 4, TDNI and ENI are computed from D and E dynamics, respectively. All issuing activity in this paper is "net"—there is no data to separate issuing from retiring activity. More detailed data definitions and method descriptions are in the Appendix.

<div align="center">

Insert Table 1 Here:
Selected Descriptive Statistics.

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Table 1 shows that the average sample firm is about $3.3 billion in market-value, $4.6 billion in book value, both in 2000 dollars. However, the median firm is worth only about $550 to $580 million. The debt ratio, the dependent variable, has a mean of about 30% of firm value, and a median of about 25%.

A quick measure of the relative importance of the dynamic components of debt ratios can be gleaned from summary statistics for the components of debt ratios, normalized by firm size, $E_t + D_t$ in the month in which issues occur. Over 40 years, corporations in the sample experience average stock return appreciations of 8.8% (11.2% unwinsorized), of which they pay out 1.6% in dividends. Therefore, they experience 7.0% (9.4% unwinsorized) in stock price induced capitalization change.

On average, firms also issue 3.7% in debt and 2.4% in equity. (All medians are below their respective means.)

My paper investigates debt ratio dynamics primarily in cross-section. Dividends show little cross-sectional dispersion (1.6%), which is why subsequent results are indifferent to running tests with stock returns (r) or percent equity growths (x). Stock induced equity growth heterogeneity (28.5%) is larger than managerial activity induced heterogeneity (14.0%). However, contrary to a common academic perception that issuing activity is rare, firms in the sample are not averse to issuing activity. In both means and standard deviations, corporate net issuing activity is about half as large as stock-market induced equity value changes. (And issuing activity is necessarily larger than *net* issuing activity!) In principle, issuing activity may be large enough to counteract a good part of the capital structure effects of stock returns.

Before estimating the full non-linear influence of stock returns, a simple classification can show the significance of stock returns. All firms are first sorted by year, then by sales and, within each consecutive set of ten similarly sized firms, allocated into ten bins based on their net stock return performance. This procedure keeps a roughly equal number of firms in each decile, and maximizes the spread in stock returns across decile, holding calendar year and firm size constant. The sort itself does not use any historical capital structure information. The header rows in Table 2 show the median net stock returns of each decile.

Insert Table 2 Here:
Corporate Activity, Equity Growth, and Capital Structure, Classified by Stock Returns (Year-Adjusted and Sales-Adjusted).

The first five data rows report corporate activity, the sixth row reports equity growth, again all normalized by firm size in the month of activity. Over 1 year, firms respond to poor performance with more debt issuing activity; and to good performance with more equity issuing activity. This hints that firms do not immediately readjust: firms whose debt ratios increase (decrease) due to poor (good) stock return performance seem to use their issuing activities not to readjust, but to amplify the stock return changes (see also Baker and Wurgler (2002)). However,

over both 1-year and 5-year horizons, the relationship is not strong. The fourth row shows that the relationship between stock returns and "activist equity expansion" is more U-shaped when dividends are considered.

The fifth row explores whether firms deliberately expand or contract in response to stock price performance. Over annual horizons, the group average total firm expansion is not only small, but also only a little more pronounced for firms experiencing either very good or very bad stock returns. Over 5 year horizons, the very best decile stock price performers *do* engage in some activist expansion, roughly 32% of their firm value (6% per year). Still, their five year stock return caused mechanistic equity growth is a much larger 265%. In other deciles, the activist expansion is flat and economically small, ranging from 7% to 18%.

In sum, in cross-section, when compared to their direct influence on equity growth, even large stock returns trigger only modest corporate activity. The median firm in each decile does not do much either to expand or contract the firm; or to undo or amplify the effects of stock returns on debt ratios. Stock return based sorts cannot uncover the large heterogeneity in issuing activity documented in Table 1.

This paper is less interested in issuing activity per sé (e.g., as are Havakimian, Opler and Titman (2001)), as it is in *capital-structure relevant* issuing activity. Not all net issuing activity is equally important for corporate debt ratios. For example, when a 100% equity financed firm issues equity, it does not change its debt ratio. Not in the table, I sorted the subset of best stock performers (decile 10) by their debt-equity ratios. Zero debt-equity firms were especially eager to issue more equity, a median of 33% of firm value, which ultimately had no influence on capital structure. The most levered quintile firms, where equity issues were most capital structure relevant, issued only 9% in equity. Thus, the relatively high equity issuing activity median of 16% in this tenth decile ends up not being as capital-structure relevant as one might suspect.

The actual capital structure relevance of the dynamic components is explored in the three lower rows. The "ending ADR" rows show that there is a large spread

of resulting debt ratios across firms having recently experienced different rates of return. Over 1 year, firms that have underperformed the S&P500 by 55% end up with an actual debt ratio of 37%, while firms that have outperformed the S&P500 by 79% end up with an actual debt ratio of 14%. Over 5 years, the worst stock performers end up with debt ratios of 41%, the best stock performers end up with debt ratios of 13%.

The "starting ADR" rows show that the ending debt ratio differences are not due to the originating debt ratios. Over 1 year horizons, starting leverage does not correlate with net return performance: most return deciles start out with actual debt ratios of just about 22%. Over 5 year horizons, if anything, firms with poorer stock returns start out with *lower* debt ratios.

Any snapshot of actual debt ratios in the economy therefore reflects differences in historical stock returns. Not in the table, when firms are sorted by ending debt ratios instead of by stock returns (still year and sales adjusted), the lowest decile median debt ratio firm ($ADR_t = 1\%$) has experienced +5% stock returns in the most recent year (+53% in the most recent 5 years), while the highest decile median debt ratio firm ($ADR_t = 75\%$) has experienced -13% (-19%) stock returns.

The "implied IDR" rows impute the effects of stock returns on starting debt ratios (ADR) in the appropriate non-linear fashion (eq. 3). Can IDR explain future debt ratios better than starting ADR? It appears so. In explaining ending ADR, the implied debt ratio IDR fits visually better than the starting ADR. Of course, all power of my later readjustment tests must derive from the extreme stock return deciles. There is no economic difference between readjustment and non-readjustment for firms that experience only small stock returns.

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IV   Estimation

A   Regression Specification

F-M *Regressions explaining Future Actual Debt Ratios* ADR$_{t+k}$ *with Debt Ratios* ADR$_t$ *and Stock-Return Modified Debt Ratios* IDR$_{t,t+k}$.

The basic regression specification of the paper, equation 1, is estimated in Table 3. The reported coefficients and standard errors are computed from the time-series of cross-sectional regression coefficients (called F-M, for Fama-Macbeth). Both the methods and variables are discussed in detail in the Appendix, as is the robustness to alternatives.

Panel A omits the intercept and thus does not allow for a constant debt ratio target. Over annual horizons, the average firm shows no tendency to revert to its old debt ratio, and instead allows its debt ratio to drift almost one-to-one (102.1%) with stock returns. Over 5 to 10 years, firms began to readjust, but the influence of stock returns through IDR remains more important than the effects of readjustment activity.

Panel B shows that this ADR coefficient reflected less a desire of firms to revert to their starting debt ratios, as a tendency of firms to prevent debt ratios from wandering too far away from a constant: In competition with the constant, ADR loses most economic significance.

I conclude that observed corporate debt ratios at any fixed point in time are largely transient, comoving with stock returns. Any deliberate readjustment is slow and modest.

B Change Regressions

The regression can also be estimated in changes and/or with a restriction that the coefficients on IDR and ADR add up to 1:

$$\text{ADR}_{t+k} = \alpha_0 + \alpha_1 \cdot \text{IDR}_{t,t+k} + (1 - \alpha_1) \cdot \text{ADR}_t + \epsilon_t \qquad (10)$$

Rearranging, the estimated regressions are

$$
\begin{aligned}
(\text{ADR}_{t+1} - \text{ADR}_t) &= 2.1\% + 102.2\% \cdot (\text{IDR}_{t,t+1} - \text{ADR}_t) \qquad R^2 = 43.2\% \quad ; \\
(\text{ADR}_{t+5} - \text{ADR}_t) &= 8.0\% + 92.9\% \cdot (\text{IDR}_{t,t+5} - \text{ADR}_t) \qquad R^2 = 40.2\% \quad .
\end{aligned}
\qquad (11)
$$

The coefficient estimates are highly statistically significant and a first difference term in ADR adds no statistical or economic power. I can conclude that stock return induced equity changes have roughly a one-to-one influence on observed debt ratio changes over 1 year horizons. Even over 5 year horizons, corporate debt ratio reversion activity is rather modest.

C Variance Decomposition

One can isolate the dynamic components laid out in Equation 7. That is, it is possible to predict ADR_{t+k} not only with ADR_t updated only for stock returns (which is $\text{IDR}_{t,t+k}$), but also with ADR_t updated, e.g., for corporate issuing activity between t and $t+k$ (keeping other dynamics components at a constant zero).

Insert Table 4 Here:
Explanatory Power of Components of Debt Ratios and Debt Ratio Dynamics:
Time-Series Average R^2's from Cross-sectional F-M *Regressions.*

Table 4 shows that history is important: 85% of firms' capital structure levels can be explained by last year's capital structures, 54% by capital structure 5 years earlier. More interesting, the table also shows that stock-return induced changes in capital structure are *less* important than corporate issuing activity, although not by much.

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Over 1 year, stock returns[1] are responsible for 43.2% of the change in debt ratios, while all net issuing activities together are responsible for about 56.9% of the change in debt ratios. Over 5 years, stock returns are responsible for 40.2% of debt ratio changes, while all net issuing activities are responsible for 68.8%. (The two need not add up to 100%.) In principle, there is more than enough capital structure relevant corporate issuing activity to counteract stock-return induced equity growth. Firms are not inactive: they just do not choose to counteract their stock returns.

But the conclusion that research should focus only on (capital structure relevant) issuing activity would also be mistaken. If the ultimate goal is to explain capital structure, explaining issuing activity alone cannot do the job—even if a researcher could perfectly predict one-hundred percent of all managerial capital structure activities, she would still miss close to half of the variation in year-to-year capital structure *changes*. And, as Table 5 will show, one hundred percent is utopian. Previously used variables have little power to explain any of this capital structure relevant managerial activity.

Table 4 can also suggest where researchers should focus their efforts to better explain debt ratios: debt issuing activities are more capital structure relevant than equity issuing activities, even though Table 1 indicated equal heterogeneity. (Equity issuing presumably occurs more in firms already heavily equity-financed.) The final rows narrow the culprit even further. Over both 1 year and 5 year horizons, long-term debt issuing activities are most capital structure relevant.[2] Over 5 year horizons, equity issuing activities become as important as short-term debt issuing activities, yet still only half as important as long-term debt issuing activity.

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[1]Here, I mean IDR. Stock returns by themselves (without interaction with past capital structure) can explain only 26% of the 1-year change, and 15–25% of the 5-year change in ADR.

[2]Although Havakimian et al. (2001) seek to explain *all*, not just capital structure relevant, net issuing activity, they succeed only in explaining 1.8% of the variation in net long-term debt issuing activities among 4,558 observations with large long-term debt changes.

D   Aggregate Effects

The focus of this paper is the cross-section. Still, one can aggregate the debt and market-equity of *all* firms on Compustat, and use the value-weighted market rate of return to compute IDR. (The results are similar with only firms meeting the size criterion.) The estimated single time-series regression on the aggregate data series are

$$
\begin{aligned}
\text{1-Year:} \quad & \text{ADR}_{t+1} - \text{ADR}_t = 2.3\% + 105.9\% \cdot (\text{IDR}_{t,t+1} - \text{ADR}_t) & R^2 = 89\% \ ; \\
\text{5-Year:} \quad & \text{ADR}_{t+5} - \text{ADR}_t = 11.2\% + 93.3\% \cdot (\text{IDR}_{t,t+5} - \text{ADR}_{t-5}) & R^2 = 82\% \ .
\end{aligned}
\tag{12}
$$

This suggests that the overall stock market level has a similarly long-lived effect on the aggregate corporate debt ratio, just as it is the major influence in determining the debt ratio of firms in cross-section. Unfortunately, the influence of stock returns may be misstated here, because debt is quoted in terms of book value (for lack of available market data); and, unlike in the cross-sectional year-by-year regressions, in these regressions, annual aggregate interest rate changes can drive a considerable wedge between book and market values of debt.

V   Alternative Proxy Variables

A natural question is whether the variables used in the prior capital structure and issuing literatures have economic relevance when the effects of stock returns are properly controlled for. For example, corporate profitability was found to predict lower debt ratios in previous studies. If profitability has no incremental significance when IDR is controlled for, then it would have correlated with capital structures only *indirectly* through its correlation with stock returns. Put differently, managers would not so much have "acted" to lower their debt ratios (by issuing more net equity) when profitability increased. Instead, managers of more profitable companies would have experienced higher stock prices, which in turn would have mechanistically reduced their debt ratios.

The multivariate columns in Table 5 estimate

$$\mathsf{ADR}_{t+k} - \mathsf{ADR}_t \quad = \quad \alpha_0 + \alpha_1 \cdot X_{t,t+k} + \sum_{c=1}^{C} \left[\alpha_{2c} \cdot \mathsf{Vc}_t + \alpha_{2c+1} \cdot \mathsf{Vc}_t \times X_{t,t+k} \right] + \epsilon \quad , \quad (13)$$

where $X_{t,t+k} \equiv \mathsf{IDR}_{t,t+k} - \mathsf{ADR}_t$, and $\mathsf{V1}$ through VC are named third variables (de-scribed in detail in the Appendix). When a coefficient on Vc is reliably positive, then Vc incrementally helps to explain *actual debt ratios*. When a coefficient on $\mathsf{Vc} \times X_{t,t+k}$ is positive, then Vc incrementally helps to explain *readjustment*. To avoid multi-collinearity, the same specifications are also run with one Vc variable at a time in a 4-variate regression,

$$\mathsf{ADR}_{t+k} - \mathsf{ADR}_t \quad = \quad \alpha_0 + \alpha_1 \cdot X_{t,t+k} + \alpha_2 \cdot \mathsf{Vc}_t + \alpha_3 \cdot \mathsf{Vc}_t \times X_{t,t+k} + \epsilon \quad . \quad (14)$$

The chosen Vc variables include most important variables used in prior capital struc-ture and issuing literature. In contrast to existing literature, the Vc variables here are challenged to explain not only issuing activity, but net issuing activity that is *capital-structure relevant* and while in competition with IDR effects. Flow variables are measured contemporaneously with the differencing interval in the dependent variable. Thus, they are *not* known at the outset t, and some correlation will come about if the proxy variable in later parts of the measuring period responds to debt ratio changes in earlier parts of the measuring period, rather than vice-versa. This is obviously not the case for stock returns. Thus, the reported power of the flow variable coefficients is likely to be an optimistic estimate. (When flow variables are measured strictly prior, they typically have zero influence.) The regressions in Ta-ble 5 report unit-normalized coefficients (coefficient times standard deviation of the variable in the sample). These coefficients indicate relative *economic* importance.

Over annual horizons, return-induced debt ratio changes have considerably big-ger impact than do other proxies. A one-standard deviation higher ΔIDR is as-socated with a 7.38% increase in debt ratio. (The non-standardized coefficient is

7.38%/0.07 ≈ 109.80%.) The best other proxy is that firms that have taken over other firms also tend to increase leverage; and that firms that wander away from their industry average debt/equity ratio seek to return to it. Asset-based Profitability and Firm Volatility are statistically significant, but only of modest economic importance. The only variable that suggests modestly greater non-adjustment (cross-term) is asset-based profitability: More profitable firms tend to adjust less for stock return induced capital structure changes.

Over five year horizons, return-induced debt ratio changes continue to exert the strongest influence. (The non-standardized coefficient is 82%.) Again, the strong negative coefficient on industry deviation suggests that firms are eager to move towards their industry's average debt ratio, and that firms that have engaged in M&A activity tend to increase leverage. Two of the cross-coefficients indicate good economic significance: firms with more profitable assets and firms with more volatility tend to have avoided readjusting (but recall that return volatility is contemporaneous with ΔIDR). Put differently, in a stratification, their ΔIDR coefficients in a bivariate regression would be significantly higher than those of other firms.

The increase in R^2, from the 43% in the 1-year difference regression when only IDR is used, to the 54% reported R^2 when the additional 20 variables in Table 5 are included is modest. The increase in R^2 is a more pronounced for the 5-year regressions (40% in the IDR-only regression, 59% in the 20+1 variable regression). But it is fair to state that the additional 20 variables make only modest headway in reducing the 60% variation that can be attributed to corporate net issuing activity.[3] Most corporate issuing motives remain unexplained.

Some variables had to be excluded from Table 5, because data availability would have dropped the number of observations in the multivariate specifications. In its own 4-variate specification:

Graham's Tax Rate is an improved iterative tax variable (Graham (2000)), which over 5 years only works better than the simpler tax variable in Table 5. Firms

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[3]A full set of 2-Digit SIC dummies raises the R^2 by about 5%. Their inclusion does not change the significance of most variables. Industry herding becomes a little more important, profitability a little less important.

with one-standard deviation higher tax rates are likely to take on an additional 2.4% in debt ratio over five years. Firms with higher tax rates are more likely to non-adjust, and in an economically significant fashion.

Interest Coverage Firms with one standard deviation higher high cash flows relative to their interest payments reduced debt over 1 year, but only by 0.4 percent. However, the 5-year cross-variable was economically important, suggesting that firms with more cash flows relative to their earnings readjust less, not more.

(The most significant interest coverage related specification indicates that firms with poor recent returns *and* very high interest payments are more likely to unlever over the next year—perhaps necessary for survival.)

A number of other variables were found to be unimportant. Three variables are interesting although/because they do not show any significance:

Uniqueness Sales-adjusted R&D and selling expenses (Titman and Wessels (1988)) have no incremental explanatory power over 1 year, and modest explanatory power over 5 years. This is both due to the fact that high R&D firms had good returns and due to the fact that many high R&D equity issuers are already 100% equity financed. (Such issues do not alter capital-structure.)

Future Stock Return Reversals Firms that experience large stock price reversals the year after the measuring period do not behave differently from firms that experience stock price continuation. Managers do not delay readjusting because they know something that the market does not know.

Profitability Changes Firms experiencing current profitability *changes* show no unusual capital structure activities or tendencies to change their debt ratios over 1 year, and very modest inclination over 5 years. Cross effects do not matter. This indicates that even firms whose stock returns and revised debt ratios are due to or accompanied by immediate cash flow effects (rather than due to long-run discount factor effects or due to far-off growth opportunities) are no more eager to readjust.

In sum, although about half to two-thirds of the dynamics of capital structure are due to net issuing activity, the variables here could not make a *large* dent in our understanding of resulting capital structure. They could not explain much of the part of capital structure that is *not* due to stock price changes. The proxies have only modest incremental influence either in predicting higher debt ratios or in predicting higher tendencies to readjust. Much of their correlation with capital structure in earlier papers was due to their correlations with IDR, in many cases, a sufficient statistic. None of these variables change the coefficient on the IDR variable, much less rival it in importance.

VI Interpretation

Corporations are not inactive with respect to issuing activity. This makes it all the more startling that they do not use their capital structure activities to counteract the external and large influences of stock returns on their capital structures. The challenge is to explain why. The answer must lie in the cost-benefit tradeoff to undoing stock return induced capital structure changes. The benefits relate to how the hypothetically friction-free optimal debt ratio shifts with stock returns. The costs relate to direct financial transaction costs or indirect costs of change that can arise from a variety of distortions.

1. Dynamic Optima: If the optimal debt ratio changes one-to-one with stock returns, then there is no need for firms to rebalance towards their previous or static debt ratio targets. For example, if stock prices relate more to changes in discount factors and/or far-away growth opportunities, then firms with positive stock returns would not experience changes in earnings in the near future. They may find that increasing the debt ratio would provide few additional tax benefits in exchange for risking a short-term liquidity crunch or outright bankruptcy (see also Barclay, Morellec and Smith (2001)). Such theories can at least predict that stock returns correlate negatively with debt ratios (over short horizons), the correct sign.

But, by itself, this explanation has drawbacks. First, the argument is less compelling for *Value Firms* with already low debt ratios which experience further large positive stock returns. (And a number of authors have argued that such firms already have too little debt.[4]) Such firms show no greater tendency to readjust or lever up. Second, even firms experiencing the most immediate *increases* in profitability—i.e., firms whose stock price movements are less likely due to far-away growth opportunities or discount rate changes—do not show any differences in their readjustment tendencies. Third, it would be curious if the optimal dynamic debt ratio were as one-to-one with stock-priced induced changes in equity values, as the evidence suggests.

2. Direct Transaction Costs: This suggests that another part of the explanation is likely to be transaction costs. Transaction costs cannot only induce path dependency, but also produce flat corporate objective functions (Miller (1977), Fischer, Heinkel and Zechner (1989), Leland (1998)). The fact that there is more readjustment over longer horizons is also consistent with transaction costs playing a role. But by itself, this explanation, too, has some drawbacks.

First, for large U.S. Corporations, direct transaction costs are small, and practitioners believe them to be small (Graham and Harvey (2001)).

Second, readjustment patterns are similar across firms where transaction costs are very different. Even if transaction costs are high for a firm that issues equity to reduce debt in response to falling enterprise valuation,[5] they are low for a firm that issues debt to repurchase equity in response to increasing enterprise valuation. Similarly, small firms should have higher transaction costs than large firms; and yet Table 5 shows that large firms are no more eager to readjust. Finally, even firms

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[4]The average (median) operating income divided by interest payments in the sample is 43 (6.5), suggesting only a modest probability of bankruptcy for many firms. An otherwise typical firm in the sample ($500 million size, 33% tax rate, 25% debt ratio) that experiences a 5% debt-equity ratio change should issue $40 million in debt, thus obtaining about 33% · $40 ≈ $13 million (perpetual NPV) in tax savings. Graham (2000) calculates that the average publicly traded firm could gain about 10% *in firm value* if it increased its debt ratio.

[5]However, first a debt ratio can also be reduced by selling off assets to pay off debt or by using former dividends to repurchase debt. Second, equity values would have *already* fallen significantly, and an equity-for-debt exchange (e.g., with existing creditors) should increase enterprise value, not decrease it (absent direct frictions).

experiencing the most dramatic changes in debt ratios readjust very little, too. This suggests that inventory-type transaction cost minimization models (under which one should observe more readjustment for larger deviations from the optimum) are not likely to explain the evidence.

Third, firms do not seem to lack the inclination to be capital structure active. They just seem to lack the proper inclination to readjust for equity value changes! (A more consistent transaction cost argument may have to suggest that transaction costs are higher after large positive or negative equity movements.) And if corporations really wanted to readjust at low transaction costs, they could issue securities that convert automatically into debt when corporate values increase and into equity as corporate values decrease—the opposite of convertible securities. They do not.

3. Indirect Costs: A number of theories can explain why firms face implicit costs to reacting or adjusting, either actual or perceived. These suffer from similar problems as direct transaction cost explanations: they can explain inertia better than lack of readjustment, although firms are very active in real life, instead. Moreover, few tests of such theories have explored their unique non-inertia implications.

The pecking order theory (Myers and Majluf (1984), Myers (1984)) is not the only model of inertia, but it is the most prominent. Firms are reluctant to raise more equity when their stock prices deteriorate because of negative inference by investors. The theory is known to have more difficulties explaining why firms are reluctant to rebalance more towards debt when their stock prices increase. To its credit, the pecking order theory does not need to rely on an agency explanation (debt discipline) to explain an additional fact, the negative stock price response to equity issuing activity.

Other theories can predict corporate inertia if firms suffer from limited memory retention (e.g., Hirshleifer and Welch (2002)); if agency or influence problems paralyze the firm (e.g., Rajan and Zingales (2000)); if managers believe that their equity is too expensive/cheap for repurchases after stock price increases/decreases (e.g., Berger, Ofek and Yermack (1997)); if managers prefer equity to debt and increasing equity values make them harder to dislodge (e.g., Zwiebel (1995)); or if firms en-

gage in near-rational or irrational behavior (e.g., Samuelson and Zeckhauser (1988), Benartzi and Thaler (2001)).

Finally, one could argue that different reasons drive corporate behavior on the upside and on the downside. For example, on the upside, managers may become more entrenched and dislike issuing debt (or exchanging equity for debt); while on the downside, managers may believe (or have inside information) that their firms have become too "undervalued," and dislike selling equity (or exchanging debt for equity).

VII   Prior Capital Structure Literature

My paper has shown that stock returns and stock return adjusted historical capital structure are the best variables forecasting market-based capital structure.

Some prior literature has examined capital structure ratios not only based on market equity value, but also book equity value. Yet, the book value of equity is primarily a "plug number" to balance the LHS and RHS of the Balance Sheet—and it can even be negative. Furthermore, book values correlate less with market values among small firms. But more importantly, accounting rules imply that the book value of equity increases with historical cash flows and decreases with asset depreciation. Not surprisingly, profitability (growth) and fixed assets are the important predictors of book-value based debt ratios (e.g., Shyam-Sunder and Myers (1999)). Yet, some authors find book values attractive, because they have lower volatility than market equity values, and therefore permit corporate issuing activity to appear more important.

In any case, compared to book value based debt ratios, interest coverage ratios would be a much better alternative for measuring the advantages of debt to firms. Operating cash flows (or cash) may be the best available measure of assets-in-place and tax advantages. Immediate interest payments may be the best measure of potential bankruptcy and liquidity problems. Thus, tradeoff theories may be better tested with the ratio of current interest burden to current operating cash flows (or

cash). Moreover, managers are known to pay attention to coverage ratios, and credit ratings (which are in turn highly related to coverage ratios). But before one sets one's hopes too high, the typical firm paid out only about 15% of its operating cash flows in interest, indicating that most firms could probably have easily borrowed more.

My evidence of readjustment failure is in line with the survey responses in Graham and Harvey (2001): queried executives apparently care little about either transaction costs, or most theories of optimal capital structure, or rebalancing when equity values change. To the extent that they do care *when actively issuing*, managers claim they care about financial flexibility and credit ratings for debt issues; and about earnings dilution and past stock price appreciation for equity issues. Yet, executives also claim that they issue equity to maintain a target debt-equity ratio, especially if their firm is highly levered—for which we could not find much evidence.

Most existing empirical literature has interpreted capital structure from the perspective of proactive managerial choice. Titman and Wessels (1988) find that only "uniqueness" (measured by R&D/sales, high selling expenses, and employees with low quit rates) and earnings are reliably important. Rajan and Zingales (1995) offer the definitive description of OECD capital structures and find a strong negative correlation between market-book ratios and leverage. Like Rajan and Zingales, Barclay, Smith and Watts (1995) find that debt ratios are negatively related to market/book ratios. Graham (2003) surveys the voluminous tax literature. Havakimian et al. (2001) find a mild tendency of firms to issue in order to return to a target debt-equity accounting ratio. The implied debt ratio can subsume most of the variables in this literature.

Baker and Wurgler (2002) investigate the influence of past stock market returns (see also Rajan and Zingales (1995)). But they are interested in how these returns influence the *active* issuing decisions of firms, and do not consider the implied change. My own paper is more interested in the failure of firms to undo the effects of stock returns, and the consequent strong relation between lagged stock returns and capital structure. Other literature has focused on non-action, though none has focused on the dramatic fluctuations that non-action can cause. In addition to pecking order tests (such as Fama and French (2002) and Shyam-Sunder and Myers

(1999)), some theories have been built on transaction costs. For example, Fischer et al. (1989) use option pricing theory and find that even small recapitalization costs can lead to wide swings in optimal debt ratios.

Finally, some behavioral finance papers find similar lack of readjustment in other contexts. For example, 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. Benartzi and Thaler (2001) find that "$1/N$" diversification heuristics are more powerful than the effects of stock market value changes in pension portfolio adjustments.

VIII   Conclusion

Market-based debt ratios describe the relative ownership of the firm by creditors and equity holders, and they are an indispensable input in WACC computations. This paper has shown that stock returns are a first order determinant of debt ratios; that they are perhaps the *only* well understood influence of debt ratio dynamics; and that many previously used proxies seem to have helped explain capital structure dynamics primarily because they correlated with omitted dynamics caused by stock price changes.

Appendix

A Method and Variable Details

A. Variable Definitions:

D_t The sum of long-term debt (Compustat item [9]) and debt in current liabilities ([34]). Convertible securities are excluded. Broader definitions were tried and found not to impact the results.

E_t CRSP Market Value, the number of shares times closing price at the end of the fiscal year. Exactly time-aligned with D_t.

Assets Assets, defined by [6], adjusted to 2000 levels using the CPI.

ADR_t Actual Debt Ratio: $D_t/(E_t + D_t)$. The dependent variable. All results, including the relative importance of debt issuing and equity issuing, are invariant to predicting an actual equity ratio (AER) instead of ADR (because $AER \equiv 1 - ADR_t$); or to predicting D_t/EQ_t.

$IDR_{t,t+k}$ Implied Debt Ratio: $D_t/[E_t \cdot (1 + x_{t,t+k}) + D_t]$.

$r_{t,t+k}$ Stock returns with dividends, from CRSP.

$x_{t,t+k}$ Stock returns without dividends, from CRSP.

In Tables 1 and 2, ENI, DIV, and Induced Equity Growth were obtained from the sum of market values minus lagged market values adjusted by compounded returns. The reported statistics sit about halfway between statistics normalized by firm value at the beginning of the period (t) and statistics normalized by firm value at the end of the period ($t + k$).

$TDNI_{t,t+k}$ Difference in total debt value: $D_{t+k} - D_t$.

$ENI_{t,t+k}$ Difference in total equity value sans return and dividend effects: $E_{t+k} - E_t \cdot (1 + x_{t,t+k})$.

$DIV_{t,t+k}$ $(r_{t,t+k} - x_{t,t+k}) \cdot E_t$.

All independent *stock* variables used in Table 5 have to be known at the outset, i.e., at time t, when predicting ADR_{t+k}. All *flow* variables are measured over the same time

interval as the rate of return, i.e., from t to $t + k$. (Over 5 years, the reported SDV's are for the average over the 5 flow variables, not the sum.)

Tax Rate Total Income Tax ([16]), divided by the sum of Earnings ([53]×[54]) plus Income Tax ([16]). Winsorized to between -100% and $+200\%$.

Log Equity Volatility Standard deviation of returns, computed from CRSP. Timed from $t - 1$ to t. Logged, not winsorized.

Log Firm Volatility Equity Volatility times $E_t/(E_t + D_t)$. Logged, not winsorized.

M&A Activity A dummy of 1 if Compustat footnotes indicate a flag of AA, AR, AS, FA, FB, FC, AB, FD, FE, or FF.

Profitability, Sales Operating Income ([13]) divided by Sales ([12]). Winsorized at 5% and 95%.

Profitability, Assets Operating Income ([13]) divided by Assets ([6]). Winsorized at 5% and 95%.

Stock Returns As used in the IDR computation, but by itself.

Book/Market Ratio Book Value of Equity ([60]) divided by CRSP Market Value. Winsorized at 5% and 95%.

Log Assets See Assets. Not winsorized.

Log Rel. Mkt. Cap. E divided by the price level of the S&P500. Always greater than 0.1.

Deviation from Industry Debt Ratio (Industry herding or conformity.) ADR of a firm minus the ADR average in its three-digit SIC code industry. (Similar answers are obtained if two-digit industry definitions are used instead.) This variable was also used in Havakimian et al. (2001). MacKay and Philips (2002) independently provide a more detailed examination of industry capital structure. Bikhchandani, Hirshleifer and Welch (1998) review the herding literature.

Independent variables described in the text following Table 5:

Selling Expense Selling Expense ([189]) divided by Sales ([12]). Winsorized at 5% and 95%.

R&D Expense R&D Expense ([46]) divided by Sales ([12]). Winsorized at 5% and 95%.

Interest Coverage Operating Income ([13]) divided by Interest Paid ([15]). Winsorized at 5% and 95%.

Graham's Tax Rate Provided by John Graham. See Graham (2000).

Future Stock Return Reversals This variable is *not* fully known at time t. It multiplies the
stock returns from $t, t + k$ with stock returns from $t + k, t + 2k$. Thus, the variable
measures "future price continuation" (consecutive positive and consecutive negative
rates of return result in positive values). Not winsorized.

Profitability Changes This variable is *not* fully known at time t. Profitability divided by
sales, an average from t to $t + k$, minus Profitability divided by sales at $t - 2$. Other
definitions were tried, and not found to make a difference. Not winsorized.

In some cases, various variable definitions were explored. The results were robust, in that
no reported insignificant variable achieved significance in alternatives, and vica-versa.

B. Fama-Macbeth Method: Regressions in Tables 3, 4, and 5 are run one Compustat pe-
riod at a time. (In Compustat, year 1987 includes firms with fiscal years ending between
June 1987 and May 1988). The coefficients and standard errors reported in the tables are
computed from the time-series of OLS regression coefficients. (Cross-sectional standard
errors are therefore ignored.) In general, the reader is well advised to ignore statistical
standard errors. Statistical significance at conventional significance levels is rarely lack-
ing. The reader's first concern should be the *economic* meaning of the coefficients, not
their *statistical* significance.

Pooling all firm-years (instead of F-M) does not change coefficient estimates: for exam-
ple, a 1-year pooled regressions has coefficients of 2.7%, 101.7%, and –5.9%, instead of the
reported 2.7%, 101.4%, and –5.3% coefficients in the F-M method. **Fixed-effects** regressions
keep the IDR coefficient at about the same level, but drop the ADR coefficient, in some cases
to –30%.

When horizons are more than 1 year, the same firm can appear in overlapping regres-
sions. **Overlap** does not change the coefficient estimates: for example, in a 10-year regres-
sion that is run with three non-overlapping periods (1970–1980; 1980–1990; 1990-2000),
the coefficient estimates are 13.9%, 75.1%, and 6.0%, instead of the reported 13.8%, 70.8%,
and 6.9% coefficients in the paper. Statistical significance drops mildly, but no reported
inference in this paper changes.

Not reported, the F-M coefficient estimates typically have negative serial correlation.
For example, the coefficient time-series of IDR in the annual regressions displays a *nega-
tive* serial correlation of about -50%, which implies that the critical 5% level is around 1.1,
not 1.96. This negative serial correlation in coefficients implies that the standard errors

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are overstated. However, although for the 1-year levels regressions, the firm-specific residuals from the cross-sectional regressions also have on average a negative -12% time-series correlation (from regression to regression), this is not the case for the differences regression ($+30\%$ correlation). The rolling overlap in the 5-year regressions further increases the same-firm residual correlation (to $+42\%$). This average positive serial correlation in residuals implies that the standard errors are understated. Fortunately, even if one increases the standard error by a factor of $\sqrt{T = 37} \approx 6$ (i.e., a worst case) or used the average cross-sectional standard error instead of the time-series variation in the F-M coefficients, the inferences in Table 3 would not change. And in Table 5, it is the economic significance of the variable coefficients that is emphasized, anyway.

The residuals in cross-sectional or pooled regressions have a nice bell shape and are generally well behaved. In cross-sectional regressions, unit-roots are not a concern (even if the autocoefficient is close to 1).

C. Other Robustness Checks

Reported results in Table 2 are robust with respect to the use of means rather than medians (or vica-versa). All results are robust with respect to the use of various scale controls; and with respect to different definitions of debt, specifically to the use of short-term and investment grade debt only (so that the debt is almost risk-free, which eliminates much concern about the use of debt book value rather than the debt market value).

Unfortunately, the more interesting hypothesis that firms target an optimal debt ratio (rather than just their past debt ratio) is not explorable due to lack of identification of an "optimum"—both theoretically and empirically. However, added lags in actual debt ratio terms in the regressions have no significance.

Over longer horizons, there are fewer observations because firms can disappear. Predicting debt ratios in 2000, the 10-year regression predicts debt ratios for only 1,131 firms, while the equivalent 1-year regression has 2,679 firms. To my surprise, simulations indicate that survivorship bias does not significantly influence the ADR/IDR coefficient estimates. Even eliminating *all* firms with negative stock returns barely budges the coefficient estimates. (The better stock performance of more levered companies in Table 2 is probably influenced by survivorship bias.)

The robustness of the specifications in Table 5 was confirmed with alternatives in which either the plain or the crossed variable were included only by themselves. Fur-

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ther, the lack of cross-sectional predictability in readjustment tendency (the cross-term) also clearly shows up when we use each variable to classify observations into quintiles, and compare the IDR/ADR coefficients across quintiles. The estimated coefficients on IDR are always close to 1 in all quintile subcategories and not very different from one another. The one exception is M&A activity in the latter half of the sample period: in a classification table, acquirors do show systematic debt increases (relative to the stock return implied debt ratios). In sum, the modest significance in any of the cross-variables indicates that non-readjustment is a relatively universal phenomenon, at least across the examined dimensions.

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B   Tables

Editor: If dashed lines are not available, please replace dashed lines with extra space for visual separation, not with solid lines.

Table 1. Selected Descriptive Statistics.

Abbreviation	Description	1-Year			5-Year		
		Mean	Median	Std.Dev.	Mean	Median	Std.Dev.
ADR_t	Actual Debt Ratio	29.8	24.9	25.3	25.0	23.8	17.7
$IDR_{t,t+k}$	Implied Debt Ratio	28.3	22.5	25.0			
$E_t + D_t$	Market Value (in million 2000-$)	$3,294	$552	$14,179			
$Assets_t$	Total Acctg Assets (in million 2000-$)	$4,645	$583	$21,259			

Normalized by Market Value (D + E) and Winsorized

Abbreviation	Description	1-Year			5-Year		
		Mean	Median	Std.Dev.	Mean	Median	Std.Dev.
$TDNI_{t,t+1}$	Net Debt Issuing	3.7%	0.6%	9.8%	27.4%	12.2%	45.0%
$ENI_{t,t+1}$	Net Equity Issuing w/o Dividends	2.4%	0.2%	6.2%	21.0%	5.0%	41.1%
$TDNI_{t,t+1} + ENI_{t,t+1}$	Debt and Equity Issuing	6.6%	2.4%	13.7%	50.9%	23.4%	77.7%
$DIV_{t,t+1} = (r_{t,t+1} - x_{t,t+1}) \cdot E_t$	Dividends	1.6%	1.2%	1.6%	11.9%	10.7%	10.2%
$ENI_{t,t+1} - DIV_{t,t+1}$	Activist Equity Expansion	0.7%	-0.7%	6.6%	8.3%	-4.3%	43.6%
$TDNI_{t,t+1} + ENI_{t,t+1} - DIV_{t,t+1}$	Activist Total Expansion	4.8%	0.9%	14.0%	38.1%	10.9%	78.8%
$r_{t,t+1} \cdot E_t$	Total Dollar Return	8.8%	5.5%	28.8%	80.8%	46.3%	112.4%
$x_{t,t+1} \cdot E_t$	Induced Equity Growth	7.0%	3.5%	28.5%	67.6%	31.3%	110.3%

Explanation: The sample are all reasonably large publicly traded firms, with a minimum market capitalization of $75 million in the first year of the sample (1964), increasing to $1.47 billion in the last year of the sample (2000). (See Page 4.) The firm size normalization is relative to the issue month, and uses the book value for debt. The normalized series are then winsorized at the 5th and 95th percentiles.

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Table 2. Corporate Activity, Equity Growth, and Capital Structure, Classified by Stock Returns (Year-Adjusted and Sales-Adjusted).

Panel A: Sort by Calendar Year, Sales, 1 Year Net Stock Returns.

Between 5,849 and 6,118 observations per decile.

Sort Criterion, Net Return $(t, t+1)$	−55	−33	−22	−13	−5	3	11	21	37	79
Net Debt Issuing, TDNI$_{t,t+1}$	.7	.8	.8	.9	.8	.6	.7	.5	.1	.0
Net Equity Issuing ENI$_{t,t+1}$	.2	.2	.2	.1	.2	.2	.2	.3	.5	1.0
Dividends DIV$_{t,t+1}$	.0	.7	1.2	1.5	1.7	1.8	1.8	1.7	1.3	.5
Activist Equity Expansion (ENI − DIV)	0	−.4	−.9	−1.2	−1.3	−1.4	−1.3	−1.1	−.5	.1
Activist Expansion (TDNI + ENI − DIV)	1.8	1.1	.9	.5	.5	.2	.4	.5	1.1	2.8
Induced Equity Growth, $x_{t,t+1} \cdot E_t$	−30	−16	−8	−2	2	6	12	20	33	63
Ending ADR$_{t+1}$	37	30	29	27	27	26	25	22	19	14
Starting ADR$_t$	22	22	22	23	25	25	26	25	23	22
Return-induced IDR$_{t,t+1}$	34	27	26	24	24	24	23	20	17	13

Panel B: Sort by Calendar Year, Sales, 5 Year Net Stock Returns.

Between 3,868 and 4,097 observations per decile.

Sort Criterion, Net Return $(t, t+5)$	−106	−64	−37	−12	10	32	61	103	176	406
Net Debt Issuing, TDNI$_{t,t+5}$	6	9	10	12	13	14	14	15	15	16
Net Equity Issuing ENI$_{t,t+5}$	4	3	3	3	4	5	5	7	8	16
Dividends DIV$_{t,t+5}$	3	8	10	12	14	14	14	14	12	10
Activist Equity Expansion (ENI − DIV)	0	−3	−5	−7	−8	−7	−7	−6	−3	4
Activist Expansion (TDNI + ENI − DIV)	9	9	8	7	9	10	10	13	18	32
Induced Equity Growth, $x_{t,t+5} \cdot E_t$	−37	−13	2	16	28	43	63	91	143	265
Ending ADR$_{t+5}$	41	34	32	30	29	28	25	22	18	13
Starting ADR$_t$	20	20	23	24	27	29	30	29	29	31
Return-induced IDR$_{t,t+5}$	34	23	23	21	20	19	17	14	11	8

Explanation: All numbers are medians and quoted in percent. Firms are sorted first by calendar year, then by sales decile (to control for size), and then allocated to deciles based on their stock return rank (within each group of 10 firms). In each panel, the first six rows are normalized by firm size in the month of issue; the last three rows are not.

Table 3. F-M Regressions explaining Future Actual Debt Ratios ADR_{t+k} with Debt Ratios ADR_t and Stock-Return Modified Debt Ratios $\text{IDR}_{t,t+k}$.

Panel A: Without Intercept.

Horizon k	con.	$\text{IDR}_{t,t+k}$	ADR_t	s.e._c	s.e._{IDR}	s.e._{ADR}	R^2	T
1-Year F-M		102.1	–0.5		1.4	1.4	96.3%	37
3-Year F-M		94.6	9.5		2.1	2.1	90.4%	35
5-Year F-M		86.7	18.7		2.8	2.1	86.5%	33
10-Year F-M		68.3	37.7		4.6	1.8	80.0%	28

Panel B: With Intercept.

Horizon k	con.	$\text{IDR}_{t,t+k}$	ADR_t	s.e._c	s.e._{IDR}	s.e._{ADR}	R^2	T
1-Year F-M	2.7	101.4	–5.3	0.1	1.3	1.2	91.3%	37
3-Year F-M	6.8	94.4	–4.2	0.3	1.5	1.4	78.4%	35
5-Year F-M	9.3	86.9	–0.5	0.4	2.1	1.6	70.2%	33
10-Year F-M	13.8	70.8	+6.9	0.6	3.7	2.7	56.0%	28

Explanation: The cross-sectional regression specifications are

$$\text{ADR}_{t+k} = [\alpha_0+]\ \alpha_1 \cdot \text{IDR}_{t,t+k} + \alpha_2 \cdot \text{ADR}_t + \epsilon_{t+k} \ .$$

Reported coefficients and standard error estimates are computed from the time-series of cross-sectional regression coefficients, and quoted in percent. A coefficient of 100% on implied debt ratio ($\text{IDR}_{t,t+k}$) indicates perfect lack of readjustment, a coefficient of 100% on actual debt ratio (ADR_t) indicates perfect readjustment. R^2's are time-series averages of cross-sectional estimates. 60,317 firm-years are used in the 1-year regressions, 25,180 in the 10-year regressions. T is the number of cross-sectional regressions.

Table 4. Explanatory Power of Components of Debt Ratios and Debt Ratio Dynamics: Time-Series Average R^2's from Cross-sectional F-M Regressions.

In Levels, ADR_{t+k} is explained by Regressor (this column). In Differences, $ADR_{t+k} - ADR_t$ is explained by Regressor Minus ADR_t.	k = 1-Year, Avg R^2		k = 5-Years, Avg R^2	
	Levels	Differences	Levels	Differences
Past Debt Ratio, ADR_t $$\frac{D_t}{D_t + E_t}$$	85.0%		54.0%	
Implied Debt Ratio, $IDR_{t,t+k}$ $$\frac{D_t}{D_t + E_t \cdot (1 + x_{t,t+k})}$$	91.2%	43.2%	68.3%	40.2%
Implied Debt Ratio, w/ dividend payout $$\frac{D_t}{D_t + E_t \cdot (1 + r_{t,t+k})}$$	91.3%	43.6%	70.0%	41.5%
All issuing and dividend activity $$\frac{D_t + TDNI_{t,t+k}}{D_t + TDNI_{t,t+k} + E_t + ENI_{t,t+k} - DIV_{t,t+k}}$$	93.4%	56.9%	85.7%	68.8%
All issuing activity $$\frac{D_t + TDNI_{t,t+k}}{D_t + TDNI_{t,t+k} + E_t + ENI_{t,t+k}}$$	93.4%	56.5%	84.9%	65.9%
Net Equity Issuing Activity $$\frac{D_t}{D_t + E_t + ENI_{t,t+k} - DIV_{t,t+k}}$$	85.6%	5.2%	63.3%	16.2%
Net Debt Issuing Activity $$\frac{D_t + TDNI_{t,t+k}}{D_t + TDNI_{t,t+k} + E_t}$$	92.3%	49.7%	71.3%	40.6%
— " — Convertibles Only		3.3%		4.0%
— " — Short-Term Only		15.9%		13.7%
— " — Long-Term Only		30.7%		31.9%

Table 5. F-M Regressions explaining Debt Ratio Changes ($\text{ADR}_{t+k} - \text{ADR}_t$). Adding Variables Used in Prior Literature.

Variable	k = 1-Year			k = 5-year		
	Multivariate	4-Variate	SDV	Multivariate	4-Variate	SDV
Intercept	2.70*	varies		−0.62	varies	
(Flow Variables Measured from t to $t+k$)						
$\Delta\text{IDR} \equiv \text{IDR}_{t,t+k} - \text{ADR}_t$	7.38***	varies	0.07	10.47**	varies	0.13
Log Volatility	−2.54***	−0.61***	0.80	−5.27***	−0.30	0.67
— ×ΔIDR	− 0.97	−0.18	0.19	3.33	3.83*	0.37
Stock Return	−0.06	−0.28	0.54	−1.33	−1.68	3.78
— ×ΔIDR	−0.46	0.32	0.08	−3.02*	−0.79	1.12
M&A Activity	1.26***	1.28***	0.39	2.51***	2.17***	0.24
— ×ΔIDR	0.08	0.06	0.03	0.34	−0.07	0.04
Profitability, Sales	−0.20	−0.09	0.14	−1.29***	−0.17	0.12
— ×ΔIDR	−0.40	0.01	0.01	−0.97*	−0.39	0.03
Profitability, Assets	−1.45***	−0.62***	0.09	−2.57***	−0.40	0.08
— ×ΔIDR	0.91***	0.74***	0.01	1.76**	3.19***	0.02
Tax Rate	0.25*	−0.05	0.28	0.74***	0.73*	0.17
— ×ΔIDR	−0.03	0.22	0.03	0.19	1.75***	0.05
(Stock Variables Measured at t)						
Industry Deviation	−1.83***	−1.13***	0.19	−6.87***	−4.86***	0.21
— ×ΔIDR	−0.14	−0.14	0.01	−0.91*	−0.73	0.03
Log Assets	−2.71***	−0.20*	1.88	−4.67***	−0.58**	1.93
— ×ΔIDR	−2.62	0.22	0.44	1.42	−1.49	0.84
Log Rel Mkt Cap	1.77***	0.01	1.54	3.47***	0.54	1.71
— ×ΔIDR	0.75	0.12	0.10	0.53	−0.07	0.26
Book/Market Ratio	0.16	−0.22	0.55	0.75*	−1.19***	0.57
— ×ΔIDR	0.37	0.24	0.07	0.61	−0.02	0.17
N,T	57,921, 37	varies		34,880, 33	varies	
R^2	54%	varies		59%	varies	

Explanation: The reported coefficient estimates are computed from the time-series of cross-sectional regression coefficients, and quoted in percent. Except for the intercept, variables were unit-normalized (coefficients were multiplied by SDV, the standard deviation of the variable). One/two/three stars means a F-M-type t-statistic above 3/4/5. The multivariate columns are the coefficients from one big specification. The 4-Variate columns are the coefficients from individual specifications, one variable V at a time, $\text{ADR}_{t+k} - \text{ADR}_t = \alpha_0 + \alpha_1 \cdot X_{t,t+k} + \alpha_2 \cdot V + \alpha_3 \cdot V \times X_{t,t+k} + \epsilon_{t+k}$. 4-Variate regressions avoid multicollinearity.