Corporate Financing Decisions: Integrated Analyses of Trade-Off, Pecking Order, and Market Timing Influences

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We develop and test a model that integrates the trade-off theory, pecking order model, and market timing hypothesis about firms' financing decisions. The model expands the basic pecking order regression model by nesting variables associated with the trade-off theory and market timing hypothesis, allowing the coefficient to vary with these variables. Empirical results support the trade-off theory and market timing hypothesis, as the pecking order coefficient varies significantly with optimal leverage determinants and timing variables. Our overall analysis leads us to suggest that firm characteristics largely determine a firm's overall financing orientation, encompassing both leverage and security of choice in incremental financing.

INTRODUCTION

An important question in corporate finance is: How do firms make financing decisions, specifically regarding the issuance or retirement of debt or equity? Three major theories of these decisions have emerged in the literature: the trade-off theory, the pecking order model, and the market timing hypothesis. All three theories are empirically supported and yet have empirical deficiencies.

Our investigation of financing decisions begins with the pecking order model of Myers and Majluf (1984). In their model frictions due to information asymmetry between managers and outside investors induce substantial costs, which are best mitigated if the firm avoids external financing. Thus, internal financing is at the top of the corporate financing preference hierarchy or pecking order. Debt financing is costly but is less costly than external equity, so if a firm engages in external financing, it will focus on debt, leaving costly external equity at the bottom of the pecking order.

Shyam-Sunder and Myers (1999) develop a simple regression model to test the pecking order model. The model, given in eq. (1), links net debt issues to the financing deficit:

$$\Delta D_{it} = \mathrm{a} + b_{po} DEF_{i,t} + \varepsilon_{i,t} \tag{1}$$

where ΔD_{it} is firm i's period t net change in debt and $DEF_{i,t}$ is firm i's period t financing deficit; i.e., the difference of period t non-financial cash outflow and inflow. (Both ΔD_{it} and $DEF_{i,t}$ are generally scaled by firm's lagged total assets, $A_{i,t-1}$.) They test this model on a small sample of firms that survive the 1971-1989 period, find that the average value of b_{po} is 0.75, and conclude that the pecking order model well describes corporate financing behavior.

However, several subsequent papers have cast doubt about the validity of the pecking order model. Chirinko and Singha (2000) use illustrations to point out that firms can exhibit high values of b_{po} even if their financing activity substantially violates the pecking order. Frank and Goyal (2003) test the pecking order model using a more comprehensive data set and find that b_{po}: (a) is generally much lower than one; (b) is greater for large firms than small firms; and (c) has been declining over the years. Jong, et. al. (2010) find that b_{po} varies substantially with the firm's financing status. Specifically, b_{po} is higher (lower) when the firm has a financing surplus (deficit), indicating that firms are more likely to retire debt when they have a surplus than to issue debt when they have a deficit.

Despite these setbacks, we suspect that the pecking order coefficient contains important information about how firms make financing decisions. However, these decisions, and therefore b_{po}, may also be influenced by factors related to the trade-off theory and the market timing hypothesis. In other words, we posit that the pecking order coefficient is not constant for all firms and states as in the original specification. Rather, the coefficient varies *predictably* with firm characteristic and state variables that reflect the other two theories. To test this assertion we expand eq. (1) by nesting such variables. Our expanded version of eq. (1), which we call the expanded pecking order regression model (EPORM), is given in general form in eq. (2):

$$\Delta D_{it} = \mathrm{a} + [f_{po}(C_{i,t-1}, S_{i,t})]DEF_{i,t} + \varepsilon_{i,t} \qquad (2)$$

In eq. (2), the pecking order coefficient is a function of firm characteristic variables, $C_{i,t-1}$, and state variables, $S_{i,t}$. The vector $C_{i,t-1}$ could include firm characteristic variables associated with the trade-off theory, while the vector $S_{i,t}$ could include market timing variables, time-based variables reflecting the development of equity markets, the firm's current financing status (deficit vs. surplus), etc. In the next section we develop predictions about the effects of specific characteristic and state variables on b_{po}, which we then test empirically. These tests are conducted against a strong null hypothesis provided by the pecking order model that b_{po} is constant.

Consider predictions of the trade-off theory for b_{po}. The trade-off theory emphasizes the benefits and costs of debt. Optimal leverage for a given firm is reached when the benefits and costs of debt balance at the margin (e.g., Harris and Raviv, 1991; Ogden, Jen, and O'Connor, 2003). When a firm's actual leverage deviates from its optimal or 'target' leverage, the firm will tend to make marginal financing decisions that serve to adjust leverage toward the target (though transaction costs may inhibit swift adjustment (e.g., Flannery and Rangan, 2006). Thus, the trade-off theory suggests that b_{po} will vary with firm characteristics that determine optimal leverage.

Next, consider predictions of the market timing hypothesis for b_{po}. Baker and Wurgler (2002) find that firms tend to issue (retire) equity when recent returns on their stock have been relatively high (low). They suggest that individual firms' incremental financing decisions reflect their attempts to time the equity market. The implication of the market timing hypothesis on b_{po} depends on the firm's financing status. When the firm has a financing deficit, market timing implies that b_{po} will be negatively related to recent stock returns; i.e. the firm will be more (less) likely to issue equity (debt) as stock returns rise. In contrast, when the firm has a surplus, b_{po} will be positively related to stock returns; i.e. the firm will be less (more) likely to retire equity (issue debt) as stock returns rise. These predictions are consistent with the evidence of Jong, et al. (2010) noted above.

In the extant literature, only one paper adopts an approach that compares closely to our EPORM. Frank and Goyal (2003) expand the basic pecking order regression model of eq. (1) by simply adding firm-characteristic variables (in change form) that have been established as strong determinants of optimal leverage ala the trade-off theory. Their specification is given in eq. (3):

$$\Delta D_{it} = \alpha + \beta_1 \Delta TANG_{i,t} + \beta_2 \Delta MBAssets_{i,t} + \beta_3 \Delta LogSales_{i,t} + \beta_4 \Delta PROFIT_{i,t} + \beta_5 DEF_{i,t} + \varepsilon_{i,t}, \qquad (3)$$

where ΔTANG, ΔMBAssets, ΔLogSales, and ΔPROFIT are changes in tangibility, the market-to-book assets ratio, log of sales, and profitability, respectively. They argue that if the pecking order model is true, DEF should subsume the firm-characteristic variables. They find that it does not, though the coefficient of DEF is reliably positive.

Like our EPORM, Frank and Goyal's (2003) model acknowledges the possibility that firm characteristics may affect firm's choice of debt vs. equity financing to offset a financing deficit. However, we argue that firm characteristic variables (as well as state variables) should be *nested* with DEF in the regression, rather than entered in parallel with DEF. Nesting is more appropriate because the firm's tendency to use debt (vs. equity) for incremental financing may *depend* on such variables.

PROPOSED DETERMINANTS OF THE PECKING ORDER COEFFICIENT

The most comprehensive version of our EPORM is given in eq. (4):

$$\begin{aligned}\Delta D_{it} = a + \; & [b_0 + b_1 LogSIZE_{it-1} + b_2 TANG_{it-1} + b_3 MBAssets_{it-1} \\ & + b_4 PROFIT_{it-1} + b_5 INDLEVmkt_{it-1} + b_6 CASH_{it-1} + b_7 RET_{it} \\ & + b_8 RET_{it-1} + b_9 SUPDUM_{it} + b_{10} TIMEDUM_{it}] \cdot DEF_{it} + \varepsilon_{it} \qquad (4)\end{aligned}$$

The first five interactive variables in eq. (4) are lagged values of the firm characteristic variables most commonly used in the conventional leverage regression testing the trade-off theory (e.g., Frank and Goyal, 2009). They include a measure of firm size (LogSIZE), asset tangibility (TANG), the market-to-book assets ratio (MBAssets), profitability (PROFIT), and median industry market leverage (INDLEVmkt). Based on recent research (discussed below), we add a sixth variable to this list, cash reserves (CASH). The final four variables are state variables. They include: (a) RET_{it} and RET_{it-1}, market-adjusted returns on firm i's stock in fiscal years t and t-1, respectively; and (b) dummy variables $SUPDUM_{it}$, which takes a value of 1 (0) if firm's year t financing status is surplus (deficit), and $TIMEDUM_{it}$, which takes a value of 1 (0) if the sample observation falls in the early (later) years of our sample (described later), 1971-89 (1990-2009). We assume that any additional explanatory variables that are excluded from eq. (4) are orthogonal to the included variables. Below we establish predictions of the effect on b_{po} of each of these variables.

Predictions for Firm Characteristic Variables

Firm Size (LogSIZE)

Firm size may affect b_{po} for several reasons. Larger firms generally have higher leverage, and according to the trade-off theory this is because larger firms generally have higher profitability and lower failure risk. Thus, larger firms generally make more use of debt financing, and therefore b_{po} should generally increase with firm size. However, the relationship between firm size and b_{po} may depend critically on the firm's financing status (deficit vs. surplus). In deficit cases, larger firms would be more likely to issue debt to finance a deficit, so b_{po} would be positively related to firm size. However, in surplus cases larger (smaller) firms may be less (more) likely to retire debt in order to maintain (reduce) leverage, so b_{po} may be negatively related to size in surplus-status cases. Thus, the overall impact of firm size on b_{po} will depend on the relative prevalence of deficit vs. surplus cases.

Asset Tangibility (TANG)

Firms with greater asset tangibility are less likely to have difficulties borrowing because collateral serves to mitigate agency costs of debt, financial distress costs, and information asymmetry problems. Conversely, firms with lower asset tangibility are also more likely to operate in industries with higher growth opportunities which would limit the debt usage in external financing due to the underinvestment problem (Myers, 1977). Thus, it is not surprising that firms that have greater tangible assets generally have higher leverage. Consequently, b_{po} should generally increase with tangibility.

Market-to-Book Assets Ratio (MBAssets)

Baker and Wurgler (2002) argue that managers tend to issue equity when MBAssets is high, a sign of perceived overvaluation of their shares. In addition, MBAssets is a proxy for growth opportunities, and debt usage may be limited for firms with high growth opportunities: (a) due to the under-investment and asset substitution problems (Myers, 1977; Jensen and Meckling, 1976); and (b) because such firms have less need for the discipline of debt payments to control the free cash flow problem (Jensen, 1986). Hence, we expect b_{po} to be negatively related to MBAssets.

Profitability (PROFIT)

According to the trade-off theory, optimal leverage should increase with profitability (PROFIT); As PROFIT increases the firm's debt capacity increases because (a) the value of interest deductibility increases, and (b) the probability of bankruptcy decreases. However, in conventional leverage regressions an important and persistent anomaly is that the coefficient of PROFIT is found to be negative, rather than positive. Frank and Goyal (2009) suggest that this could occur because an increase in PROFIT increases the firm's equity base (to the extent that profits are not distributed as dividends), resulting in a *mechanical* decrease in leverage.

In our EPORM, we predict that the relationship between b_{po} will depend critically on the firm's financing status in accordance with the trade-off theory. In deficit cases b_{po} should increase with PROFIT because *more profitable* firms will tend to issue *more debt* to finance the deficit simply to maintain (higher) optimal leverage. In contrast, in surplus cases b_{po} should decrease with PROFIT because more profitable firms will tend to retire less debt, again simply to maintain (higher) optimal leverage. If these predictions are borne out in the empirical analysis, the results would serve to at least partially resolve the aforementioned anomaly in conventional regressions.

Industry Median Market Leverage (INDLEVmkt)

It is well known that leverage varies substantially across industries. Firms in the same industry face common forces that affect their financing decisions. These could reflect product market interaction, the nature of competition, or inter-industry heterogeneity in asset composition, business risk, technology, and/or regulation. Thus, industry median leverage is, empirically, an important determinant of leverage simply because it is an important proxy for optimal leverage. Moreover, Gilson (1997), Hull (1999), and Hovakimian, Opler, and Titman (2001) all find that firms actively adjust their debt ratios towards the industry average. Thus, we expect b_{po} to be positively related to industry median leverage because (a) b_{po} should increase with a firm's optimal leverage, and (b) industry leverage is a strong proxy for firm-specific optimal leverage.

Cash Reserves (CASH)

In addition to the five firm characteristic variables associated with the conventional leverage regression, we also investigate the relationship between b_{po} and cash reserves (CASH). In a recent paper Bates, Kahle and Stulz (2009) find that the average cash balance of U.S. firms has increased dramatically over time, and in concert with a decrease in leverage. Based on additional evidence, they conclude that cash balances have increased over time because the riskiness of firms' cash flows have generally increased over time. Bates et al.'s (2009) results suggest that a firm's cash balance is a proxy for the firm's tendency to use cash reserves to offset a financing imbalance, and therefore is a negative proxy for the firm's tendency to use debt to offset a financing imbalance. Therefore, we expect b_{po} to be negatively related to CASH. Moreover, the time series evidence of Bates et al. (2009) suggests that CASH may account for the decrease in b_{po} over time observed by Frank and Goyal (2003), and therefore may subsume the time dummy interactive variable, TIMEDUM, introduced below.

Predictions for State Variables

Market Timing Variables (RET)

Baker and Wurgler's (2002) evidence indirectly suggests that firms will tend to issue (retire) equity when recent stock returns are high (low). Similarly, Welch (2004) documents evidence that recent stock returns have a strong negative effect on market leverage. Based on these results, we expect that b_{po} will generally be negatively related to our measures of recent stock returns, RET_{it} and RET_{it-1}. However, this relationship will depend on the firm's financing status. In deficit cases, the market timing hypothesis clearly suggests that firms are more likely to finance the deficit using equity as recent stock returns increase, so the coefficients of RET_{it} and RET_{it-1} should be negative. However, for surplus cases stock repurchases, driven by undervaluation, are actually less likely as stock returns increase. (Instead, surplus firms with high recent stock returns will tend to dispose of a surplus by retiring debt.) Thus, we expect the coefficients to be positive for surplus cases. As such, the interactive variables RET_{it} and RET_{it-1} may account for the general asymmetry in b_{po} observed by Jong et al. (2010) in deficit vs. surplus cases.

Surplus vs. Deficit Status (SUPDUM)

As noted earlier, Jong et al. (2010) find that b_{po} is asymmetric with respect to financing deficit vs. surplus status. They argue that the reason for this asymmetry is that large deficits are relatively more likely for smaller firms, and smaller firms, with limited debt capacity, are less likely to issue debt to finance a deficit. They also argue that their finding helps explain why the pecking order model has lost explanatory power over time; i.e., the prevalence of smaller firms, with their large deficits, has been increasing over time. We expect the coefficient of SUPDUM to be positive. However, as noted above the market timing interactive variables (RET) may subsume SUPDUM.

Time Effect (TIMEDUM)

As noted earlier, Frank and Goyal (2003) find that the pecking order model loses its explanatory power over the years. To account for this *time effect*, we include the dummy variable TIMEDUM, which isolates the *early* years of our sample. We expect the coefficient of TIMEDUM to be positive. However, as noted above CASH may subsume TIMEDUM.

DATA AND SUMMARY STATISTICS

The universe of firms from which we draw our sample includes all U.S.–incorporated, publicly traded NYSE, AMEX, and NASDAQ firms on the COMPUSTAT fundamentals annual database for fiscal years 1971–2009, with a check that their stock has a Center for Research in Security Prices (CRSP) share code value of 10 or 11. We exclude financial firms (SIC code values of 6000-6999) and utility firms (SIC code values of 4900-4949). A firm must have the necessary accounting and market data for fiscal years t-1 and t. We calculate industry median leverage using the 4-digit SIC industry, so we require that each firm belongs to an industry which has at least 3 firms in year t.

To calculate the financing deficit variable DEF, we use data for net debt issues and net equity issues from cash flow statements. The financing deficit is defined as in Shyam-Sunder and Myers (1999); i.e., DEF is the sum of the change in working capital, net investment, and cash dividends, less net operating cash flow (NOCF). Year t security issuances and retirements, as well as financial deficits and surpluses, are all scaled by total assets at year-end t-1. The associated accounting cash flow identity is given in eq. (5):

$$DEF_{i,t}=DIV_{i,t}+I_{i,t}+\Delta W_{i,t}-NOCF_{i,t}=\Delta D_{i,t}+\Delta E_{i,t}, \quad (5)$$

where $DEF_{i,t}$ is financing deficit; $DIV_{i,t}$ is cash dividends; $I_{i,t}$ is net cash flow from investment in the cash flow statement; $\Delta W_{i,t}$ is the change of net working capital; $NOCF_{i,t}$ is net operating cash flow; $\Delta D_{i,t}$ is net debt issuance, calculated as long-term debt issuance less long-term debt reduction plus the change in the current portion of long-term debt, and $\Delta E_{i,t}$ is net equity issuance, calculated as sale of common and preferred stock minus purchase of common and preferred stock. Each firm-year observation must satisfy eq. (5). Also, in order to avoid undue extreme values, we delete the firm-year observations with a market-to-book assets ratio (MBAssets) greater than 10 and require that both (scaled) net debt and the financing deficit do not exceed 100%.

Our final sample includes 109,218 firm-year observations. Descriptive statistics for the sample are presented in Table 1. For the sample as a whole, average net debt issuance, at 2.10%, is slightly *smaller* than average net equity issuance, 2.63%, results that do not bode well for the basic pecking order model. Their sum, the average financing deficit (DEF), is 4.73%. Regarding firm characteristics, the results indicate the sample firms span a wide range of values of firm size, tangibility, market-to-book assets ratio, profitability, industry leverage, recent stock returns, cash reserves, and net operating cash flow.

Table 2 shows annual average values of financing and related variables, as well as various annual frequency statistics. Average net debt issuance (ΔD) is fairly stable over the years, while average net equity issuance (ΔE) and the average financing deficit (DEF) increase irregularly over time. Several other trends are also noteworthy. For instance, the percentage of firms with a large surplus (DEF<-5%) increases dramatically over time. In turn, this trend is driven by substantial increases over time in both average debt retirement and average equity repurchases. Indeed, average debt issuance, average debt retirement, average equity issuance, and average equity retirement all increase substantially over time. Thus, the evidence indicates that external financing activity has generally increased over time. The average increase in debt issuance and retirement activity bodes well for the basic pecking order model, though this may be driven at least in part by an increase in debt refinancing activity accompanying the shortening of corporate debt maturities over time (see Ogden, et. al., 2003); Custodio, et. al., 2011).

TABLE 1
DESCRIPTIVE STATISTICS

	Mean	Std. Dev.	Minimum	Median	Maximum
Net debt issuance (ΔD, %)	2.10	12.59	-98.81	0.00	99.85
Net equity issuance (ΔE, %)	2.63	12.69	-159.81	0.03	154.87
Financing deficit (DEF, %)	4.73	17.07	-98.12	0.24	100.00
Total assets ($ mn.)	1,297.88	9,949.17	0.08	99.46	797,769.00
Tangibility (TANG, %)	29.97	21.92	0.00	24.90	99.93
Market-to-book assets ratio (MBAssets)	1.41	1.24	0.00	1.00	10.00
Profitability (PROFIT, %)	8.89	18.03	-76.17	12.28	39.99
Median industry mkt. lev. (INDLEVmkt)	0.24	0.18	0.00	0.21	1.08
Fiscal year t market-adjusted return (RET_t)	0.02	0.54	-0.83	-0.06	2.36
Cash reserve (CASH, %)	15.71	19.78	-1.02	7.34	100.00
Net Operating Cash flow (NOCF, %)	8.62	15.88	-53.11	10.57	47.59

The sample includes all U.S.-incorporated, publicly traded NYSE, AMEX, and NASDAQ firms on the COMPUSTAT fundamentals annual database for fiscal year 1971–2009, with a check that their stock has a Center for Research in Security Prices (CRSP) share code value of 10 or 11. We exclude financial firms and utility firms (SIC code values 6000-6999 and 4900-4949, resp.). A firm must have accounting and market data for fiscal years t-1 and t, and belong to a 4-digit SIC industry with at least 3 firms. A firm must satisfy the cash flow identity eq. (5), where DEF, the financing deficit, is equal to the sum of cash dividends, net investment, and change of net working capital, less net operating cash flow (NOCF), ΔD is net debt issuance, calculated as long-term debt issues less long-term debt reduction plus the change in current debt, ΔE is net equity issuance, calculated as sale of stock less purchase of stock. DEF (and its components), ΔD, and ΔE are all year t values scaled by year-end t-1 total assets, TA_{t-1}. TANG year-end t-

1 net property, plant and equipment to TA_{t-1}. MBAssets is year-end t-1 market value of assets (market value of equity + book debt + preferred stock – deferred taxes) to TA_{t-1}. PROFIT year t-1 operating income before depreciation to TA_{t-1}. INDLEVmkt is median market leverage for firms in a firm's 4-digit SIC industry. RET_t is the market adjusted return in fiscal year t, the difference of the firm's stock return less the return on the value weighted market index. CASH is year-end t-1 cash and short-term securities to TA_{t-1}. N = 109,218.

However, the increases in equity issuance and repurchase activity do not bode well for the basic pecking order model. The increase in equity issuance reflects the influx of new, smaller firms over time, as discussed earlier, while the increase in equity repurchases follows the Securities and Exchange Commission's (SEC) 'safe harbor' ruling in 1982 that firms can conduct open market stock repurchases. The final two columns of Table 2 show annual average values of CASH and NOCF, respectively. CASH almost triples over the period, from about 8% in 1971 and 1972 to about 24% in 2005−2008. At the same time, NOCF falls from about 13% in the 1970s to about 7% in the 2000s. These trends are also consistent with the influx of new, small firms into the market over time.

TABLE 2
AVERAGE ANNUAL VALUES OF FINANCING AND RELATED VARIABLES

Year	N	Avg. ΔD (%)	Avg. ΔE (%)	Avg. DEF, %	% with DEF > 0	% with DEF > 5%	% with DEF < 0	% with DEF < -5%
1971	1,248	1.56	1.14	2.68	47.92	23.88	39.90	5.93
1972	1,314	1.51	1.21	2.70	47.56	22.22	42.77	6.09
1973	1,904	2.88	0.13	2.99	49.58	25.79	42.28	6.72
1974	2,417	2.89	0.16	3.01	48.86	26.73	45.47	8.40
1975	2,584	0.96	0.25	1.20	42.72	20.47	54.72	13.27
1976	2,628	1.12	0.51	1.62	44.10	20.21	53.77	12.18
1977	2,656	2.49	0.37	2.86	51.96	24.77	45.90	9.22
1978	2,559	3.28	0.76	4.04	54.83	29.03	43.14	7.74
1979	2,507	3.13	1.10	4.14	54.21	28.60	44.08	8.34
1980	2,480	2.30	2.44	4.67	52.82	28.31	45.56	10.69
1981	2,505	2.51	2.98	5.44	53.93	28.34	43.83	10.70
1982	2,660	2.26	1.71	3.97	51.92	27.48	45.68	10.83
1983	2,680	0.96	5.13	6.08	52.80	30.04	44.96	11.46
1984	2,199	3.01	2.19	6.08	56.71	32.92	41.93	12.55
1985	2,153	2.98	2.86	6.41	55.69	33.49	42.78	14.44
1986	2,127	2.74	4.11	7.55	55.71	35.40	42.74	15.80
1987	2,385	3.48	2.75	6.32	53.50	34.05	44.91	17.99
1988	2,998	2.96	1.18	4.20	51.53	30.75	47.43	18.28
1989	2,943	2.82	2.31	5.12	53.75	32.18	45.16	17.16
1990	2,900	1.27	1.58	2.85	47.97	26.28	50.93	19.76
1991	2,865	-0.33	3.25	2.92	46.60	23.98	52.32	20.17
1992	2,943	0.29	3.72	4.01	51.51	26.50	47.71	17.74
1993	3,199	1.04	4.52	5.56	53.95	29.95	45.05	15.85
1994	3,531	2.87	3.64	6.52	58.26	32.71	40.87	14.47
1995	3,642	3.32	4.46	7.78	61.29	36.93	37.92	14.42
1996	3,778	2.95	5.06	8.00	59.18	36.37	39.97	16.49
1997	4,104	3.94	4.20	8.14	61.60	37.16	37.55	14.57
1998	3,995	4.93	2.80	7.73	61.15	37.70	38.37	15.34
1999	3,623	3.36	2.95	6.31	55.84	34.20	43.53	19.10
2000	3,499	1.86	4.20	6.07	56.62	32.12	42.84	19.55
2001	3,514	0.62	3.04	3.66	51.99	24.53	47.32	20.15
2002	3,317	-0.52	2.22	1.70	45.10	18.69	54.30	22.52
2003	3,017	0.09	3.25	3.35	50.71	23.93	48.82	19.75
2004	2,940	0.93	3.92	4.85	56.19	26.53	43.20	17.65
2005	2,915	1.53	2.71	4.25	55.68	24.87	43.95	19.55
2006	2,797	2.55	2.54	5.43	56.70	29.57	42.97	18.70
2007	2,716	3.00	1.68	4.97	54.60	28.31	44.88	21.58
2008	2,763	2.02	0.05	2.23	44.81	21.50	54.51	23.49
2009	2,213	-1.86	3.04	1.27	39.63	16.99	59.42	25.31

TABLE 2
AVERAGE ANNUAL VALUES OF FINANCING AND RELATED VARIABLES (CONTINUED)

Year	N	Avg. Debt Iss. (%)	Avg. Debt Ret. (%)	Avg. Eq. Iss. (%)	Avg. Eq. Rep. (%)	Avg. CASH (%)	Avg. NOCF (%)
1971	1,248	5.14	3.58	1.32	0.18	7.70	11.44
1972	1,314	5.05	3.54	1.56	0.36	8.47	12.52
1973	1,904	6.68	3.80	0.75	0.62	9.00	14.30
1974	2,417	7.00	4.11	0.55	0.40	8.23	13.35
1975	2,584	5.75	4.79	0.60	0.35	7.29	12.18
1976	2,628	6.25	5.14	0.95	0.44	8.95	13.28
1977	2,656	7.45	4.97	1.00	0.63	9.33	14.14
1978	2,559	8.34	5.06	1.36	0.60	8.98	14.35
1979	2,507	8.20	5.07	1.64	0.54	8.55	14.55
1980	2,480	7.72	5.43	2.98	0.54	8.24	13.73
1981	2,505	7.71	5.20	3.57	0.59	9.80	13.05
1982	2,660	7.57	5.31	2.42	0.71	11.35	10.97
1983	2,680	6.84	5.88	5.83	0.69	11.55	12.22
1984	2,199	8.27	5.26	3.41	1.21	16.74	12.39
1985	2,153	8.93	5.95	3.97	1.12	14.09	11.82
1986	2,127	9.55	6.81	5.27	1.16	14.48	11.94
1987	2,385	11.14	7.67	4.51	1.76	16.24	11.38
1988	2,998	10.44	7.47	2.39	1.21	15.44	7.81
1989	2,943	11.10	8.28	3.33	1.02	13.67	7.21
1990	2,900	9.29	8.02	2.61	1.03	13.70	7.64
1991	2,865	8.12	8.45	3.92	0.67	12.91	7.63
1992	2,943	9.43	9.14	4.51	0.79	15.25	7.98
1993	3,199	11.74	10.69	5.25	0.73	15.93	8.03
1994	3,531	12.77	9.90	4.55	0.90	17.08	8.00
1995	3,642	14.24	10.92	5.42	0.96	15.03	8.73
1996	3,778	14.43	11.48	6.23	1.18	16.25	8.06
1997	4,104	15.15	11.21	5.59	1.39	19.12	6.97
1998	3,995	15.92	10.98	4.82	2.02	19.09	6.39
1999	3,623	14.46	11.10	5.03	2.08	16.57	6.41
2000	3,499	12.28	10.42	5.91	1.71	18.66	5.37
2001	3,514	11.15	10.54	4.26	1.22	20.97	3.25
2002	3,317	8.74	9.27	3.54	1.31	21.81	4.30
2003	3,017	10.22	10.12	4.74	1.48	20.97	7.18
2004	2,940	11.91	10.98	5.69	1.77	22.77	8.16
2005	2,915	11.49	9.95	5.03	2.33	23.65	7.19
2006	2,797	12.32	9.76	5.32	2.78	23.35	7.47
2007	2,716	12.71	9.72	5.14	3.46	23.82	6.66
2008	2,763	11.00	8.97	2.71	2.67	23.58	5.36
2009	2,213	7.23	9.09	4.14	1.10	21.40	5.28

Sample of U.S. firms for 1971–2009; N=109,218. ΔD, ΔE, DEF, CASH, and NOCF are percent net debt issuance, net equity issuance, financing deficit, cash reserves, and net operating cash flow, resp.

MAIN EMPIRICAL RESULTS

In this section we present and discuss results of our EPORM estimation. Initial results are displayed in Table 3, which are generated using the full sample. Estimates based on subsamples split on deficit vs. surplus cases are displayed in Table 4, which we discuss later.

The sample includes U.S. firms for 1971–2009; N=109,218. Regression model (1) is the basic pecking order regression of Shyam-Sunder and Myers (1999), where the dependent variable is year t scaled change in debt, ΔD, and the independent variable is the year t scaled financing deficit, DEF. In models (2)-(5), the basic model is expanded by adding interactions of DEF with indicated firm characteristic and state variables in various combinations. Characteristic variables include LogSIZE, TANG, MBAssets, PROFIT, INDLEVmkt, and CASH, all previously defined. State variables include market-adjusted returns $RET_{i,t}$ and $RET_{i,t-1}$, as previously defined, as well as two dummy variables: (a) SUPDUM, which takes a value of 1 (0) one if the firm's year t financing status is surplus (deficit); and (b) TIMEDUM, which takes a value of 1 (0) if the sample observation falls in the years 1971-89 (1990-2009). Standard errors, corrected for clustering at the firm and year levels (Peterson, 2009), are shown in parentheses. ***, ** and * indicate significance at 1%, 5%, and 10% levels, respectively.

Results of estimating the basic pecking order regression model (eq. (1)) are displayed in column (1) of Table 3. The coefficient of DEF is positive and highly significant, as expected. However, its value is only 0.4875 (s.e. of 0.0165), or roughly 31 standard errors less than the value of one predicted by the pecking order model. However, the value is roughly in line with corresponding large-sample results obtained by Frank and Goyal (2003) and Jong et al. (2010). Combining the coefficient result with the associated adjusted R^2 value of 0.4372, the results indicate that the basic pecking order model is inadequate to explain financing decisions.

Initial results of estimating our EPORM are displayed in column (2), where the independent variables include DEF and interactive variables involving all of the firm characteristic variables used in the conventional leverage regression, LogSIZE, TANG, MBAssets, PROFIT, and INDLEVmkt. The coefficients of all five interactive variables are highly significant, and all have the predicted sign as per our earlier discussion. Specifically: (a) large firms, firms with more tangible assets, and firms with greater profitability have a greater tendency to use debt to offset a financing deficit; (b) a firm's use of debt is negatively related to MBAssets; and (c) firms' use of debt is positively related to industry-median market leverage. All of these results are consistent with the trade-off theory. Most notably, the positive coefficient of the interactive for PROFIT overturns anomalous results in conventional leverage regressions in which the coefficient is negative. In addition, the adjusted R^2 is much higher for this model, 0.5367, than for the basic pecking order model in column (1), 0.4372.

TABLE 3
BASIC AND EXPANDED PECKING ORDER REGRESSIONS

Regression model	(1)	(2)	(3)	(4)	(5)
Constant	-0.0023*	-0.0018	-0.0020*	0.0065***	0.0011**
	(0.0013)	(0.0011)	(0.0011)	(0.0007)	(0.0006)
DEF	0.4875***	0.3126***	0.4250***	0.4047***	0.4226***
	(0.0165)	(0.0244)	(0.0242)	(0.0156)	(0.0237)
×LogSIZE		0.0444***	0.0531***		0.0483***
		(0.0040)	(0.0039)		(0.0032)
×TANG		0.1215***	0.0161		0.0115
		(0.0250)	(0.0279)		(0.0256)
×MBAssets		-0.0193***	-0.0157***		-0.0160***
		(0.0046)	(0.0041)		(0.0050)
×PROFIT		0.2854***	0.1450***		0.2179***
		(0.0395)	(0.0350)		(0.0348)
×INDLEVmkt		0.6234***	0.5205***		0.4587***
		(0.0507)	(0.0451)		(0.0426)
×CASH			-0.3714***		-0.3245***
			(0.0206)		(0.0232)
×$RET_{i,t}$				-0.0666***	-0.1023***
				(0.0148)	(0.0105)
×$RET_{i,t-1}$				-0.0513***	-0.0641***
				(0.0130)	(0.0103)
×SUPDUM				0.2940***	0.0987***
				(0.0360)	(0.0365)
×TIMEDUM				0.1535***	0.0374
				(0.0324)	(0.0259)
Adj R^2	0.4372	0.5367	0.5479	0.4673	0.5624

For our second EPORM estimation, we add an interactive for CASH to the five conventional firm characteristic variables. Results are displayed in column (3). The coefficient of the CASH interactive variable is negative, as expected, and is highly significant. The addition of the CASH interactive only marginally disturbs the coefficients of the LogSIZE, MBAssets, and INDLEVmkt interactive variables. However, the addition of the CASH interactive completely decimates the coefficient of the TANG interactive variable, which is now insignificant, and substantially reduces the coefficient of the PROFIT interactive variable, the value of which falls from 0.2854 (s.e. of 0.0395) in column (2) to 0.1450 (s.e. of 0.0350) in column (3). We interpret the former result as indicating that CASH is a better proxy than TANG for constraints on the use of debt financing. The latter results are consistent with either of two arguments. On one hand, CASH may simply be a proxy for profitability (i.e., at least a portion of cash reserves comes from accumulated profits). On the other hand, CASH is also a proxy for the precautionary motive (Bates, Kahle and Stulz, 2009), so firms with greater profitability *uncertainty* will simultaneously have higher cash reserves and are less likely to use debt financing. As such, all results are consistent with the trade-off theory.

For our third EPORM estimation, we focus on state variables. Independent variables include DEF and interactives with $RET_{i,t}$, $RET_{i,t-1}$, SUPDUM, and TIMEDUM. Results are displayed in column (4). The coefficients of $RET_{i,t}$ and $RET_{i,t-1}$ are both reliably negative, consistent with the market timing hypothesis. The coefficients of the SUPDUM and TIMEDUM interactive variables are both positive and highly significant, as expected. However, note that we have not included firm characteristic interactives in this regression, so it remains to be seen whether, as we predict, firm characteristic variables will supplant SUPDUM and/or TIMEDUM.

Finally, the results in column (5) reflect the inclusion of all firm characteristic and state variables. Regarding the five conventional leverage regression variables, the results are similar to those in column (2); i.e., the coefficients of the interactives associated with LogSIZE, MBAssets,, PROFIT, and INDLEVmkt are highly significant, while the coefficient of the TANG interactive is insignificant.
In addition, the coefficients of $RET_{i,t}$ and $RET_{i,t-1}$ are both reliably negative, as in column (4). However, the magnitudes of the coefficients of the interactives for both SUPDUM and TIMEDUM are much smaller in column (5) than in column (4), and indeed the coefficient of the TIMEDUM interactive is now insignificant. These results are consistent with our prediction that firm characteristic variables would be likely to subsume the influence of both SUPDUM and TIMEDUM.

Next we estimate regressions using subsamples split on deficit vs. surplus cases. Specifically, regressions are estimated for subsamples with: a financing deficit, a large deficit (i.e., DEF>5%), a financing surplus, and a large surplus (i.e., DEF<-5%). For each subsample, we estimate the basic pecking regression model (eq. (1)) and the EPORM with the full complement of interactive variables (except SUPDUM, of course). The results are displayed in Table 4.

We initially discuss several general results. First, for the basic pecking order regressions we obtain results consistent with those of Jong et al. (2010); specifically, (a) the coefficient of DEF is substantially higher for the surplus subsample (0.6743; s.e. of 0.0340) than for the deficit subsample (0.4115; s.e. of 0.0175); and (b) the coefficient of DEF is smaller for large deficits (0.3480; s.e. of 0.0182) than for all deficits. Second, and more importantly, nesting firm characteristics and state variables substantially increases the adjusted R^2 relative to the basic pecking order regression. For instance, for the deficit (surplus) cases the adjusted R^2 increases from 0.2996 (0.4103) to 0.4665 (0.5292). Thus, controlling for variables associated with the trade-off theory and market timing hypothesis helps to explain a large proportion of the variation in net debt issuance that is unexplained using the basic pecking order regression.

Next, we turn to several predictions made earlier about the behavior of the coefficients of logSIZE, PROFIT, and RET interactives in our EPORM across the deficit and surplus cases. All results are consistent with our predictions. For logSIZE and PROFIT, the coefficients are positive and highly significant in the deficit and large deficit subsamples, and are negative and highly significant in both the surplus and large surplus subsamples. These results are consistent with the trade-off theory. The results for the two RET interactive variables are also consistent with our predictions, as the coefficients are reliably negative and highly significant in the deficit and large deficit subsamples, while the coefficients are positive, though generally statistically weak, in the surplus and large surplus subsamples. These results are consistent with the market timing hypothesis, and suggest that market timing might explain the asymmetry in b_{po} in deficit vs. surplus cases.

For sample and variable definitions, see Table 3. In Table 4, large deficit (large surplus) is defined as a financing deficit (surplus) greater than 5% of total assets. Standard errors, corrected for clustering at the firm and year levels (Peterson, 2009), are shown in parentheses. ***, ** and * indicate significance at 1%, 5%, and 10% levels, respectively.

TABLE 4
EXPANDED PECKING ORDER REGRESSIONS BY FINANCING STATUS

Financing status	Deficit	Deficit	Large Def.	Large Def.	Surplus	Surplus	Large Surp.	Large Surp.
Regression model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	0.0181***	0.0029***	0.0453***	0.0106***	-0.0045***	-0.0039***	-0.0073***	-0.0058**
	(0.0011)	(0.0010)	(0.0020)	(0.0019)	(0.0009)	(0.0009)	(0.0024)	(0.0023)
DEF	0.4115***	0.3808***	0.3480***	0.3628***	0.6743***	0.9608***	0.6579***	0.9434***
	(0.0175)	(0.0221)	(0.0182)	(0.0232)	(0.0340)	(0.0229)	(0.0396)	(0.0300)
×LogSIZE		0.0634***		0.0621***		-0.0439***		-0.0427***
		(0.0039)		(0.0040)		(0.0058)		(0.0059)
×TANG		-0.0078		-0.0052		0.1652***		0.1644***
		(0.0293)		(0.0296)		(0.0358)		(0.0380)
×MBAssets		-0.0119***		-0.0114***		-0.0326***		-0.0332***
		(0.0041)		(0.0040)		(0.0090)		(0.0091)
×PROFIT		0.2803***		0.2780***		-0.8643***		-0.8477***
		(0.0379)		(0.0382)		(0.0709)		(0.0730)
×INDLEVmkt		0.4342***		0.4288***		0.3183***		0.3268***
		(0.0480)		(0.0475)		(0.0443)		(0.0458)
×CASH		-0.2715***		-0.2645***		-0.7402***		-0.7285***
		(0.0250)		(0.0253)		(0.0624)		(0.0636)
×$RET_{i,t}$		-0.1136***		-0.1112***		0.0280		0.0244
		(0.0109)		(0.0109)		(0.0173)		(0.0178)
×$RET_{i,t-1}$		-0.0744***		-0.0723***		0.0308**		0.0272*
		(0.0106)		0.0105		(0.0150)		(0.0161)
×TIMEDUM		0.0416		0.0389		-0.0579**		-0.0607**
		(0.0297)		(0.0297)		(0.0267)		0.0278
N	58,024	58,024	31,462	31,462	49,476	49,476	17,216	17,216
Adj R^2	0.2996	0.4665	0.1780	0.3680	0.4103	0.5292	0.3030	0.4802

The coefficient of TIMEDUM is insignificant in both deficit subsamples, indicating that for deficit firms the tendency to use debt to offset a deficit has not changed over time (i.e., after controlling for other variables). However, the coefficient of TIMEDUM is negative and significant in both surplus samples, indicating that the tendency for surplus firms to retire debt has increased over time, though this may simply be due, at least in part, to increased refinancing activity associated with the trend toward shorter corporate debt maturities, as discussed earlier.

Finally, the results for CASH indicate that the precautionary motive is an important driver of financing decisions. The coefficient of the CASH interactive is negative and highly significant in all subsamples, and has roughly twice the magnitude in the surplus regressions than in the deficit regressions. Thus, firms with greater precautionary motive are less likely to use debt to offset a financing deficit (i.e., they may use previously-hoarded cash instead), and are *much* less likely to use a surplus to retire debt (i.e., they may either hoard the surplus cash, or have little or no debt to retire).

ROBUSTNESS CHECKS

In the previous section we found that the performance of pecking order regression model is substantially enhanced by incorporating the influence of variables associated with the trade-off theory and the market timing hypothesis. In this section we conduct two robustness checks of these results.

Subsample Analyses: Combinations of Financing Status and Basic Pecking Order Coefficient

For our first robustness check, we identify subsamples that vary in terms of adherence to the basic pecking order regression, and then examine firm-characteristic and state variables to determine whether the trade-off theory or the market timing hypothesis can explain why these subsamples vary in terms of adherence. Specifically, we break down the full sample into cases by: (a) the proportion of a deficit that is financed by debt issuance, for deficit firms; or (b) the proportion of a surplus that is used to retire debt, for surplus firms. Note that these proportions are directly analogous to b_{po}, so we refer to these cases in terms of the value of b_{po}.

Table 5 shows the distribution of these 'adherence' subsamples. Financing deficit subsamples are displayed in the first column, financial surplus subsamples are displayed in the second column, and financing 'balance' subsamples (i.e., where the financial deficit is equal to zero) are displayed in the third column. For each individual subsample, the table shows the percentage of total observations accounted for by that subsample, along with an illustrative description and example.

The first subsample under each heading includes firms that nearly perfectly conform to the pecking order model in that b_{po} is between 0.95 and 1.00. Such 'Perfect Pecking Order' cases account for only 22.55%, or less than a quarter, of all observations, with perfect deficit, surplus, and balance cases accounting for 12.46%, 8.36%, and 1.73% of all observations, respectively.

The remaining subsamples represent various deviations from the pecking order model, and are numbered Case 1 through Case 10. Cases 1 and 2 involve deficit and surplus firms, respectively, for which the pecking order coefficient is between 0.05 and 0.95 (i.e., moderately supportive of the pecking order model). Cases 1 and 2 account for 12.91% and 9.28% of all observations, respectively, for a total of 22.19%. Thus, cases in which the pecking order model is either 'perfectly' or 'moderately supported collectively account for 44.74%, or less than half, of all observations.

The remaining cases are the most troubling for the pecking order model. Cases 3 and 4 we label 'b_{po} is Low' because b_{po} is between 0.0 and 0.05. We also refer to them as 'Debt Equity Mix' cases because in Case 3 (Case 4) the firm issues both debt and equity (retires both debt and equity) to finance a deficit (distribute a surplus). Firms in Cases 3 and 4 account for 7.15% and 4.56% of all observations, respectively.

In all remaining subsamples, we have (pseudo) swaps of debt and equity. (We ignore Cases 7 and 10, rare cases in which the swap is associated with a financing balance.) Cases 5 and 6 are deficit and surplus cases, respectively, that involve swaps that would imply a *negative* value for the pecking order coefficient. Cases 8 and 9 are deficit and surplus cases, respectively, that involve swaps that would imply a pecking order coefficient value *greater than one*. Such 'swap' cases are not unusual: Cases 5, 6, 8, and 9 account for 10.04%, 2.91%, 10.48%, and 20.12% of all observations, respectively.

Subsample 'cases' are formed by year t financing status and financing activity, the latter defined by adherence to the basic pecking order (PO) coefficient (b_{po}). For each case, the percentage of the full sample (N=109,218) is reported, as well as a hypothetical example of financing activity. Variables are as previously defined.

TABLE 5
DISTRIBUTION OF CASES INVOLVING COMBINATIONS OF FINANCING STATUS AND FINANCING ACTIVITY

Financing Deficit		Financing Surplus		Financing Balance	
Case PD	DEF = 10	Case PS	DEF = - 10	Case PB	DEF = 0
Perfect PO	$\Delta D = 10$	Perfect PO	$\Delta D = -10$	Perfect PO	$\Delta D = 0$
bpo: [0.95,1]	$\Delta E = 0$	bpo: [0.95,1]	$\Delta E = 0$		$\Delta E = 0$
	$b_{po} = 1$		$b_{po} = 1$		$b_{po} = 1$
Pct. of all obs.	12.46	Pct. of all obs.	8.36	Pct. of all obs.	1.73
Case 1	DEF = 10	Case 2	DEF = -10		
bpo: [0.05,0.95)	$\Delta D = 5$	bpo: [0.05,0.95)	$\Delta D = -5$		
	$\Delta E = 5$		$\Delta E = -5$		
	$b_{po} = 0.5$		$b_{po} = 0.5$		
Debt-equity mix	Iss. debt, Iss. eq.	Debt-eq. mix	Ret. debt, Ret. eq.		
Pct. of all obs.	12.91	Pct. of all obs.	9.28		
Case 3	DEF > 0	Case 4	DEF < 0		
bpo: [0,0.05)	$\Delta D > 0$	bpo: [0,0.05)	$\Delta D < 0$		
	$\Delta E > 0$		$\Delta E < 0$		
	b_{po} is Low		b_{po} is Low		
Debt-equity mix	Iss. debt, Iss. eq.	Debt-eq. mix	Ret. debt, Ret. eq.		
Pct. of all obs.	7.15	Pct. of all obs.	4.56		
Case 5	DEF = 10	Case 6	DEF = -10	Case 7	DEF = 0
$b_{po} < 0$	$\Delta D = -5$	$b_{po} < 0$	$\Delta D = 5$	$b_{po} = +\infty$	$\Delta D = 5$
	$\Delta E = 15$		$\Delta E = -15$		$\Delta E = -5$
	$b_{po} = -0.5$		$b_{po} = -0.5$		b_{po} is Infinite
Eq.−Debt swap	Ret. debt, Iss. eq.	Debt−Eq. swap	Iss. debt, Ret. eq.	Debt−Eq. swap	Iss. debt, Ret. eq.
Pct. of all obs.	10.04	Pct. of all obs.	2.91	Pct. of all obs.	0.02
Case 8	DEF = 10	Case 9	DEF = -10	Case 10	DEF = 0
$b_{po} > 1$	$\Delta D = 15$	$b_{po} > 1$	$\Delta D = -15$	$b_{po} = -\infty$	$\Delta D = -5$
	$\Delta E = -5$		$\Delta E = 5$		$\Delta E = 5$
	$b_{po} = 1.5$		$b_{po} = 1.5$		b_{po} is Infinite
Debt−Eq. swap	Iss. debt, Ret. eq.	Eq.−Debt swap	Ret. debt, Iss. eq.	Eq.−Debt swap	Ret. debt, Iss. eq.
Pct. of all obs.	10.48	Pct. of all obs.	20.12	Pct. of all obs.	0.12

Because so many of the cases in Table 5 represent violations of the pecking order model (especially the 'swap' cases), it is important to determine whether such cases can be reconciled with either the trade-off theory or the market timing hypothesis. We use univariate analysis to compare the values of various firm characteristic and state variables across the subsamples. The results are displayed in Tables 6 and 7 for deficit and surplus subsamples, respectively.

Across all subsamples in Tables 6 and 7, the 'Case 9' subsample, displayed in Column (5) of Table 7, accounts for the highest proportion of all observations, 20.12%. These are surplus firms that not only use their full surplus to retire debt, but also issue equity to retire additional debt. The financing decisions of these firms appear to be influenced by market timing, as the average value of $RET_{i,t}$ for these firms, 0.08, is highest among all surplus cases in Table 7.

Table 6 shows mean values of financing variables (DEF, ΔD, and ΔE), firm characteristic variables (Total assets, TANG, MBAssets, PROFIT, INDLEVmkt, and CASH), and state variables ($RET_{i,t}$ and

$RET_{i,t-1}$) for subsamples of firms defined by the financing *deficit* cases in Table 5. All variables are as previously defined. For differences, ***, ** and * indicate significance at 1%, 5% and 10% levels, respectively.

TABLE 6
MEAN VALUES OF FINANCING, FIRM CHARACTERISTIC, AND STATE VARIABLES FOR FINANCING *DEFICIT* CASES IN TABLE 5

Table 5 case:	Case 5	Case 3	Case 1	Case PD	Case 8	
Representative financing activity:	Ret. debt, Iss. Eq.	Iss. Little Debt, Iss. Much Eq.	Iss. debt, Iss. Equity	Debt Iss. ≈ DEF, Eq. Iss. ≈ 0	Iss. Extra Debt, Ret. Eq.	
Pecking order coeff.:	$b_{po} < 0$	b_{po} is Low	b_{po} is Moderate	b_{po} is Close to 1	$b_{po} > 1$	Diff.
	(1)	(2)	(3)	(4)	(5)	(5) vs. (1)
% of obs	10.04	7.15	12.91	12.46	10.48	
DEF (%)	14.18	10.18	16.85	15.07	9.39	-4.79***
ΔD (%)	-3.63	0.05	9.62	14.90	11.32	14.95***
ΔE (%)	17.50	10.02	6.88	0.17	-1.37	-18.87***
Total Assets ($mn.)	474.56	256.25	1,157.99	854.49	2,073.51	1,598.95***
TANG (%)	24.34	17.08	31.63	35.20	34.98	10.64***
MBAssets	2.28	2.65	1.69	1.19	1.13	-1.15***
PROFIT (%)	2.58	1.93	7.75	10.79	13.00	10.43***
INDLEVmkt	0.15	0.11	0.22	0.29	0.29	0.13***
CASH (%)	25.41	38.78	13.34	8.69	8.55	-16.86***
$RET_{i,t}$	0.15	0.08	0.06	-0.05	-0.04	-0.19***
$RET_{i,t-1}$	0.20	0.15	0.15	0.02	-0.01	-0.21***

If market timing does explain the results in Table 7 Column (5), then it should also explain the diametrically opposing cases as well, namely cases in Column (5) of Table 6 (10.48% of total observations), where deficit firms issue debt not only to fully cover their deficit, but also to retire equity. This appears to be so because the average value of $RET_{i,t}$ ($RET_{i,t-1}$), -0.04 (-0.01), is second-lowest (lowest) among all deficit cases in Table 6, and indeed is second-lowest (second-lowest) among all columns across Tables 6 and 7. However, the decisions of these firms may have also been influenced by factors related to the trade-off theory, as these firms generally are large, have relatively high average values of TANG, PROFIT, and INDLEVmkt, and relatively low average MBAssets. Thus, the decisions of these firms may simply represent adjustments toward target leverage.

Analysis of two additional pairs of diametrically opposing cases is also instructive. Specifically, we consider (a) subsamples in Column (1) of Table 6, where deficit firms issue equity not only to cover the deficit but also to retire debt (10.04% of total observations), and (b) subsamples in Column (1) of Table 7, where surplus firms not only use their surplus to retire equity but also issue debt to retire additional equity (2.91% of total observations). For these subsamples as well, market timing appears to influence decisions because for the Table 6 Column (1) cases $RET_{i,t}$ and $RET_{i,t-1}$ are relatively high (0.15 and 0.20, resp.), while for the Table 7 Column (1) cases, $RET_{i,t}$ and $RET_{i,t-1}$ are relatively low (0.00 and 0.01, resp.). In addition, though, trade-off considerations may have influenced decisions for firms in both subsamples. For the Table 6 Column (1) firms, average values of total assets, TANG, PROFIT, and INDLEVmkt are all relatively low, while average MBAssets is relatively high, all characteristics that suggest low leverage per the trade-off theory, so perhaps these firms are simply adjusting toward relatively low target leverage. For the cases in Table 7 Column (1), average values of total assets, TANG, and PROFIT are all relatively high, while average MBAssets is relatively low, all characteristics that suggest higher leverage via the trade-off theory, so these firms appear to be simply adjusting toward relatively high target leverage.

This table shows mean values of financing variables (DEF, ΔD, and ΔE), firm characteristic variables (Total assets, TANG, MBAssets, PROFIT, INDLEVmkt, and CASH), and state variables ($RET_{i,t}$ and $RET_{i,t-1}$) for subsamples of firms defined by the financing *surplus* cases in Table 5. All variables are as previously defined. For differences, ***, ** and * indicate significance at 1%, 5% and 10% levels, respectively.

TABLE 7
MEAN VALUES OF FINANCING, FIRM CHARACTERISTIC, AND STATE VARIABLES FOR FINANCING *SURPLUS* CASES IN TABLE 5

Table 5 case:	Case 6	Case 4	Case 2	Case PS	Case 9	
Representative financing activity:	Iss. Debt, Ret. Eq.	Ret. some Debt, Ret. more Eq.	Ret. Debt, Ret. Eq.	Debt Ret. ≈ DEF, Eq. Ret. ≈ 0	Ret. extra Debt, Iss. Eq.	
Pecking order coeff.:	$b_{po} < 0$	b_{po} is low	b_{po} is moderate	b_{po} is close to 1	$b_{po} > 1$	Diff.
	(1)	(2)	(3)	(4)	(5)	(5) vs. (1)
% of obs	2.91	4.56	9.28	8.36	20.12	
DEF (%)	-4.97	-6.18	-6.06	-5.78	-4.61	0.36
ΔD (%)	4.14	-0.04	-3.28	-5.75	-5.74	-9.87***
ΔE (%)	-9.09	-6.20	-2.66	-0.03	0.90	9.99***
Total Assets ($mn.)	4,654.30	1,080.37	2,299.13	762.96	1,024.34	-3,629.96***
TANG (%)	31.18	18.64	30.17	32.88	30.74	-0.44
MBAssets	1.60	1.90	1.22	0.91	1.20	-0.40**
PROFIT (%)	17.75	14.49	14.06	9.15	10.25	-7.49***
INDLEVmkt	0.21	0.14	0.25	0.32	0.26	0.04**
CASH (%)	11.20	32.83	13.50	9.39	11.95	0.76
$RET_{i,t}$	0.00	-0.01	0.03	0.01	0.08	0.08***
$RET_{i,t-1}$	0.01	0.02	0.00	-0.10	0.01	0.00

Multinomial Regression Analysis

For our second robustness check, we use multinomial regression to investigate determinants of a firm's *propensity* to demonstrate pecking order behavior. We classify firms into groups according to their manifest pecking order coefficient, and then regress a dummy variable based on these classifications on variables associated with the trade-off theory and the market timing hypothesis; specifically LogSIZE, TANG, PROFIT, MBAssets, INDLEVmkt, CASH, $RET_{i,t}$, and $RET_{i,t-1}$. DEF is also included as a control. We conduct this analysis separately for deficit and surplus subsamples.

Regarding the classifications, we consider several combinations of pecking order coefficient groups. For the deficit subsample, the alternative classifications are as follows. The negative pecking order (NPO) group includes firms that retire debt despite having a financial deficit; the low pecking order (LPO) group includes deficit firms for which net debt issuance covers less than 5% of the financial deficit; the moderate pecking order (MPO) group includes deficit firms for which net debt covers 5% to 95% of the deficit; the close to one pecking order (OPO) group includes deficit firms for which net debt covers 95% to 100% of the deficit; and finally, the extra pecking order (EPO) group includes firms for which net debt issues are larger than the deficit. Analogous classifications are developed for the surplus subsample. The results are displayed in Tables 8 and 9 for deficit and surplus subsamples, respectively.

We initially discuss the results in Table 8. The results are basically consistent with the EPORM and univariate robustness results reported earlier. In particular, large size, higher tangibility, higher profitability, higher industrial median leverage, and lower cash reserves all increase the odds of a deficit firm being classified into a higher pecking order coefficient group. These results are all consistent with the trade-off theory. Meanwhile, higher RET reduces the odds of being included in a high pecking order coefficient group, consistent with the market timing hypothesis. Finally, a higher financing deficit generally increases the odds of being in a higher pecking order coefficient group, with one important exception: Higher financial deficit firms are less likely to be in the extra pecking order (EPO) coefficient group, suggesting that EPO firms have smaller financing deficits.

Using only observations with a financing *deficit*, this table shows results of multinomial logit regressions in which the dependent variable is 1 (0) if the observation is from the indicated focal (benchmark) subsample. The negative pecking order (NPO) subsample includes observations in which the firm retires debt. The low pecking order (LPO) subsample includes firms for which net debt issuance covers less than 5% of the deficit. The moderate pecking order (MPO) subsample includes deficit firms for which net debt covers 5% to 95% of the deficit. The close-to-one pecking order (OPO) subsample includes deficit firms for which net debt covers 95% to 100% of the deficit. Finally, the extra pecking order (EPO) subsample includes firms for which net debt issuance exceeds the deficit (i.e., for which equity is also retired). All variables are as previously defined. ***, ** and * indicate significance at 1%, 5%, and 10% levels, respectively.

TABLE 8
MULTINOMIAL LOGIT REGRESSIONS FOR PROPENSITY TO BE CLASSIFIED INTO ALTERNATIVE PECKING ORDER COEFFICIENT GROUPS: *DEFICIT* SUBSAMPLE

Focal subsample: Benchmark subsample:	NPO+LPO MPO+OPO+EPO	NPO+LPO MPO+EPO	NPO+LPO+MPO OPO+EPO	NPO+LPO+MPO+OPO EPO
Constant	0.6095***	0.2333***	-0.0517	-1.1507***
	(0.0338)	(0.0362)	(0.0329)	(0.0399)
LogSIZE	0.1122***	0.1386***	0.0220***	0.0589***
	(0.0062)	(0.0066)	(0.0053)	(0.0061)
TANG	0.3600***	0.2780***	0.1184***	-0.0341
	(0.0559)	(0.0586)	(0.0453)	(0.0519)
MBAssets	-0.2164***	-0.1779***	-0.3722***	-0.3011***
	(0.0080)	(0.0084)	(0.0113)	(0.0153)
PROFIT	0.1824***	0.1159**	1.1981***	1.7750***
	(0.0560)	(0.0596)	(0.0688)	(0.1000)
INDLEVmkt	2.4247***	2.0094***	1.9056***	0.8455***
	(0.0761)	(0.0796)	(0.0622)	(0.0681)
CASH	-3.3452***	-3.2192***	-2.7460***	-2.0915***
	(0.0627)	(0.0681)	(0.0735)	(0.0974)
$RET_{i,t}$	-0.4734***	-0.4012***	-0.6174***	-0.3956***
	(0.0162)	(0.0174)	(0.0185)	(0.0228)
$RET_{i,t-1}$	-0.1193***	-0.0870***	-0.3217***	-0.3328***
	(0.0151)	(0.0157)	(0.0184)	(0.0244)
DEF	2.0887***	1.7319***	0.7547***	-1.1174***
	(0.0645)	(0.0666)	(0.0588)	(0.0850)
R^2	0.3446	0.3167	0.2797	0.1453
N for focal subsample	18,765	18,765	32,848	46,442
N for benchmark subsample	39,110	25,516	25,027	11,433

The results for surplus firms in Table 9 are also consistent with earlier EPORM and univariate robustness results. Larger firms have a lower likelihood of retiring debt, while high tangibility firms seem more likely to retire debt. Firms with higher MBAssets are less likely to retire debt, as are more profitable firms. Surplus firms are more likely to retire debt when their counterparties in the same industry have higher leverage. Finally, higher RET increases the likelihood of debt retirement. These results are consistent with both the trade-off theory and the market timing hypothesis.

Using only observations with a financing *surplus*, this table shows results of multinomial logit regressions in which the dependent variable is 1 (0) if the observation is from the indicated focal (benchmark) subsample. The negative pecking order (NPO) subsample includes observations in which the firm retires debt. The low pecking order (LPO) subsample includes firms for which net debt issuance covers less than 5% of the deficit. The moderate pecking order (MPO) subsample includes deficit firms for which net debt covers 5% to 95% of the deficit. The close-to-one pecking order (OPO) subsample includes deficit firms for which net debt covers 95% to 100% of the deficit. Finally, the extra pecking order (EPO) subsample includes firms for which net debt issuance exceeds the deficit (i.e., for which equity is also retired). All variables are as previously defined. ***, ** and * indicate significance at 1%, 5%, and 10% levels, respectively.

TABLE 9
MULTINOMIAL LOGIT REGRESSIONS FOR PROPENSITY TO BE CLASSIFIED INTO ALTERNATIVE PECKING ORDER COEFFICIENT GROUPS: *SURPLUS* SUBSAMPLE

Focal subsample:	NPO+LPO	NPO+LPO	NPO+LPO+MPO	NPO+LPO+MPO+OPO
Benchmark subsample:	MPO+OPO+EPO	MPO+EPO	OPO+EPO	EPO
Constant	2.8184***	2.5896***	1.7930***	0.6509***
	(0.0498)	(0.0507)	(0.0371)	(0.0330)
LogSIZE	-0.1882***	-0.1610***	-0.2063***	-0.0765***
	(0.0071)	(0.0073)	(0.0055)	(0.0050)
TANG	1.0053***	0.9115***	0.6615***	0.3504***
	(0.0813)	(0.0822)	(0.0547)	(0.0488)
MBAssets	-0.0612***	-0.0442***	0.0261**	0.0616***
	(0.0126)	(0.0128)	(0.0114)	(0.0104)
PROFIT	-4.2947***	-4.1416***	-4.1719***	-2.2988***
	(0.1232)	(0.1264)	(0.1005)	(0.0822)
INDLEVmkt	1.8583***	1.4580***	1.0178***	-0.4328**
	(0.0943)	(0.0959)	(0.0643)	(0.0577)
CASH	-3.7542***	-3.6324***	-3.2323***	-1.9862***
	(0.0828)	(0.0852)	(0.0725)	(0.0685)
$RET_{i,t}$	0.0912***	0.1312***	0.1459***	0.2491***
	(0.0260)	(0.0269)	(0.0186)	(0.0166)
$RET_{i,t-1}$	0.2583***	0.2944***	0.1980***	0.2851***
	(0.0277)	(0.0283)	(0.0204)	(0.0189)
DEF	-0.3080	-0.0695	2.4007***	3.6077***
	(0.2049)	(0.2100)	(0.1572)	(0.1604)
R^2	0.2188	0.1999	0.1797	0.0671
N for focal subsample	8,116	8,116	18,244	27,366
N for benchmark subsample	41,210	32,088	31,082	21,960

LEVERAGE AND INCREMENTAL FINANCING DECISIONS

Evidence presented thus far is consistent with our argument that recognized determinants of optimal leverage via the trade-off theory also influence the pecking order coefficient. Given the overall results and results in deficit and surplus subsamples, we conjecture that the pecking order coefficient could increase with leverage *per se.* Specifically, high leverage firms will have a high pecking order coefficient (i.e., they will tend to issue debt to cover a deficit and retire debt when they have a surplus), while low leverage firms will have low pecking order coefficient (i.e., they will tend to issue equity to finance a deficit and retire equity when they have a surplus). In other words, we suspect that high-(low-) leverage firms could be *oriented* toward the use of debt (equity) in their marginal financing decisions. As we explain below, cross-sectional differences in overall financial orientation are determined by cross-sectional differences in firm characteristics.

We surmise that the typical high-leverage firm operates in a regulated or 'commoditized' product market. Their product is not unique and is well understood by the market (Titman and Wessels, 1988). They have few investment opportunities; instead, they are basically *cash cows*. For such firms the trade-off theory strongly suggests high optimal leverage because (a) interest deductibility represents their primary means of creating value, (b) costs of financial distress and bankruptcy are relatively low (i.e., their tangible assets are highly liquid), and (c) agency costs of managerial discretion are potentially high, so leverage mitigates these costs. These firms will also exhibit a high pecking order coefficient, though this is not due to information asymmetry as in Myers and Majluf (1984). Instead, these firms (a) can readily finance investment by issuing debt (i.e., the new assets are tangible), and (b) will tend to retire debt as a discipline-based means of disgorging surplus cash.

Analogously, we surmise that the low-leverage firms generally produce a unique (or proprietary) product that is difficult for the market to value. They generally have substantial investment opportunities, and therefore will tend to have high MBAssets. They tend to have low leverage in part because of the underinvestment problem (Myers, 1977). In addition, because their equity is often subject to substantial mis-valuation, such firms will tend to be active in the equity market (i.e., they will be equity *oriented*), issuing stock when it is overvalued and repurchasing stock when it is undervalued. Consequently, they will also tend to have higher cash reserves.

The main prediction of this *financing orientation argument* is that the pecking order coefficient will increase with leverage because leverage is a proxy for a firm's overall debt (vs. equity) orientation. We test this conjecture by estimating the pecking order coefficient for subsamples of firms that have high (above median) and low (below median) leverage. For completeness, we also estimate complementary regressions in which *net equity issuance* is the dependent variable. For these latter regressions, the slope coefficient should be lower (higher) for high- (low-) leverage firms. Results are displayed in Tables 10 and 11 for the pecking order and equity orientation regressions, respectively.

The results largely support the orientation argument. Using either market or book leverage, the pecking order (equity orientation) coefficient is substantially higher (lower) for high-leverage firms than for low-leverage firms. To test for robustness, we re-estimate all regressions after cross-sorting the subsamples by financing status. For all resulting subsample pairings, the result holds that the pecking order (equity orientation) coefficient is substantially higher (lower) for high-leverage firms than for low-leverage firms. A particularly notable result is that the pecking order (equity orientation) coefficient is especially low (high) for low-leverage firms with a financing deficit. These results would be anomalous for the trade-off theory if all firms in our sample are homogeneous with respect to optimal leverage; that is, firms with low (i.e., below-optimal) leverage and a financing deficit should issue debt in order to increase leverage. The results are also inconsistent with the pecking order model. Instead, the results are consistent with our argument that low-leverage firms, because of their characteristics, will be equity oriented.

Each year the sample is sorted into two subsamples by splitting at the median value of either market or book leverage, and the basic pecking order regression model is estimated (i.e., ΔD is regressed on DEF) for each subsample. Each subsample is then divided into further subsamples by financing status, deficit vs. surplus, and the model is estimated for these subsamples. Standard errors, corrected for clustering at the firm and year levels (Peterson 2009), are shown in parentheses. ***, ** and * indicate significance at 1%, 5%, and 10% levels, respectively.

TABLE 10
BASIC PECKING ORDER REGRESSIONS BY LEVERAGE AND FINANCING STATUS

Subsample	Constant	DEF	N	Adj R^2
High Market Lev	-0.0007	0.7833***	54,598	0.7485
	(0.0012)	(0.0105)		
Low Market Lev	-0.0071***	0.2198***	54,620	0.1752
	(0.0013)	(0.0180)		
High Market Lev Deficit	0.0092***	0.7467***	29,341	0.6754
	(0.0013)	(0.0124)		
Low Market Lev Deficit	0.0145***	0.1370***	28,683	0.0682
	(0.0015)	(0.0163)		
High Market Lev Surplus	-0.0033***	0.8357***	24,848	0.5085
	(0.0014)	(0.0273)		
Low Market Lev Surplus	-0.0044***	0.5275***	24,628	0.3296
	(0.0009)	(0.0381)		
High Book Lev	0.0003	0.7344***	54,598	0.6994
	(0.0014)	(0.0109)		
Low Book Lev	-0.0106***	0.1312***	54,620	0.0892
	(0.0012)	(0.0113)		
High Book Lev Deficit	0.0132***	0.6911***	31,207	0.6114
	(0.0014)	(0.0133)		
Low Book Lev Deficit	0.0165***	0.0104*	26,817	0.0007
	(0.0016)	(0.0062)		
High Book Lev Surplus	-0.0044***	0.7946***	23,020	0.4398
	0.0015	0.0334		
Low Book Lev Surplus	-0.0045***	0.5548***	26,456	0.3913
	(0.0008)	(0.0347)		

Each year the sample is sorted into two subsamples by splitting at the median value of either market or book leverage, and a basic *equity orientation* regression model is estimated (i.e., ΔE is regressed on DEF) for each subsample. Each subsample is then divided into further subsamples by financing status, deficit vs. surplus, and the model is estimated for these subsamples. Standard errors, corrected for clustering at the firm and year levels (Peterson 2009), are shown in parentheses. ***, ** and * indicate significance at 1%, 5%, and 10% levels, respectively.

TABLE 11
EQUITY ORIENTATION REGRESSIONS BY LEVERAGE AND FINANCING STATUS

Subsample	Constant	DEF	N	Adj R^2
High Market Lev	0.0005	0.2035***	54,598	0.1873
	(0.0011)	(0.0105)		
Low Market Lev	0.0069***	0.7780***	54,620	0.7255
	0.0013	0.0182		
High Market Lev Deficit	-0.0066***	0.2309***	29,341	0.1811
	(0.0011)	(0.0116)		
Low Market Lev Deficit	-0.0146***	0.8607***	28,683	0.7419
	(0.0014)	(0.0163)		
High Market Lev Surplus	0.0010	0.1442***	24,848	0.0376
	(0.0008)	(0.0261)		
Low Market Lev Surplus	0.0037***	0.4647***	24,628	0.2739
	(0.0010)	(0.0412)		
High Book Lev	-0.0006	0.2528***	54,598	0.2351
	(0.0014)	(0.0105)		
Low Book Lev	0.0105***	0.8690***	54,620	0.8094
	(0.0012)	(0.0112)		
High Book Lev Deficit	-0.0107***	0.2876***	31,207	0.2288
	(0.0011)	(0.0115)		
Low Book Lev Deficit	-0.0166***	0.9910***	26,817	0.8653
	(0.0016)	(0.0058)		
High Book Lev Surplus	0.0019*	0.1879***	23,020	0.0502
	(0.0010)	(0.0333)		
Low Book Lev Surplus	0.0038***	0.4342***	26,456	0.2808
	(0.0009)	(0.0377)		

For our final perspective on financing decisions, we calculate mean values of firm characteristic variables, state variables, and financing variables for subsamples of firms with high vs. low leverage (again, separated at the median), as well as subsamples created by cross-sorting leverage and financing status (deficit vs. surplus). The results are shown in Table 12.

Several aspects of these results are consistent with the financing orientation argument. First, high-leverage firms have high mean TANG and lower mean MBAssets. Second, high-leverage firms exhibit a substantially greater debt orientation as measured by the mean values of debt issuance and debt retirement, while low leverage firms exhibit a substantially greater equity orientation as measured by the mean values of equity issuance and repurchases. Further, the results are robust to subsamples based on financing status. We argue, then, that a firm's basic characteristics tend to determine its overall financial *orientation*, encompassing both leverage and security of choice for incremental financing. Similarly, DeAngelo, DeAngelo, and Whited (2011) develop an empirically-supported model in which firms deliberately deviate from permanent leverage targets by issuing debt to fund investment, consistent with notion that such firms are debt oriented, rather than oriented toward an optimal capital structure.

This table shows mean values of financing variables (DEF, ΔD, and ΔE, debt iss. and ret., and equity iss. and rep.), firm characteristic variables (Total assets, TANG, MBAssets, PROFIT, NOCF, LEVmkt, LEVbk, and CASH), and state variables ($RET_{i,t}$ and $RET_{i,t-1}$) for subsamples of firms defined by initially splitting at the median value of market leverage (LEVmkt) and then cross-sorting by year t financing status (deficit vs. surplus). All variables are as previously defined.

TABLE 12
MEAN VALUES OF FINANCING, FIRM CHARACTERISTIC, AND STATE VARIABLES FOR SUBSAMPLES SPLIT BY MARKET LEVERAGE AND FINANCING STATUS

LEVmkt:	Low	High	Low	High	Low	High
Financing status:	All	All	Deficit	Deficit	Surplus	Surplus
DEF (%)	4.47	5.10	12.93	14.09	-5.14	-5.44
ΔD (%)	0.27	3.92	3.22	11.44	-3.15	-4.88
ΔE (%)	4.17	1.08	9.67	2.60	-2.02	-0.69
Debt Issuance (%)	4.52	16.21	6.95	24.22	1.93	7.01
Debt Retirement (%)	4.25	12.29	3.72	12.79	5.07	11.89
Equity Issuance (%)	5.73	1.99	10.11	3.22	0.93	0.56
Equity Repurchase (%)	1.56	0.90	0.44	0.63	2.95	1.25
Total assets ($ mn.)	772.73	1823.25	542.76	1756.91	1074.92	1927.32
TANG (%)	24.95	34.99	24.38	35.90	25.62	33.99
MBAssets	1.89	0.92	2.19	0.97	1.57	0.86
PROFIT (%)	9.09	8.69	5.38	7.47	13.39	10.19
NOCF (%)	10.00	7.25	8.02	7.05	12.85	8.15
LEVmkt	0.08	0.47	0.07	0.47	0.08	0.47
LEVbk	0.10	0.38	0.11	0.39	0.09	0.36
CASH (%)	22.29	7.29	24.41	7.21	19.58	7.38
$RET_{i,t}$	0.10	-0.06	0.11	-0.08	0.08	-0.03
$RET_{i,t-1}$	0.09	-0.03	0.13	0.00	0.04	-0.07

CONCLUSION

This paper develops an integrated approach to identifying determinants of corporate financing decisions. The approach involves expanding the Shyam-Sunder and Myers (1999) pecking order regression model by nesting firm characteristic and state variables associated with the trade-off theory and the market timing hypothesis. We test our model using data on U.S. firms for 1971–2009. Results are consistent with both the trade-off theory and the market timing hypothesis. Our results are consistent with an argument that firms vary in terms of their overall *financing orientation,* encompassing both leverage and security of choice for incremental financing.

REFERENCES

Baker, M. & Wurgler, J. (2002). Market Timing and Capital Structure, *Journal of Finance* 57, 1–32.

Bates, T.W., Kahle K.M., & Stulz, R.M. (2009). Why do U.S Firms Hold so Much More Cash than They

Used To? *Journal of Finance* 64, 1985–2021.

Chirinko, R.S. & Singha A.R. (2000). Testing Static Tradeoff Against Pecking Order Models of Capital Structure: A Critical Comment, *Journal of Financial Economics 58,* 417–425.

Custodio, C., Ferreira, M.A., & Laureano, L. (2011). The Declining Corporate Debt Maturity: The Impact of Asymmetric Information and New Listings, working paper.

DeAngelo, H., DeAngelo, L., & Whited, T.M. (2011). Capital Structure Dynamics and Transitory Debt, *Journal of Financial Economics* 99, 235–261.

Fama, E.F. & French, K.R. (2002). Testing Trade-Off and Pecking Order Predictions about Dividends and Debt, *Review of Financial Studies* 15, 1−33.

Fama, E.F. & French, K.R. (2005). Financing Decisions: Who Issues Stock? *Journal of Financial Economics* 76, 549–582.

Flannery, M.J., & Rangan, K.P. (2006). Partial Adjustment Toward Target Capital Structures, *Journal of Financial Economics* 79, 469–506.

Frank, M.Z. & Goyal, V.K. (2003). Testing the Pecking Order Theory of Capital Structure, *Journal of Financial Economics* 67, 217–248.

Frank, M.Z. & Goyal, V.K. (2009). Capital Structure Decisions: Which Factors are Reliably Important? *Financial Management,* Spring, 1–37.

Gilson, S.C. (1997). Transaction Costs and Capital Structure Choice: Evidence from Financially Distressed Firms, *Journal of Finance,* 52, 161–196.

Harris, M. & Raviv, A. (1991). The Theory of Capital Structure, *Journal of Finance* 46, 297-356.

Hovakimian, A., Opler T., & Titman, S. (2001). The Debt-Equity Choice, *Journal of Financial and Quantitative Analysis.* 36, 1−24.

Hull, R.M. (1999). Leverage Ratios, Industry Norms, and Stock Price Reaction: An Empirical Investigation of Stock for Debt Transactions, *Financial Management,* 28, 32−45.

Jensen, M.C., & Meckling, W.H. (1976). Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure, *Journal of Financial Economics,* 3, 305−360.

Jensen, M.C. (1986). Agency Costs of Free Cash Flow, Corporate Finance and Takeovers, *American Economic Review,* 76(2), 323−329.

Jong, A.D. Verbeek, M., & Verwijmeren, P. (2010). The Impact of Financing Surpluses and Large Financing Deficits on Tests of the Pecking Order Theory, *Financial Management* 39, 733–756.

Leary, M.T & Roberts, M.R. (2005). Do Firms Rebalance Their Capital Structures, *Journal of Finance, 60,* 2575−2619.

Myers, S.C. (1977). Determinants of Corporate Borrowing, *Journal of Financial Economics* 5, 147−175.

Myers, S.C. (1984). The Capital Structure Puzzle, *Journal of Finance* 39, 575–592.

Myers, S.C. & Majluf, N.S. (1984). Corporate Financing and Investment Decisions When Firms Have Information that Investors Do Not Have, *Journal of Financial Economics* 13, 187–221.

Ogden, J.P., Jen, F.C., & O'Connor, P. (2003). *Advanced Corporate Finance: Policies & Strategies*, Prentice Hall, Upper Saddle River, NJ.

Peterson, M. (2009). Estimating Standard Errors in Finance Panel Data Sets: Comparing Approaches, *Review of Financial Studies* 22, 435–480.

Rajan, R. & Zingales, L. (1995). What do We Know About Capital Structure: Some Evidence from International Data, *Journal of Finance,* 50, 142 –1460.

Shyam–Sunder, L. & Myers, S.C. (1999). Testing Static Tradeoff Against Pecking Order Models of Capital Structure, *Journal of Financial Economics* 51, 219–244.

Titman, S., & Wessels, R. (1988). The Determinants of Capital Structure Choice, *Journal of Finance* 43, 1−19.

Welch, I. (2004). Capital Structure and Stock Returns, *Journal of Political Economy* 112, 106–131.