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Capital Structure Choices

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ABSTRACT

We examine three pairs of cross-section regressions that test predictions of the tradeoff model, the pecking order model, and models that center on market conditions. The regressions examine (i) the split of new outside financing between share issues and debt, (ii) the split of new debt financing between short-term and long-term, and (iii) the split of new equity financing between share issues and retained earnings. The pecking order does well until the early 1980s, when the share issues that are its bane become common. The adjustment of leverage to target predicted by the tradeoff model and the response of equity financing to market valuations predicted by the market conditions model have statistically detectable but rather second-order effects on the split of new outside financing between share issues and debt. Targets for short-term debt seem to influence the mix of short-term versus long-term debt choices of smaller firms, but this targeting effect is weak to non-existent for large firms. Sticky dividends plague the predictions of the pecking order and market conditions models about the split of equity financing between share issues and retained earnings.

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1 Introduction

We test the predictions of three common models for the financing decisions of firms — the tradeoff model, the pecking order model, and the market conditions model. The central prediction of the tradeoff model is that firms have leverage targets and leverage tends to return to its target. The pecking order model, as framed by Myers (1984) and Myers and Majluf (1984), predicts that because of asymmetric information problems that are more severe for riskier securities, firms prefer to finance with retained earnings, outside financing is primarily debt rather than new shares, and debt financing is primarily short-term. Pecking order financing can also arise for other reasons, for example, issuing costs that are zero for retained earnings, low for short-term debt, and highest for share issues.

The market conditions model has several variants. They share the prediction that firms with high prices relative to a fundamental like book value issue more new shares. The market-timing version of the model is an offshoot of the behavioral story for the value premium in average stock returns. Debondt and Thaler (1985) and Lakonishok *et al.* (1994) argue that growth stocks (characterized by high ratios of stock price to book value, P/B) tend to be overvalued and low P/B value stocks tend to be undervalued. Gradual price corrections produce the value premium, that is, low average returns for growth stocks and high average returns for value stocks. If growth stocks are overvalued, it seems reasonable that the debt of growth firms is also likely to be overvalued, with long-term debt more overvalued than short-term debt (Myers and Majluf, 1984).

In the market-timing model, managers use financing decisions to take advantage of the slow correction of pricing errors. High P/B growth firms prefer share issues (to take advantage of stock prices that are too high) over new debt or retained earnings. When growth firms issue debt, they favor (more overvalued) long-term debt over short-term debt. Repurchases of overpriced shares are a bad investment for growth firms, but dividends are attractive because, holding total assets fixed, they allow growth firms to issue overvalued securities. For low P/B value firms, everything reverses. Retained earnings are the cheapest financing, followed by slightly underpriced short-term debt, then by more underpriced long-term debt, with most underpriced outside equity last in line. Repurchases of undervalued shares are attractive for value firms, but dividends have high opportunity cost.

Baker and Wurgler (2002) are strong proponents of the market-timing story, which we also label the mispricing model.

Other models that center on market conditions but do not rely on mispricing also predict a positive relation between equity financing and *P/B*. For example, with rational pricing, high *P/B* is a signal of some combination of high expected future cashflows to equity and low discount rates for the cashflows, that is, a low cost of equity capital. Suppose security prices are rational and the capital structure irrelevance theorem of Modigliani and Miller (1958) holds. In this scenario, a low cost of equity capital does not imply that equity is cheaper than other forms of financing. Suppose, however, managers respond to higher *P/B* with new share financing because they mistakenly believe higher *P/B* signals a low relative cost of equity. The mistaken belief might arise, for example, because managers do not understand the MM theorem or because they falsely believe *P/B* signals mispricing. The positive relation between *P/B* and share financing is then what Miller (1977) calls a neutral mutation: benign behavior that signals nothing about the cost of share issues relative to other forms of financing or about mispricing. This version of the market conditions model is consistent with evidence that capital structure choices have only a moderate impact on the value of most firms (see the excellent review by Graham and Leary, 2011) and with evidence that manager characteristics affect capital structure choices (Bertrand and Schoar, 2003; Graham and Narasimhan, 2004; Lewellen, 2006; Cronqvist *et al.*, 2010).

The line between the pecking order model of Myers and Majluf (1984) and the mispricing version of the market conditions model is also blurry. In developing the theoretical underpinnings of their model, Myers and Majluf (1984) argue that asymmetric information problems are less severe for firms with obvious growth opportunities. This implies that with appropriate controls for other pecking order explanatory variables, growth firms, which typically have higher *P/B*, use more new share financing — the prediction of the mispricing model and other variants of the market conditions model.

In short, a positive relation between *P/B* and share issues is predicted by many models, some based on irrational pricing and some that assume rational pricing. We classify all these models under the rubric, market conditions models (a label we owe to a referee). Because the relation between security issues and *P/B* does not in itself allow us to distinguish among market conditions models or between these and the pecking order model of Myers and Majluf (1984), cautious interpretation of the P/B results is in order.

An important contribution of this paper is a new regression framework that allows us to nest, in a simple way, tests of the tradeoff, pecking order, and market conditions models. We use three pairs of cross-section regressions that focus on (i) the split of total new outside financing between share issues and debt, (ii) the split of new debt financing between short-term and long-term, and (iii) the split of total new equity financing between retained earnings and share issues. Each regression pair imposes a different form of the cashflow constraint linking sources and uses of funds, and imposition of the constraint means the two regressions in a pair are complementary, in a sense that becomes clear.

The basic cashflow constraint is,

$$dS_t + dL_t = dA_t + D_t - Y_t. \tag{1}$$

In Equation (1), dS_t is the book value of (equivalently, the proceeds from) common stock issued during the fiscal year ending in calendar year t, dL_t is the change in liabilities including preferred stock, dA_t is total investment (the change in total assets), D_t is dividends paid, and Y_t is earnings, all for the same fiscal year t. The cashflow constraint in (1) says that total new outside financing, $dS_t + dL_t$, must cover the demand for financing from investment and dividends less the supply of financing from earnings. (The Appendix gives details on the measurement of the variables.)

The first two regressions focus on how firms split total new outside financing between share issues and debt, dS_t and dL_t. The explanatory variables include dA_t, D_t, and Y_t, the variables on the right side of the cashflow constraint (1). This means the two regressions are complementary: the sum of the slopes on Y_t in the dS_t and dL_t regressions must be minus one, the slopes on dA_t must sum to one, and the sum of the slopes on D_t is also one. The slopes on the cashflow variables in the two cross-section regressions thus measure the average split of an additional dollar of earnings between lower share issues and lower debt issues, and the average splits of the financing of investment and dividends between new shares and debt. The slopes on the cashflow variables in the dS_t and dL_t regressions provide our evidence on the pecking order prediction that new outside financing is primarily debt.

To test the tradeoff model's prediction that leverage reverts to its target, the dS_t and dL_t regressions also include the lagged leverage surplus, LS_{t-1}, the difference between actual and target leverage at the end of the fiscal year ending in calendar year $t-1$, as an explanatory variable. In line with the tradition in the market timing literature (see the reviews of Baker *et al.*, 2007 or Eckbo *et al.*, 2007), the regressions also include the lagged price to book ratio, P/B_{t-1}, as an explanatory variable. We interpret the P/B_{t-1} slopes more broadly, as evidence on market conditions models in general and on the Myers-Majluf version of the pecking order model. In the regressions to explain new outside debt and equity financing, the P/B_{t-1} slopes tell us whether, as predicted by these models, higher P/B_{t-1} pushes outside financing away from debt toward share issues, and the LS_{t-1} slopes tell us whether, as predicted by the tradeoff model, a larger leverage surplus leads to less new debt.

With the control for total required outside financing provided by the investment, dividend, and earnings explanatory variables, the cashflow constraint (1) implies that the slopes for P/B_{t-1} or LS_{t-1} must sum to zero in the dS_t and dL_t regressions. In other words, imposition of the cashflow constraint on the regressions means additional share issues in response to higher P/B_{t-1} or higher LS_{t-1} imply an exact offset in debt financing — an additional dollar of shares is a dollar less of debt.

The second pair of regressions focuses on the split of total new debt financing, dL_t, between short-term and long-term debt, $dSTD_t$ and $dLTD_t$. For these tests, we move stock issues to the right side of the cashflow constraint,

$$dSTD_t + dLTD_t = dA_t + D_t - Y_t - dS_t. \quad (2)$$

This form of the constraint says total new debt, $dSTD_t + dLTD_t$, must equal the demand for financing from investment and dividends minus the supply of financing from earnings and stock issues.

The explanatory variables in the $dSTD_t$ and $dLTD_t$ regressions include the variables on the right side of the cashflow constraint (2). Because we impose (2), the two regressions treat the quantity of new debt as fixed and focus on the split between short-term and long-term. We use these regressions to test the pecking order prediction that firms prefer short-term to long-term debt and the market conditions prediction that higher P/B_{t-1} leads firms to use long-term rather than short-term debt. We also test a simple extension of the tradeoff model that implies firms have a target for the ratio of short-term debt to total debt. The $dSTD_t$ and $dLTD_t$ regressions are again complementary; specifically, the slopes for dA_t sum to one, the sum of the slopes for D_t is one, the slopes for each of Y_t and dS_t sum to minus one, and the slopes for any additional variable sum to zero.

The last pair of regressions focuses on the split of new equity financing between share issues and retained earnings. We take earnings as given, so firms alter retained earnings by adjusting dividends. To isolate the share issue/dividend decision, we express the cashflow constraint as

$$dS_t - D_t = dA_t - Y_t - dL_t, \tag{3}$$

and we include investment, earnings, and new debt issues as explanatory variables in regressions that explain share issues and dividends.

If the proceeds from share issues are not used to pay dividends or repurchase debt, dS_t shows up in dA_t, the change in total assets including cash. Thus, with controls for total investment, earnings, and the change in liabilities on the right side of (3), by including P/B_{t-1} as an explanatory variable in the dS_t and D_t regressions, we test the prediction of the market conditions model that higher P/B_{t-1} also makes firms willing to pay more current dividends to absorb the proceeds from share issues. The two regressions also shed light on the prediction of a strong version of the pecking order model that firms vary dividends to finance with low cost retained earnings.

Our main findings are easily summarized.

(1) The first two regressions, which explain the split of total new outside financing between shares and debt, provide reliable evidence that, as predicted by the tradeoff model, firms tend to adjust the mix of new equity and debt to move toward target leverage. The magnitude of the effect is, however, typically small. Thus, our results reinforce earlier evidence that leverage targets are generally not a first-order consideration in financing decisions (e.g., Shyam-Sunder and Myers, 1999; Graham and Harvey, 2001; Fama and French, 2002; Welch, 2004; Iliev and Welch, 2010; DeAngelo and Roll, 2011; Hovakimian and Li, 2011).

(2) The second pair of regressions, which explains the split of new debt financing between short-term and long-term, tests the extended tradeoff model's prediction that firms have a target mix of short-term and long-term debt. We find that when issuing debt, microcaps (firms with stock market capitalization below the 20th NYSE percentile) and small firms (market capitalization between the 20th and 50th NYSE percentile) do tend to move toward a target short-term/long-term mix, and for microcaps the magnitude of the effect is large. This tradeoff effect is weak to non-existent for big stocks.

(3) All three pairs of regressions provide some evidence that supports the market conditions model. In statistical terms the support ranges from strong to weak, and in economic terms the effects are generally small. There is strong statistical evidence that higher P/B_{t-1} firms allocate more new outside financing to share issues, but variation in the mix of new debt and equity in response to P/B_{t-1} is typically modest. As predicted by the market conditions model, there are hints in our tests that more of the new debt financing of higher P/B_{t-1} firms is long-term during 1963–1982, but there is little evidence of this behavior during 1983–2009. Finally, our tests suggest that higher P/B_{t-1} firms pay more dividends so they can issue more new shares, but the statistical reliability of this inference is not overwhelming, and the variation of new shares linked to dividends is tiny.

(4) The pecking order model predicts that firms favor debt over share issues for new outside financing and they favor short-term over long-term debt. The cashflow control variables in the first pair (dS_t and dL_t) and second pair ($dSTD_t$ and $dLTD_t$) of regressions isolate these specific financing decisions and so provide direct tests of the pecking order. The prediction that variation in investment, dividends, and earnings is absorbed more by debt than by share issues fares well during 1963–1982. Stock issues and repurchases are more common after 1982 (Fama and French, 2005), however, and in the 1983–2009 tests, share issues absorb about as much cashflow variation as debt. The $dSTD_t$ and $dLTD_t$ regressions provide no support for the pecking order prediction that firms favor short-term debt. Contrary to the model, long-term debt typically absorbs more of the variation in cashflow variables than short-term debt.

What is our contribution? The regression to explain total debt issues has precedents in Shyam-Sunder and Myers (1999) and in especially Frank and Goyal (2003). At a minimum, however, examining the complementary regression to explain share issues expands the perspective provided by the debt regression. The regressions to explain the split of debt financing between short-term and long-term, and the regressions to explain the split of equity financing between retained earnings and share issues are novel, but one can argue that they address less central predictions of the tradeoff, pecking order, and market conditions models. As in most empirical research, some of our results are predictable from earlier studies that use different approaches. We judge that our tests provide interesting new results, as well as new perspective on existing results. And our regression framework — three pairs of complementary regressions that nest tests of the tradeoff, pecking order, and market conditions models in a simple unified structure — is a contribution that can provide the foundation for much future work.

We first discuss (in Section 2) the regressions to explain share issues and new debt. Section 3 examines the split of debt financing between short-term and long-term, and Section 4 takes up share issues and dividends (retained earnings). In each case, we discuss the logic of the regressions and then turn to the results. A summary and conclusions are in Section 5.

2 Share Issues versus New Debt

2.1 The Logic of the Regressions

The regressions that examine the split of new outside financing between share issues, dS_t, and debt, dL_t, build on the cashflow constraint in Equation (1), which says new outside financing must cover the demand for financing from investment and dividends less the supply of financing from earnings. Suppose that for each year t in our sample we estimate two cross-section regressions for individual firms: new equity, dS_t, regressed on the change in assets, dA_t, dividends, D_t, and earnings, Y_t, and new debt, dL_t also on dA_t, D_t, and Y_t. The cashflow constraint (1) holds firm-by-firm and year-by-year. Thus, because we include asset growth, dividends, and earnings as explanatory variables, the sum of each year's regressions to explain dS_t and dL_t must reduce to $dA_t + D_t - Y_t$. Specifically, the sum of the intercepts in the dS_t and dL_t regressions must be zero every year, the slopes for Y_t must sum to minus one, and the sums of the slopes for dA_t and D_t must each be one. These constraints on the intercept and the slopes for Y_t, dA_t, and D_t continue to hold if we add other explanatory variables to both regressions, and like the intercepts, the slopes for each additional explanatory variable must sum to zero in the two annual regressions.

There are two primary additional explanatory variables in the dS_t and dL_t regressions. The first is the lagged price-to-book ratio, P/B_{t-1}, which is market capitalization (market cap) at the end of December of year $t-1$ over book equity for the fiscal yearend in $t-1$. The second is the lagged leverage surplus, LS_{t-1}, defined as the difference between leverage and target leverage for year $t-1$, where leverage is the ratio of book liabilities (including preferred stock) to book assets for $t-1$, and where target leverage is the $t-1$ value-weight leverage ratio for the firm's industry (see Appendix for details). Thus, ignoring other variables added later and using notation that accounts for the constraints on the coefficients and residuals implied by (1), the two regressions estimated each year are,

$$dS_t = a_t + b_1 dA_t + b_2 D_t + b_3 Y_t + b_4 P/B_{t-1} + b_5 LS_{t-1} + e_t, \quad (4)$$

$$\begin{aligned} dL_t = & -a_t + (1-b_1)dA_t + (1-b_2)D_t - (1+b_3)Y_t \\ & - b_4 P/B_{t-1} - b_5 LS_{t-1} - e_t. \end{aligned} \quad (5)$$

In economic terms, the slopes for investment, dividends, and earnings in the two regressions provide estimates of how, on average, required outside financing due to variation in these variables across firms splits between share issues and debt. The slopes for the price-to-book ratio and the lagged leverage surplus then tell us how they push the allocation of outside financing away from the averages.

Using lagged industry leverage to proxy for target leverage is crude, but the alternatives we have tried (equal-weight industry leverage for $t-1$, average equal-weight or value-weight industry leverage for the five years from $t-1$ to $t-5$, the firm's average leverage for $t-1$ to $t-5$, and the average leverage of all firms for $t-1$) produce similar results on the reversion of leverage to its target. Our inferences about reversion to target are also similar to those from more ambitious cross-section regression approaches that attempt to capture the effects of a wide range of explanatory variables for target leverage suggested by variants of the tradeoff model (see, for example, Fama and French, 2002 or the review of Parsons and Titman, 2008). We focus on book leverage because the results in Welch (2004) suggest that firms do not respond much to variation in market leverage due to changes in stock prices. We have, however, replicated our results using market leverage, and as in Fama and French (2002), estimates of the rate of reversion of leverage to its target are similar for book and market leverage. Rampini and Viswanathan (2010), Rauh and Sufi (2010), and Welch (2011) suggest that non-debt liabilities, such as operating leases, should be included in measures of leverage. We leave such refinements to future work.

There are also alternatives to P/B_{t-1} as a measure of market conditions. Cumulative lagged returns are a common choice. Rhodes-Kropf *et al.* (2005) and Polk and Sapienza (2009) propose other measures. DeAngelo *et al.* (2010) examine the performance of different market conditions variables as predictors of seasoned equity offerings. They find that combining measures provides some enhancement of explanatory power, but in economic terms not much seems to be gained. We choose to go with timeworn P/B_{t-1} (the popular choice in the literature) as the sole measure of market conditions, leaving enhancements to future work.

We use regressions (4) and (5) to shed light on tradeoff, pecking order, and market conditions predictions about the split of outside financing between debt and equity. The slopes for the cashflow variables provide evidence on the pecking order prediction that new outside financing is primarily debt. Thus, the slopes for investment, earnings, and dividends should be further from zero in the new debt regression (5) than in the new shares regression (4).

In the tradeoff model, leverage tends to return to its target. The prediction is that higher leverage relative to target should, on average, lead firms to substitute away from debt toward equity for outside financing. Thus, the slope for the leverage surplus, LS_{t-1}, should be positive in regression (4) to explain share issues and negative in the debt regression (5).

As a test for the reversion of leverage to its target, the novelty of regressions (4) and (5) is the cashflow controls. For example, if pecking order forces also affect financing decisions, variation in leverage in response to cashflows may obscure tradeoff forces that push leverage toward its target. The cashflow controls in our regressions should, however, capture pecking order (and other) effects, allowing the slopes for the leverage surplus to produce cleaner estimates of the rate at which leverage reverts to target. Moreover, the constraint on outside financing in Equation (1) implies that, with the cashflow controls, the sum of the slopes on the lagged leverage surplus in regressions (4) and (5) is zero. The slopes for LS_{t-1} thus produce dollar-for-dollar estimates of how a larger leverage surplus leads firms to substitute share issues for debt.

The slopes for the lagged price-to-book ratio, P/B_{t-1}, in regressions (4) and (5) test the prediction of the market conditions model that managers perceive high P/B_{t-1} as a signal that the cost of outside equity is low relative to other forms of financing, so high P/B_{t-1} growth firms are more likely to meet required outside financing with share issues rather than debt. Using P/B_{t-1} to capture these effects is standard. The cashflow control variables in (4), however, allow the slopes on P/B_{t-1} to provide sharper tests of the market conditions model. For example, most of the variation in P/B_{t-1} across firms is caused by differences in expected growth rather than differences in expected return (Cohen *et al.*, 2003). High P/B_{t-1} growth firms tend to grow more quickly than low P/B_{t-1} value firms. Since investment must be financed, if we did not include the cashflow variables in regressions (4) and (5), we would likely find that high P/B_{t-1} is associated with more new debt and more new shares, and any effect of market conditions on outside financing would be at least partially obscured. Regressions (4) and (5) address this problem by controlling for required outside financing, that is, the demand for financing from investment and dividends and the supply of financing from earnings.

Finally, our cross-section regressions impose the same slopes for explanatory variables on all firms, and this warrants careful interpretation of the results. For example, the cashflow slopes in (4) and (5) measure how, on average (that is, across firms), the financing of variation in investment, dividends, and earnings splits between share and debt issues. Likewise, the slopes on P/B_{t-1} measure how, on average, higher P/B_{t-1} pushes the split of outside financing toward equity and away from debt. Estimates of average effects are informative about overall responses, but they are surely inaccurate for some individual firms. We can envision extensions of the regressions that allow the slopes to vary across firms, for example, via interaction variables. Here we stay with simple transparent functional forms to illustrate the complementary regression approach; we leave extensions for future work.

2.2 Regression Results

The two regressions we actually estimate are minor enhancements of (4) and (5), specifically,

$$\begin{aligned} dF_t &= a_t + b_1 dA_t + b_2 NegY_t + b_3 PosY_t + b_4 NoD_t + b_5 D_t \\ &\quad + b_6 MC_t + b_7 NegB_{t-1} + b_8 P/B_{t-1} + b_9 LS_{t-1} + e_t. \end{aligned} \tag{6}$$

The dependent variable, dF_t, is either dS_t, the book value of (proceeds from) shares issued during the fiscal year ending in calendar year t, or dL_t, the change in liabilities. We estimate different slopes for negative and positive earnings, $NegY_t$ and $PosY_t$, to allow for the possibility that debt is more difficult to issue for firms with negative earnings. Like earlier researchers, we include MC_t, the log of market cap in June of t, to allow for differences in financing as a function of size. We also include a dummy variable for firms that pay no dividends during fiscal year t, NoD_t, and a dummy for firms with negative book equity, $NegB_{t-1}$. Except for MC_t, P/B_{t-1}, LS_{t-1}, $NegB_{t-1}$, and NoD_t, all the variables in the year t estimates of regression (6) (and regressions reported later) are scaled by year t total assets.

In the spirit of Fama and MacBeth (1973), we estimate regression (6) year by year for 1963–2009 and draw inferences from averages of the annual slopes and t-statistics for the averages. This is a simple way to produce standard errors of the average slopes that allow for any within year cross-correlation of the regression residuals. Autocorrelation of the annual slopes is also a potential problem, but skipping the details, we can report that the problem is not serious, probably because the dependent variables in the regressions are year-to-year changes.

To reduce the influence of outliers, the annual samples are trimmed. The estimates of regression (6), for example, exclude 0.5% of the observations in the right tails of the explanatory variables $PosY_t$, D_t, P/B_{t-1}, and LS_{t-1}, and 0.5% of the observations in the left tails of dA_t and $NegY_t$. Because extreme observations tend to be correlated across variables, trimming results in small reductions in sample sizes. More important, we can report that trimming reduces the standard errors of the average slopes, thus enhancing the information from the regressions.

Bagwell and Shoven (1989) find that share repurchases surge after 1982. Fama and French (1995) find that the profitability of small firms declines in the early 1980s. We split our 1963–2009 sample in 1983 to accommodate these results. Formal tests (Appendix Table A1) suggest that the true regression slopes for the two periods differ, so we do not show results for the full 1963–2009 period.

We also report separate results for microcap firms (market cap below the NYSE 20th percentile), small firms (between the 20th and 50th NYSE market cap percentiles), and big firms (above the 50th NYSE percentile). The sample includes NYSE and Amex stocks, with Nasdaq stocks added in 1973. On average 51% of the firms in the sample are microcaps during 1963–1982 and 62% are microcaps during 1983–2009 (Table 1). We partition the sample into three size groups to prevent the large number of tiny stocks from dominating the economically more important large stocks in the regressions. We do not show results for the full sample because formal tests (Appendix Table A2) suggest that the true regression slopes differ across the three size groups.

	Firms	dS_t	dL_t	$dSTD_t$	$dLTD_t$	dA_t	$NegY_t$	$PosY_t$	NoD_t	D_t	MC_t	$NegB_{t-1}$	P/B_{t-1}	LS_{t-1}	STS_{t-1}
							1963–1982								
Micro															
Ave	1242	0.94	4.53	2.43	2.11	7.97	−1.51	5.14	0.48	1.13	2.36	0.01	1.67	−0.04	0.12
Std Dev		5.61	13.99	10.78	9.34	17.04	4.97	4.34	0.50	1.56	0.88	0.08	1.94	0.19	0.24
Small															
Ave	442	1.28	6.25	2.85	3.40	11.79	−0.29	6.53	0.18	1.99	4.23	0.00	1.87	−0.05	0.06
Std Dev		5.31	10.67	6.90	8.27	13.19	1.78	4.18	0.38	1.68	0.34	0.05	1.81	0.17	0.22
Big															
Ave	581	1.09	5.96	2.53	3.42	11.16	−0.09	6.89	0.06	2.69	6.12	0.00	2.12	−0.04	0.04
Std Dev		3.86	8.01	4.79	6.31	9.95	0.84	3.83	0.24	1.79	0.98	0.04	1.81	0.14	0.19
							1983–2009								
Micro															
Ave	2375	8.16	2.66	1.72	0.94	−1.10	−14.83	3.25	0.84	0.34	3.53	0.04	2.72	−0.13	0.17
Std Dev		23.06	21.63	16.88	16.53	33.97	30.42	4.79	0.37	1.10	1.16	0.19	4.26	0.26	0.27
Small															
Ave	768	4.77	5.44	2.52	2.92	11.10	−3.81	5.59	0.57	0.89	5.96	0.02	3.10	−0.12	0.08
Std Dev		15.30	15.30	8.54	12.80	22.02	12.59	5.20	0.48	1.48	0.39	0.13	3.85	0.22	0.24
Big															
Ave	705	1.23	5.04	2.16	2.88	9.75	−1.39	6.55	0.30	1.67	7.94	0.01	3.37	−0.07	0.04
Std Dev		11.08	12.79	6.54	10.49	18.68	6.88	5.21	0.43	1.76	1.01	0.11	3.80	0.19	0.21

Table 1. Means (Ave) and standard deviations (Std Dev) of the regressions variables. (See next page for table description.)

Table 1 Description: We use CRSP and Compustat data for non-financial NYSE, Amex, and (after 1972) Nasdaq firms with fiscal yearends in calendar year t, 1963–2009. The variables are: dS_t, the book value of common shares issued during the fiscal year ending in t; dL_t, the change in liabilities, including preferred stock, in fiscal year t; $dSTD_t$, the change in short-term debt (current liabilities, excluding long-term debt in current liabilities) in fiscal year t; $dLTD_t$, the change in long-term debt, including preferred stock and long-term debt in current liabilities, in fiscal year t; dA_t, the change in total assets in fiscal year t; $NegY_t$ and $PosY_t$, earnings for firms with negative and positive earnings for fiscal year t; NoD_t, a dummy variable for firms that do not pay dividends in t; D_t, total dividends paid in fiscal year t; MC_t, the log of market cap in June of t; $NegB_{t-1}$, a dummy variable for firms with negative book equity; P/B_{t-1}, the ratio of market cap for December of $t-1$ to book equity for the fiscal yearend in $t-1$, for firms with positive book equity; LS_{t-1}, the difference between leverage and target leverage for year $t-1$, where leverage is the ratio of book liabilities including preferred stock to book assets for $t-1$ and target leverage is the $t-1$ value-weight average leverage ratio for the firm's industry; and STS_{t-1}, the difference between the short-term debt ratio and the target ratio for year $t-1$, where the short-term ratio is current liabilities, excluding long-term debt in current liabilities, divided by total liabilities for $t-1$ and the target short-term ratio is the $t-1$ value-weight average for the firm's industry. Except for MC_t, P/B_{t-1}, LS_{t-1}, STS_{t-1}, and the two dummy variables, the variables are scaled by assets at the end of year t. The table shows separate results for microcap firms (Micro, market cap in June of year t below the 20th NYSE percentile), small firms (Small, between the 20th and 50th NYSE percentiles), and big firms (Big, above the 50th percentile), and for 1963–1982 and 1983–2009. The annual samples match those used to estimate regression (4), in Table 2; we delete 0.5% of the observations in the right tails of $PosY_t$, D_t, P/B_{t-1}, and LS_{t-1}, and 0.5% of the observations in the left tails of dA_t and $NegY_t$.

We first examine what the regression slopes for the cashflow variables say about the pecking order model. We then turn to the evidence on the reversion of leverage to target predicted by the tradeoff model. The final step is to discuss what the regressions tell us about the market conditions model.

The Pecking Order Model — In the pecking order model, outside financing in response to variation in investment, earnings, and dividends is primarily debt. This prediction fares best in the regressions for 1963–1982, where share issues on average absorb between 7% and 33% of the marginal variation in dA_t, $NegY_t$, $PosY_t$, and D_t, with the rest (67% to 93%) met by debt (Table 2). The regressions for 1983–2009 are a different matter. In the dS_t regressions, the average slopes for investment, dividends, and earnings typically more than double from 1963–1982 to 1983–2009, which implies a corresponding decline in the magnitude of the slopes in the dL_t regressions. New share issues on average absorb much less than half the variation in the cashflow variables during 1963–1982, but for 1983–2009 equity and debt are on more equal footing. The tests in Appendix Table A1 say that the changes in the average slopes from 1963–1982 to 1983–2009 signal changes in the true slopes.

The summary statistics in Table 1 confirm that during 1963–1982, most outside financing is debt. For each of the three size groups, the average value of dL_t is roughly five times the average dS_t. New share financing is more important during 1983–2009, particularly among microcap and small stocks. The average value of dS_t for small stocks increases from 1.28% of assets in 1963–1982 to 4.77% in 1983–2009, and the average for microcaps increases from 0.94% to 8.16%. The summary statistics and regressions confirm the inference of Fama and French (2002, 2005) and Frank and Goyal (2003) that the pecking order model is less tenable in recent years because of the increased frequency of share issues.

Other features of the results in Table 2 are worth noting. For example, the average $NegY_t$ and $PosY_t$ slopes for big firms in the dS_t regressions for 1983–2009 are −0.48 and −0.53. Thus, given investment and dividends, the increase in share issues to cover a marginal dollar of negative earnings is on average close to the reduction in response to a dollar of positive earnings. But for microcaps, share issues during 1983–2009 respond more to negative earnings. This suggests that during 1983–2009 debt is more costly to issue for microcap firms with negative earnings. The results for 1963–1982, however, do not confirm this conclusion.

The NoD_t variable in (6) also produces an interesting result. Firms that do not pay dividends tend to issue more equity and less debt. The incremental share issues of non-payers are large, especially during 1983–2009, when they average 1.34%, 1.85%, and 1.71% of assets per year for microcap, small, and big firms (Table 2). Firms with negative book equity also tend to issue more stock. Negative book equity has a particularly large impact on the debt-equity choice of smaller firms during 1983–2009; the average annual incremental shift toward share issues is 6.58% of assets for small firms and 11.16% for microcaps. Firms that do not pay dividends or have negative book equity apparently differ from other firms in ways that affect financing decisions and are not captured by the other variables in (6).

In the results for 1963–1982, the market cap variable, MC_t, has little explanatory power in the regressions to explain share and debt issues (Table 2). Thus, splitting the sample into microcap, small, and big firms apparently captures most size effects. In the 1983–2009 results, however, there is stronger evidence that in the small and big groups, larger firms tend to issue less equity and more debt.

The Tradeoff Model — In the tradeoff model, firms have leverage targets, and leverage tends to return to its target. The prediction for outside financing is that a higher leverage surplus leads firms to issue more stock and less debt. In the estimates of (6), the slopes for LS_{t-1} should be positive in the regressions to explain share issues, which, given the cashflow controls in (6), implies exactly offsetting negative slopes in the paired regressions to explain debt issues.

Table 2 provides statistically strong evidence that leverage reverts to its target. The average slopes for LS_{t-1} in the regressions to explain share issues are positive and between 2.44 and 10.49 standard errors from zero for all size groups for 1963–1982 and 1983–2009. The average slopes for microcaps are further from zero than the slopes for small and big firms, particularly during 1983–2009.

Appendix Table A1 says that for microcaps the true average rate at which leverage reverts to target during 1983–2009 is almost surely higher than the rate for 1963–1982. In contrast, for small and big firms the average LS_{t-1}

Table 2 — Part A: Regressions to explain dS_t

	a_t	dA_t	$NegY_t$	$PosY_t$	NoD_t	D_t	MC_t	$NegB_{t-1}$	P/B_{t-1}	LS_{t-1}	R^2
						1963–1982					
Micro											
Coef	−1.16	0.14	−0.17	−0.15	0.59	0.32	0.08	1.00	0.41	2.98	0.21
t-stat	−5.32	8.18	−6.44	−5.46	3.69	7.80	1.48	0.82	7.05	7.15	
Small											
Coef	−1.40	0.19	−0.15	−0.22	0.71	0.33	0.09	2.80	0.47	2.01	0.28
t-stat	−2.47	11.08	−1.09	−9.11	2.75	5.64	0.59	2.70	4.19	3.79	
Big											
Coef	−0.42	0.20	−0.07	−0.21	0.42	0.24	−0.06	0.44	0.26	1.46	0.29
t-stat	−1.68	17.98	−1.03	−7.50	1.25	6.96	−1.88	0.35	4.87	3.78	
						1983–2009					
Micro											
Coef	−2.23	0.41	−0.60	−0.35	1.34	0.72	0.09	11.16	0.72	7.28	0.59
t-stat	−5.61	19.80	−21.80	−16.88	9.69	12.71	1.12	12.33	20.30	10.47	
Small											
Coef	3.02	0.40	−0.57	−0.48	1.85	0.64	−0.91	6.58	0.57	1.67	0.54
t-stat	2.47	18.08	−16.20	−13.35	6.39	9.36	−5.38	4.82	10.57	2.62	
Big											
Coef	1.34	0.37	−0.48	−0.53	1.71	0.38	−0.37	1.63	0.25	1.72	0.49
t-stat	2.38	18.49	−8.45	−14.85	5.24	5.66	−5.34	0.87	4.13	2.44	

(*Continued*)

Table 2 — Part B: Regressions to explain dL_t

	a_t	dA_t	$NegY_t$	$PosY_t$	NoD_t	D_t	MC_t	$NegB_{t-1}$	P/B_{t-1}	LS_{t-1}	R^2
					1963–1982						
Micro											
Coef	1.16	0.86	−0.83	−0.85	−0.59	0.68	−0.08	−1.00	−0.41	−2.98	0.88
t-stat	5.32	51.69	−31.95	−32.14	−3.69	16.38	−1.48	−0.82	−7.05	−7.15	
Small											
Coef	1.40	0.81	−0.85	−0.78	−0.71	0.67	−0.09	−2.80	−0.47	−2.01	0.82
t-stat	2.47	48.76	−6.12	−32.18	−2.75	11.45	−0.59	−2.70	−4.19	−3.79	
Big											
Coef	0.42	0.80	−0.93	−0.79	−0.42	0.76	0.06	−0.44	−0.26	−1.46	0.83
t-stat	1.68	72.45	−13.71	−28.94	−1.25	22.07	1.88	−0.35	−4.87	−3.78	
					1983–2009						
Micro											
Coef	2.23	0.59	−0.40	−0.65	−1.34	0.28	−0.09	−11.16	−0.72	−7.28	0.56
t-stat	5.61	28.56	−14.43	−31.11	−9.69	5.05	−1.12	−12.33	−20.30	−10.47	
Small											
Coef	−3.01	0.60	−0.43	−0.52	−1.85	0.36	0.91	−6.58	−0.57	−1.67	0.58
t-stat	−2.47	26.83	−11.98	−14.68	−6.39	5.24	5.38	−4.82	−10.57	−2.62	
Big											
Coef	−1.34	0.63	−0.52	−0.47	−1.71	0.62	0.37	−1.63	−0.25	−1.72	0.66
t-stat	−2.38	31.76	−9.17	−13.02	−5.24	9.19	5.34	−0.87	−4.13	−2.44	

Table 2. Average slopes from estimates of regression (6) to explain the split of new outside financing between share issues and total debt issues.

The regressions are estimated each year t during 1963–2009 using CRSP and Compustat data for non-financial NYSE, Amex, and (after 1972) Nasdaq firms with fiscal yearends in calendar year t. The dependent variable is either dS_t (book value of common shares issued during the fiscal year ending in t) or dL_t (change in liabilities, including preferred stock, during the fiscal year ending in t). In addition to the regression intercept (a_t) the explanatory variables are: dA_t, the change in total assets from $t-1$ to t; $NegY_t$ and $PosY_t$, earnings for firms with negative and positive earnings for the fiscal year ending in t; NoD_t, a dummy variable for firms that do not pay dividends in t; D_t, total dividends paid during the fiscal year ending in t; MC_t, the log of market cap in June of t; $NegB_{t-1}$, a dummy variable for firms with negative book equity; P/B_{t-1}, the ratio of market cap for December of $t-1$ to book equity for the fiscal yearend in $t-1$, for firms with positive book equity; and LS_{t-1}, the difference between leverage and target leverage for year $t-1$. Except for MC_t, P/B_{t-1}, LS_{t-1}, and the two dummy variables, the dependent and explanatory variables are scaled by assets at the end of year t. The table shows averages of the annual regression slopes (Coef) and the t-statistics (t-stat) for the average slopes (the ratios of the average slopes to their time-series standard errors, estimated using the standard deviations of the annual slopes), and R^2, the average value of the annual regression coefficient of determination. We show separate results for microcap firms (Micro, market cap in June of year t below the 20th NYSE percentile), small firms (Small, between the 20th and 50th NYSE percentiles), and big firms (Big, above the 50th percentile), and for 1963–1982 and 1983–2009. To reduce the influence of outliers, the annual samples are trimmed, deleting 0.5% of the observations in the right tails of $PosY_t$, D_t, P/B_{t-1}, and LS_{t-1}, and 0.5% of the observations in the left tails of dA_t and $NegY_t$. On average, the regressions for 1963–1982 use 1242 microcaps, 442 small firms, and 581 big firms, and those for 1983–2009 use 2375 microcaps, 768 small firms, and 705 big firms.

slopes for 1963–1982 and 1983–2009 are not reliably different. Appendix Table A2 suggests that the true slopes for microcaps differ from those for small or big firms, but the differences between the average slopes for small and big firms may be due to chance. The benefits of moving leverage toward its target are apparently larger for microcaps, especially during 1983–2009.

The reversion of leverage to target is statistically reliable, but except for the microcaps of 1983–2009, it is economically weak. During 1963–1982 the cross-section standard deviation of the leverage surplus for microcaps, averaged across years, is 0.19 (Table 1). The average LS_{t-1} slope for microcaps in the dS_t regression is 2.98 for this period so, roughly speaking, a leverage surplus one standard deviation above zero increases a microcap's expected annual share issues by 0.57% (2.98×0.19) of assets (and reduces debt issues by the same amount) relative to a microcap with no leverage surplus. The comparable predicted increases in share issues for small and big firms during 1963–1982 and 1983–2009 are even smaller. Only the estimate for microcaps for 1983–2009 suggests that the leverage surplus has much effect on stock and debt issues; roughly speaking, a leverage surplus one standard deviation above zero on average increases annual share issues and reduces debt issues by 1.89% of assets. All this is in line with previous evidence that leverage reverts to its target but at the proverbial snail's pace (for example, Fama and French, 2002; Flannery and Rangan, 2006; Kayhan and Titman, 2007; Huang and Ritter, 2009; Hovakimian and Li, 2011), and with the evidence that if there are leverage targets, they are rather soft (Graham and Harvey, 2001; Welch, 2004, DeAngelo and Roll, 2011).

Leary and Roberts (2005) argue that adjustment costs can explain the slow reversion of leverage to its target. If adjustment costs are to explain our results, they must be lower for microcaps than for small or big firms, and they must be lower for microcaps (but not for small or big firms) later in our 1963–2009 sample period. We doubt that adjustment costs are the whole story.

The Market Conditions Model — Inferences about the market conditions model center on the average slopes for the lagged price-to-book ratio, P/B_{t-1}. The model says managers believe, rightly or wrongly, that higher P/B_{t-1} signals a lower cost of share issues relative to other forms of financing, so higher P/B_{t-1} firms allocate more outside financing to share issues. The positive average slopes for P/B_{t-1} in the Table 2 regressions to explain stock issues are in line with this prediction. The average slopes for 1963–1982 and 1983–2009 are all more than 4.1 standard errors from zero. The positive average slopes for P/B_{t-1} in the regressions for share issues are also consistent with the prediction of Myers and Majluf (1984) that the asymmetric information problems that drive pecking order financing are less severe for high P/B_{t-1} firms with clear growth opportunities.

There is an interesting and novel size effect in the P/B_{t-1} slopes. The slopes for microcaps and small firms are further from zero than the slopes for big firms during both 1963–1982 and 1983–2009. For proponents of the market conditions model, this suggests that the belief that P/B_{t-1} is informative about the relative cost of share issues is more prevalent among managers of smaller firms. The inference for proponents of the Myers-Majluf version of the pecking order is that higher P/B_{t-1} is more informative about growth opportunities for smaller firms.

The average slopes for P/B_{t-1} in the regressions to explain stock issues are statistically far from zero, but in economic terms the effects are large only for smaller firms and only during the 1983–2009 period of generally higher stock issue activity. Combining the average slopes for P/B_{t-1} in Table 2 with the average cross-section standard deviations in Table 1 says that during 1963–1982 a one standard deviation higher value of P/B_{t-1} is associated with increases in annual share issues (and reductions in debt issues) that average only about 0.47%, 0.85%, and 0.80% of assets for big, small, and microcap firms. The estimates for 1983–2009 — 0.95% for big firms, 2.19% for small firms, and 3.07% for microcaps — are more impressive, at least for microcaps and small firms.

3 Short-Term versus Long-Term Debt

3.1 The Logic of the Regressions

The pecking order, market conditions, and tradeoff models also make predictions about debt financing. The pecking order model predicts that debt financing in response to cashflows is mostly short-term. In Myers and Majluf (1984), a preference for short-term versus long-term debt financing arises because the asymmetric information problems that drive pecking order financing are more severe for long-term debt. In a simpler pecking order model, the preference for short-term debt is just due to lower issuing costs.

The logic of the market conditions model is that if managers perceive, rightly or wrongly, that high P/B_{t-1} growth stocks are overvalued, they are also likely to judge that the debt of growth firms is overvalued, with long-term debt more overvalued than short-term debt. The model thus predicts that higher P/B_{t-1} firms that issue debt prefer long-term debt. The pecking order model of Myers and Majluf (1984) suggests that asymmetric information problems are less severe for firms with clear growth opportunities, which also implies that controlling for cashflows, higher P/B_{t-1} firms that issue debt lean more toward long-term debt than lower P/B_{t-1} firms.

The tradeoff model predicts that various forces, including the tax deductibility of interest and potential bankruptcy costs associated with debt, push firms toward an optimal mix of debt and equity. Tradeoff arguments also suggest predictions about the split of debt between short-term and long-term. For example, a company that shifts some of its debt from long-term to short-term increases the probability of bankruptcy and expected bankruptcy costs, but the incentives of its creditors to monitor and discipline management also increase (Diamond, 2004). Benmelech (2009) argues that the characteristics of a firm's collateral can also affect its debt maturity. Assets that are more redeployable and more easily sold allow the firm to use longer term debt. In our suggested extension of the tradeoff model, these and other forces push firms toward an optimal mix of short-term and long-term debt; that is, a firm's ratio of short-term debt to total liabilities tends to revert to a target. When it issues debt, a firm is more likely to issue long-term debt if its short-term ratio is above target and a firm below target is more likely to issue short-term debt.

As with leverage, we use industry averages to measure target short-term debt ratios. We define a firm's lagged short-term surplus, STS_{t-1}, as the difference between its short-term ratio for year $t-1$ and its target ratio for $t-1$, where the short-term ratio is short-term debt divided by total liabilities for $t-1$ and the target short-term ratio is the $t-1$ average for the firm's industry, with each firm in the industry weighted by its total liabilities (see Appendix for details).

To test pecking order, market conditions, and tradeoff predictions about the split of debt financing between short-term and long-term, we lean on the cashflow constraint (2), which says that new financing from short-term and long-term debt must cover the demand for financing from investment and dividends less the supply of financing from earnings and share issues. Adding dS_t to the other cashflow variables, dA_t, D_t, and Y_t, on the right side of the regressions controls for total required new debt (rather than total required outside financing) to isolate the choice between short-term and long-term debt,

$$\begin{aligned} dSTD_t &= a_t + b_1 dA_t + b_2 D_t + b_3 Y_t + b_4 dS_t \\ &\quad + b_5 P/B_{t-1} + b_6 STS_{t-1} + e_t, \qquad (7) \\ dLTD_t &= -a_t + (1-b_1) dA_t + (1-b_2) D_t - (1+b_3) Y_t \\ &\quad - (1+b_4) dS_t - b_5 P/B_{t-1} - b_6 STS_{t-1} - e_t. \qquad (8) \end{aligned}$$

The change in short-term debt, $dSTD_t$, in (7) is the change in current liabilities during the fiscal year ending in calendar year t; $dLTD_t$ in (8) is the change in long-term debt, including preferred stock. As the notation indicates, the constraints on the sums of the coefficients and residuals in (7) and (8) are the same as those in (4) and (5), with the additional constraints that the slopes for dS_t must sum to minus one and the slopes for STS_{t-1} sum to zero.

The slopes on the cashflow variables, dA_t, D_t, Y_t, and dS_t, in (7) and (8) tell us how, on average, new debt splits between short-term and long-term in response to variation in investment, dividends, earnings, and share issues. The pecking order model predicts that debt financing in response to cashflows is mostly short-term. In other words, the slopes for dA_t, D_t, Y_t, and dS_t should be further from zero for short-term debt than for long-term debt. The slopes on the lagged price-to-book ratio in (7) and (8) then tell us how P/B_{t-1} pushes the split of debt financing away from the averages. The market conditions model and the Myers-Majluf version of the pecking order model predict that higher P/B_{t-1} firms substitute away from short-term debt toward long-term debt, so the slope on P/B_{t-1}should be positive in the regression to explain $dLTD_t$, with an exactly offsetting negative slope in the $dSTD_t$ regression. Finally, the tradeoff model predicts that firms tend to revert to their target short-term ratio, so the slope on STS_{t-1} should be negative in the $dSTD_t$ regression and positive in the $dLTD_t$ regression.

3.2 Regression Results

The explanatory variables in the actual cross-section regressions to test predictions about debt financing match those in (6) except we add share issues, dS_t, and replace the lagged leverage surplus with the lagged short-term surplus, STS_{t-1}. The dependent variables, dF_t, in the paired regressions are $dSTD_t$ and $dLTD_t$, short-term and long-term debt issued in fiscal year t,

$$\begin{aligned} dF_t = {} & a_t + b_1 dA_t + b_2 NegY_t + b_3 PosY_t + b_4 dS_t + b_5 NoD_t + b_6 D_t \\ & + b_7 MC_t + b_8 NegB_{t-1} + b_9 P/B_{t-1} + b_{10} STS_{t-1} + e_t. \end{aligned} \tag{9}$$

The prediction of the market conditions model and the pecking order of Myers and Majluf (1984) that the new debt of high P/B_{t-1} firms tends to be long-term gets at best weak support in the $dSTD_{t-1}$ and $dLTD_{t-1}$ regressions for 1963–1982 and no support in results for 1983–2009 (Table 3). The average slopes for P/B_{t-1} in the $dLTD_t$ regressions for 1963–1982 are positive for all three size groups but only the average slope for microcaps is more than 2.0 standard errors from zero. In the regressions for 1983–2009, the average slope for microcaps is quite close to zero, and the average slopes for small and big firms have the wrong sign (negative).

Pecking order predictions about the response of short-term and long-term debt financing to cashflow variables also fare poorly in Table 3. The regressions say that given total new debt, with few exceptions long-term debt absorbs more of the variation in investment, earnings, dividends, and share issues than short-term debt. Thus, asymmetric information problems, issuing costs, and any other pecking order forces that predict a preference for short-term debt apparently do not play an important role in debt financing.

The tradeoff model's prediction that firms have targets for the short-term debt ratio is more successful, at least among smaller firms. The STS_{t-1} slopes for microcaps and small stocks are positive and more than 3.5 standard errors from zero in the long-term debt regressions for 1963–1982 and 1983–2009. Thus, controlling for total new debt, microcaps and small stocks with a higher short-term surplus tend to issue more long-term debt and less short-term debt. For big stocks, however, the average slope for STS_{t-1} in the $dLTD_t$ regression is negative (the wrong sign) but indistinguishable from zero for 1963–1983, and the positive average slope for 1983–2009 is just 1.74 standard errors from zero.

Table 3 — Part A: Regressions to explain $dSTD_t$

	a_t	dA_t	$NegY_t$	$PosY_t$	dS_t	NoD_t	D_t	MC_t	$NegB_{t-1}$	P/B_{t-1}	STS_{t-1}	R^2
						1963–1982						
Micro												
Coef	0.42	0.58	−0.71	−0.36	−0.53	0.31	0.74	−0.52	−1.67	−0.28	−5.63	0.58
t-stat	1.37	47.52	−25.36	−14.06	−12.26	1.53	11.65	−7.68	−0.88	−2.88	−10.92	
Small												
Coef	0.79	0.41	−0.44	−0.13	−0.34	−0.37	0.21	−0.43	−4.36	−0.08	−1.94	0.45
t-stat	0.74	31.47	−2.53	−3.86	−18.47	−1.55	3.87	−1.68	−1.31	−1.13	−3.60	
Big												
Coef	−1.32	0.38	−0.64	−0.12	−0.32	−0.23	0.14	0.10	−0.81	−0.12	0.28	0.42
t-stat	−5.64	25.49	−5.02	−3.99	−13.69	−0.83	3.95	3.02	−0.98	−1.97	0.65	
						1983–2009						
Micro												
Coef	1.91	0.52	−0.55	−0.39	−0.49	0.97	0.73	−0.43	−1.94	−0.01	−10.62	0.45
t-stat	5.20	41.98	−33.33	−20.06	−31.92	4.92	12.12	−5.96	−2.29	−0.60	−14.44	
Small												
Coef	0.10	0.32	−0.38	−0.15	−0.28	0.21	0.18	−0.07	0.52	0.03	−2.24	0.34
t-stat	0.12	23.90	−10.85	−8.11	−15.26	1.43	3.20	−0.46	0.84	0.99	−4.47	
Big												
Coef	−1.01	0.30	−0.29	−0.15	−0.24	0.30	0.12	0.09	1.32	0.09	−0.96	0.38
t-stat	−3.01	44.47	−13.07	−9.48	−20.10	1.92	4.03	2.54	1.24	3.15	−1.74	

(*Continued*)

Table 3 — Part B: Regressions to explain $dLTD_t$

	a_t	dA_t	$NegY_t$	$PosY_t$	dS_t	NoD_t	D_t	MC_t	$NegB_{t-1}$	P/B_{t-1}	STS_{t-1}	R^2
						1963–1982						
Micro												
Coef	−0.42	0.42	−0.29	−0.64	−0.47	−0.31	0.26	0.52	1.67	0.28	5.63	0.44
t-stat	−1.37	34.46	−10.27	−25.44	−10.96	−1.53	4.01	7.68	0.88	2.88	10.92	
Small												
Coef	−0.79	0.59	−0.56	−0.87	−0.66	0.37	0.79	0.43	4.36	0.08	1.94	0.61
t-stat	−0.74	44.69	−3.19	−26.51	−36.11	1.55	14.15	1.68	1.31	1.13	3.60	
Big												
Coef	1.32	0.62	−0.36	−0.88	−0.68	0.23	0.86	−0.10	0.81	0.12	−0.28	0.65
t-stat	5.64	42.48	−2.82	−29.94	−28.79	0.83	24.30	−3.02	0.98	1.97	−0.65	
						1983–2009						
Micro												
Coef	−1.91	0.48	−0.45	−0.61	−0.51	−0.97	0.27	0.43	1.94	0.01	10.62	0.44
t-stat	−5.20	38.87	−27.82	−31.64	−32.61	−4.92	4.49	5.96	2.29	0.60	14.44	
Small												
Coef	−0.10	0.68	−0.62	−0.85	−0.72	−0.21	0.82	0.07	−0.52	−0.03	2.24	0.69
t-stat	−0.12	50.29	−17.91	−46.48	−38.57	−1.43	14.37	0.46	−0.84	−0.99	4.47	
Big												
Coef	1.01	0.70	−0.71	−0.85	−0.76	−0.30	0.88	−0.09	−1.32	−0.09	0.96	0.74
t-stat	3.01	103.90	−31.87	−54.35	−64.00	−1.92	29.30	−2.54	−1.24	−3.15	1.74	

Table 3. Average slopes from estimates of regression (9) to explain the allocation of new liabilities between current liabilities and long-term debt. (See next page for table description.)

Table 3 Description: The regressions are estimated each year t during 1963–2009 using CRSP and Compustat data for non-financial NYSE, Amex, and (after 1972) Nasdaq firms with fiscal yearends in calendar year t. The dependent variable is either $dSTD_t$ (change in short-term debt, which is current liabilities, during the fiscal year ending in calendar year t) or $dLTD_t$ (change in long-term debt). In addition to the regression intercept (a_t) the explanatory variables are: dA_t, the change in total assets from $t-1$ to t; $NegY_t$ and $PosY_t$, earnings for firms with negative and positive earnings for the fiscal year ending in t; dS_t, the book value of common shares issued from the fiscal yearend in calendar year $t-1$ to the fiscal yearend in t; NoD_t, a dummy variable for firms that do not pay dividends in t; D_t, total dividends paid during the fiscal year ending in t; MC_t, the log of market cap in June of t; $NegB_{t-1}$, a dummy variable for firms with negative book equity; P/B_{t-1}, the ratio of market cap for December of $t-1$ to book equity for the fiscal yearend in $t-1$, for firms with positive book equity; and STS_{t-1}, the difference between the short-term debt ratio and the target ratio for year $t-1$. Except for MC_t, P/B_{t-1}, STS_{t-1}, and the two dummy variables, the dependent and explanatory variables are scaled by assets at the end of year t. The table shows averages of the annual regression slopes (Coef) and the t-statistics (t-stat) for the average slopes (the ratios of the average slopes to their time-series standard errors, estimated using the standard deviations of the annual slopes), and R^2, the average value of the annual regression coefficient of determination. We show separate results for microcap firms (Micro, market cap in June of year t below the 20th NYSE percentile), small firms (Small, between the 20th and 50th NYSE percentiles), and big firms (Big, above the 50th percentile), and for 1963–1982 and 1983–2009. To reduce the influence of outliers, the annual samples are trimmed, deleting 0.5% of the observations in the right tails of $PosY_t$, D_t, and P/B_{t-1}, and 0.5% of the observations in the left tails of dA_t, $NegY_t$, and dS_t. On average, the regressions for 1963–1982 use 1244 microcaps, 441 small firms, and 580 big firms, and those for 1983–2009 use 2380 microcaps, 767 small firms, and 702 big firms.

The magnitude of the tradeoff effect for microcaps is substantial. The average STS_{t-1} slopes are 5.63 for 1963–1982 and 10.62 for 1983–2009, and the average standard deviations of STS are 0.24 and 0.27 (Table 1), so roughly speaking, a short-term surplus one standard deviation above the mean increases a microcap firm's expected allocation to long-term debt by 1.35% (5.63×0.25) of assets in the first period and 2.87% of assets in the second. The effect of the short-term surplus is weaker, however, among small stocks and apparently non-existent for big stocks, especially during the early years of our sample period.

In sum, the estimates of regression (9) provide hints of the relevance of tradeoff, pecking order, and market conditions predictions in debt maturity decisions, but evidence that is consistent across size groups and time periods is lacking. Given that the evidence is so mixed, it seems safe to conclude that the forces we consider do not play a dominant role in long-term versus short-term debt choices.

4 Dividends and Share Issues

4.1 The Logic of the Regressions

Our final task is to test the predictions of the pecking order and market conditions models about the split of equity financing between share issues and retained earnings. Earnings are not a choice variable; to control retained earnings firms must vary dividends. To focus on the choice between share issues and dividends, we use the cashflow constraint in (3), which we repeat here,

$$dS_t - D_t = dA_t - Y_t - dL_t. \tag{3}$$

Equation (3) says investment not financed by earnings and new debt must be financed by net share issuance, that is, by share issues minus dividends. Equivalently, (3) implies that holding investment, earnings, and new debt fixed, every additional dollar of new shares must be consumed by an additional dollar of dividends. This version of the cashflow constraint suggests the paired regressions,

$$dS_t = a_t + b_1 dA_t + b_2 Y_t + b_3 dL_t + b_4 P/B_{t-1} + e_t \tag{10}$$

$$D_t = a_t + (b_1 - 1)dA_t + (b_2 + 1)Y_t + (b_3 + 1)dL_t + b_4 P/B_{t-1} + e_t. \tag{11}$$

The notation captures the constraints on the regression coefficients and residuals implied by equation (3). If we subtract the dividend regression (11) from the share issues regression (10), we get (3), so the difference between the slopes for dA_t in the dS_t and D_t regressions is one, the difference between the slopes for Y_t in the dS_t and D_t regressions is minus one, and the same is true for the dL_t slopes. Equation (3) also implies that (10) and (11) have the same intercepts and residuals. Finally, the slopes for P/B_{t-1} and any other variables not in the cashflow constraint (3) must also be identical in the two regressions. In words, because the cashflow variables in (10) and (11) control for variation in $dS_t - D_t$, variation in share issues linked to other explanatory variables must be matched by variation in dividends in the same direction.

If managers interpret the price-to-book ratio as information about the relative cost of new share financing, higher P/B_{t-1} should lead firms to issue shares. The proceeds from share issues can be put into investment (including cash), in which case they show up in dA_t, or they can be paid out as dividends. We then interpret the market conditions model as predicting that controlling for investment, higher P/B_{t-1} leads some firms to increase dividends to make larger issues of shares. In the pecking order model, share issues are, for one reason or another, the most expensive form of financing, which in itself should lead firms to lower dividends to fund investment outlays not covered by earnings and new debt.

4.2 Regression Results

As usual, we estimate enhanced versions of (10) and (11),

$$\begin{aligned} dF_t &= a_t + b_1 dA_t + b_2 NegY_t + b_3 PosY_t + b_4 dL_t + b_5 MC_t \\ &\quad + b_6 NegB_{t-1} + b_7 P/B_{t-1} + b_8 D_{t-1} + e_t. \end{aligned} \tag{12}$$

The dependent variable, dF_t, is either share issues, dS_t, or dividends, D_t, for the fiscal year ending in calendar year t. The new explanatory variable is lagged dividends, D_{t-1}, dividends for fiscal year $t-1$. There is no consensus about why firms pay dividends, but there is strong evidence, from Fama and Babiak (1968) to Skinner (2008), that dividends are sticky. We include D_{t-1} in regression (12) to allow for management's reluctance to change dividends. (More precisely, D_{t-1} is an estimate of the total dividends that would be paid in fiscal year t if split-adjusted dividends per share did not change from $t-1$ to t. See the Appendix for details.)

The persistence of dividends is clear in Table 4. The average slopes for D_{t-1} are 0.88 or higher in the dividend regressions. Dividend persistence is strongest for big stocks. The average D_{t-1} slope for big stocks is 0.98 for 1963–1982 and 0.93 for 1983–2009. Since the dividend regressions include earnings as an explanatory variable, the deviation of a D_{t-1} slope from 1.0 is an estimate of the annual speed-of-adjustment of dividends to target dividends (a fixed proportion of earnings) in Lintner's (1956) partial adjustment model. Adjustment is slow for microcaps (12% per year for 1963–1982 and 10% for 1983–2009), and it is slower for small stocks (7% and 8% per year) and big stocks (2% and 7%).

The stickiness of dividends is also apparent in the earnings slopes in the dividend regressions of Table 4. The average slopes for $PosY_t$ are at least 2.8 standard errors from zero, but the response of dividends to earnings is nevertheless feeble. On average, between four and nine cents of an additional

Table 4 — Part A: Regressions to explain D_t

	a_t	dA_t	$NegY_t$	$PosY_t$	dL_t	MC_t	$NegB_{t-1}$	P/B_{t-1}	D_{t-1}	R_2
					1963–1982					
Micro										
Coef	−0.22	−0.02	0.01	0.07	0.02	0.06	0.01	−0.02	0.88	0.82
t-stat	−8.18	−5.56	3.95	10.65	6.02	6.22	0.19	−3.21	57.83	
Small										
Coef	−0.61	−0.03	0.02	0.09	0.03	0.12	0.01	0.01	0.93	0.85
t-stat	−2.26	−2.85	1.53	6.88	2.74	1.68	0.11	0.65	47.93	
Big										
Coef	−0.14	0.00	0.04	0.06	−0.01	0.01	−0.07	0.01	0.98	0.92
t-stat	−1.68	0.09	1.00	2.80	−0.27	0.93	−1.31	2.57	43.93	
					1983–2009					
Micro										
Coef	−0.03	−0.02	0.01	0.04	0.02	0.03	0.25	0.02	0.90	0.27
t-stat	−0.64	−4.49	4.03	5.21	4.25	1.76	3.20	3.68	20.38	
Small										
Coef	0.59	−0.06	0.04	0.07	0.07	−0.09	0.76	0.05	0.92	0.61
t-stat	2.21	−2.88	2.68	3.94	2.74	−2.41	2.25	2.24	32.94	
Big										
Coef	−0.03	−0.06	0.07	0.07	0.08	0.00	0.86	0.02	0.93	0.66
t-stat	−0.16	−2.24	1.72	3.70	2.25	−0.06	2.02	1.48	37.35	

(*Continued*)

Table 4 — Part B: Regressions to explain dS_t

	a_t	dA_t	$NegY_t$	$PosY_t$	dL_t	MC_t	$NegB_{t-1}$	P/B_{t-1}	D_{t-1}	R_2
					1963–1982					
Micro										
Coef	−0.22	0.98	−0.99	−0.93	−0.98	0.06	0.01	−0.02	0.88	0.98
t-stat	−8.18	330.51	−271.33	−132.76	−333.04	6.22	0.19	−3.21	57.83	
Small										
Coef	−0.61	0.97	−0.98	−0.91	−0.97	0.12	0.01	0.01	0.93	0.95
t-stat	−2.26	95.27	−73.30	−69.75	−97.35	1.68	0.11	0.65	47.93	
Big										
Coef	−0.14	1.00	−0.96	−0.94	−1.01	0.01	−0.07	0.01	0.98	0.97
t-stat	−1.68	53.55	−23.93	−47.81	−43.69	0.93	−1.31	2.57	43.93	
					1983–2009					
Micro										
Coef	−0.03	0.98	−0.99	−0.96	−0.98	0.03	0.25	0.02	0.90	0.97
t-stat	−0.64	284.08	−383.64	−117.75	−252.58	1.76	3.20	3.68	20.38	
Small										
Coef	0.59	0.94	−0.96	−0.93	−0.93	−0.09	0.76	0.05	0.92	0.95
t-stat	2.21	48.43	−62.41	−49.11	−36.71	−2.41	2.25	2.24	32.94	
Big										
Coef	−0.03	0.94	−0.93	−0.93	−0.92	0.00	0.86	0.02	0.93	0.93
t-stat	−0.16	38.56	−21.94	−52.46	−27.68	−0.06	2.02	1.48	37.35	

Table 4. Average slopes from estimates of regression (12) to explain the allocation of net new equity financing between retained earnings and share issues. (See next page for table description.)

Table 4 Description: The regressions are estimated each year t during 1963–2009 using CRSP and Compustat data for non-financial NYSE, Amex, and (after 1972) Nasdaq firms with fiscal yearends in calendar year t. The dependent variable is either D_t (total dividends paid during the fiscal year ending in t) or dS_t (book value of common shares issued during the fiscal year ending in calendar year t). In addition to the regression intercept (a_t) the explanatory variables are: dA_t, the change in total assets from $t-1$ to t; $NegY_t$ and $PosY_t$, earnings for firms with negative and positive earnings for the fiscal year ending in t; dL_t, the change in liabilities, including preferred stock, during the fiscal year ending in t; MC_t, the log of market cap in June of t; $NegB_{t-1}$, a dummy variable for firms with negative book equity; P/B_{t-1}, the ratio of market cap for December of $t-1$ to book equity for the fiscal yearend in $t-1$, for firms with positive book equity; and D_{t-1}, split-adjusted dividends paid during the fiscal year ending in $t-1$. Except for MC_t, P/B_{t-1}, and the two dummy variables, the dependent and explanatory variables are scaled by assets at the end of year t. The table shows averages of the annual regression slopes (Coef) and the t-statistics (t-stat) for the average slopes (the ratios of the average slopes to their time-series standard errors, estimated using the standard deviations of the annual slopes), and R^2, the average value of the annual regression coefficient of determination. We show separate results for microcap firms (Micro, market cap in June of year t below the 20th NYSE percentile), small firms (Small, between the 20th and 50th NYSE percentiles), and big firms (Big, above the 50th percentile), and for 1963–1982 and 1983–2009. To reduce the influence of outliers, the annual samples are trimmed, deleting 0.5% of the observations in the right tails of $PosY_t$, D_{t-1}, and P/B_{t-1}, and 0.5% of the observations in the left tails of dA_t, $NegY_t$, and dL_t. On average, the regressions for 1963–1982 use 1245 microcaps, 442 small firms, and 581 big firms, and those for 1983–2009 use 2380 microcaps, 769 small firms, and 705 big firms.

dollar of positive earnings goes to dividends, with the remainder used to reduce share issues. Dividends almost always respond less to negative earnings than to positive earnings. This is in line with Lintner's (1956) claim that managers are reluctant to cut dividends when faced with negative earnings. But it may also mean that many firms with negative earnings pay no dividends. In any case, the estimates of regression (12) for share issues and dividends say that, given investment and new debt, higher positive earnings show up almost entirely as lower share issues rather than higher dividends, and bigger losses are covered almost entirely by share issues rather than lower dividends.

The remaining cashflow controls in (12) are investment, dA_t, and debt issues, dL_t. The slopes for dA_t in the dS_t and D_t regressions again say that holding earnings and new debt fixed, higher investment is financed almost entirely by share issues, not by a reduction in dividends. Similarly, holding investment and earnings fixed, firms that issue less new debt make up almost all the shortfall with share issues, not smaller dividend payments. All these results confirm that dividends are sticky: they move hardly at all with variation in investment, earnings, and debt issues.

The average adjusted R^2 in the dividend regressions for 1963–1982 are 0.82 or higher. Most of the explanatory power comes from lagged dividends. The *t*-statistics for the average D_{t-1} slopes for 1963–1982 exceed 43.0. There is less explanatory power in the dividend regressions for 1983–2009. The drop in the average adjusted R^2 for microcaps, from 0.82 in the first period to 0.27 in the second, is the most extreme, but the declines for small firms (from 0.85 to 0.61) and big firms (0.92 to 0.66) are also substantial. At least part of the reduction in explanatory power is due to an increase in the fraction of firms that do not pay dividends (Fama and French, 2001). The average fraction of big firms that do not pay dividends grows from 6% in 1963–1982 to 30% in 1983–2009 (Table 1). The shift away from dividends is even more dramatic for smaller firms. On average, 57% of small firms and 84% of microcaps do not pay dividends during 1983–2009, versus 18% and 48% for 1963–1982.

The estimates of regression (12) say that almost all variation in investment, earnings, and new debt in the cashflow constraint (3) is absorbed by share issues. As a result, the explanatory power of the dS_t version of (12) is high, with average adjusted R^2 at least 0.95 in the first period and 0.93 in the second, and average slopes for the cashflow variables that are all more than 21 standard errors from zero.

Table 4 provides some support for the prediction of the market conditions model that, controlling for other cashflow variables, high P/B_{t-1} growth firms increase dividends to issue shares and low P/B_{t-1} value firms repurchase shares rather than pay dividends. Five of the six dividend regressions produce the positive average P/B_{t-1} slope predicted by the model and three are more than two standard errors above zero. The slopes, however, are tiny. Only one average P/B_{t-1} slope, 0.05 ($t = 2.67$) for small firms during 1983–2009, is bigger than 0.02. For perspective, the average P/B_{t-1} slopes in the dS_{t-1} version of regression (6) in Table 2 are all positive and at least ten times the matching average P/B_{t-1} slopes in Table 4. Thus, the tradeoff of new equity for new debt in response to variation in P/B_{t-1} (regression (6)) is at least ten times stronger than the tradeoff of share issues for retained earnings (regression (12)). In short, the costs and benefits that produce sticky dividends apparently overwhelm any effects of market conditions.

As noted above, a strong version of the pecking order model predicts that the high cost of share issues (due to asymmetric information problems, transaction costs, or other factors) leads firms to reduce dividends to fund investment outlays not covered by earnings and new debt. The extreme stickiness of dividends in response to variation in investment, earnings, and debt issues might thus be taken as a blow to this version of the pecking order model. Myers (1984) recognizes this problem and stipulates that dividends are outside the purview of the pecking order, in effect conceding that whatever costs and benefits produce sticky dividends apparently outweigh pecking order forces that would produce more variation in dividends.

5 Conclusions and Caveats

We test the tradeoff, pecking order, and market conditions models with three pairs of cross-section regressions. Each pair focuses on predictions about different kinds of financing. The first pair of regressions explains the split of new outside financing between share issues and debt. The second examines the choice between short-term and long-term debt. The third pair focuses on the split of equity financing between share issues and retained earnings. Table 5 summarizes the models' predictions and the regression results.

Tradeoff Model — Our evidence on the tradeoff model's prediction that leverage reverts to its target comes from the paired regressions that split total new outside financing between shares and debt. There is reliable evidence that leverage moves toward its target, but like others (e.g., Fama and French, 2002), we find that reversion is quite slow. This raises questions about relevance (Shyam-Sunder and Myers, 1999; Hovakimian and Li, 2011), especially given other evidence that leverage targets are not a first-order consideration in financing decisions (Graham and Harvey, 2001; Welch, 2004; DeAngelo and Roll, 2011).

The regressions that split total new debt between short-term and long-term test an extension of the tradeoff model. If tradeoff forces push firms toward an optimal mix of short-term and long-term debt, then controlling for total debt issues, firms below their target allocation will issue more short-term debt and those above will issue less. Our results on this

	Tradeoff	Pecking Order	Market Conditions
Predictions	Firms have targets for leverage and for short-term relative to long-term debt, and adjust their new financing to move back toward their targets.	Firms favor debt over new share issues, short-term debt over long-term debt, and retained earnings over new share issues.	Firms with higher P/B_{t-1} allocate more outside financing to share issues, more debt financing to long-term debt, and more equity financing to new shares.
Share Issues vs New Debt (Controlling for total outside financing)	Reversion of leverage to target is statistically reliable but, except for microcaps in 1983–2009, it is economically weak.	New debt absorbs most of the variation in dA_t, Y_t, and D_t in 1963-1982, but share issues are about as important as new debt in 1983–2009.	Controlling for total outside financing, new share issues are positively related to P/B_{t-1}, but the effect is economically large only for smaller firms in 1983–2009.
Short-term vs Long-term Debt (Controlling for total new debt)	Controlling for total new debt, smaller firms with a higher short-term surplus tend to issue more long-term debt.	Long-term debt absorbs more variation in investment, earnings, dividends, and share issues than short-term debt.	There is only weak evidence that high P/B_{t-1} firms favor long-term debt in 1963–1982 and there is no evidence in 1983–2009.
Share Issues vs Retained Earnings (Controlling for total equity financing)		Controlling for total equity financing, share issues absorb almost all variation in investment, earnings, and debt issues.	There is reliable evidence that high P/B_{t-1} firms increase dividends to issue shares, but the effect is economically tiny.

Table 5. Summary of Predictions and Empirical Results.

prediction are mixed, ranging from strong support among microcap stocks, modest support among small stocks, and no support among big stocks.

Market Conditions Model — The regressions that split total outside financing between share issues and debt support the prediction of the market conditions model that higher price-to-book firms allocate more outside financing to share issues and less to debt. The average P/B_{t-1} slopes in regressions to explain dS_t are reliably positive for microcap, small, and big firms during 1963–1982 and 1983–2009. In economic terms, however, substitution of share issues for debt in response to P/B_{t-1} is modest except for microcaps and small firms, and then only during 1983–2009.

Support for other predictions of the market conditions model is at best mixed. The prediction that higher P/B_{t-1} is associated with more long-term than short-term new debt (second set of regressions) gets some support during 1963–1982, but not during 1983–2009. There is also evidence (from the third set of regressions) that higher P/B_{t-1} leads firms to pay dividends in order to issue shares, but the magnitude of the effect is tiny.

Pecking Order — Our evidence that firms prefer debt to new shares for outside financing during 1963–1982, but not during 1983–2009, confirms earlier results on this prediction of the pecking order model (Fama and French, 2002; Frank and Goyal, 2003). The regressions that split new debt issues between short-term and long-term are novel, and they do not support the pecking order prediction that issuing costs (asymmetric information problems or simple transaction costs) that are higher for long-term debt lead firms to prefer short-term debt. This prediction fails in the tests for 1963–1982 as well as in the tests for 1983–2009. Not surprisingly in light of previous evidence on the stickiness of dividends, our regressions to explain share issues and dividends do not support the prediction of a strong version of the pecking order model that firms vary dividends to avoid the high costs of issuing shares.

Finally, stock issues and repurchases are more common later in the 1963–2009 period, particularly among smaller firms, and this change permeates our results. The pecking order prediction that most of the variation in investment, dividends, and earnings is absorbed by debt rather than by share issues does well during 1963–1982, but the prediction fails during 1983–2009 when share issues become more common. In contrast, the reversion of leverage to target predicted by the tradeoff model and the variation in the split between debt and equity financing in response to P/B_{t-1} predicted by the market conditions model hinge on share issues and repurchases. Thus, the mispricing model's prediction that higher P/B_{t-1} pushes outside financing toward share issues does better for microcaps and small firms during 1983–2009, when the share issues and repurchases that are the bane of the pecking order become common. The reversion of leverage to target is also stronger for microcaps during 1983–2009.

A Appendix

A.1 Variable Definitions

The data are from the Center for Research in Security Prices (CRSP) and Compustat, supplemented by book equity data for NYSE stocks collected from Moody's manuals, as in Davis *et al.* (2000). The variables we use in the regressions for year t (traditional Compustat item numbers in parentheses) are:

dA_t Investment: Change in assets (6) during fiscal year t.

Y_t Earnings: Income before extraordinary items available for common (237) plus extraordinary income (48) during fiscal year t.

$PosY_t$ Positive earnings: Earnings if Y_t is positive, 0 if Y_t is negative.

$NegY_t$ Negative earnings: Earnings if Y_t is negative, 0 if Y_t is positive.

MC_t Market cap: The log of the price times shares outstanding at the end of June of calendar year t, from CRSP.

D_t Dividends: Dividends per share by ex-date (26) at the end of fiscal year t times shares outstanding (25) at the end of t.

NoD_t No dividends: A dummy variable that is 1 if the firm does not pay dividends in fiscal year t and 0 otherwise.

D_{t-1} Lagged dividends: Split-adjusted dividends per share by ex-date (26) at the end of fiscal year $t-1$ times shares outstanding (25) at the end of t. We use the Compustat adjustment factor (27) to adjust for splits and stock dividends during fiscal year t. For example, if there is a three-for-one split during year t, we divide dividends per share for fiscal year $t-1$ by three.

P/B_{t-1} Lagged price-to-book ratio: Market equity (CRSP price times shares outstanding) in December of year $t - 1$ divided by aggregate book equity for the fiscal year ending in calendar year $t - 1$. Book equity is stockholders equity (216) (or common equity, 60, plus carrying value of preferred stock, 130, or assets, 6, minus reported liabilities, 181) plus balance sheet deferred taxes and investment tax credit (35) if available, minus postretirement benefits (330) if available, minus preferred stock liquidating value (10) if available, or redemption value (56) if available, or carrying value (130).

$NegB_{t-1}$ Negative book equity: A dummy variable that is 1 if the firm's book equity at the end of fiscal year $t - 1$ is negative and 0 otherwise.

LS_{t-1} Lagged leverage surplus: The difference between the firm's leverage ratio and its target leverage ratio. The leverage ratio is assets (6) minus common equity (60) at the end of fiscal year $t - 1$ divided by assets at the end of $t - 1$. The target leverage ratio is the average leverage ratio at the end of $t - 1$ for the firms in the same industry, with each firm weighted by its assets (6) at the end of $t - 1$. Firms are assigned to one of ten industries each year using the industry definitions at: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/det_10_ind_port.html.

dS_t Book value of shares issued: Change in common equity (Compustat data item 60) plus dividends, D_t, minus earnings, Y_t, during fiscal year t.

dL_t Change in total liabilities, including preferred: Change in assets (6) minus change in common equity (60) during fiscal year t.

$dSTD_t$ Change in short-term debt: Change in current liabilities (5) during fiscal year t.

$dLTD_t$ Change in long-term debt: Change in total liabilities, dL_t, minus change in current liabilities, $dSTD_t$.

STS_{t-1} Lagged short-term surplus: The difference between the firm's short-term debt ratio and its target ratio. The short-term debt ratio is current liabilities (5) at the end of fiscal year $t-1$, divided by total liabilities (assets 6 minus common equity 60) at the end of $t-1$. The target ratio is the average short-term ratio at the end of $t-1$ for the firms in the same industry, with each firm weighted by its total liabilities at the end of $t-1$. Firms are assigned to one of ten industries each year using the industry definitions at: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/det_10_ind_port.html.

All variables except MC_t, P/B_{t-1}, LS_{t-1}, STS_{t-1}, $NegB_{t-1}$, and NoD_t are divided by assets at the end of fiscal year t. The flow variables, dA_t, Y_t, $PosY_t$, $NegY_t$, dS_t, dL_t, $dSTD_t$, $dLTD_t$, D_t, and D_{t-1}, are then multiplied by 100. We exclude financial firms (Standard Industrial Classification codes between 6000 and 6999). We also exclude firms from the regressions for year t if we are missing: market cap (from CRSP) for December of $t-1$, June of t, and the fiscal yearend in $t-1$; dividends per share by ex date, Compustat shares outstanding, income before extraordinary items available for common, and extraordinary income for the fiscal year ending in t; assets, common equity, and current liabilities for the fiscal yearends in calendar years $t-1$ and t; and book equity for the fiscal year ending in calendar year $t-1$. Finally, we exclude firms whose common equity at the end of year $t-1$ exceeds their assets at the end of $t-1$. Firms must also have dividends per share by ex date for fiscal year $t-1$ to be included in the year t regressions in Table 4.

A.2 Comparisons of Slopes across Size Groups and Periods

Table A1 reports tests of whether the average regression slopes in Table 2 are different for 1983–2009 versus 1963–1982. Table A2 reports tests of whether the average regression slopes differ across the microcap, small, and big size groups.

	a_t	dA_t	$NegY_t$	$PosY_t$	NoD_t	D_t	MC_t	$NegB_{t-1}$	P/B_{t-1}	LS_{t-1}
Micro										
Ave Dif	−1.07	0.27	−0.43	−0.21	0.75	0.39	0.01	10.16	0.31	4.31
t-stat	−2.36	10.26	−11.43	−6.10	3.55	5.63	0.09	6.70	4.65	5.31
Small										
Ave Dif	4.42	0.22	−0.42	−0.26	1.15	0.31	−1.00	3.78	0.10	−0.34
t-stat	3.28	7.80	−2.96	−5.92	2.96	3.45	−4.42	2.20	0.78	−0.40
Big										
Ave Dif	1.75	0.17	−0.41	−0.33	1.30	0.14	−0.31	1.19	−0.01	0.26
t-stat	2.86	7.43	−4.63	−7.24	2.78	1.87	−4.07	0.53	−0.11	0.32

Table A1. Tests of whether the average regression slopes in Table 2 differ for 1963–1982 and 1983–2009.

The regressions are estimated each year t during 1963–2009 using CRSP and Compustat data for non-financial NYSE, Amex, and (after 1972) Nasdaq firms with fiscal yearends in calendar year t. The dependent variable is dS_t (book value of common shares issued during the fiscal year ending in t). In addition to the regression intercept (a_t) the explanatory variables are: dA_t, the change in total assets from $t-1$ to t; $NegY_t$ and $PosY_t$, earnings for firms with negative and positive earnings for the fiscal year ending in t; NoD_t, a dummy variable for firms that do not pay dividends in t; D_t, total dividends paid during the fiscal year ending in t; MC_t, the log of market cap in June of t; $NegB_{t-1}$, a dummy variable for firms with negative book equity; P/B_{t-1}, the ratio of market cap for December of $t-1$ to book equity for the fiscal yearend in $t-1$, for firms with positive book equity; and LS_{t-1}, the difference between leverage and target leverage for year $t-1$. Except for MC_t, P/B_{t-1}, LS_{t-1}, and the two dummy variables, the dependent and explanatory variables are scaled by assets at the end of year t. We show separate results for microcap firms (Micro, market cap in June of year t below the 20th NYSE percentile), small firms (Small, between the 20th and 50th NYSE percentiles), and big firms (Big, above the 50th percentile), and for 1963–1982 and 1983–2009. To reduce the influence of outliers, the annual samples are trimmed, deleting 0.5% of the observations in the right tails of $PosY_t$, D_t, P/B_{t-1}, and LS_{t-1}, and 0.5% of the observations in the left tails of dA_t and $NegY_t$. The table shows the difference between the average slopes for 1983–2009 and 1963–1982 (Ave Dif), and the t-statistic (t-stat) for the difference. On average, the regressions for 1963–1982 use 1242 microcaps, 442 small firms, and 581 big firms, and those for 1983–2009 use 2375 microcaps, 768 small firms, and 705 big firms. The table shows results only for the dS_t regressions. Given the constraint of equation (1) the results for dL_t (change in liabilities, including preferred stock) are identical except for changes in the signs of all slopes and t-stats.

Table A2 — Regressions to explain dS_t

	a_t	dA_t	$NegY_t$	$PosY_t$	NoD_t	D_t	MC_t	$NegB_{t-1}$	P/B_{t-1}	LS_{t-1}
					1963–1982					
Micro vs Small										
Ave Dif	0.24	−0.05	−0.02	0.08	−0.12	−0.01	0.00	−0.73	−0.06	0.97
Std Err	0.71	0.02	0.14	0.03	0.30	0.07	0.18	1.57	0.11	0.71
t-stat	0.34	−2.84	−0.12	2.19	−0.39	−0.11	−0.02	−0.47	−0.56	1.38
Micro vs Big										
Ave Dif	−0.74	−0.06	−0.10	0.06	0.18	0.08	0.14	1.89	0.14	1.52
Std Err	0.23	0.01	0.07	0.03	0.33	0.04	0.06	1.89	0.07	0.41
t-stat	−3.26	−4.59	−1.40	1.82	0.53	2.01	2.45	1.00	2.07	3.69
Small vs Big										
Ave Dif	−0.99	−0.01	−0.08	−0.01	0.29	0.09	0.15	2.59	0.21	0.55
Std Err	0.66	0.01	0.17	0.03	0.42	0.07	0.15	1.91	0.11	0.52
t-stat	−1.50	−0.98	−0.48	−0.46	0.69	1.33	0.97	1.35	1.91	1.06

(*Continued*)

	a_t	dA_t	$NegY_t$	$PosY_t$	NoD_t	D_t	MC_t	$NegB_{t-1}$	P/B_{t-1}	LS_{t-1}
					1983–2009					
Micro vs Small										
Ave Dif	−5.25	0.01	−0.03	0.12	−0.51	0.07	1.01	4.58	0.16	5.61
Std Err	1.07	0.02	0.03	0.03	0.29	0.07	0.17	1.47	0.05	0.85
t-stat	−4.89	0.40	−0.86	4.07	−1.75	1.00	5.76	3.11	2.95	6.61
Micro vs Big										
Ave Dif	−3.57	0.04	−0.12	0.18	−0.37	0.33	0.46	9.53	0.47	5.57
Std Err	0.66	0.02	0.05	0.03	0.30	0.08	0.12	1.79	0.06	1.03
t-stat	−5.42	2.44	−2.62	5.47	−1.24	4.08	3.79	5.31	8.28	5.39
Small vs Big										
Ave Dif	1.68	0.03	−0.10	0.06	0.14	0.26	−0.55	4.95	0.31	−0.04
Std Err	1.31	0.02	0.05	0.02	0.31	0.08	0.20	2.20	0.06	0.93
t-stat	1.28	2.19	−2.06	2.50	0.45	3.27	−2.78	2.25	5.45	−0.05

Table A2. Tests of whether the average regression slopes in Table 2 differ across size groups

The regressions are estimated each year t during 1963–2009 using CRSP and Compustat data for non-financial NYSE, Amex, and (after 1972) Nasdaq firms with fiscal yearends in calendar year t. The dependent variable is dS_t (book value of common shares issued during the fiscal year ending in t). In addition to the regression intercept (a_t) the explanatory variables are: dA_t, the change in total assets from t-1 to t; $NegY_t$ and $PosY_t$, earnings for firms with negative and positive earnings for the fiscal year ending in t; NoD_t, a dummy variable for firms that do not pay dividends in t; D_t, total dividends paid during the fiscal year ending in t; MC_t, the log of market cap in June of t; $NegB_{t-1}$, a dummy variable for firms with negative book equity; P/B_{t-1}, the ratio of market cap for December of $t-1$ to book equity for the fiscal yearend in $t-1$, for firms with positive book equity; and LS_{t-1}, the difference between leverage and target leverage for year $t-1$. Except for MC_t, P/B_{t-1}, LS_{t-1}, and the two dummy variables, the dependent and explanatory variables are scaled by assets at the end of year t. Microcap firms (Micro) have market caps in June of year t below the 20th NYSE percentile, small firms (Small) are between the 20th and 50th NYSE percentiles, and big firms (Big) are above the 50th percentile. The table shows average values (Ave Dif) of the differences between the annual regression slopes for two size groups, and the t-statistic (t-Stat) for the average difference (the ratio of the average difference to its time-series standard error, estimated using the standard deviation of the annual differences). To reduce the influence of outliers, the annual samples are trimmed, deleting 0.5% of the observations in the right tails of $PosY_t$, D_t, P/B_{t-1}, and LS_{t-1}, and 0.5% of the observations in the left tails of dA_t and $NegY_t$. On average, the regressions for 1963–1982 use 1242 microcaps, 442 small firms, and 581 big firms, and those for 1983–2009 use 2375 microcaps, 768 small firms, and 705 big firms. The table shows results only for the dS_t regressions. Given the constraint of equation (1) the results for dL_t (change in liabilities, including preferred stock) are identical except for changes in the signs of all slopes and t-stats.

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