Large Investments, Financial Constraint and Capital Structure

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We examine the choice of capital structure for large-scale investments, contingent upon high or low degrees of financial constraint. Traditional pecking theory suggests the most desired financing source order is internal capital, debt and lastly, equity. We find, however, that financially constrained firms funding abnormally large investments primarily use equity and relatively little internal capital pools or debt. Such a financing pattern holds even when constrained firms have larger cash balances and higher debt capacity. Thus, for financially constrained firms in our manufacturing sample, our findings do not support pecking order theory. We further find equity financing in such instances value-decreasing for shareholders.

Introduction

Traditional financial theory dictates that firms partake in value-enhancing investment activity. Such actions are beneficial to both the firm and, more importantly, their shareholders. However, it could be suggested that such activity be curtailed in the face of financial constraint. Constraint increases barriers to capital resources, both internally and externally. Retaining internal capital accounts becomes a larger priority due to the necessity to mitigate future financial distress. Existing literature documents an increase in cash holdings as a result of increased financial constraint. External sources become more difficult to obtain and, if that hurdle is crossed, the costs of obtainment are typically at a premium.

Thus, it is counterintuitive to think that firms would make abnormally large investments when they are financially constrained. However, Gatchev, Pulvino and Tarhan (2010) show that firms do not necessarily reduce their investment programs due to financial constraint. As an example, consider Immunogen Inc., a biopharmaceutical company with total assets of $82 million and no credit ratings as of March 2008. During the subsequent year, the firm incurred $17.6 million (which is equivalent to 21% of its assets and 43% of its cash stock) in capital expenditures for the first nine months of 2008, compared to only $1.4 million in the previous year. The capital outlays include $3.6 million for improved capabilities at its manufacturing plant in Norwood and $10.9 million for the building of its laboratory and office space in Waltham, both in Massachusetts.

This work addresses two primary questions. First, how do constrained firms like Immunogen Inc. finance these large investments, presumably so as to not miss profitable opportunities? This provides a fertile environment to re-examine traditional capital structure theories and, more specifically, the influence of financial constraint on large project financing. Second, what is the impact on shareholders' value of such important financing decisions? Large investments would seem to require a large amount of external financing, a notion supported by Elsas, Flannery and Garfinkel (2012). This is a particularly important decision in the face of financial constraint, as theory suggests constraint forces firms to be more careful in their financing choice since incorrect capital budgeting decision would have harsher ramifications.

Following Gatchev et al. (2009) and Elsas et al. (2012), we estimate a multi-equation system that allows decisions on the sources and uses of funds to be made simultaneously. Our analysis shows that constrained firms use approximately 65% external equity and 30% of debt to finance each dollar of large capital expenditures. The small remaining funding is arrived at through a combination of cash holding and negative share repurchases. In contrast, unconstrained firms use more internal cash and debt and rely less on equity to fund such projects.

Traditional pecking theory suggests that higher financing costs and increased asymmetry associated with equity financing make it the least optimal funding source. However, equity may be used out of necessity since other funding options are unavailable or excessively expensive, especially in the event of financial distress. Pecking order theory does predict a negative relation between financial constraint and equity issuance (and a resulting positive relation between constraint and debt levels). However, our results suggest that constrained firms' equity use is a choice rather than a restriction imposed by market participants. This does seem to contradict the pecking order theory and provides a new conclusion to add to the evidence regarding funding choices.

An alternative explanation often posed in the capital structure literature is the theory of market timing, which states that firms issue equity when market conditions are most favorable for them to do so. If so, it is more difficult to contribute the accumulation of the raised proceeds to financing choice preference. A firm that accumulates a certain type of capital does not necessarily do so with the intent of overinvestment. In an effort to examine this potential alternative explanation of our findings, we investigate the relative propensity to spend different types of funds, characterized by financial constraint.

We find that constrained firms generally have a higher propensity to spend equity funds than their unconstrained counterparts. Also, we find that an increase in equity (debt) funds has a negative (positive) relation with a subsequent change in cash. Both of these findings suggest the newly raised equity funds exit the firm faster than debt funds and add evidence to the suggestion that constrained firms opt for equity funding for large project expenditures.

Lastly, the influence of funding choices on firm value is always a critical point of study. We find that using equity to finance abnormally large investments is value-decreasing for shareholders of constrained firms. Such a finding is not unprecedented. For example, Moeller, Schlingemann and Stulz (2005) examine mergers and acquisitions (M&As), which are other forms of large corporate investments, and find such actions reduce firm value.

Related Literature

Perhaps the most researched capital structure theory is the pecking order, as first developed in Donaldson (1961). Myers and Majluf (1984) popularized the notion by building upon the idea that increased information asymmetry results in an increased cost of funding. These findings are extended by Shyam-Sunder and Myers (1999). Information asymmetry is positively related to lack of control. Therefore, the theory asserts that internal capital funds, over which the firm has a large amount of control, are the preferred financing choice.[1]

When internal funds are depleted, pecking order theory then suggests firms move to debt financing and then finally to equity financing as a last resort. Equity is generally regarded as the least appealing source due to many reasons, including the cost of issuance, potential dilution effects, and the increased risk of equity assets (relative to debt). Many studies have since examined the relative importance of debt and equity in a firm's capital structure, including Almeida and Campello (2010); Lemmon and Zender (2010); Gatchev et al. (2009); Billingsley, Smith and Lamy (1994); and Masulis and Korwar (1986).

Evidence is far from universally supportive of the pecking order theory, however. De Jong, Verbeek and Verwijmeren (2010); Lemmon and Zender (2010); Fama and French (2005); Frank and Goyal (2003); and Helwege and Liang (1996) all find results that contradict the traditional notions posed by the pecking order theory.[2] An alternative theory related to the choice of security issuance is posed by Stein (1996). The market timing theory suggests that firm managers are capable of timing the market and would issue equity when the market overvalues their firm. As such, the

[1] A large body of financial economics research has examined the sensitivity of investments to internal cash flows, e.g., Hubbard (1998); Fazzari and Petersen (1993); Whited (1992); Oliner and Rudebusch (1992); Hoshi, Kashyap and Scharfstein (1991); and Fazzari, Hubbard and Petersen (1988).

[2] Brounen, de Jong and Koedijk (2006) and Graham and Harvey (2001) complete thorough surveys of the literature relating to pecking order in Europe and the U.S., respectively.

additional equity would be valued at a premium.

Existing literature is also somewhat inconsistent in finding support for market timing. Henderson, Jegadeesh and Weisbach (2006); Baker and Wurgler (2002) and Asquith and Mullins (1986) find evidence consistent with a positive relationship between market valuations of equity and equity issuances. On the other hand, DeAngelo et al. (2010); Li et al. (2009); Carlson et al. (2006) and Jung, Kim and Stulz (1996) all find evidence inconsistent with market timing explanations of capital source decisions.

We more specifically focus on the influence of constraint on capital choices for investment activity. Korajczyk and Levy (2003) suggests unconstrained firms can time the market to obtain optimal pricing, whereas constrained firms must take what they can get. Dong, Loncarski, Horst and Veld (2012) find the notion that equity issuances are primarily completed by firms that are overvalued to be unsupported in the event of constraint. Existing literature has documented the relative importance of both internal and externally generated capital in constrained firms. Khieu and Pyles (2012), Denis and Sibilkov (2010), Faulkender and Wang (2006) and Almeida et al. (2004) document that financially constrained firms hoard more cash and have a higher propensity to save cash out of cash flows to buffer against any shock from capital market frictions to their investments.

Notable works examining external capital sources and constraint include Almeida and Campello (2010), Tsyplakov (2008), Fama and French (2005) and Frank and Goyal (2003). Gatchev et al. (2009) proxies for constraint with information asymmetry and agency costs and find that high levels of constraint result in a disproportionate weighting in equity. Alshwer, Sibilkov and Zaiats (2011) document that financially constrained firms tend to use equity to finance corporate mergers and acquisitions. Hovakimian et al. (2001) find that equity is used more so than debt in smaller, riskier firms, which is consistent with the notion of a positive correlation between constraint and equity issuances posted by the pecking order theory.

Abnormally large investments naturally put a greater strain on resources (both internal and external) on which the firm can draw for funding. Also, one would expect large investment opportunities to have larger risk, all else equal, due simply to the amount of funding at stake. Elsas et al. (2012) report that large investments are primarily externally financed. Fu

(2010) finds that seasonal equity offerings (SEO) result in firms suffering from poor operating performances when they use the equity proceeds to finance overinvestment. Further, Kim, Pilotte and Yang (2012) and Titman et al. (2004, 2009), among numerous others, document that abnormal investments are associated with subsequent negative stock returns.

Constraint Definition and Sample Selection Description

FINANCIAL CONSTRAINT CRITERIA

The notion of financial constraint is difficult to quantify. Thus, in an effort to robustly examine the issue, we calculate constraint in multiple ways. First, we follow previous works, including Almeida and Campello (2010), in identifying three common constraint criteria. Perhaps the simplest method is based upon firm size. The rationale for this criterion is that agency and information asymmetry problems are more severe for small firms than for large ones since they are mostly young and less mature and garner less attention from analysts. Hadlock and Pierce (2010) find that, despite the simplicity of measurement, size is a good predictor of financial constraint levels. We rank firm-years based upon the natural logarithm of sales and categorize those firm-years in the bottom (top) quintile as financially constrained (unconstrained).

The second constraint criterion is the dividend payout ratio. While determining the amount of dividend is at the firm's discretion, there is an inverse relationship between the amount paid and the subsequent amount the firm can retain for operational purposes. Gilchrist and Himmelberg (1995) argue that dividends and investment are competing uses of funds. Thus, firms facing financial constraints may select low dividend payout ratios so as to allow sufficient capital to be retained for investment purposes. Firm-years are ranked based upon their dividend payout ratios, which are computed as total stock dividends divided by income before extraordinary items. We label those firm-years in the bottom (top) quintile of the annual payout distribution as financially constrained (unconstrained).[3]

Our third measure of financial constraint comes in the form of

[3] We omit a firm-year if either common dividends or preferred dividends are negative. Any missing value for dividends is set to zero.

bond ratings. Should a firm have a debt rating, this signals a certain level of access to the debt market and perhaps serves as a larger signal to the investing public. Both of these results could increase the likelihood of obtaining capital at a manageable cost. We therefore categorize firm-years as financially constrained if the firm has positive debt but no public debt ratings (Faulkender and Petersen 2006).

We also examine a more formal measure of financial constraint with the Whited-Wu (2006) index. Whited and Wu (2006) measure a Generalized Method of Moments (GMM) estimation of a structural investment model. The results of that model are then used to predict the index value, which is shown to be closely related to external financial constraints.[4] The index values are then ranked each year. We then define those firm-years in the top (bottom) quintile of the index distribution as financially constrained (unconstrained).

Data and Sample Description

Following Almeida and Campello (2010), Almeida et al. (2004), Vogt (1994) and Fazzari et al. (1988), among others, we consider a sample of all U.S. manufacturing firms. Manufacturing firms represent the largest industry in terms of capital expenditures, with over 15% of the total outlay each year. Other notable works, such as Fazzari et al. (1988), examine this industry in their research; thus, our findings are readily comparable to those existing studies.

Our sample data are obtained from Compustat for the period 1984–2009. The raw sample consists of 83,192 firm years. Investments are capital expenditures net of depreciation, scaled by total assets. Industry is defined by the 2-digit SIC codes. We focus on new investments rather than total investments to maintain assets in place; therefore, we exclude depreciation from our investment calculation. Since the focus of the paper is to examine large investment activity contingent upon clearly defined constraint categories, we only retain firm-year observations where constraint

[4] Specifically, the index is constructed as follows:
WW-index = −0.091 * Cash Flow/Assets − 0.062 * Dividend Dummy + 0.021 * Long-Term Debt/Assets − 0.044 * Log of Total Assets + 0.102 * 3-Digit SIC Industry Sales Growth + 0.035 * Firm Sales Growth.

is categorized by the respective method and corresponding definitions as outlined in the previous section.

Following Elsas et al. (2012) and Marchica and Mura (2010), we define large investments as capital expenditures that are more than double the average investment of the industry over the past three years. To illustrate, if the average firm within a given industry invests 20% of the assets in the past three years, a firm that invests 40% or more of the industry average over the year would be categorized as a large investor. LARGEINV is then calculated as the excess beyond this baseline measure. For example, a firm with investment of 45% of the industry average would have a calculated LARGEINV of 5%. Our construction of large investment is based only on industry averages, so our results are not dependent on the selection of any specific regression-based investment model.[5]

Our first analysis is an examination of the firm's choice of capital structure changes during the period of large investment. Specifically, we examine changes in long- and short-term debt, equity issuances, changes in cash holdings and share repurchases during the year in which the abnormal investment took place. Variables included in the study are defined in a similar manner to those in Gatchev et al. (2009).

Long-term debt issues (LTDISS) are defined as the change in long-term debt from t-1 to t. Short-term debt issues (STDISS) are changes in current liabilities from t-1 to t. Net equity issues (EQTYISS) is the change in common equity (from t-1 to t) minus the change in retained earnings (from t-1 to t). Change in cash holdings (CHGCASH) is the change in cash plus short-term investments from time t-1 to t. Share repurchases (SHAREREP) is the total of common and preferred shares repurchased from time t-1 to t. All variables are scaled by total assets.

Similar to Gatchev et al. (2009), net working capital is defined

[5] We investigate the robustness of our results with an alternative construction. Specifically, we first sort observations into terciles based on total assets (SIZE) and then market-to-book (MB) ratio at time t-1. We then group each observation into one of the nine cross-sectional combinations of SIZE and MB groups and calculate the median capital expenditures (divided by total assets) of each two-digit SIC industry, which represents the normal level of expenditures for each firm within the group for that period. Large investment is then defined as actual capital expenditures minus this industry median level. We reconduct our analyses for all regressions in the study and find our conclusions remain essentially unchanged.

as current assets (net of cash and short-term investments) minus current liabilities (net of debt in current liabilities). Thus, change in net working capital (CHGNWC) is the change, from time t-1 to t, in net working capital. Income (INCOME) is that available to common and preferred shareholders and is defined as changes in retained earnings from t-1 to t plus dividends. Again, all preceding variables are scaled by total book assets.

Leverage (LEVERAGE) is total long-term debt to assets and is used to control for convertible debt being converted into equity or equity being used to pay off outstanding debt. In either case, neither cash nor investment accounts are affected. This variable will also be used to represent the firm's existing debt capacity, which may affect future capital structure decisions. Size (SIZE) is the natural logarithm of total book assets. The market-to-book ratio (MB) is calculated as the market value of assets divided by the book value of assets, where the market value of assets is total assets minus book equity plus common share prices times the number of shares outstanding. Finally, we create earnings-to-assets (EARNINGS), which is calculated as earnings before interest, taxes, depreciation and amortization, scaled by total assets.[6]

Panel A of Table 1 presents summary statistics for the total sample. Observations are also averaged contingent upon financial constraint. LIDUM is a dummy variable equal to 1 if LARGEINV is greater than 0. Thus, 12% of firm-year observations include abnormally large investment activity. For conciseness, discussion of summary statistics and constraint will center on averages over all constraint criteria. For the entire sample, firms had short-term debt issuances of 0.6% of total assets, whereas long-term debt issuances were 0.8% of total assets. This indicates total debt issuances of 1.4% of total assets. The average firm in our sample also had a 0.2% increase in cash holdings and 22% in additional equity issuances.

By way of illustration, a firm with $100 million in assets would add $1.4 million in debt and $22 million in equity, while adding approximately $200,000 to their cash account. When examining only the constrained firm-year observations, the average amount of total debt issuances is also approximately 0.6% of total assets, but equity issuances were substantially

[6] We winsorize all ingredient variables at 1% and 99% to mitigate outlier bias.

higher at approximately 52% of assets. It should be noted, despite winsorizing, these averages are positively skewed by the influence of large values. In particular, the untabulated median value for equity issuances is less than 1, which is much smaller than the mean. Thus, the example above should be considered for explanatory purposes only and not as indicative of realistic values. Unconstrained firms have averages of 0.2% in short-term debt issuances, 1.7% long-term debt issuances, 2.1% in equity issuances, 0.9% increase in cash holdings and 1.8% in share repurchases.

Turning to the subsample of only large investment observations in Panel B, we find the dichotomy of results for constrained versus unconstrained observations to be particularly pronounced. If short and long-term debt issuances are combined, constrained firms see increases in debt of only 0.6% compared to increases in equity of 51.9%. This would strongly suggest the primary method of funding large investments is equity based. The same does not seem to be true, however, of unconstrained firms that have abnormally large investment activity. The average increase in total debt for these firms is 5.5%, while equity increases by only 3.7%. The disproportionate increase in equity for constrained versus unconstrained firms is likely to be partially explained by the differential in size, as constrained firms are much smaller on average than their unconstrained counterparts. Thus, an equal amount of increased equity generates a much larger percentage change for the smaller firm.[7]

Regardless, the results seem to suggest that constrained firms use equity for financing large investment activity more so that unconstrained firms. In addition, summary statistics for the control variables are consistent with those found in existing literature (see, for example, Almeida and Campello 2010). There is clear evidence supporting differing characteristics for constrained and unconstrained firms. For example, constrained firms have lower income available to common and preferred shareholders, lower leverage ratios, higher market-to-book values, higher short-term debt issues and higher equity issues than their unconstrained counterparts. These significant differences in controls suggest that conclusions drawn from univariate analysis need to be done with considerable caution.

[7] It is also worth noting that though constrained firms make less industry-adjusted large investments across all four financial constraint criteria, the maximum size of large investments, which is not reported, is significantly larger for constrained (19% of total assets) than for unconstrained firms (9% of total assets).

Empirical Results and Discussions

FINANCIAL CONSTRAINT AND LARGE INVESTMENT FUNDING SELECTION

Following Gatchev et al. (2009), we first investigate long-term debt, short-term debt, equity and cash holdings as determined simultaneously in our empirical model. This method allows us to compare the relative and concurrent importance of these funding sources for abnormally large investments.

Specifically, the model of multiple equations is as follows:

$$\text{Dep} = \alpha + \beta_1\text{ChgNWC} + \beta_2\text{LARGEINV} + \beta_3\text{INCOME} + \beta_4\text{DIV} + \beta_5\text{SIZE} + \beta_6\text{MB} + \beta_7\text{EARNINGS} + \beta_8\text{LEVERAGE} + \text{YEAR DUMMIES} + \epsilon \quad (1)$$

where Dep is changes in cash holdings (CHGCASH, eq. 1), short-term debt issues (STDISS, eq. 2), long-term debt issues (LTDISS, eq. 3), equity issues (EQTYISS, eq. 4) and share repurchases (SHAREREP, eq. 5). The five equations are tested using seemingly unrelated regressions. Year dummies are included to account for time-varying macro-economic conditions that may impact investment and financing decisions.[8]

We impose restrictions on the coefficient estimates across. For example, for LARGEINV, the estimates must add up to one and the intercept coefficients must sum to zero to allow for all investments to be fully financed. We also restrict the coefficients of the financing explanatory variables so that the uses and sources of funds are equal, thereby allowing the error terms across equations to be correlated.[9]

For the sake of brevity, we present complete results (in Table 2) based upon only one constraint criterion – firm size. Our variable of primary

[8] It is possible that if dividend and investment decisions are jointly made, this model would be biased and inconsistent. To address this concern, we augment our multi-equation system with the large investment, dividend and net working capital variables as additional dependent variables. We also include own-lagged values of financing sources as independent variables. The results are consistent with those reported.

[9] As a test of robustness, we also examine the models excluding cross-equation restrictions. The results are consistent with those reported.

interest is LARGEINV, and the objective is to determine the average capital structure used for funding. The magnitude of coefficients on LARGEINV across equations in Table 2 indicates that constrained firms finance their abnormally large investments with 54% of equity, 23% of long-term debt, 13% of short-term debt and 11% of internal cash. Constrained firms, which are typically smaller and riskier than their unconstrained counterparts, appear to use more long-term than short-term debt in funding investment. However, the most interesting finding is the disproportionate use of equity in funding investment activity.

Table 2 shows that unconstrained firms use a decidedly different mix to fund large-scale projects. Such firms rely significantly less on equity (a decrease from 54% to 21%) and more on long-term debt (an increase from 23% to 37%) and the internal cash (an increase from 11% to 21%) to fund each average dollar. All the coefficient estimates and their mean differences are significant at the 1% level.

To ensure these findings are consistent across constraint criteria, Table 3 reports the capital structure predicted by the series of regressions using the remaining three constraint criteria. The results are consistent with those presented in Table 2. Specifically, we find the average capital structure when constrained firms invest in large projects is 64% equity, 31% debt and the remainder in cash expenditures. Contrarily, unconstrained firms use 47% debt, 24% equity and 22% in cash to fund large investments. Given the negative and insignificant coefficient on share repurchases, constrained firms do not save on share repurchases, on average, to fund large investments.

Thus, our findings provide evidence in support of the hypothesis that constrained firms in our sample violate the pecking order hierarchy when partaking in abnormally large investment opportunities. Rather than leaning heavily upon internal cash holdings and debt, these firms invest primarily with equity financing. The same is not true for unconstrained firms that invest abnormally.

Choice versus Restriction

A natural supposition is that the funding choices for constrained firms are due to necessity. Such firms would be reluctant to use cash to fund investments, particularly ones that carry a large amount of risk. Thus the most desirable source of funding (according the pecking order) would be unavailable. In addition, constrained firms may not have ready access to debt markets, thus eliminating that possibility as well.

If, however, the constrained firms choose to use equity rather than are forced to, this runs contradictory to traditional pecking order. Further, if these firms are simply attempting to issue equity when the markets are favorable for doing so, the explanation for our results could lie in the market timing theory. We now turn our attention to these questions.

First, one could argue that constrained firms use very little internal capital for funding purposes simply because they do not have a sufficient supply. Constrained firms often have a shortage of cash that cannot be replenished from operating cash flows. DeAngelo, DeAngelo and Stulz (2004) document that 62% of equity issuers would run out of cash if they did not conduct the seasoned equity offerings (SEO) since more than 80% of them have subnormal cash balances. Even when operating cash flows improve, constrained firms tend to use the internally generated funds to reduce debt (Gatchev et al. 2009). However, some works suggest, like Khieu and Pyles (2012) and Faulkender and Wang (2006), that constrained firms actually hold more cash than unconstrained. Our sample provides consistent evidence in this regard, as pre-investment (time t-1) cash holding levels for the average constrained firm are actually higher than those for the average unconstrained firm.

In the same vein, it could be put forth that constrained firms may already have reached their debt capacity and therefore have no choice but to go to the equity market. One way of attempting to control for this possibility is to examine debt levels before the investment period. All else equal, higher debt levels would be likely to result in a firm being closer to their debt capacity. However, it should be noted that Table 1 shows constrained firms, on average, have lower leverage levels than unconstrained firms. Also, we attempt to control for this factor by including leverage in the regression model.

As a more robust test of this issue, we segment the sample into firms with high and low leverage levels (defined as the top and bottom 20%) at time t-1 and run the models on the two subsamples independently. Results of these tests are presented in Table 4. We do not, for the sake of brevity, tabulate all results except the coefficients and standard errors relative to LARGEINV. The ancillary results, which are available upon request, are consistent with previous findings. If the results of Tables 2 and 3 are driven by firms hitting their debt capacity, the findings are less likely to hold in the subsample of low leverage firms. However, we find the opposite. Firms with large pre-investment levels of debt actually borrow more money and firms with low pre-investment levels of debt do not resort to more debt and still issue equity, presumably to partially fund large investment activity. Further, the finding that equity is a much more prevalent source of funding large investment activity in constrained firms is consistent in each subsample.[10]

In yet an additional effort to examine the possibility of debt capacity constraint, we conduct a test to see if the financing order is demand- or supply-driven. Large projects may pose too high a risk for lenders who know less about the investment opportunities undertaken than managers do, thereby limiting the size of debt extended to guard against massive defaults (Khieu, Mullineaux and Yi 2012). Almeida and Campello (2007) document that asset tangibility increases borrowing capability, which in turn results in more investments in pledgeable assets.

To examine this issue, we segment both constrained and unconstrained firms into those with low and high asset tangibility at time t-1, which is one year prior to large investment engagements. For the sake of brevity, we do not present these results in this text. They are, however, available upon request. Theory would predict that firms with particularly low tangibility borrow less, simply due to financial institutions' reluctance to lend funds in the absence of collateral from pledegable assets. In that case, we should observe an increase in the use of debt relative to other financing sources as asset tangibility increases for this group of firms. We again do not find evidence supporting this possible explanation for our primary

[10] It could also be the case that, rather than the debt capacity being strained, the presence of constraint renders the cost of debt too high to be viable as a funding source. As a rough estimate of this possibility, we compare interest expenses (as a percentage of total debt) at times t-1 and t+1 and find no evidence that debt costs increased more for constrained firms than unconstrained firms. We find no evidence to support the possibility that increased cost of debt results in the firm's equity preference.

findings. Firms with low asset tangibility actually use more debt than those with high asset tangibility, which again suggests the large amount of equity issuance is done as a result of choice rather necessity.

Collectively, such findings are inconsistent with the belief that firms are accepting equity funding because obtaining debt funding is overly burdensome. This runs counter to the traditional notion associated with the pecking order theory that constrained firms are forced to use equity financing.

Propensity to Spend

In this section, we analyze an alternative explanation for our findings by comparing firms' relative propensity to spend funding sources. In Table 1, we document that the equity proceeds are the largest of all the external financing sources for constrained firms financing large investments. In Tables 2 - 4, we confirm this result with multivariate analyses.

However, this still leaves an unresolved issue pertaining to the use of the funds. The results prior to this point only suggest constrained firms use equity financing for large investments. However, in actuality, all we can definitively conclude is a strong positive correlation between large investment activity and increased equity holdings. We cannot tell whether these firms issue new equity to simply time the market or to meet their large financing needs.

We thus examine this issue by investigating the relative speed that these raised funds exit the firms' balance sheets. If, for example, equity gets accumulated due to market timing, one would expect the funds to stay in the cash account longer than other funding sources (cash, debt, etc.) We test this conjecture by extending Almeida et al. (2004)'s baseline regression model by adding our variables indicating the newly raised capital: long-term debt, short-term debt and equity issues. We also control for a direct conversion of debt to equity without going through the cash account and any funding of net working capital. We measure the change in the cash holdings balance one period after the external funds are obtained. Our empirical specification is as follows:

$$\Delta CASH_{t+1} = \alpha + \beta_1 STDISS_t + \beta_2 LTDISS_t + \beta_3 EQTYISS_t + \beta_4 CASHFLOW_t + \beta_5 MB_t + \beta_6 SIZE_t + \beta_7 LEVERAGE_t + \beta_8 \Delta NWC_t + \beta_9 ACQUISITION_t + FIRM\ DUMMIES + YEAR\ DUMMIES + \epsilon_t. \quad (2)$$

A positive (negative) change in cash indicates an increase (decrease) in the cash account, where change is defined as cash balances at t+1 minus those at t, all divided by total assets. Therefore, if a certain fund type is used, there should be a negative relationship between the level of that asset type and the change in the cash account. In other words, if the firm is timing the market for the sake of obtaining funds at a discounted rate, one would not necessarily expect those funds to be immediately exited from the account.

Since our focus is on the method of financing large investments, this equation is fitted with only observations where LARGEINV is positive. We are interested in the relative magnitudes and directions of impact shown by β_1, β_2, β_3 and β_4. A positive coefficient estimate indicates the funds raised at time t are stocked in cash at time t+1 instead of being spent, and a negative sign indicates that they have been used (although not necessarily completely).[11]

The results in Table 5 show that equity issuances at t have a negative and significant relation with cash holdings at t+1 for constrained firms across all constraint criteria. The same is not true, however, for unconstrained firms. This suggests that constrained firms use their equity capital, whereas we cannot draw the same conclusion for unconstrained firms. McLean (2011) finds that firms issue shares and save the cash when costs are low to avoid issuances at times of high costs; however, our results suggest that firms are willing to forgo this benefit when large investment opportunities arise.[12]

Large Investment, Capital Sources under Constraint and Firm Value

Our evidence thus far indicates that financially constrained firms

[11] It is necessary to measure the financing and cash holdings one period apart to allow for any timing difference between the accounting transaction recording and the issuances since, using Compustat, we do not have the precise dates of the new financing obtained.

finance a large proportion of their large investments with equity issuances. They seem to do so by choice, despite traditional theories posing this method as the most expensive and less value-enhancing funding choice. Therefore, our hypothesis is that such activities will be met with disapproval by participants on the marketplace.

We base our model upon Dittmar and Mahrt-Smith (2007), who build upon the value models developed in Fama and French (1998). The market-to-book ratio is used as the proxy for firm value, with controls for earnings, interest, R&D expenditures and dividends on the right-hand side. The final model, including the variables of interest, has the following form:

$$\begin{aligned} MB_{t+1} = {} & \alpha + \beta_1 EARNINGS + \beta_2 EARNINGSLAG2 + \beta_3 EARNINGFLAG2 \\ & + \beta_4 ASSETSLAG2 + \beta_5 ASSETSFLAG2 + \beta_6 RD + \beta_7 RDLag2 \\ & + \beta_8 RDFLAG2 + \beta_9 INTEREST + \beta_{10} INTERESTLAG2 + \\ & \beta_{11} INTERESTFLAG2 + \beta_{12} DIVIDENDS + \beta_{13} DIVIDENDSLAG2 + \\ & \beta_{14} DIVIDENDSFLAG2 + \beta_{15} MBFLAG2 + \beta_{16} LIDUM + \beta_{17} STDISS + \\ & \beta_{18} LTDISS + \beta_{19} EQTYISS + \beta_{20} CHGCASH + \beta_{21} STDISS*LIDUM + \\ & \beta_{22} LTDISS*LIDUM + \beta_{23} EQTYISS*LIDUM + \beta_{24} CHGCASH*LIDUM + \\ & YEAR\ DUMMIES + \epsilon \end{aligned} \quad (3)$$

All base variables are at time t+1, where time t is the year of financing and investments. Thus, the two-year lag (LAG2) is the difference between times t+1 and t-1, while two-year forward (FLAG2) is the difference between times t-1 and t+3 for each applicable variable. EARNINGS, INTEREST, RD and DIVIDENDS are measured as changes in values from t to t+1. The variables of primary interest are the interaction terms. LIDUM is a binary variable equal to 1 if the observation has positive excess capital expenditures, and zero otherwise. Thus, the interaction variables are designed to capture the marginal effect of external funds on firm value when they are used to

[12] It should be noted the negative coefficient on cash flows (significant for constrained loans only) do not necessarily contradict Almeida et al. (2004)'s findings that constrained firms have a high propensity to save cash out of cash flows. Our cash holdings are constructed one year after the respective cash flow. When we replicate Almeida et al. with our data and with changes in cash holdings as the dependent variable at time t instead of t+1, we observe a positive coefficient on internal cash flows (results not tabulated).

finance large investments.

We tabulate the results for the variables of interest in Table 6 and omit the estimates of control variables for brevity. Interestingly, we find little relation between large investment activity and firm value. Previous studies have identified a positive reaction to normal investment activity (e.g., Trueman 1986) but a negative relation to abnormally large investments. Our findings provide neither support nor contradiction to these studies.

The positive coefficient on EQTYISS suggests that issuances positively influence firm value, a finding seemingly contradictory to traditional findings. However, it should be noted that our model includes interaction terms. Therefore, the stand-alone variable of equity issues cannot be interpreted in the same way as in a model absent interaction effects. In addition, the positive sign on EQTYISS exists within constraint groups only and is, in our model, the predicted impact of equity issues on firm value when firms do not overinvest (i.e., when the dummy variable, LIDUM, takes the value of zero). Note that Fu (2010) and Titman et al. (2004) find that only the overinvesting firms exhibit a negative impact of SEO's on firm values.

Now, when the interaction effects between financing choices and large investments enter the model, equity financing for large investments in constrained firms is value-decreasing, as evidenced by the negative and statistically significant coefficient estimates on the interaction (EQTYISS*LIDUM). The coefficients on other interactions are either insignificant or inconsistent across the constraint groupings.[13] Funding large investment activity with debt or internal funds does not appear to have an influence on firm value. These findings are partially consistent with Titman et al. (2009), who document that overinvesting firms drive the negative relation between equity issuances and subsequent stock returns. However, our results differ from theirs in that not all overinvesting firms suffer from the negative stock price reaction. Rather, we find the result to be specific to firms that are financially constrained and use equity financing as a primary funding source for large investment activity.

[13] To alleviate a possible concern that including interaction terms in the regressions may cause collinearity among the related variables which could bias their respective coefficient estimates, we also examine model specifications excluding the interaction terms. Although we do not present the results, the signs and magnitudes of the related stand-alone variables are consistent with those reported in Table 6.

Conclusion

We examine the choice of financing – debt, equity and internal funds – abnormally large investments by the U.S. manufacturing firms over the period 1984-2009. We focus on the influence of constraint and abnormally large investment, which adds a unique angle to the traditional capital structure research. We find that equity is the primary financing source for abnormally large investments by financially constrained firms and find evidence suggesting this is by choice rather than market restriction. This runs counter to the traditional pecking theory, which predicts firms prefer internal financing, followed by debt, and equity as a last resort.

Unconstrained firms in our sample finance abnormally large investments in a manner much more consistent with traditional theory. These actions run counter to those generally considered value-enhancing, since equity issuance, particularly in the event of financial distress, often comes at significant market cost. We further confirm the prediction that such actions decrease firm value. Finally, due to data limitation, our work does not consider private loans and hybrid debt types, nor does it investigate such financing behavior of private firms. Such an analysis is left to future research.

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TABLE 1
Summary Statistics

This table provides summary statistics for the main variables employed in the analysis over the sample period of 1984-2009 for all U.S. firms in the manufacturing industry (SICs 2000-3999). Data are secured from the COMPUSTAT database. Panel A reports mean values for the whole sample. Panel B reports means conditional on the fact that the firm years must have positive abnormally large investments. Four financial constrained criteria - firm size, dividend payout policy, bond ratings and Whited-Wu (WW) index - are used in identifying constrained and unconstrained subsamples. Firms in the first quintile of the criteria are constrained (C), and firms in the fifth quintile unconstrained (UC). LARGEINV is the excess of actual investments over two times the past three-year average of industry investment, where investments are capital expenditures, net of depreciation, scaled by total assets, and industry is defined according to the 2-digit SIC codes. LIDUM is a binary variable if LARGEINV is positive and zero otherwise. STDISS, short-term debt issues, is defined as changes in debt in current liabilities from t-1 to t. LTDISS, long-term debt issues, is defined as changes in long-term debt from t-1 to t. EQTYISS, net equity issues, is defined as changes in common equity from t-1 to t minus changes in retained earnings from t-1 to t. CHGCASH, changes in cash holdings, is defined as changes in cash from t-1 to t plus short-term investments. CHGNWC, changes in net working capital, is changes in current assets net of cash minus changes in current liabilities net of debt in current liabilities from t-1 to t. SHAREREP, share repurchases, consists of repurchases of both common and preferred shares relative to total assets. INCOME, income available to common and preferred, is defined as changes in retained earnings from t-1 to t plus dividends. DIV is total common and preferred dividends paid. All the variables are scaled by total assets. SIZE is the natural logarithm of total assets. MB, market-to-book, is calculated as the ratio of total assets plus market value of equity minus the total of book value of equity to total assets. EARNINGS is earnings before interest, taxes, depreciation and amortization scaled by total assets. LEVERAGE is the ratio of total long-term debt to assets. All data items used to calculate variables shown in the table are winsorized at the first and ninety-ninth percentiles.

Panel A: Total Sample

Variables	Total Sample	Firm Size			Dividend Payout		
		(C)	(UC)	p-value	(C)	(UC)	p-value
LIDUM	.123	.138	.079	.000	.130	.091	.000
STDISS	.006	.019	.001	.000	.008	.001	.000
LTDISS	.008	.002	.016	.000	.006	.013	.000
EQTYISS	.217	.747	.018	.000	.298	.007	.000
CHGCASH	.002	-.053	.010	.000	-.001	.005	.018
CHGNWC	-.019	-.111	-.002	.000	-.032	-.044	.000
SHAREREP	.010	.004	.018	.000	.007	.017	.000
INCOME	-.195	-.847	.027	.000	-.297	.056	.000
DIV	.010	.009	.017	.000	.004	.032	.000
SIZE	4.435	1.008	8.072	.000	3.682	6.536	.000
MB	2.589	5.488	1.712	.000	2.960	1.639	.000
EARNINGS	-.081	-.653	.138	.000	-.297	.154	.000
LEVERAGE	.172	.158	.229	.000	.170	.172	.272

TABLE 1 *(continued)*
Summary Statistics

Panel A: Total Sample							
Variables	**Total Sample**	**Bond Ratings**			**Whited-Wu Index**		
		(C)	(UC)	p-value	(C)	(UC)	p-value
LIDUM	.123	.104	.069	.000	.097	.100	.074
STDISS	.006	.010	.003	.000	.007	.003	.094
LTDISS	.008	-.025	.021	.000	-.003	.018	.000
EQTYISS	.217	.432	.019	.000	.599	.040	.000
CHGCASH	.002	-.008	.006	.000	-.056	.014	.000
CHGNWC	-.019	-.057	-.003	.000	-.101	-.001	.000
SHAREREP	.010	.012	.017	.000	.004	.018	.000
INCOME	-.195	-.437	.013	.000	-.707	.023	.000
DIV	.010	.011	.016	.000	.007	.020	.000
SIZE	4.435	2.968	7.677	.000	1.558	7.846	.000
MB	2.589	4.142	1.613	.000	4.045	1.895	.000
EARNINGS	-.081	-.340	.135	.000	-.513	.127	.000
LEVERAGE	.172	.000	.309	.000	.163	.199	.000

TABLE 1 *(continued)*

Summary Statistics

Panel B: Firm Years with Abnormally Large Investments Only							
Variables	Total Sample	Firm Size			Dividend Payout		
STDISS	.019	.019	.009	.145	.008	.012	.292
LTDISS	.041	.002	.045	.000	.006	.037	.000
EQTYISS	.266	.747	.028	.000	.298	.014	.000
CHGCASH	-.003	-.053	.007	.000	-.001	-.008	.315
CHGNWC	-.015	-.111	-.004	.000	-.032	-.004	.013
SHAREREP	.009	.004	.016	.000	.007	.012	.000
INCOME	-.182	-.847	.056	.000	-.297	.070	.000
DIV	.009	.009	.018	.000	.004	.033	.000
SIZE	4.018	1.008	7.763	.000	3.682	6.061	.000
MB	3.196	5.488	2.025	.000	2.960	1.782	.000
EARNINGS	-.097	-.653	.165	.000	-.176	.172	.000
LEVERAGE	.160	.158	.202	.000	.170	.166	.500

TABLE 1 *(continued)*

Summary Statistics

Panel B: Firm Years with Abnormally Large Investments Only							
Variables	Total Sample	Bond Ratings			Whited-Wu Index		
STDISS	.019	.010	.009	.872	.007	.017	.099
LTDISS	.041	-.025	.051	.000	-.003	.040	.000
EQTYISS	.266	.432	.027	.000	.599	.079	.000
CHGCASH	-.003	-.008	.004	.313	-.056	.010	.000
CHGNWC	-.015	-.057	-.005	.002	-.101	-.019	.000
SHAREREP	.009	.012	.019	.000	.004	.016	.000
INCOME	-.182	-.437	.040	.000	-.707	.024	.000
DIV	.009	.011	.018	.000	.007	.022	.000
SIZE	4.018	2.968	7.415	.000	1.558	7.087	.000
MB	3.196	4.142	1.891	.000	4.045	2.402	.000
EARNINGS	-.097	-.340	.159	.000	-.516	.128	.000
LEVERAGE	.160	.000	.273	.000	.163	.176	.090

TABLE 2

The Financing of Abnormally Large Capital Expenditures

This table presents SUR regression estimates using firm size to identify constrained (bottom 20%) and unconstrained (top 20%) subsamples. Results from other constraint criteria are not reported to save space, and t-statistics are in parentheses. Year dummies are included in all regressions but not tabulated. See Table 1 for variable definitions.
***Significant at the 1% level
**Significant at the 5% level
*Significant at the 10% level

Panel A. Firm size – Constrained					
	(1)	(2)	(3)	(4)	(5)
Variables	CHGCASH	STDISS	LTDISS	EQTYISS	SHAREREP
CHGNWC$_{t-1, t}$	-0.248***	-0.102***	0.268***	0.416***	-0.170***
	(-48.95)	(-41.37)	(95.17)	(64.82)	(-125.75)
LARGEINV$_{t}$	-0.111**	0.130***	0.234***	0.538***	0.013
	(-2.52)	(6.04)	(9.55)	(9.62)	(1.12)
INCOME$_{t}$	0.156***	0.006***	-0.037***	-0.791***	0.022***
	(53.35)	(4.30)	(-22.94)	(-213.01)	(27.60)
DIV$_{t}$	0.230***	-0.369***	-0.295***	2.196***	0.302***
	(2.65)	(-8.71)	(-6.11)	(19.93)	(12.97)
SIZE$_{t-1}$	-0.032***	-0.011***	-0.021***	-0.078***	0.007***
	(-8.08)	(-4.56)	(-7.95)	(-14.31)	(4.01)
MB$_{t-1}$	0.006***	-0.000	-0.002***	0.007***	0.001***
	(9.68)	(-0.18)	(-3.70)	(7.57)	(3.31)
EARNINGS$_{t-1}$	-0.047***	-0.014***	-0.017***	-0.132***	0.007***
	(-8.98)	(-4.49)	(-5.10)	(-18.50)	(3.34)
LEVERAGE$_{t-1}$	0.023*	0.094***	-0.143***	0.360***	-0.051***
	(1.76)	(11.64)	(-16.41)	(19.63)	(-9.07)
CONSTANT	-0.006	-0.007	0.060***	-0.051	0.008
	(-0.21)	(-0.48)	(3.69)	(-1.37)	(1.07)
Observations	10,360	10,360	10,360	10,360	10,360

TABLE 2 *(continued)*

The Financing of Abnormally Large Capital Expenditures

Panel B. Firm size – Unconstrained					
	(1)	(2)	(3)	(4)	(5)
Variables	CHGCASH	STDISS	LTDISS	EQTYISS	SHAREREP
$CHGNWC_{t-1, t}$	-0.266***	-0.281***	0.553***	0.298***	-0.164***
	(-59.76)	(-155.07)	(108.02)	(63.82)	(-69.79)
$LARGEINV_t$	-0.211***	0.107***	0.368***	0.212***	-0.102***
	(-12.52)	(15.53)	(18.91)	(11.91)	(-11.39)
$INCOME_t$	0.202***	-0.038***	-0.217***	-0.472***	0.071***
	(38.97)	(-17.95)	(-36.33)	(-86.49)	(25.86)
DIV_t	-0.605***	0.053***	0.237***	0.151***	0.045***
	(-21.23)	(4.53)	(7.22)	(5.04)	(2.99)
$SIZE_{t-1}$	-0.004***	-0.001***	-0.009***	-0.008***	-0.001*
	(-6.74)	(-3.88)	(-11.41)	(-11.15)	(-1.67)
MB_{t-1}	0.007***	0.001***	0.004***	0.013***	0.004***
	(13.01)	(5.21)	(5.65)	(22.27)	(13.27)
$EARNINGS_{t-1}$	0.011**	0.017***	0.057***	0.012*	0.025***
	(2.13)	(5.96)	(8.20)	(1.90)	(7.61)
$LEVERAGE_{t-1}$	-0.041***	0.016***	-0.046***	0.043***	-0.049***
	(-9.30)	(6.70)	(-7.78)	(8.23)	(-17.71)
CONSTANT	0.090***	-0.019***	0.056***	0.078***	0.025***
	(6.74)	(-3.39)	(3.61)	(5.53)	(3.48)
Observations	12,057	12,057	12,057	12,057	12,057

TABLE 3

Capital Sources for Large Investments by Constraint Type

This table reports coefficient estimates from the LARGEINV variable from the model shown in Table 2. Values are put into the nearest whole percentage to aid in understanding. The percentages, due to the construction of the models, add to 100% for each constraint criterion and represent the changes in the capital sources over the respective period. ^ represents an insignificant coefficient. All other coefficients are significant at least at the 10% level.

	(1)	(2)	(3)	(4)	(5)
	CHGCASH	STDISS	LTDISS	EQTYISS	SHAREREP
Firm Size					
Constrained	11%	13%	23%	54%	-1%^
Unconstrained	21%	11%	37%	21%	10%
Dividend					
Constrained	4%	10%	27%	62%	-3%
Unconstrained	25%	11%	38%	17%	9%
Bond Ratings					
Constrained	3%^	9%	5%	86%	-3%
Unconstrained	22%	10%	39%	22%	8%
Whited-Wu					
Constrained	10%	12%	25%	55%	-2%^
Unconstrained	19%	7%	32%	34%	8%
Average Constrained	7%	11%	20%	64%	-2%
Average Unconstrained	22%	10%	37%	24%	9%

TABLE 4

Capital Source Selection for High and Low Levels of Leverage Firms

This table presents coefficient estimates and corresponding t-statistics for the LARGEINV variable only, using the model from Table 2. The sample is further segmented into those with above and below median levels of leverage at time t-1, where time t is the period of large investment.
***Significant at the 1% level
**Significant at the 5% level
*Significant at the 10% level

Low Leverage					
	(1)	(2)	(3)	(4)	(5)
Variables	CHGCASH	STDISS	LTDISS	EQTYISS	SHAREREP
Firm Size					
Constrained	0.094	0.107***	0.132***	0.859***	0.005
	(1.03)	(2.73)	(4.06)	(7.43)	(0.21)
Unconstrained	-0.487***	0.154***	0.165	0.040	-0.154**
	(-3.03)	(2.68)	(1.60)	(0.25)	(-2.15)
Dividend					
Constrained	0.121**	0.086***	0.121***	0.938***	0.023*
	(2.22)	(4.29)	(6.35)	(14.27)	(1.95)
Unconstrained	-0.492***	0.143***	0.099***	0.205***	-0.060**
	(-6.76)	(6.17)	(3.15)	(3.28)	(-2.10)
Bond ratings					
Constrained	0.084**	0.080***	0.124***	0.909***	0.029***
	(2.16)	(6.00)	(8.96)	(19.81)	(3.48)
Unconstrained	-0.408**	-0.046	0.376*	0.067	-0.196*
	(-2.25)	(-0.36)	(1.85)	(0.32)	(-1.79)
Whited-Wu					
Constrained	0.177*	0.063*	0.106***	1.041***	0.033
	(1.88)	(1.72)	(3.06)	(8.82)	(1.54)
Unconstrained	0.001	0.031	0.233***	0.796***	0.059
	(0.00)	(0.60)	(3.00)	(3.39)	(1.20)

TABLE 4 *(continued)*

Capital Source Selection for High and Low Levels of Leverage Firms

High Leverage					
	(6)	(7)	(8)	(9)	(10)
Variables	CHGCASH	STDISS	LTDISS	EQTYISS	SHAREREP
Firm Size					
Constrained	0.010	0.124**	0.616***	0.228**	-0.041
	(0.11)	(2.49)	(7.72)	(2.12)	(-1.51)
Unconstrained	-0.056*	0.071***	0.707***	0.136***	-0.030*
	(-1.80)	(5.53)	(15.44)	(4.40)	(-1.82)
Dividend					
Constrained	0.021	0.119***	0.682***	0.221***	0.001
	(0.64)	(7.17)	(20.05)	(5.74)	(0.09)
Unconstrained	-0.064*	0.054***	0.657***	0.151***	-0.073***
	(-1.91)	(3.39)	(12.41)	(3.84)	(-3.25)
Bond ratings					
Constrained	0.030	0.107***	0.359***	0.575***	0.012*
	(1.15)	(10.26)	(23.05)	(18.21)	(1.81)
Unconstrained	-0.068**	0.083***	0.643***	0.190***	-0.015
	(-2.48)	(8.36)	(18.68)	(7.65)	(-1.26)
Whited-Wu					
Constrained	-0.040	0.145***	0.612***	0.177*	-0.026
	(-0.50)	(3.42)	(8.26)	(1.81)	(-1.08)
Unconstrained	-0.018	0.054***	0.659***	0.223***	-0.045**
	(-0.51)	(3.81)	(12.58)	(5.59)	(-2.39)

TABLE 5

The Link between Financing Sources and Propensity to Spend

This table presents fixed-effects regression results using firm size in identifying constrained (C) and unconstrained (UC) subsamples. Results from other constraint criteria are not reported to save space. The dependent variable, CHGCASH, changes in cash holdings, is defined as changes in cash plus short-term investments from t to t+1. INVEST is capital expenditures. CASHFLOW is calculated as earnings before extraordinary items plus depreciation and amortization minus total dividends paid to common and preferred shareholders, all at time t. ACQUISITION is defined as acquisition expenses. All variables except SIZE are scaled by total assets at time t. Year dummies are included in all regressions but not tabulated. See Table 1 for detailed definitions of all other variables.

***Significant at the 1% level

**Significant at the 5% level

*Significant at the 10% level

	Firm Size		Dividends		Bond Ratings		Whited-Wu	
Variables	(C)	(UC)	(C)	(UC)	(C)	(UC)	(C)	(UC)
$STDISS_{t-1,t}$	0.375**	0.186	0.295***	0.426***	0.032	0.513**	-0.218	0.170
	(2.14)	(0.95)	(2.89)	(3.69)	(0.79)	(2.31)	(-1.26)	(1.45)
$LTDISS_{t-1,t}$	-0.036	-0.141**	-0.020	-0.067	0.002	-0.206***	0.099	-0.063
	(-0.46)	(-2.14)	(-0.43)	(-0.88)	(0.07)	(-2.92)	(1.12)	(-1.33)
$EQTYISS_{t-1,t}$	-0.086**	-0.065	-0.074***	-0.123	-0.053***	0.029	-0.166***	-0.082**
	(-2.36)	(-0.74)	(-3.27)	(-1.21)	(-5.34)	(0.19)	(-3.93)	(-2.05)
$INVEST_t$	-0.002**	0.302***	-0.002***	0.185**	0.000	0.082	-0.002**	0.265***
	(-2.47)	(3.29)	(-5.44)	(2.32)	(0.15)	(0.61)	(-2.11)	(3.16)
MB_t	0.017***	0.010**	0.015***	0.005	0.017***	0.006	0.018***	0.002
	(3.39)	(2.00)	(5.31)	(0.91)	(12.12)	(0.65)	(3.14)	(0.70)
$CASHFLOW_t$	-0.094**	-0.077	-0.066**	-0.074	-0.039***	-0.028	-0.097**	-0.095**
	(-2.21)	(-0.84)	(-2.53)	(-0.51)	(-3.59)	(-0.32)	(-2.01)	(-2.12)
$SIZE_t$	-0.070*	-0.014	-0.066***	-0.028**	-0.058***	-0.013	-0.116***	0.002
	(-1.78)	(-0.97)	(-5.40)	(-2.26)	(-9.74)	(-0.62)	(-3.37)	(0.20)
$LEVERAGE_t$	0.234**	-0.014	0.075	0.061*	0.112***	-0.032	0.163	-0.030
	(2.40)	(-0.17)	(1.39)	(1.69)	(3.15)	(-0.41)	(1.55)	(-0.87)
$CHGNWC_{t-1,t}$	0.087	0.149	0.063	0.270***	-0.028*	0.321***	-0.208***	0.161**
	(1.18)	(1.45)	(1.42)	(3.89)	(-1.66)	(2.78)	(-2.98)	(2.54)
$ACQUISITION_t$	0.183	0.040	0.038	0.027	0.161***	0.014	0.566	0.061
	(0.50)	(0.52)	(0.47)	(0.25)	(3.05)	(0.17)	(1.60)	(1.00)
CONSTANT	-0.166	0.070	0.104*	0.049	0.018	0.072	-0.040	-0.003
	(-1.42)	(0.70)	(1.94)	(0.59)	(0.55)	(0.56)	(-0.36)	(-0.04)
Observations	1,196	934	5,209	1,077	18,227	658	1,115	1,010
R-squared	0.233	0.144	0.134	0.143	0.105	0.206	0.318	0.115

TABLE 6

Large Investments, Capital Sources under Constraint and Firm Value

This table reports fixed-effects regression results based on Eq. (3) using firm size to identify constrained (C) and unconstrained (UC) subsamples. Other constraint criteria are not reported to save space. All base variables are entered at time t+1, where time t is the year of financing and investments. LIDUM is a binary variable with 1 if LARGEINV is positive and zero otherwise. Only the variables of interest – the interaction terms and their components – are tabulated. Year dummies are included but not reported. See Table 1 for detailed variable constructions.

***Significant at the 1% level
**Significant at the 5% level
*Significant at the 10% level

	Firm Size		Dividends	
	(C)	(UC)	(C)	(UC)
LIDUM	0.496	0.085	0.318	0.029
	(0.62)	(1.26)	(1.33)	(0.36)
STDISS	1.865	-0.144	2.174**	0.064
	(1.20)	(-0.68)	(2.35)	(0.34)
LTDISS	2.850	-0.028	2.640***	-0.485*
	(1.60)	(-0.13)	(3.42)	(-1.75)
EQTYISS	3.752***	0.518	3.843***	-0.099
	(7.37)	(1.51)	(9.73)	(-0.20)
CHGCASH	0.509	2.073***	-0.047	1.059***
	(0.44)	(5.75)	(-0.07)	(3.81)
SHAREREP	-3.216	2.622***	-3.163	1.856***
	(-0.26)	(3.88)	(-1.21)	(3.37)
ΔCASH*LIDUM	5.868	0.505	4.499***	4.937
	(1.41)	(0.54)	(2.84)	(1.55)
STDISS*LIDUM	-7.869	0.009	-3.399	-3.363*
	(-0.61)	(0.01)	(-0.77)	(-1.74)
LTDISS*LIDUM	4.976	0.478	-0.449	-1.849*
	(0.67)	(0.69)	(-0.21)	(-1.75)
EQTYISS*LIDUM	-5.804**	-1.680	-3.820***	17.408*
	(-2.43)	(-1.05)	(-3.09)	(1.83)
SHAREREP*LIDUM	-43.386	1.705	-13.073	7.602
	(-0.61)	(0.37)	(-0.82)	(1.39)
Constant	10.842***	1.563***	5.696***	1.641***
	(5.00)	(8.41)	(6.26)	(10.48)
Observations	6,418	10,258	28,217	11,399
R-squared	0.758	0.752	0.735	0.785

TABLE 6 *(continued)*

Large Investments, Capital Sources under Constraint and Firm Value

	Bond Ratings		Whited-Wu	
	(C)	(UC)	(C)	(UC)
LIDUM	0.386**	0.144*	0.447	-0.103
	(2.22)	(1.95)	(0.52)	(-0.85)
STDISS	2.149**	-0.172	1.150	-0.654**
	(2.43)	(-0.88)	(0.79)	(-2.09)
LTDISS	2.552***	0.077	1.560	0.102
	(3.50)	(0.45)	(1.03)	(0.33)
EQTYISS	3.830***	1.054***	3.637***	1.667**
	(9.96)	(2.73)	(6.24)	(2.29)
CHGCASH	-0.071	2.224***	-0.756	3.144***
	(-0.11)	(4.35)	(-0.68)	(3.03)
SHAREREP	-1.344	3.251***	-9.673	3.715***
	(-0.75)	(5.26)	(-0.89)	(3.85)
ΔCASH*LIDUM	4.741***	0.672	4.673	-0.521
	(3.14)	(0.57)	(1.18)	(-0.15)
STDISS*LIDUM	-3.770	2.169	-4.566	0.440
	(-1.08)	(1.15)	(-0.37)	(0.28)
LTDISS*LIDUM	-0.599	-0.800	6.936	-0.581
	(-0.34)	(-0.94)	(0.91)	(-0.65)
EQTYISS*LIDUM	-3.739***	-2.435	-3.619*	3.722
	(-3.20)	(-1.19)	(-1.71)	(0.60)
SHAREREP*LIDUM	-14.471	-1.098	-79.687	9.766*
	(-1.43)	(-0.23)	(-0.92)	(1.75)
Constant	4.816***	1.613***	8.186***	1.716***
	(8.20)	(13.23)	(5.43)	(10.13)
Observations	35,202	8,543	6,744	9,901
R-squared	0.738	0.732	0.736	0.931