The Effects of Financial Flexibility Demand on Corporate Financial Decisions

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Abstract

Financial flexibility is a firm's ability to deploy its financial resources to meet future financing needs. Flexibility-building firms' financial decisions are geared toward building up financial flexibility— maintain low leverage by issuing equity in order to raise cash. As firms progress and start making investments, they utilize their financial resources—flexibility-utilizing firms increase debt and use reserved cash in order to exercise investment options. As more cash flows are generated and investment opportunities diminish, firms recharge their financial flexibility by repaying debt and increasing cash using internal funds. The findings have important implications for previously documented empirical regularities.

Keywords: Financial flexibility; Cash holding; Capital structure; Trade-off theory; Pecking-order theory

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Identifying and financing investment opportunities are crucial to any successful corporation. Financial flexibility reflects a firm's ability to deploy financial resources in response to future investment opportunities. Not surprisingly, corporate managers are most concerned about financial flexibility in their financial decisions.[1] Yet, the empirical literature has not yet systematically explored the relation between the financial flexibility demand and corporate behavior. This study examines how the demand for financial flexibility affects firms' financial decisions.

A recent theoretical development provides a framework for understanding how a firm's demand for financial flexibility drives financial decisions. Gamba and Triantis (2008) suggest that by managing their cash and capital structure policies, firms alleviate the impact of external financing costs on investments. Moreover, they find that the effect of financial flexibility on firm value is quite significant when constrained firms have high growth opportunities and low internal cash flows. Acharya, Almeida, and Campello (2007) also suggest that firms with low correlation between cash flows and investment opportunities have greater incentives to transfer resources into future states. DeAngelo et al. (2011) develop a model in which firms preserve the ability ex ante to access the capital market ex post in the event of unexpected cash flow shortfalls or investment opportunities. Huberman (1984) and Martin and Morgan (1988) argue that costs of issuing securities are much higher when the firm's cash flows deteriorate. Balancing the current and future costs, firms with large expected

[1] See the survey results of Graham and Harvey (2001), Bancel and Mittoo (2004), and Brounen et al. (2004).

investments and low expected cash flows should maintain low-risk debt capacity and large cash holdings to avoid either forgoing future investments or financing them with high-cost securities (Fama and French (2002)).

According to above arguments, the critical reason for demanding financial flexibility is to deal with future financial needs. In particular, managers make current financing and cash holding decisions directed toward addressing their future financing requirements. Once this interplay is taken into account, the optimal financial decisions from the static point of view are no longer optimal. Thus, from the perspective of financial flexibility, the costs of leverage (and the benefits of cash holdings) should include the opportunity costs of consequent future inability (ability) to take advantage of investment opportunities or to cope with future contingencies.

A firm's demand for financial flexibility should vary with its financial progress. In the next section, I develop a hypothesis that firms go through three stages of a financial flexibility demand cycle: 1) the flexibility-building stage; 2) the flexibility-utilizing stage; and 3) the flexibility-recharging stage.[2] Based on this framework, I make predictions about the interactions of corporate financing, leverage, and cash holding decisions.

Flexibility-building firms are most concerned about future financing frictions and hence in the greatest demand of financial flexibility. Accordingly, they issue equity and maintain

[2]The financial flexibility demand cycle can be contrasted with the life cycle (DeAngelo et al. (2006) and Byoun (2013)). The implicit assumption in the life cycle theory, however, is that a firm's financial progress is a function of firm age. As noted by Penrose (1952), firms do not proceed according to the "grim law" of living organisms; e.g., after the maturity stage, firms may fall back to the growth stage through reorganization rather than decaying. The financial flexibility demand cycle addresses this issue.

lower leverage and larger cash holdings. Flexibility-building firms are defined as those with low earned capital, low expected cash flows, high growth opportunities, no dividend payout, and young age. Flexibility-utilizing firms are resorting to all available financial resources to finance their profitable investments. They issue debt and use saved cash and hence have high leverage and small cash holdings. Flexibility-utilizing firms are characterized by medium earned capital, medium expected cash flows, medium growth opportunities, and low dividend payouts. Flexibility-recharging firms repay debt and replenish cash with internal cash flows, which results in moderate leverage and cash holdings. These firms are characterized by large earned capital, large expected cash flows, low growth opportunities, and large dividend payouts.

Consistent with the hypothesis, I find that: flexibility-building firms build up cash through equity issuances and maintain low leverage ratios; flexibility-utilizing firms have the highest leverage ratios by issuing debt while having the lowest cash holdings; and flexibility-recharging firms maintain moderate leverage and cash ratios through the use of internal cash flows. Furthermore, I find that firms in the flexibility-building stage hold more cash than debt, suggesting that the "negative net-debt phenomenon" documented by Bates et al. (2009) is driven by firms who demand the greatest financial flexibility—they preserve the greatest debt capacity and liquidity for future financing needs. The plots of cash and leverage ratios and debt and equity issuances also confirm their predicted non-linear patterns over the financial flexibility demand cycle.

The intersection-union tests (Casella and Berger (2002)) further suggest that there is a strong inverted-U (U) relation between leverage or net debt (cash) ratio and flexibility demand cycle proxies. The non-linear relations between leverage/cash ratios and financial flexibility demand cycle proxies are further confirmed in the system of simultaneous equations models in which leverage and cash equations are endogenously estimated. The results provide strong support for the financial flexibility demand cycle hypothesis.

The findings in this paper have important implications for existing capital structure theories. In particular, the literature has wrestled with sorting out the effects of adverse selection costs of asymmetric information on capital structure. For instance, larger firms provide a better fit for the pecking-order theory (Shyam-Sunder and Myers (1999) and Frank and Goyal (2003)) despite the fact that larger firms are less subject to information asymmetry than smaller firms. Furthermore, Graham (2000) finds that large, profitable, and dividend-paying firms are surprisingly conservative in their use of debt. My findings suggest that large flexibility-recharging firms reduce leverage using internal funds to replenish financial flexibility, consistent with the pecking order theory.

Fama and French (2002, 2005), and Leary and Roberts (2005) show that most equity issuances occur when firms have sufficient debt capacity, which leads them to conclude that the decision rule that firms use to access external capital is unclear. Moreover, recent studies show that financially constrained firms issue more equity than unconstrained firm (Farre-Mensa and Ljungqvist (forthcoming)), while saving much of the proceeds as cash (McLean (2011) and DeAngelo, DeAngelo, and Stulz (2010)). My findings suggest that flexibility-building firms save large cash by issuing equity due to lack of financial flexibility to deal with future opportunities and contingencies. From the perspective of the static trade-off theory, flexibility-building firms appear to be inconsiderate regarding their capital structures since they issue equity with a low debt ratio and ample cash holdings. The financial flexibility demand may also explain why firms do not appear to counteract the large influence of stock returns on capital structures (Welch (2004)). Flexibility-building firms do not increase leverage in response to an increase in stock value because of their concern for financial flexibility.

Previous studies take low leverage and large cash holdings as characteristics of financially constrained firms (e.g., Fazzari et al. (1998), Almeida et al. (2004), Acharya et al. (2007), and Campello and Graham (2013)). The novelty of the financial flexibility demand cycle hypothesis is its predictions on not only the relative financial ratios across firms but also the reasons behind such ratios. According to the hypothesis, both flexibility-building and recharging firms have low leverage and high cash holdings, but for quite different reasons. Flexibility-recharging firms have relatively low leverage and large cash holdings by replacing debt and accumulating cash with internal funds, whereas flexibility-building firms maintain low leverage and large cash holdings by issuing external equity. Thus, my study illustrates the importance of examining financing activities in relation to leverage and cash ratios in understanding corporate financial decisions. Theses findings also raise doubts over the practices of estimating the target leverage and cash ratios based on a linear regression.

My study complements Denis and McKeon (2012), who find that, after increasing leverage ratio to fund investment opportunities, firms reduce debt when they produce financial surplus, which is consistent with firms' utilizing and recharging of financial flexibility.[3] While Denis and McKeon (2012) show how firms utilize reserved debt capacity by focusing on firms with substantial increase in leverage ratios, my findings provide more comprehensive evidence on firms' behavior across various stages of financial flexibility demand cycle. In particular, I show how firms build, utilize, and recharge financial flexibility through not only debt capacity but also cash holdings to fund their investment opportunities and cash flow shortfalls.

My findings are generally consistent with the Gamba and Triantis (2008) model which shows that firms initially build up financial flexibility with cash and debt capacity, reduce cash and increase debt when facing positive investment shocks, and then move to a steady state. My results are also consistent with the model of DeAngelo et al. (2011) which suggests that leverage changes reflect shocks to cash flow or investment opportunities.

In conclusion, corporate financial decisions may be explained through its financial flexibility concern in dealing with future opportunities and contingencies. Traditional tradeoff and pecking order theories fall short of providing a complete explanation for the motivation behind firms' external financing decisions. From the perspective of financial flexibility demand cycle, capital structures, cash holdings, and financing choices are integral parts of corporate financial policies. This paper demonstrates that this interaction can be crucial to understanding corporate financial policies.

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[3] Byoun (2008) and Faulkender et al. (2012) also show that firms adjust their capital structures by lowering leverage ratios when they have surplus cash flows.

The rest of the paper proceeds as follows: Section I develops the financial flexibility demand cycle hypothesis and discusses the methodology used to test the hypothesis. Section II describes the data and proxy variables. Section III provides univariate results and Section IV multivariate results. Section V provides robustness checks. Section VI contains summary and concluding remarks.

I. Hypothesis Development and Methodology

A. Hypothesis Development

In this section I develop a hypothesis on how firms' financial flexibility demand cycle affects its cash holding and leverage decisions. According to the Gamba and Triantis (2008) model, constrained firms with more future growth opportunities relative to expected future cash flows need greater financial flexibility than do those with fewer investment opportunities relative to expected future cash flows. Firms can maintain their financial flexibility through cash holdings and reserved borrowing capacity.[4] The Acharya, Almeida, and Campello (2007) model also suggests that firms with low correlation between cash flows and investment opportunities have greater needs for cash and debt capacity. I classify three stages of financial

[4]There can be other ways of maintaining financial flexibility. For example, lines of credit may be considered another source of financial flexibility. However, Sufi (2009) shows that lines of credit are contingent on maintenance of cash flow-based covenants, implying that they represent a poor source of financial flexibility for firms with low operating cash flows. Moreover, Lins et al. (2010) argue, based on their survey results from a sample of relatively large firms, that lines of credit are more important for funding growth options in good times, while cash is more important to insure against negative cash flow shocks.

flexibility demand cycle as follows: 1) flexibility-building stage in which firms are building financial flexibility—these firms are financially constrained, have many future investment opportunities but have low expected cash flows; 2) flexibility-utilizing stage in which firms are utilizing available financial flexibility—they exercise substantiated growth options with less financial constraints; and 3) flexibility-recharging stage in which firms are recharging financial flexibility with internal funds—they have declining growth opportunities, while generating large cash flows.

For firms facing shortfalls in cash flows, even a little debt may cause them to be in financial distress because debt financing incurs fixed payments. Thus, for a firm with low expected cash flows, issuing risky debt implies further loss of financial flexibility. The limitation on debt issuance that results from the risk of asset substitution (Jensen and Meckling (1976)) is more important for such firms. On the other hand, firms lacking in investable funds for their profitable investments have little free cash flows, thus reducing the benefit of debt that limits the scope of over-investment and perquisites by managers (Jensen (1986), Stulz (1990), and DeAngelo and DeAngelo (2007)). Hence, debt is less helpful in both providing capital and reducing the costs of free cash flows for firms in the flexibility-building stage. In addition, debt financing renders firms with little financial flexibility vulnerable to predatory strategies, such as price wars by established firms that exhaust less financially flexible firms (Poitevin (1989)). Furthermore, debt covenants often carry restrictions on financing and investment decisions that are especially onerous for firms with lack of financial flexibility.[5] Debt financing is also costly to the manager of a firm in the flexibility-building stage because she surrenders all project choices to investors (Faulkender et al. (2007)). Consistent with these arguments, Barclay et al. (2006) show that higher costs and lower benefits of debt for firms in the development stage cause a reduction in leverage.

Bolton and Freixas (2000) also argue that constrained firms would like to reduce information dilution costs by funding their investments through a bank loan or a bond issue but are too risky to be able to obtain such loan or issue bond. Equity issues do not require collateral or restrictive covenants, nor accentuate moral hazard problems associated with leverage, nor raise the probability of financial distress. Moreover, equity markets are more willing to fund currently unprofitable firms with good growth prospects (Frank and Goyal (2003)). Thus, the better option for these firms is equity financing, which incurs greater dilution costs but provides greater financial flexibility. In addition, Boot and Thakor (1993) and Fulghieri and Lukin (2001) show that firms prefer to issue equity (the more informationally sensitive security) rather than debt (the less informationally sensitive security) in order to stimulate information production. De Meza and Webb (1987) also show that asymmetric information regarding firm risk makes equity (rather than debt) the optimal choice for external financing. The literature also documents overwhelming evidence that firms save much of their cash

[5] Kaplan and Stromberg (2003) find that small growing firms face not only different types of contracts but also significantly more restrictive agreements within the same debt financing contract than do large firms. Billet et al. (2007) also report that firms with more growth options face more restrictive covenant protections.

from equity issue proceeds.[6]

In sum, firms facing the greatest need of financial flexibility, prefer financial choices that enhance their ability to deal with future opportunities and contingencies. Accordingly, flexibility-building firms will prefer issuing equity in order to raise cash, since issuing equity in the event of an unexpected poor outcome will bear prohibitively high issuing costs. Thus, they accumulate cash through equity financing and maintain low leverage in order to increase financial flexibility for future opportunities and contingencies.

Flexibility-utilizing firms are in great need of capital in order to exercise their substantiated growth options. Consequently, they utilize all available financial resources to take advantage of their opportunities. These firms expect growing future cash flows from current investments. Thus, they rely on debt and reserved cash in order to exercise their current growth options with less concern for financial flexibility since their growing cash flows provide necessary resources for the future. Also, they face less constraints to borrow because debt becomes relatively easy to value and a cost-efficient means of raising capital when current investment opportunities dictate a funding need (DeAngelo et al. (2006)). Thus, flexibility-utilizing firms are expected to have high leverage and low cash holdings.

As firms progress from the flexibility-utilizing stage, they face declining growth opportunities and large operating cash flows. The large cash flows generated from assets in place for these firms allow them to replenish cash and reduce debt while relying on self-financing for

[6] See, among others, Pagano et al. (1998), Alti (2006), Kim and Weisbach (2008), Hertzel and Li (2010), DeAngelo, DeAngelo, and Stulz (2010), McLean (2011), and McLean and Zhao (2012).

their current investment needs. These flexibility-recharging firms shift their focus from acquiring new financing to servicing debt. Reducing debt is attractive because it restores financial flexibility (the option to borrow in the future), which enables firms to avoid more costly forms of financing when facing cash flow/investment shocks. Thus, firms in the flexibility-recharging stage are likely to maintain moderate leverage and cash. When facing earnings shortfalls or investment shocks, these firms will reduce cash and increase leverage, going back to the flexibility-utilizing stage.

The novelty of the financial flexibility demand cycle hypothesis (FFH) is its prediction of a U (inverted-U) relation between the demand for financial flexibility and leverage (cash) ratio as well as financing sources: flexibility-building firms are likely to issue equity in order to raise cash; flexibility-utilizing firms are likely to issue debt and use reserved cash in order to exercise investment options; and flexibility-recharging firms are likely to reduce debt using internally generated cash flows.

B. Methodology

In order to test the U (inverted-U) relation, the univariate analysis explores the patterns of cash holdings and leverage ratios over the deciles of proxy variables for the financial flexibility demand cycle. Representations of these patterns are also plotted in figures.

For multivariate analysis, regression models which include quadratic terms of proxy variables are specified in order to test for the U (inverted-U) relation. A general model is given as follows:

$$y = a + b_1 x + b_2 x^2 + cz + \varepsilon, \tag{1}$$

where y is the dependent variable (leverage or cash ratio), x is the proxy variable for the financial flexibility demand cycle, z is a vector of control variables, and ε is an error term. In this specification, a U shape can be confirmed when the slope of the curve is negative at the minimum (x_l) and positive at the maximum (x_h) in which $x \in [x_l, x_h]$. A U-relation between x and y is then implied by the following condition:

$$H_a : \hat{b_1} + 2\hat{b_2} x_l < 0 < \hat{b_1} + 2\hat{b_2} x_h, \tag{2}$$

where $\hat{b_1}$ and $\hat{b_2}$ are estimates of b_1 and b_2, respectively. Thus, whether the U-relation is supported by the data or not can be tested by the combined null hypothesis:

$$H_0 : \hat{b_1} + 2\hat{b_2} x_l \geq 0 \quad \text{and} \quad \hat{b_1} + 2\hat{b_2} x_h \leq 0. \tag{3}$$

The rejection region is given by the following convex cone:

$$R_\alpha : \frac{\hat{b_1} + 2\hat{b_2} x_l}{\sqrt{s_{11} + 4 s_{12} x_l + 4 s_{22} x_l^2}} \leq -t_\alpha \quad \text{and} \quad \frac{\hat{b_1} + 2\hat{b_2} x_h}{\sqrt{s_{11} + 4 s_{12} x_h + 4 s_{22} x_h^2}} \geq t_\alpha. \tag{4}$$

where s_{11}, s_{22}, and s_{12} are the estimated variances of b_1, b_2, and their covariance, respectively, and t_α represents the α-level tail probability of the t-distribution with the appropriate degree of freedom. The test for H_0 is based on the likelihood ratio principle developed by Sasabuchi (1980) and is known as an intersection-union test (Casella and Berger (2002) and Lind and Mehlum (2010)).

Similarly, the combined null hypothesis for an inverted-U relation is given by:

$$H_0 : \hat{b_1} + 2\hat{b_2}x_l \leq 0 \quad \text{and} \quad \hat{b_1} + 2\hat{b_2}x_h \geq 0, \tag{5}$$

against the alternative hypothesis,

$$H_a : \hat{b_1} + 2\hat{b_2}x_l > 0 > \hat{b_1} + 2\hat{b_2}x_h. \tag{6}$$

The corresponding rejection region is given by the following concave cone:

$$R_\alpha : \frac{\hat{b_1} + 2\hat{b_2}x_l}{\sqrt{s_{11} + 4s_{12}x_l + 4s_{22}x_l^2}} \geq t_\alpha \quad \text{and} \quad \frac{\hat{b_1} + 2\hat{b_2}x_h}{\sqrt{s_{11} + 4s_{12}x_h + 4s_{22}x_h^2}} \leq -t_\alpha. \tag{7}$$

II. Data and Proxies for Financial Flexibility Demand

A. The Data

The sample consists of all available U.S. firms from the annual Compustat files for the 30-year period between 1982 and 2011.[7] Following previous studies, financial firms and regulated utilities are excluded from the sample.[8] I require firms to have positive net sales and a minimum of $1 million book and market value of common equity. I delete observations with leverage ratios less than zero or greater than one or the asset growth rate exceeding 200%—these may indicate mergers and acquisitions. Overall, I drop about 10% of firm-year observations in the sample that do not meet these requirements. After the initial requirements are applied, the sample consists of 149,033 firm-year observations or 15,448 firms.

B. Proxies for Financial Flexibility Demand

A firm's demand for financial flexibility should depend on the firm's financial constraint and projected investment opportunities relative to expected cash flows. I rely on several proxies to measure these aspects of firms.

[7]Some variables require the estimation periods of prior 10 years and post 2 years. Accordingly, the actual sample period spans from 1973 to 2013.

[8]Financial firms are represented by SIC codes 6000-6799 and utilities by SIC codes 4800-4999. These firms have very different capital structures and their financing decisions may not convey the same information as non-financial and non-regulated firms. For example, a relatively high leverage ratio is normal for financial firms, but the same high leverage ratio for non-financial firms may indicate financial distress.

The first proxy variable is expected operating cash flow from assets in place (CF). Given the fluctuation in operating cash flows, I measure CF by the five-year centered moving average of operating cash flow including $[t-2, t+2]$ with t being the current year divided by book value of assets at t.[9] I require a minimum of three-year observations in calculating CF. Firms with low CF are likely to be more concerned for financial flexibility in order to cope with future contingencies than are firms with high CF.

The second proxy variable is growth opportunities. Previous studies typically use market-to-book assets ratio (Q) as a proxy for growth opportunities. As Fama and French (2002) and Alti (2003) point out, however, Q contains information not only about future growth opportunities, but also about expected profitability. This makes it difficult to interpret the results associated with this variable, because the FFH predicts opposite effects of future growth opportunities and expected cash flows on financial decisions. Accordingly, I measure QR which is the residual from the regression of Q on expected operating cash flow (CF).[10]

The third proxy variable is earned-to-total capital ratio (EC) defined as retained earnings divided by total assets.[11] DeAngelo et al. (2007) argue that firms with low EC tend to be in the capital infusion stage (more investment opportunities than internal cash flows), whereas firms with greater EC tend to have ample cumulative profits that make them largely self-financing for their investment opportunities. Thus, firms with low EC are likely to be

[9] The three-year moving average CF produces similar results.

[10] The results are similar when we use R&D as an alternative measure of growth opportunities. We use QR for tabulated results, however, mainly because there are so many missing R&D observations.

[11] I also try earned capital divided by total equity. The results are similar and not reported.

flexibility-building firms with great demand for financial flexibility, whereas firms with high EC are likely to be flexibility-recharging firms with self-financing.

I also consider dividend payout ratio and firm age that might be related to firms' financial flexibility cycle. A dividend payout ratio is defined as cash dividend divided by total assets. DeAngelo et al. (2007) argue that large dividend payouts serve as an empirical indicator of a maturing firm, as large dividend payouts are generally not feasible for firms in the early stage that have not attained high profitability. Additionally, Grullon et al. (2002) suggests that firms anticipating declining investment opportunities are likely to increase dividends. Consistent with these arguments, Fama and French (2001) find that firms that do not pay dividends typically have large investments relative to earnings. Thus, a high dividend payout ratio may serve as a proxy for a firm's flexibility-recharging stage. However, dividend payout ratio may not distinguish the flexibility-building and utilizing stages because firms in both stages may not pay dividends. Firm age is the number of years since the IPO year. Young starting firms are most likely to be in flexibility-building or utilizing stage. After the flexibility-utilizing stage, however, firms may repeat the flexibility recharging-utilizing cycle. Thus, a firm's age beyond the starting stage may not distinguish clearly the financial flexibility demand cycle. Given these limitations, a firm's dividend payout ratio and age are used with caution.

I report the correlation coefficients among the proxies for financial flexibility demand cycle in Table I. Due to the additional requirements in calculating the proxy variables, the sample size is reduced to 116,273. There is highly significant and positive correlation (0.6716) between EC and CF. There is also positive correlation between EC and QR. Not surprisingly, the correlation is not significant between CF and QR, given that QR is the residual from the regression of Q on CF. CF and EC are positively correlated with firm age (Age) and dividend payout ratio (DIV), while QR is negatively correlated with DIV.

Table I

III. Univariate Results

A. Leverage and Cash Ratios across the Financial Flexibility Demand Cycle

This section reports leverage, cash, and net leverage (debt minus cash) ratios across deciles of the financial flexibility demand cycle proxy variables.

Panel A of Table II shows the distribution of (net) leverage and cash ratios across earned-to-total capital ratio (EC) deciles. Regardless of the various definitions of leverage ratios, there is a clear inverted-U relation between EC and leverage ratio, whereas there is a U relation between EC and cash holdings. The p-values from the non-parametric Kruskal-Wallis test indicate significant differences in leverage and cash ratios among deciles. I also conduct the Tukey multiple comparisons tests (not reported on the table) which show that there are significant pair-wise differences. The average leverage ratios tend to be the highest for decile 4 when firms' earned capital turns positive. On the other hand, the average cash holdings show the lowest level for decile 5. The results in Panel B also show that the leverage and cash ratios exhibit similar inverted-U and U relations, respectively, across CF deciles.

Panel C of Table II shows results for investment opportunities (QR) deciles. I reverse the order of the QR deciles from 10 to 1 because high growth options imply greater demand for financial flexibility. Again the results show similar inverted-U and U shapes of leverage and cash ratios across QR deciles, respectively.

Interestingly, firms in low deciles in Panels A and B and in high deciles in Panel C are associated with negative net leverage, suggesting that firms in the flexibility-building stage tend to hold more cash than outstanding debt. Some firms in the flexibility-recharging stage also have negative net leverage. These findings suggest that the "negative net leverage phenomenon" documented by Bates et al. (2009) is mainly driven by flexibility-building firms who demand greater financial flexibility or flexibility-recharging firms who generate a lot of internal cash flows with few growth opportunities.

Table II

Panel D of Table II shows results for dividend payout (DIV) deciles and non-dividend paying firms. Both non-dividend paying firms and large-dividend paying firms tend to have low leverage and high cash ratios, producing the overall inverted-U and U patterns for leverage and cash ratios, respectively. Firms advancing to the flexibility-recharging stage appear to reduce debt while increasing cash holdings and dividends, as their investment opportunities diminish relative to internally generated cash flows. Facing investment opportunities and/or cash flow shocks, these firms may reduce cash holdings and dividends while increasing debt. Thus, the leverage and cash ratio patterns across dividend payout deciles are consistent with the predictions of the FFH.

Figure 1

I also plot the patterns of leverage and cash ratios across the deciles of proxy variables in Figure 1. The figures in Panels A to C show inverted-U shape curves for the leverage ratio and U shape curves for the cash ratio over the flexibility demand cycle. Examining the curves for leverage and cash ratios together suggests that flexibility-building firms that are characterized by low EC, low CF, and high QR maintain low leverage with large cash holdings. The plots further suggest that flexibility-utilizing firms in the mid-deciles increase leverage while reducing cash balances. Flexibility-recharging firms in the higher deciles of EC and CF and in the lower deciles of QR reduce leverage while increasing cash as their investment opportunities diminish and expected cash flows increase. The pattern of leverage ratio across the deciles of CF contrasts previous studies that find a negative *linear* association between profitability (or cash flow) and leverage ratio.[12] The pattern in Panel B suggests that the

[12]See, among others, Long and Malitz (1985), Titman and Wessels (1988), Rajan and Zingales (1995), and Fama and French (2002).

negative relation is shown for flexibility-utilizing and recharging firms from mid to high CF deciles that show decreasing debt with increasing internal cash flows. However, increases in cash flows are associated with greater leverage for flexibility-building and utilizing firms in lower CF deciles. Thus, if studies exclude small flexibility-building firms, their result are likely to show the negative relation between CF and leverage ratio.

B. External Financing Activities over the Financial Flexibility Demand Cycle

The FFH suggests that low leverage with large cash holdings for firms in the flexibility-building stage results from *external* equity, whereas flexibility-recharging firms' lower leverage and higher cash holdings relative to those of flexibility-utilizing firms result from *internal* equity. In order to examine these implications, I report net debt and equity issuances as proportions of total book assets across the deciles of financial flexibility demand cycle proxies in Table III.

The results show that firms in the first and second EC deciles have negative debt issuance while issuing much equity. Firms in the middle EC deciles issue more debt than those in lower and higher deciles. Firms in the 10th EC decile reduce both debt and equity as shown by negative figures. The financing patterns across CF deciles also show that lower CF decile firms issue more equity than debt. Firms in the first CF decile issue equity as much as 18.27% of total assets per year on average, while issuing debt as much as 1.25%

of total assets. The amount of equity issue proceeds decreases monotonically with EC and CF deciles. The p-values from the non-parametric Kruskal-Wallis test indicate significant differences in debt and equity issuances across deciles.

Table III

Figure 2 plots firms' debt and equity issuances over the EC deciles. The figure in Panel A shows the inverted-U pattern of debt issuances across EC deciles, whereas the figure in Panel B shows equity issuances monotonically decreasing with EC deciles.

Figure 2

The results for QR deciles show that firms with more growth opportunities tend to issue less debt but more equity. It appears that some distressed firms (in low QR deciles) issue equity, while reducing debt. The results for DIV deciles show that non-dividend-paying firms issue less debt relative to equity. Equity issuances are decreasing monotonically over DIV deciles. The negative equity issuances of firms in the higher DIV deciles indicate that firms with high dividend payouts also tend to repurchase equity.

The large equity issuances in Table III can be driven by initial public offering (IPO) firms that are more likely to be in the flexibility-building stage. In order to examine the IPO effect, I identify the IPO date from Compustat and designate the first fiscal year ending after the IPO date as an IPO year. I also identify the first year appearing in the Compustat for those that do not have IPO dates but begin Compustat coverage during the sample period and treat this as the IPO year. The results (not reported) with the IPO and following years excluded show that the magnitude of external equity financing does not decrease much, suggesting that equity financing for low decile firms and small firms are not mainly coming from IPOs. It is also possible that the results could be driven by a few outliers—especially in low deciles. In order to address this concern I reproduce results with exclusion of the outliers of the net equity issuance at the second and 98th percentiles. The results (not reported) still show that flexibility-building firms rely heavily more on external equity.

Overall, equity issuances are positively associated with the financial flexibility demand, while debt issuances show inverted-U patterns. These results are consistent with the prediction of the FFCH that flexibility-building firms build up cash holdings through external equity and maintain low leverage in order to preserve financial flexibility for the future, whereas flexibility-recharging firms increase cash and reduce leverage with internal equity.

C. Cash Holdings and Leverage over Firm Age

Figure 3 plots leverage and cash ratios over firm age. The plots show that starting firms have the largest cash holdings which become smaller as they grow older. On the other hand, the leverage ratio is the lowest for starting firms, tends to increase as firms grow older, and then fluctuates around 19% of total assets once firms become more established. The higher cash ratio than leverage ratio for young firms also suggest that the negative net leverage phenomenon is driven by these young firms. Unreported results also show that young firms issue much more equity than debt. Overall, Figure 3 suggests that flexibility-building firms characterized by very young age hold large cash raised mostly with external equity and maintain low leverage.

Figure 3

IV. Multivariate Analysis

A. Leverage Regression Results

I use the following regression models to test directly the implications of the FFH:

$$
\begin{aligned}
LEV_t = \; & \alpha_1 ECR_{t-1} + \alpha_2 ECR^2_{t-1} + \alpha_3 CFR_{t-1} + \alpha_4 CFR^2_{t-1} + \alpha_5 QRR_{t-1} + \alpha_6 QRR^2_{t-1} \\
& + \alpha_7 DIV_{t-1} + \alpha_8 D^{DIV}_{t-1} + \alpha_9 LAge_{t-1} + \alpha_{10} D^{Age}_{t-1} + \alpha_{11} Size_{t-1} + \alpha_{12} MLev_{t-1} \\
& + \alpha_{13} Fixed_{t-1} + \alpha_{14} RND_{t-1} + \alpha_{15} AZ_{t-1} + \alpha_{16} Tax_{t-1} + \alpha_{17} SD_{t-1} + \varepsilon, \qquad (8)
\end{aligned}
$$

$$
\begin{aligned}
LEV_t = \; & \alpha'_1 Index_{t-1} + \alpha'_2 Index^2_{t-1} + \alpha'_3 DIV_{t-1} + \alpha'_4 D^{DIV}_{t-1} + \alpha'_5 LAge_{t-1} + \alpha'_6 D^{Age}_{t-1} \\
& + \alpha'_7 Size_{t-1} + \alpha'_8 MLev_{t-1} + \alpha'_9 Fixed_{t-1} + \alpha'_{10} RND_{t-1} + \alpha'_{11} AZ_{t-1} \\
& + \alpha'_{12} Tax_{t-1} + \alpha'_{13} SD_{t-1} + \varepsilon, \qquad (9)
\end{aligned}
$$

where LEV is the leverage ratio; ECR, CFR, and QRR are percentile ranks of earned-to-total capital (EC), expected cash flow (CF), and reverse-ordered residual Q (QR), respectively. Percentile ranks are used to avoid the influence of extreme values when negative or large values are squared. Using percentile rank also facilitates the test of an inverted-U relation with the values bounded between 0 and 1. Regression (9) uses a financial flexibility index by summing the percentile ranks of the proxy variables: i.e., $Index = ECR + CFR + QRR$. The advantage of using $Index$ is that it simultaneously accounts for firms' earned capital, expected cash flow, and growth opportunities.[13]

All regressions include dividend payout ratio (DIV), a dummy variable for non-dividend paying firms (D^{DIV}), the logarithm of firm age ($LAge$), and a dummy variables for starting firms with 4 years old or younger age (D^{Age}).[14] Firms are expected to increase dividends as they transition from the flexibility-utilizing stage to the flexibility-recharging stage. Thus, according to the FFH, the coefficients on DIV are expected to be negative. On the other hand, firms with no dividend payouts are likely to be either in the flexibility building stage (low leverage) or in the flexibility utilizing stage (high leverage), and hence non-dividend paying firms' leverage ratios relative to those of dividend paying firms are ambiguous. Since young firms are likely to be in the flexibility-building stage, the coefficients on D^{Age} are expected to be negative.

[13] I also tried the principal components of these three variables, but the results are similar to what is reported and hence not reported.

[14] I also try 3 to 8 years of firm age in defining the starting firm dummy. The unreported results are similar to those reported in the Tables.

Other control variables are from previous studies: industry median debt ratio based on the 2-digit SIC code ($MLev$); firm size ($Size$); fixed assets ($Fixed$); research and development expenditures (RND); Altman's Z-score (AZ); and marginal tax rate (Tax). The detailed definition of each variable is provided in the Appendix. Following the practice of dealing with extreme values in the literature, the sample is winsorized at 1% and 99%. The tabulated results are based on the book-value leverage ratio using the fixed effects (FE) regressions.[15]

Panel A of Table IV reports estimation results. Robust standard errors clustered by both time and firm are reported in the brackets. Given the high correlation between EC and CF, a separate regression for each of these proxies is also estimated. The estimation results show that the coefficient estimates on the proxy variables for the financial flexibility demand cycle are all positive and significant, whereas the coefficient estimates on their squared terms are all negative and significant. The adjusted R-squares are between 70% and 71%, which is consistent with Flannery and Rangan (2006) and Lemmon and Zender (2008).

Table IV

In all regressions, dividend payout (DIV) is negative and significant, suggesting that leverage ratio decreases with dividend payout ratio (as firms advancing to the flexibility-recharging stage). The coefficient estimates on D^{DIV} are also negative, suggesting that

[15]The results are similar when the market-value leverage ratio is used, when the regressions are estimated with OLS, tobit, or Fama-MacBeth methodology, when the unfiltered data are used, and when the extreme variables are trimmed instead of winsorized.

non-dividend-paying firms on average have lower leverage ratio relative to dividend-paying firms. The negative coefficient estimates on $LAge$ suggest that firms reduce leverage as they grow older. The coefficient estimates on the dummy variable for starting firms (D^{Age}) are all negative and highly significant, suggesting that young firms in the flexibility-building stage have lower leverage ratios. Other coefficient estimates carry the signs consistent with previous studies.

Panel B reports the estimated slopes at lower and upper bounds of the proxy variables and the intersection-union tests against the inverted-U relation. All slopes change signs from positive to negative, showing the inverted-U patterns in leverage ratios over the proxy variables. Moreover, all t statistics are highly significant, rejecting the null hypothesis in favor of the inverted-U relation for all proxy variables.

Overall, the results suggest that young firms and firms with low EC, low CF, and high QR have lower leverage ratios resulting from their concern for financial flexibility and that firms with high EC, high CF, low QR, and high DIV also have low leverage, as they mostly rely on internal funds while using only safe debt. Furthermore, the flexibility index ($Index$) show the clear inverted-U relation between leverage ratio and the financial flexibility demand cycle, supporting the FFH.

B. Cash Regression Results

The implications of the FFH with regard to cash holdings are tested by estimating the regression models similar to those in equations (8) and (9). The dependent variable is $Cash$

defined as cash and equivalents divided by total assets. Control variables include: industry median cash ratio based on the 2-digit SIC code ($MCash$); firm size ($Size$); fixed assets ($Fixed$); research and development expenditures (RND); Altman's Z-score (AZ); and the standard deviation of industry operating cash flow (based on 2-digit SIC code) calculated for the prior 10-year period (SD).

Table V

Table V reports estimation results. All the coefficient estimates on the proxies of the financial flexibility demand cycle are negative, while the coefficient estimates on their squared terms are all positive. All estimates are highly significant. The coefficient estimates on DIV are all positive and significant, suggesting that firms increase cash holdings as they increase dividend payouts. On the other hand, the coefficient estimates on D^{DIV} are insignificant. The positive and significant coefficient estimates on D^{Age} suggest that starting firms maintain significantly greater cash ratios than do older firms.

The opposite signs of estimated slopes at lower and upper bounds of the proxy variables and the intersection-union tests ($Utest$) in Panel B of Table V provide evidence of a U-shape relations between cash ratio and proxy variables, supporting the FFH. The comprehensive proxy, $Index$, also shows the presence of a strong U relation between cash holdings and the financial flexibility demand cycle.

C. Net Leverage Regression Results

The FFH implies that both flexibility-building and recharging firms maintain low leverage and large cash holdings. Accordingly, the FFH is tested by estimating regression models with net leverage (NL) defined as total debt minus cash divided by total assets as the dependent variable. In addition to the control variables used in the previous regressions, the industry median net leverage (MNL) based on the 2-digit SIC code is included instead of the industry median leverage and cash ratios. The FFH predicts an inverted U-relation between net leverage and the proxies for the financial flexibility demand cycle. The coefficient estimates on DIV are expected to be negative since flexibility-recharging firms (with larger dividends) decrease leverage and increase cash holdings as they replenish financial flexibility with internal funds. The coefficient estimate on D^{Age} is expected to be negative as flexibility-building young firms maintain low leverage and large cash holdings.

Table VI

Estimation results in Panel A of Table VI show that the coefficient estimates on all proxy variables and their squared values have expected signs with high significance. The coefficient estimates on DIV and D^{Age} are negative and highly significant, suggesting that firms advancing to the flexibility-recharging stage and young firms have low net leverage. The test statistics in Panel B are all significant, suggesting that there is an inverted-U relation between net leverage and financial flexibility demand cycle. These results provide strong support for the FFH.

D. Simultaneous Equations Model

The FFH suggests that a firm can optimize its financial flexibility by jointly making its cash and leverage decisions. Accordingly, this section considers simultaneous equations models where financial leverage and cash balance enter as endogenous variables as well as regressors in the other equation. The purpose here is to determine if the inferences drawn from the single equation setting are robust to a simultaneous equations approach. The models are estimated with the Heteroskedastic Two-Stage Least Square Generalized Method of Moments (H2SLS GMM) suggested by Greene (1997). In addition to the independent variables used in previous regressions, lagged values of endogenous variables are included as instruments.

The results are reported in Table VII. The coefficient estimates all carry the same signs with high significance as in single-equation regressions, including those on DIV and D^{Age}. The estimation results show strong negative association between leverage and cash holdings, suggesting that firms consider both leverage and cash holdings simultaneously. The tests for inverted-U and U relations in Panels B and C for leverage and cash ratios, respectively, confirm the non-linear relations found in single-equation regressions. Overall, the results in Table VII indicate that endogeneity bias is not likely to account for the inverted-U (U) relations between leverage (cash) ratio and proxies for the financial flexibility demand cycle.

Table VII

V. Robustness Checks

A. Alternative Specifications

As alternative specifications for testing the FFH, I estimate piecewise linear regressions (as in Morck et al. (1988)) and also with a series of dummy variables representing quintiles of each proxy variable for the financial flexibility demand cycle. I also estimate separate regressions for samples divided into two groups based on the sample medians of EC, CF, and QR, and between dividend paying and non-paying firms. The results with alternative regressions further confirm the non-linear relations between cash/leverage ratio and the financial flexibility demand cycle proxy variables.

I also estimate the models using alternative measures of flexibility demand such as the ratio of R&D to assets and asset growth rate. In addition, I investigate if the results are varying with different time periods. I find that the results are robust to these alternative measures and time periods.

B. Alternative Measures of Leverage Ratio

Welch (2007) suggests that leverage should be measured by debt-to-invested capital ratio. To examine how the results change with this alternative measure of leverage ratio, I reproduce results similar to those in Tables II through VII. The book leverage ratio is defined as total debt divided by invested capital (book debt plus stockholders' equity plus minority interest). Market leverage ratio is the ratio of book debt-to-market value of invested capital. When I use these alternative measures, the univariate results (not reported) show less variation in leverage ratio across EC deciles and the inverted-U pattern is less clearcut. However, the multivariate results lead to the same conclusions as those reported in Tables.

VI. Summary and Conclusions

This paper develops and tests the financial flexibility demand cycle hypothesis (FFH). The results strongly support the FFH. Flexibility-building firms, characterized by low expected cash flows, high growth opportunities, low earned capital, and young age, have lower leverage ratios and larger cash holdings. They build up cash through external equity issues in order to improve their financial flexibility for future opportunities. Flexibility-utilizing firms, characterized by medium expected cash flows, medium growth opportunities, and medium earned capital, have the highest leverage and the lowest cash holdings, as they fund their investment opportunities with debt and reserved cash. Flexibility-recharging firms, characterized by large expected cash flows, low growth opportunities, large earned capital, and large dividends, have moderate leverage and cash holdings, as they replace debt with internal funds.

This study brings new insights into several unresolved issues in the capital structure literature. For example, why do larger firms appear to be a better fit for the pecking-order theory (Shyam-Sunder and Myers (1999) and Frank and Goyal (2003)) despite the fact that large firms are less subject to information asymmetry than smaller firms? My findings suggest that large mature firms reduce debt with internal funds in order to replenish financial flexibility exhausted during their growth stage. On the other hand, small starting firms issue equity and increase cash holdings despite having low leverage in order to cope with lack of financial flexibility, thus reversing the external financing hierarchy suggested by the pecking-order theory. Thus, my findings explain why financially constrained firms hold so much cash (Bates et al. (2009) and Ma et al. (2013)), while raising so much equity (McLean (2011), DeAngelo, DeAngelo, and Stulz (2010), and Farre-Mensa and Ljungqvist (forthcoming)). These findings also shed light on the question of why firms issue most equity when they have sufficient debt capacity (Fama and French (2002) and Leary and Roberts (2005)) without any apparent risk of entering financial distress from issuing debt (Leary and Roberts (2004)).

In conclusion, corporate financial decisions are driven by the demand for financial flexibility to deal with future opportunities. This paper demonstrates that the framework of the financial flexibility demand help us understand the interactions of firms' financing, leverage, and cash holding decisions.

Appendix: Variable Definitions

Age = Firm age defined as the number of years since the IPO year or the first year appearing in Compustat if the IPO year is missing

AZ = Altman's Z-score modified by MacKie-Mason (1990): 3.3EBIT + Sales + 1.4 Retained earnings + 1.2 Working capital divided by total assets

$Cash$ = Cash and short-term investments divided by total assets

CF = Five-year centered moving average of operating income plus depreciation divided by total assets

CFR = Percentile rank of CF

D^{Age} = Dummy variable equal to one if the firm is 4 years old or younger

DIV = Common stock cash dividends divided by total assets

D^{DIV} = Dummy variable equal to one if the firm has missing values for DIV and zero otherwise

EC = Retained earnings divided by total assets

ECR = Percentile rank of EC

$Fixed$ = Fixed assets divided by total assets

$Index$ = Financial flexibility index defined as $ECR + CFR + QRR$

$LAge$ = Logarithm of Age

LEV = Debt ratio (TD/BA or TD/MA)

$MLev$ = Industry median debt ratio (TD/BA or TD/MA) based on two-digit SIC code (or Fama and French (2002) industry groupings)

$MCash$ = Industry median Cash based on two-digit SIC code (or Fama and French (2002) industry groupings)

MNL = Industry median NL based on two-digit SIC code (or Fama and French (2002) industry groupings

NL = Net leverage defined as total debt minus cash and equivalents divided by total assets

RND = Research and development (R&D) expenditures divided by net sales

Q = Book-to-market asset ratio. The market value of assets equals total assets minus total equity minus balance sheet deferred taxes and investment tax credit plus the market value of common equity (price times shares outstanding) plus preferred stock liquidating value (replaced by the redemption value of preferred stock when missing)

QR = Residual from the regression of Q on CF

QRR = Percentile rank of QR

SD = Standard deviation of cash flow (operating income plus depreciation divided by total assets) over five years including $[t-2, t+2]$ with t being the current year

$Size$ = Logarithm of sales

TD/BA = Book leverage defined as total debt divided by total assets

TD/MA = Market leverage defined as total debt divided by market value of assets

Tax = Marginal tax rate equal to the statutory tax rate if the firm reports no net operating loss carryforwards with positive pretax return and zero otherwise. The statutory taxes are 48% before 1986, 40% in 1987, 34% from 1988 to 1992, and 35% from 1993 to 2011.

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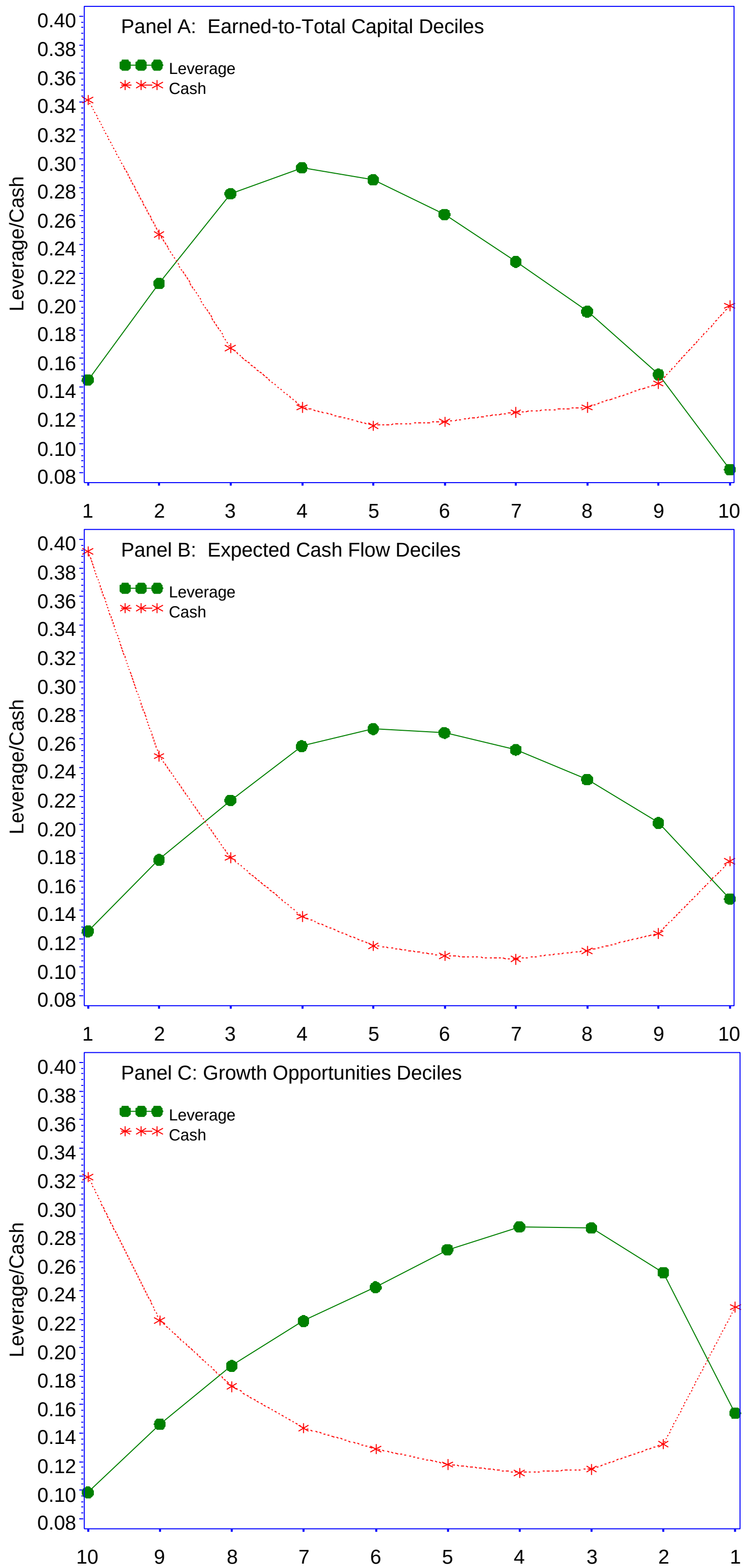
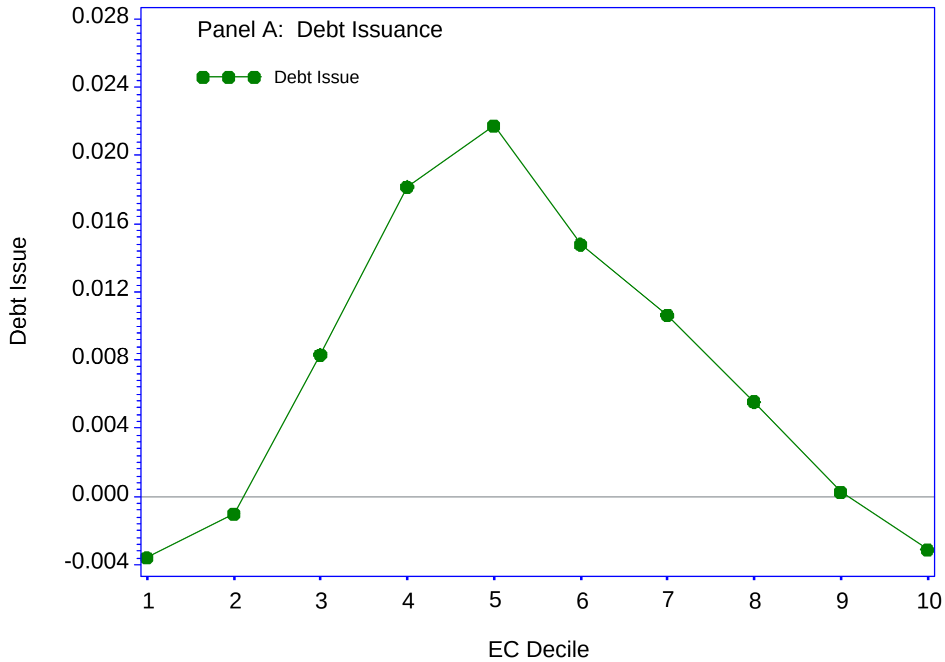
Figure 1: Cash and Leverage Ratios across the Financial Flexibility Demand Cycle



*

Figure 2: Debt and Equity Issuances across the Financial Flexibility Demand Cycle



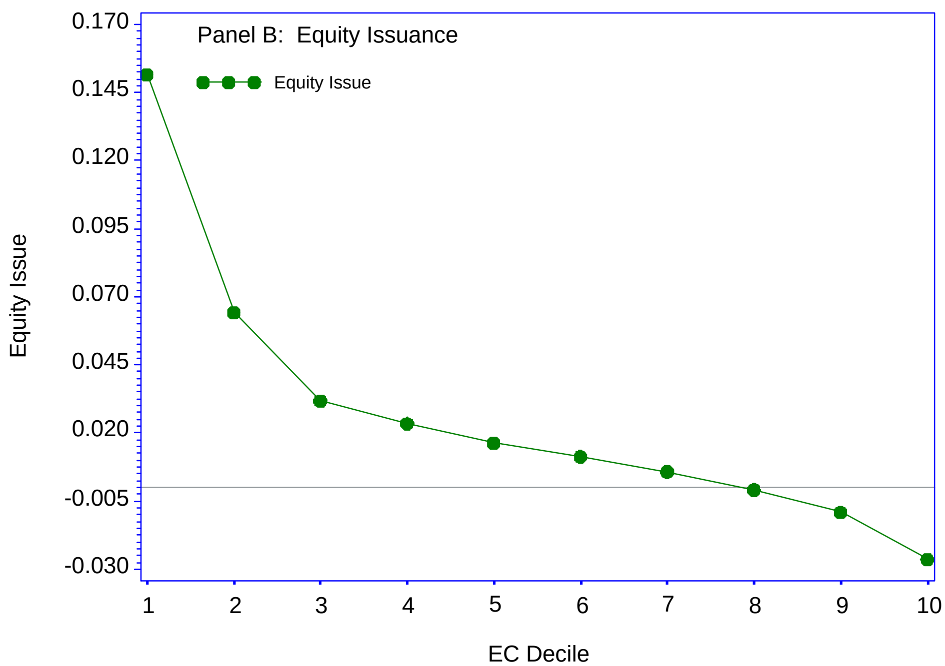


Figure 3: Cash Holdings and Leverage Ratio over Firm Age

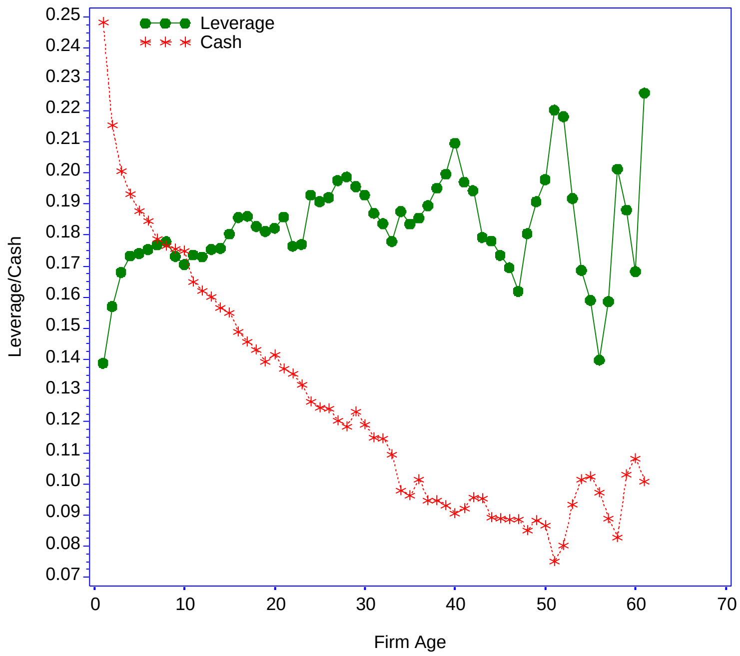


Table I: Pearson Correlation Coefficient

The data consists of 116,273 firm-year observations for the period 1982-2011. Earned capital (*EC*) is retained earnings divided by total assets. Expected cash flow (*CF*) at year *t* is the five-year centered moving average of operating cash flow divided by book value of assets centered around year *t*. Q residual (*QR*) is the residual from the regression of *Q* (the market value of assets divided by the book value of assets) on *CF*. The market value of assets equals total assets minus total equity minus balance sheet deferred taxes and investment tax credit plus the market value of common equity plus preferred stock liquidating value. Firm age (*Age*) is the number years since the firm's IPO. Dividend payout ratio (*DIV*) is cash dividend divided by total assets. Statistical significance at the 1% level is denoted by ***.

	CF	***EC***	***QR***	***Age***	***DIV***
CF	1.0000***				
EC	0.6716***	1.0000***			
QR	0.0001	0.1042***	1.0000***		
Age	0.2043**	0.2209***	0.1001***	1.0000***	
DIV	0.1749***	0.1159***	-0.0808***	0.1116***	1.0000***

Table II: Leverage and Cash Ratios across Financial Flexibility Demand Cycle Proxies

The data consists of 116,273 firm-year observations for the period 1982-2011. Earned capital (*EC*) is retained earnings divided by Total assets. Expected cash flow (*CF*) at year *t* is the five-year centered moving average of operating cash flow divided by book value of assets centered around year *t*. Q residual (*QR*) is the residual from the regression of *Q* (the market value of assets divided by the book value of assets) on *CF*. The market value of assets equals total assets minus total equity minus balance sheet deferred taxes and investment tax credit plus the market value of common equity plus preferred stock liquidating value. Book (Market) Leverage is total debt divided by book (market) value of total assets. Cash is cash holding divided by total assets. Debt – Cash is total debt minus cash divided by total assets. Variable definitions are provided in the appendix. KW Test p-value is the p-value of the Kruskal-Wallis non-parametric test for equal means.

Panel A: Leverage and Cash Ratios across Earned-to-Total Capital (*EC*) Deciles

EC Decile	*EC*	Book Leverage	Market Leverage	Cash	Debt – Cash
1	-2.0747	0.1573	0.1060	0.3220	-0.1646
2	-0.5971	0.2244	0.1816	0.2243	0.0001
3	-0.1784	0.2864	0.2452	0.1532	0.1332
4	-0.0091	0.2986	0.2595	0.1205	0.1781
5	0.0847	0.2834	0.2429	0.1122	0.1711
6	0.1614	0.2576	0.2163	0.1161	0.1415
7	0.2385	0.2267	0.1865	0.1218	0.1048
8	0.3252	0.1908	0.1519	0.1264	0.0644
9	0.4394	0.1469	0.1111	0.1434	0.0036
10	0.6726	0.0812	0.0554	0.1978	-0.1167
KW Test p-value	<0.001	<0.001	<0.001	<0.001	<0.001

Panel B: Leverage and Cash Ratios across Expected Cash Flow (*CF*) Deciles

CF Decile	*CF*	Book Leverage	Market Leverage	Cash	Debt – Cash
1	-0.2676	0.1314	0.0863	0.3748	-0.2434
2	-0.0266	0.1831	0.1615	0.2290	-0.0459
3	0.0410	0.2261	0.2107	0.1630	0.0630
4	0.0749	0.2570	0.2396	0.1317	0.1253
5	0.0981	0.2686	0.2419	0.1133	0.1552
6	0.1179	0.2624	0.2265	0.1082	0.1542
7	0.1380	0.2502	0.2023	0.1062	0.1440
8	0.1612	0.2292	0.1713	0.1116	0.1176
9	0.1928	0.1995	0.1355	0.1244	0.0751
10	0.2764	0.1457	0.0808	0.1756	-0.0298
KW Test p-value	<0.001	<0.001	<0.001	<0.001	<0.001

Panel C: Leverage and Cash Ratios across Growth Opportunities (*QR*) Deciles

***QR* Decile**	***QR***	**Book Leverage**	**Market Leverage**	**Cash**	**Debt – Cash**
10	3.5534	0.0982	0.0243	0.3229	-0.2248
9	0.8385	0.1449	0.0597	0.2214	-0.0765
8	0.2185	0.1837	0.0981	0.1744	0.0093
7	-0.1207	0.2145	0.1370	0.1461	0.0684
6	-0.3473	0.2378	0.1736	0.1309	0.1069
5	-0.5172	0.2645	0.2164	0.1168	0.1476
4	-0.6565	0.2864	0.2576	0.1102	0.1762
3	-0.7859	0.2905	0.2855	0.1094	0.1812
2	-0.9330	0.2632	0.2858	0.1210	0.1421
1	-1.2412	0.1695	0.2187	0.1845	-0.0150
KW Test p-value	<0.001	<0.001	<0.001	<0.001	<0.001

Panel D: Leverage and Cash Ratios across Dividend Payout (*DIV*) Deciles

***DIV* Decile**	***DIV***	**Book Leverage**	**Market Leverage**	**Cash**	**Debt – Cash**
No Dividend	.	0.2119	0.1752	0.1945	0.0174
1	0.0009	0.2794	0.2498	0.1386	0.1408
2	0.0038	0.2701	0.2394	0.1241	0.1458
3	0.0075	0.2593	0.2265	0.1151	0.1442
4	0.0117	0.2410	0.2056	0.1140	0.1270
5	0.0167	0.2270	0.1877	0.1200	0.1070
6	0.0233	0.2128	0.1699	0.1230	0.0898
7	0.0326	0.1954	0.1500	0.1337	0.0618
8	0.0465	0.1786	0.1282	0.1436	0.0349
9	0.0722	0.1634	0.1094	0.1634	0.0000
10	0.1936	0.1560	0.0946	0.1971	-0.0411
KW Test p-value	<0.001	<0.001	<0.001	<0.001	<0.001

Table III: External Financing Activities across Financial Flexibility Demand Cycle Proxies

The data consists of 116,273 firm-year observations for the period 1982-2011. Earned capital (*EC*) is retained earnings divided by Total assets. Expected cash flow (*CF*) at year *t* is the five-year centered moving average of operating cash flow divided by book value of assets centered around year *t*. Q residual (*QR*) is the residual from the regression of *Q* (the market value of assets divided by the book value of assets) on *CF*. The market value of assets equals total assets minus total equity minus balance sheet deferred taxes and investment tax credit plus the market value of common equity plus preferred stock liquidating value. Dividend payout ratio (*DIV*) is cash dividend divided by total assets. KW Test p-value is the p-value of the Kruskal-Wallis non-parametric test for equal means.

***EC* Decile**	**Net Total Debt Issue**	**Net New Equity Issue**	***CF* Decile**	**Net Total Debt Issue**	**Net New Equity Issue**
1	-0.0034	0.1547	1	0.0125	0.1827
2	-0.0007	0.0687	2	0.0008	0.0450
3	0.0088	0.0368	3	0.0040	0.0244
4	0.0181	0.0285	4	0.0052	0.0161
5	0.0217	0.0212	5	0.0096	0.0137
6	0.0160	0.0141	6	0.0094	0.0112
7	0.0110	0.0077	7	0.0102	0.0122
8	0.0055	0.0009	8	0.0105	0.0055
9	0.0004	-0.0075	9	0.0087	0.0024
10	-0.0036	-0.0245	10	0.0027	-0.0125
KW Test p-value	<0.001	<0.001	KW Test p-value	<0.001	<0.001
***QR* Decile**	**Net Total Debt Issue**	**Net New Equity Issue**	***DIV* Decile**	**Net Total Debt Issue**	**Net New Equity Issue**
			No Dividend	0.0058	0.0657
10	0.0067	0.1031	1	0.0089	0.0318
9	0.0104	0.0462	2	0.0108	0.0251
8	0.0116	0.0312	3	0.0107	0.0191
7	0.0138	0.0240	4	0.0101	0.0154
6	0.0129	0.0191	5	0.0070	0.0113
5	0.0115	0.0165	6	0.0065	0.0088
4	0.0111	0.0135	7	0.0052	0.0028
3	0.0067	0.0124	8	0.0060	-0.0069
2	0.0001	0.0115	9	0.0056	-0.0209
1	-0.0110	0.0230	10	0.0163	-0.0925
KW Test p-value	<0.001	<0.001	KW Test p-value	<0.001	<0.001

Table IV: Fixed Effects Regression Estimation on Determinants of Leverage Ratio

The data consists of 102,714 firm-year observations for the period 1982-2011. TD/BA is total debt divided by book value of total assets. *ECR* is the percentile rank of Earned capital (*EC*). *CFR* is the percentile rank of expected cash flow (*CF*). *QRR* is the percentile rank of growth opportunities (*QR*). *Index* is defines as *ECR* + *CFR* + *QRR*. *DIV* is dividend payout ratio and D^{DIV} is dummy variable for non-dividend-paying firms. *LAge* is the logarithm of firm age and D^{Age} is dummy variable for a firm with 4 years old or younger age. *Size* is the logarithm of sales. *MLev* is the industry median debt ratio based on the 2-digit SIC code. *Fixed* is fixed assets divided by total assets. *RND* is research and development expenditures divided by total assets. *AZ* is Altman's Z-score. *Tax* is marginal tax rate. In the brackets is robust standard deviation clustered by time and firm. Statistical significance at the 1%, 5%, and 10% levels is denoted by ***, **, and *, respectively. Utest in Panel B is the intersection-union test for an inverted-U relation.

Panel A: Regression Results

	TD /BA (1)	TD /BA (2)	TD /BA (3)	TD /BA (4)
Index				0.0854***
				[0.0079]
Index^2				-0.0512***
				[0.0028]
ECR	0.1130***		0.1178***	
	[0.0117]		[0.0199]	
ECR^2	-0.2424***		-0.2322***	
	[0.0101]		[0.0176]	
CFR		0.0697***	0.0466**	
		[0.0194]	[0.0189]	
CFR^2		-0.1538***	-0.1121***	
		[0.0170]	[0.0165]	
QRR	0.1476***	0.1158***	0.1079***	
	[0.0068]	[0.0103]	[0.0101]	
QRR^2	-0.1174***	-0.1104***	-0.1017***	
	[0.0065]	[0.0098]	[0.0095]	
DIV	-0.2000***	-0.1611***	-0.1256***	-0.3683***
	[0.0313]	[0.0502]	[0.0469]	[0.0489]
D^{DIV}	-0.0079***	-0.0017	-0.0071***	-0.0061**
	[0.0016]	[0.0027]	[0.0026]	[0.0026]
LAge	-0.0125***	-0.0222***	-0.0127***	-0.0130***
	[0.0014]	[0.0027]	[0.0026]	[0.0026]
D^{Age}	-0.0124***	-0.0146***	-0.0125***	-0.0134***
	[0.0016]	[0.0024]	[0.0023]	[0.0024]
Size	0.0214***	0.0228***	0.0223***	0.0235***
	[0.0008]	[0.0014]	[0.0014]	[0.0014]
MLev	0.3618***	0.3828***	0.3656***	0.3864***
	[0.0107]	[0.0192]	[0.0184]	[0.0190]
Fixed	0.1252***	0.1302***	0.1333***	0.1366***
	[0.0053]	[0.0095]	[0.0092]	[0.0094]
RND	-0.1301***	-0.1461***	-0.1239***	-0.1500***
	[0.0114]	[0.0168]	[0.0163]	[0.0168]
AZ	-0.0099***	-0.0117***	-0.0089***	-0.0127***
	[0.0005]	[0.0007]	[0.0007]	[0.0007]
Tax	-0.0561***	-0.0288	-0.0518**	-0.0536**

	[0.0140]	[0.0225]	[0.0217]	[0.0221]
SD	-0.0314***	-0.0481***	-0.0368***	-0.0534***
	[0.0068]	[0.0098]	[0.0093]	[0.0097]
Adjusted-R^2	0.71	0.70	0.71	0.70

Panel B: Tests for Inverted-U Relation

	Slope at Lower Bound	***Slope at Upper Bound***	***Utest t-value***	**p-value**
ECR (1)	0.1130	-0.3670	9.62	0.000
QRR (1)	0.1476	-0.0848	12.79	0.000
CFR (2)	0.0697	-0.2347	3.59	0.000
QRR (2)	0.1158	-0.1027	10.17	0.000
ECR (3)	0.1178	-0.3420	5.91	0.000
CFR (3)	0.0466	-0.1754	2.46	0.007
QRR (3)	0.1079	-0.0936	9.52	0.000
Index (4)	0.0854	-0.2001	10.85	0.000

Table V: Fixed Effects Regression Estimation on Determinants of Cash Ratio

The data consists of 102,710 firm-year observations for the period 1982-2011. *Cash* is Cash and equivalents divided by total assets. *ECR* is the percentile rank of Earned capital (*EC*). *CFR* is the percentile rank of Expected cash flow (*CF*). *QRR* is the percentile rank of growth opportunities (*QR*). *Index* is defines as *ECR* + *CFR* + *QRR*. *DIV* is dividend payout ratio and D^{DIV} is dummy variable for non-dividend-paying firms. *LAge* is the logarithm of firm age and D^{Age} is dummy variable for a firm with 4 years old or younger age. *MLev* (*MCash*) is the industry median *TD/BA* (*Cash*) based on the 2-digit SIC code. *Size* is the logarithm of sales. *Fixed* is fixed assets divided by total assets. *RND* is research and development expenditures divided by total assets. *AZ* is Altman's Z-score. *Tax* is marginal tax rate. *SD* is the standard deviation of cash flow. In the brackets is robust standard deviation clustered by time and firm of the estimated coefficient. Statistical significance at the 1%, 5%, and 10% levels is denoted by ***, **, and *, respectively. Utest in Panel B is the intersection-union test for a U relation.

Panel A: Regression Results

	CASH (1)	*CASH* (2)	*CASH* (3)	*CASH* (4)
Index				-0.0720***
				[0.0094]
Index^2				0.0266***
				[0.0031]
ECR	-0.1082***		-0.0892***	
	[0.0193]		[0.0189]	
ECR^2	0.1316***		0.1122***	
	[0.0167]		[0.0165]	
CFR		-0.1433***	-0.1271***	
		[0.0207]	[0.0205]	
CFR^2		0.1443***	0.1249***	
		[0.0176]	[0.0175]	
QRR	-0.1233***	-0.0970***	-0.0948***	
	[0.0109]	[0.0113]	[0.0113]	
QRR^2	0.0964***	0.0735***	0.0718***	
	[0.0101]	[0.0105]	[0.0105]	
DIV	0.1240**	0.1116**	0.0913*	0.2257***
	[0.0507]	[0.0516]	[0.0508]	[0.0513]
D^{DIV}	0.0029	0.0011	0.0025	0.0029
	[0.0020]	[0.0020]	[0.0020]	[0.0020]
LAge	0.0043*	0.0076***	0.0047*	0.0046*
	[0.0024]	[0.0024]	[0.0024]	[0.0024]
D^{Age}	0.0093***	0.0096***	0.0092***	0.0096***
	[0.0024]	[0.0024]	[0.0024]	[0.0024]
Size	-0.0244***	-0.0243***	-0.0238***	-0.0254***
	[0.0014]	[0.0014]	[0.0014]	[0.0014]
MCash	0.2373***	0.2415***	0.2404***	0.2462***
	[0.0230]	[0.0231]	[0.0229]	[0.0233]
Fixed	-0.2316***	-0.2320***	-0.2325***	-0.2340***
	[0.0093]	[0.0093]	[0.0093]	[0.0094]
RND	0.0905***	0.0921***	0.0822***	0.0994***
	[0.0223]	[0.0221]	[0.0221]	[0.0223]
AZ	0.0037***	0.0038***	0.0036***	0.0050***
	[0.0008]	[0.0008]	[0.0008]	[0.0008]
SD	0.0665***	0.0553***	0.0516***	0.0725***
	[0.0152]	[0.0155]	[0.0154]	[0.0155]

Adjusted-R^2	0.77	0.77	0.77	0.77

Panel B: Tests for U Relation

	Slope at Lower Bound	***Slope at Upper Bound***	***Utest t-value***	**p-value**
ECR (1)	-0.1082	0.1523	5.62	0.000
QRR (1)	-0.1233	0.0675	6.69	0.000
CFR (2)	-0.1433	0.1423	6.91	0.000
QRR (2)	-0.0970	0.0485	4.53	0.000
ECR (3)	-0.0892	0.1330	4.73	0.000
CFR (3)	-0.1271	0.1202	6.19	0.000
QRR (3)	-0.0948	0.0473	4.44	0.000
Index (4)	-0.0720	0.0762	7.63	0.000

Table VI: Fixed Effects Regression Estimation on Determinants of Net Leverage Ratio

The data consists of 102,710 firm-year observations for the period 1982-2011. *Net Leverage* is total debt minus cash and equivalents divided by total assets. *ECR* is the percentile rank of Earned capital (*EC*). *CFR* is the percentile rank of Expected cash flow (*CF*). *QRR* is the percentile rank of growth opportunities (*QR*). *Index* is defines as *ECR* + *CFR* + *QRR*. *DIV* is dividend payout ratio and D^{DIV} is dummy variable for non-dividend-paying firms. *LAge* is the logarithm of firm age. *MNL* is the industry median *Net Leverage* based on the 2-digit SIC code. *Size* is the logarithm of sales. *Fixed* is fixed assets divided by total assets. *RND* is research and development expenditures divided by total assets. *AZ* is Altman's Z-score. *Tax* is marginal tax rate. *SD* is the standard deviation of cash flow. In the brackets is robust standard deviation clustered by time and firm of the estimated coefficient. Statistical significance at the 1%, 5%, and 10% levels is denoted by ***, **, and *, respectively. Utest in Panel B is the intersection-union test for an inverted-U relation.

Panel A: Regression Results

	Net Leverage **(1)**	***Net Leverage*** **(2)**	***Net Leverage*** **(3)**	***Net Leverage*** **(4)**
Index				0.1529***
				[0.0138]
$Index^2$				-0.0761***
				[0.0047]
ECR	0.2156***		0.2016***	
	[0.0309]		[0.0305]	
ECR^2	-0.3703***		-0.3413***	
	[0.0271]		[0.0268]	
CFR		0.2092***	0.1709***	
		[0.0318]	[0.0311]	
CFR^2		-0.2931***	-0.2327***	
		[0.0273]	[0.0266]	
QRR	0.2684***	0.2117***	0.2014***	
	[0.0162]	[0.0171]	[0.0168]	
QRR^2	-0.2117***	-0.1827***	-0.1722***	
	[0.0153]	[0.0160]	[0.0157]	
DIV	-0.3201***	-0.2703***	-0.2154***	-0.5876***
	[0.0767]	[0.0819]	[0.0770]	[0.0802]
D^{DIV}	-0.0118***	-0.0037	-0.0106***	-0.0099***
	[0.0035]	[0.0037]	[0.0036]	[0.0037]
LAge	-0.0258***	-0.0387***	-0.0265***	-0.0268***
	[0.0040]	[0.0041]	[0.0040]	[0.0041]
D^{Age}	-0.0263***	-0.0287***	-0.0263***	-0.0276***
	[0.0036]	[0.0037]	[0.0036]	[0.0037]
Size	0.0454***	0.0466***	0.0457***	0.0485***
	[0.0022]	[0.0022]	[0.0022]	[0.0022]
MNL	0.4807***	0.5053***	0.4829***	0.5146***
	[0.0270]	[0.0279]	[0.0269]	[0.0281]
Fixed	0.3647***	0.3697***	0.3736***	0.3783***
	[0.0145]	[0.0148]	[0.0145]	[0.0149]
RND	-0.2184***	-0.2360***	-0.2041***	-0.2477***
	[0.0303]	[0.0305]	[0.0299]	[0.0305]
AZ	-0.0130***	-0.0149***	-0.0119***	-0.0171***
	[0.0012]	[0.0012]	[0.0012]	[0.0012]
Tax	-0.2147***	-0.1807***	-0.2099***	-0.2125***

	[0.0319]	[0.0328]	[0.0318]	[0.0325]
SD	-0.0971***	-0.1029***	-0.0877***	-0.1253***
	[0.0198]	[0.0207]	[0.0201]	[0.0209]
Adjusted-R^2	0.78	0.78	0.79	0.78

Panel B: Tests for Inverted-U Relation

	Slope at Lower Bound	***Slope at Upper Bound***	***Utest t-value***	**p-value**
ECR (1)	0.2156	-0.5175	6.98	0.000
QRR (1)	0.2684	-0.1508	9.72	0.000
CFR (2)	0.2092	-0.3711	6.58	0.000
QRR (2)	0.2117	-0.1500	9.14	0.000
ECR (3)	0.2016	-0.4741	6.62	0.000
CFR (3)	0.1709	-0.2898	5.50	0.000
QRR (3)	0.2014	-0.1395	8.67	0.000
Index (4)	0.1530	-0.2717	11.10	0.000

Table VII: H2SLS Estimation Results of Simultaneous Equations of Leverage Ratio and Cash Balance

The data consists of 101,023 firm-year observations for the period 1982-2011. *TD/BA* is total debt divided by book value of total assets. *Cash* is Cash and equivalents divided by total assets. *ECR* is the percentile rank of Earned capital (*EC*). *CFR* is the percentile rank of Expected cash flow (*CF*). *QRR* is the percentile rank of growth opportunities (*QR*). *Index* is defines as *ECR* + *CFR* + *QRR*. *DIV* is dividend payout ratio and D^{DIV} is dummy variable for non-dividend-paying firms. *LAge* is the logarithm of firm age and D^{Age} is dummy variable for a firm with 4 years old or younger age. *MLev* (*MCash*) is the industry median *TD/BA* (*Cash*) based on the 2-digit SIC code. *Size* is the logarithm of sales. *Fixed* is fixed assets divided by total assets. *RND* is research and development expenditures divided by total assets. *AZ* is Altman's Z-score. *Tax* is marginal tax rate. *SD* is the standard deviation of cash flow. In the brackets is robust standard deviation clustered by time and firm of the estimated coefficient. Statistical significance at the 1%, 5%, and 10% levels is denoted by ***, **, and *, respectively. Utests in Panels B and C are the intersection-union test for inverted U and U relations, respectively.

Panel A: H2SLS Estimation Result

Independent Variable	*TD/BA* (1)	*CASH* (2)	*TD/BA* (3)	*CASH* (4)	*TD/BA* (5)	*CASH* (6)
CASH	-0.2212***		-0.2583***		-0.2681***	
	[0.0135]		[0.0138]		[0.0136]	
TD/BA		-0.1567***		-0.1308***		-0.1632***
		[0.0419]		[0.0411]		[0.0405]
Index					0.0683***	-0.0542***
					[0.0083]	[0.0094]
Index²					-0.0434***	0.0171***
					[0.0029]	[0.0036]
ECR	0.1197***	-0.0918***				
	[0.0203]	[0.0182]				
ECR²	-0.2344***	0.0926***				
	[0.0176]	[0.0183]				
CFR			0.0378**	-0.1382***		
			[0.0191]	[0.0193]		
CFR²			-0.1191***	0.1296***		
			[0.0167]	[0.0175]		
QRR	0.1193***	-0.0953***	0.0876***	-0.0760***		
	[0.0103]	[0.0121]	[0.0106]	[0.0117]		
QRR²	-0.0928***	0.0750***	-0.0874***	0.0556***		
	[0.0096]	[0.0107]	[0.0099]	[0.0109]		
DIV	-0.1385***	0.0848*	-0.1013**	0.0815*	-0.2797***	0.1529***
	[0.0449]	[0.0479]	[0.0474]	[0.0481]	[0.0466]	[0.0501]
D^{DIV}	-0.0071***	0.0019	-0.0014	0.0012	-0.0051**	0.0022
	[0.0025]	[0.0019]	[0.0026]	[0.0018]	[0.0026]	[0.0019]
Age	-0.0131***	0.0012	-0.0216***	0.0034	-0.0133***	0.0012
	[0.0028]	[0.0023]	[0.0029]	[0.0024]	[0.0029]	[0.0023]
D^{Age}	-0.0099***	0.0085***	-0.0113***	0.0086***	-0.0096***	0.0084***
	[0.0022]	[0.0022]	[0.0023]	[0.0022]	[0.0023]	[0.0022]
Size	0.0182***	-0.0205***	0.0190***	-0.0208***	0.0192***	-0.0211***
	[0.0015]	[0.0016]	[0.0015]	[0.0016]	[0.0015]	[0.0016]
MLev	0.3388***		0.3537***		0.3547***	
	[0.0182]		[0.0188]		[0.0187]	
MCash		0.2182***		0.2259***		0.2219***
		[0.0226]		[0.0230]		[0.0231]
Fixed	0.0703***	-0.2116***	0.0668***	-0.2152***	0.0693***	-0.2115***

	[0.0101]	[0.0102]	[0.0105]	[0.0102]	[0.0103]	[0.0103]
RND	-0.1193***	0.0760***	-0.1340***	0.0773***	-0.1402***	0.0803***
	[0.0181]	[0.0214]	[0.0186]	[0.0214]	[0.0186]	[0.0215]
AZ	-0.0112***	0.0024***	-0.0128***	0.0023**	-0.0138***	0.0029***
	[0.0008]	[0.0009]	[0.0008]	[0.0009]	[0.0008]	[0.0009]
Tax	-0.0213		0.0057		-0.0140	
	[0.0212]		[0.0216]		[0.0214]	
SD	-0.0200*	0.0674***	-0.0395***	0.0543***	-0.0414***	0.0694***
	[0.0106]	[0.0140]	[0.0117]	[0.0144]	[0.0112]	[0.0143]
Adjusted-R^2	0.15	0.12	0.13	0.12	0.13	0.12

Panel B: Tests for Inverted-U Relation between Leverage and Proxy Variables

	Slope at Lower Bound	***Slope at Upper Bound***	***Utest t-value***	**p-value**
ECR (1)	0.1197	-0.3444	5.91	0.000
QRR (1)	0.1193	-0.0644	6.66	0.000
CFR (3)	0.0378	-0.1981	1.98	0.024
QRR (3)	0.0876	-0.0854	8.29	0.000
Index(5)	0.0683	-0.1739	8.27	0.000

Panel C: Tests for U Relation between Cash and Proxy Variables

	Slope at Lower Bound	***Slope at Upper Bound***	***Utest t-value***	**p-value**
ECR (2)	-0.0918	0.0916	4.26	0.000
QRR (2)	-0.0953	0.0533	5.30	0.000
CFR (4)	-0.1382	0.1184	6.62	0.000
QRR (4)	-0.0760	0.0342	3.14	0.001
Index (6)	-0.0542	0.0411	3.48	0.001