# Tapping into Financial Synergies: Alleviating Financial Constraints Through Acquisitions[*]

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This version: October, 2016

### Abstract

The paper examines whether financially constrained firms are able to use acquisitions to ease their constraints. The results show that acquisitions do ease financing constraints for constrained acquirers. Relative to unconstrained acquires, financially constrained firms are more likely to use undervalued equity to fund acquisitions and to target unconstrained and more liquid firms. Using a propensity score matched sample in a difference-in-difference framework, the results show that constrained acquirers become less constrained post-acquisition and relative to matched non-acquiring firms. This improvement is more pronounced for diversifying acquisitions and constrained firms that acquire rather than issue equity and retain the proceeds. Following acquisition, constrained acquirers raise more debt and increase investments, consistent with experiencing reductions in financing constraints relative to matched non-acquirers. These improvements are not seen for unconstrained acquirers. Finally, the familiar diversification discount is non- existent for financially constrained acquirers.

*Keywords:* Financing Constraints, Firm Structure, Diversification, Mergers & Acquisitions

*JEL classification:* G30, G32, G34, L25

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# 1    Introduction

*"The Company is continually evaluating business opportunities such as joint ventures and mergers and acquisitions with the objective of creating additional cash flow to sustain the corporation and provide a future source of funds for growth."*

\- Canyon Resource Corp, September 2005 Quarterly Report

Recent shocks to capital markets driven by the financial crisis affected the financial flexibility of firms by restricting access to external capital, highlighting the need for better understanding of how firms respond to financing constraints. Based on Keynes (1936), firms are concerned about shocks to external capital as these shocks may impact real investments. Therefore, in a world with market frictions, firms that are limited in obtaining external financing for investments may pass up good investments to the detriment of firm value. These firms that have limited or restricted access to the external capital markets are considered to face financing constraints. Previous empirical studies of financing constraints have focused primarily on the measurement of financing constraints and the cross-sectional differences between financially constrained and unconstrained firms. Generally, as these papers have taken the level of financing constraints of a firm as given, there are few studies on how firms can manage and alleviate their own constraints.

As indicated in the above quote from the September 2005 quarterly report of Canyon Resource Corporation, one channel through which firms could potentially alleviate their own financing constraints is mergers and acquisitions. Lewellen (1971) discusses the advantage of mergers based on financial, or capital structure, synergies and Chatterjee (1986) finds that mergers based on financial synergies generate more value than those based on operational synergies.[1] This paper examines the financial usefulness of mergers in alleviating constraints by asking whether acquisitions can ease financing constraints for the acquirer. Indeed, Lewellen (1971) states that for financial benefits of mergers to exist there must either be a market imperfection or a firm with suboptimal capital structure (p. 525). As both conditions exist with financially constrained firms, this suggests that firm structure and acquisitions is useful for investigating the alleviation of financing constraints.

There is a natural time series component to firm-level financing constraints that is driven by

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[1]According to Lewellen (1971), firms may benefit from a coinsurance effect by acquiring business segments that allows segments with less correlated cash flows to insure each other.

changes in the macro-economy which impacts the availability of external capital. Changes to the supply of capital may affect firm financing constraints through the willingness of markets to fund particular industries or types of firms (Stein, 1997; Opler, Pinkowitz, Stulz, and Williamson, 1999; and Campello, 2002). Moreover, time variation in firm financing constraints could, in part, be driven by a firm's ability to manage its own financing constraints along with its own cash flow sensitivities. With lack of access to external capital, firms may be restricted in their first-best source of financing and, as a result, from their first-best level of investment (Fazzari, Hubbard, and Petersen, 1988). That is, they either forego positive NPV projects or engage in disproportionately costly activities to fund these projects.

The adverse impact of firms facing financing constraints is even more severe during financial crises, when it has been shown that firms made deep cuts in investment, burned through more cash, drew more credit from banks, and engaged in more asset sales (Campello, Graham, and Harvey, 2010; Campello, Giambona, Graham, and Harvey, 2011; and Ivashina and Scharfstein, 2010). Easing financing constraints and improving access to external capital markets allow firms to invest in valuable projects even during times of otherwise rationed external capital. This paper goes beyond the time series changes in financing constraints and specifically investigates acquisitions as a potential means of alleviating financing constraints for the acquirer.

It may seem counterintuitive that a constrained firm can acquire and the initial response may be that the firm is unconstrained. Here, two points should be emphasized. First, our definition and measures for financing constraint rely on the firm's ability to access external financing, not necessarily that firms do not have funds to use or do not make investments. Indeed, one main implication from Almeida, Campello, and Weisbach (2004) is the firm's propensity or sensitivity to save cash from cash flows when expecting to be constrained and unable to access external markets. Second, our measures for financing constraints are continuous, allowing the degrees of being financially constrained to be measured rather than an absolute binary interpretation. While there exist firms in the tails of the distribution that are unambiguously constrained or unconstrained, most firms fall into the more or less constrained spectrum. That is, the *expectation* of being constrained may be sufficient to motivate firms into precautionary and preventative behavior.

Given that firms may take actions to avoid becoming more constrained, it is worthwhile to

investigate whether acquisitions alleviate financing constraints for the acquirer itself. Recent work by Erel, Jang, and Weisbach (2015) show that constrained targets improve their financing constraint status when acquired by an unconstrained acquirer. This study examines whether constrained acquirers themselves are able to improve their financing constraint status through mergers and acquisitions. Take, for example, the case of the financially constrained drugstore.com that acquired Salu, Inc. Though a small private company, Salu, Inc. enjoyed 95 percent revenue growth prior to the acquisition, with net income larger in magnitude than that of its much larger acquirer. Interestingly, the two companies have no plans to merge operations or locations, suggesting a financial rather than operational incentive to merge for drugstore.com.[2]

To examine the overall question of whether acquisitions could affect the degree of financing constraints, the paper first studies the persistence of constraints and the relation between firm structure and financing constraint status. The results confirm that financing constraint status changes across time, on average, taking between four to eight quarters. This finding is supported by Erel, Julio, Kim, and Weisbach (2012) and McLean and Zhao (2014) who show that the raising of external capital changes over the business cycle. Comparing financing constraints in single-segment firms against constraints in diversified firms, the results indicate that diversified firms are less constrained than single-segment firms, which is consistent with Dimitrov and Tice (2006). Additionally, among diversified firms, those that are more concentrated in the main industry face more financing constraints than those that are less concentrated. The implication of this evidence is that acquisitions are a potential channel through which financing constraints are alleviated.

The paper then investigates the impact of acquisitions on financing constraint status using merger and acquisition events. As a sensibility check, constrained firms should be more likely to use undervalued equity due to the lack of cheaper financing. This is supported by the analysis and suggests that acquisitions by constrained acquirers are driven by financing constraints, and not market timing. Furthermore, the results show that constrained acquirers are more likely to target firms that are less constrained, have higher cash flows, and have higher cash ratios than themselves. The results also suggest that focused constrained firms are more likely to make diversifying acquisitions than focused unconstrained acquirers.

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[2]http://www.bizjournals.com/sacramento/stories/2009/12/28/daily6.html

Next, the study examines the pre- and post- acquisition level of financing constraints in acquiring firms. We perform a propensity score match to isolate actual acquirers and potential acquirers based on the determinants of being an acquirer. These are a set of characteristics, including financing constraints, that predict the likelihood of being an acquirer. The propensity score matching procedure and related algorithms have been used in prior literature to identify control groups for testing a treatment effect (e.g., Aggarwal, Erel, Stulz, and Williamson, 2009; Almeida, Campello, Laranjeira, and Weisbenner, 2011; and Bartram, Brown, and Stulz, 2012). Specifically, the treatment group is comprised of firms actually making an acquisition and the control group is comprised of firms with similar characteristics as the actual acquirers, but did not undergo an acquisition.

The results show that acquirers constrained one year prior to acquisition realize a statistically significant improvement in financing constraints post-acquisition. This reduction in constraints is significantly greater than that experienced by the matched, non-acquiring, constrained firms. In contrast, there is an increase in financing constraints for unconstrained acquirers relative to their matched, unconstrained non-acquirers following the acquisition. These results are robust to explicitly controlling for the size of the target, as size is an important determinant of financial constraints, and through use of a placebo test using withdrawn acquisitions. The reduction in constraints are greater for acquiring firms than for matched firms that do a seasoned equity offering (SEO) and keep the proceeds. Furthermore, the improvement in constraints for constrained acquirers over their matched, constrained non-acquirers are more pronounced for diversifying acquisitions than for non-diversifying acquisitions, consistent with a coinsurance effect (Lewellen, 1971). Overall, the findings support the idea that acquisitions can alleviate financing constraints for constrained acquirers.

If financing constraints are alleviated post-acquisition, there should be changes reflected in corporate decision making along at least three dimensions: use of external capital, investment activity, and managerial view of internal liquidity. The alleviation of financing constraints through acquisitions should lead to increased use of external capital in the post-acquisition period. We examine the potential use of external capital by the merged firm in the post-acquisition period through external debt markets. Using debt issuance information, the results show that constrained

acquirers issue more debt post-acquisition relative to matched, constrained non-acquirers, while there is evidence of a decrease in debt issuance for unconstrained acquirers relative to unconstrained non-acquirers. The increase in external debt is robust to using increases in long-term debt issuances on the statement of cash flow or directly measuring new debt issuances.

Additionally, constrained firms that loosen constraints may increase investment as they become better able to fund valuable projects. The results show that constrained acquirers see increases in investments post-acquisition relative to matched constrained non-acquirers, while, again, the opposite is true for unconstrained acquirers relative to unconstrained non-acquirers. These findings support the idea that acquisitions lead to real improvements in financing constraints for pre-acquisition constrained firms relative to constrained, non-acquiring firms and unconstrained acquiring firms, resulting in improved ability to finance real investments.

To investigate the managerial view of a firm's liquidity and constraints, we examine firm cash to cash flow sensitivity, developed by Almeida, Campello, and Weisbach (2004). Their paper argues that managers who believe the firm will be more constrained in the future will save more cash out of the firm's cash flow in order to fund future investment while those who believe the firm will be less constrained in the future will have lower cash to cash flow sensitivities. Suggestive of loosening financing constraints, we observe a reduction in the cash to cash flow sensitivity for constrained firms from the pre to post acquisition period.

Finally, if acquisitions by constrained firms alleviate financing constraints and lead to increases in real investment, then these improvements should translate into increased firm value. As such, we examine investor reaction to these acquisitions and find that constrained acquirers realize larger abnormal returns in the $-1/+1$ days around acquisition announcement than unconstrained acquirers. In addition, the diversification discount - in which mergers between acquirers and targets in different industries see a drop in returns following announcement - exists for unconstrained firms, but does not exist for constrained firms. This suggests that diversification offers benefits for alleviating financing constraints that are valued by investors.

The paper adds to the literature on acquisitions and financing constraints in several areas. There is a link between firm structure and financing constraints in that changing firm structure could ease constraints. Stein (1997) argues that diversified firms that are financially constrained in their main

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industry may have business segments in alternative industries that are unconstrained, allowing them to access funds through the unconstrained channels which is supported by the findings in Campello (2002) and Hubbard and Palia (1999). Therefore, diversified firms should be less constrained than focused firms (e.g., Lewellen, 1971; Duchin, 2010; and Hann, Ogneva, and Ozbas, 2013) and is particularly important during crises as shown in Jang (2016), Kuppuswamy and Villalonga (2015), and Dimitrov and Tice (2006).

The paper is the first to our knowledge to show that firms can alleviate their own constraints through acquisitions. Erel, Jang, and Weisbach (2015) find that a constrained target becomes less constrained after being acquired by an unconstrained firm. The argument is similar to the theory of liquidity mergers developed in Almeida, Campello, and Hackbarth (2011) where financially distressed firms in an industry are acquired by liquid firms to fund profitable investments. In contrast, this paper focuses on the acquirer being the constrained firm and the acquisition easing the acquirer's own financing constraints, especially among diversifying acquisitions. An important contribution of our study is to highlight the importance of financial synergies in acquisitions and show that constrained firms can take action to alleviate its own constraints through acquisition.

Harford (1999) shows that firms with high cash holdings tend to make value destroying acquisitions using their excess cash holdings. On the other hand, Almeida, Campello, and Weisbach (2004) argue that firms expecting to be constrained and rationed out of the external market in the future will save cash out of cash flow in order to use internal cash to fund investment. Additionally, Faulkender and Wang (2006) and Denis and Sibilkov (2010) show that cash holdings of constrained firms have a higher value than cash holdings of unconstrained firms. This paper finds that financing constraints are positively correlated with cash holdings (and negatively correlated with excess cash holdings), consistent with Almeida, Campello, and Weisbach (2004). Furthermore, though these firms hold cash, we find that these acquisitions are value enhancing, consistent with the relation between cash and value of investments in constrained firms as in Faulkender and Wang (2006) and Denis and Sibilkov (2010).

Finally, the loosening of financing constraints has real impacts on firm financing, investment, and performance. Smith and Kim (1994) argue that acquisitions between high cash flow firms and low cash flow firms are value-enhancing in contrast to the value-destroying acquisitions between

firms that are both high cash flow or both low cash flow. The paper links the alleviation of financing constraints through acquisitions with an increase in the use of external capital and firm investment. Furthermore, we find a positive investor reaction to constrained firms engaging in actions that alleviate their financing constraints and the disappearance of the diversification discount for constrained acquirers.

## 2    Financing Constraint Measures and Data Construction

One of the main challenges in any study of financing constraints is measurement of constraint status. Current literature provides several measures for financing constraints. As each of these measures capture different aspects of financing constraints, in this paper, we use a composite of the existing measures. This will allow us to robustly measure the financing constraint status of a firm while remaining agnostic on the best measure for financing constraints.

### 2.1    The Financing Constraint Measure

In this paper we use a combination of several financing constraint measures that have been used in the literature. We start with the Whited and Wu (2006) index and Hadlock and Pierce (2010) size-age index. Whited and Wu (2006) provide a structural approach to financing constraints and develop an index of firm characteristics that are related to a firm being financially constrained. Hadlock and Pierce (2010) group firms into financing constraint categories based on qualitative information collected from annual reports. Their paper concludes that firm size and firm age are the two characteristics that are more related to being financially constrained while being less likely to be endogenous. Appendix A provides detailed descriptions on the construction of the Whited and Wu (WW) and Hadlock and Pierce size-age (HPSA) financing constraint indices.[3]

In order to take advantage of the unique information contained in each index, we create composite measures using both the Whited and Wu index (WW) and the Hadlock and Pierce size age index (HPSA). In addition, having a credit rating has been shown to be an important

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[3]In recent work, Farre-Mensa and Ljungqvist (2016) show that firms classified as being financially constrained based on existing measures may not be truly constrained based on their financing behavior. The paper's definition of constrained assumes no access to external capital or an insurmountable wedge between internal and external capital. The goal of this paper is to examine relative constrainedness across firms and across time, rather than absolute strict states of complete (un)constrainedness. For this purpose, existing measures of financing constraints have been shown to capture firms with characteristics consistent with being more or less constrained.

determinant of access to financing (e.g., see Kisgen, 2006 and Faulkender and Petersen, 2006). Hence, we also incorporate the credit rating status of the firm into our composite measures.

To construct the composite measure, we first construct the WW index and sort firms into five equal-sized bins from 0 to 4 on a quarterly basis, defined as WW5. This procedure is repeated on HPSA by constructing the HPSA index and sorting firms into five equal-sized bins on a quarterly basis, defined as HPSA5. Next, firms are sorted based on their credit rating status into three bins, CR3, defined below:

$$
\text{CR3}_{i,t} = \begin{cases} 0, & \text{hasInvGrLTCR}_{i,t} = 1 \text{ or hasInvGrSTCR}_{i,t} = 1 \\ 1, & \text{if } (\text{hasInvGrLTCR}_{i,t} = 0 \text{ and hasInvGrSTCR}_{i,t} = 0) \\ & \quad \text{AND } (\text{hasLTCR}_{i,t} = 1 \text{ or hasSTCR}_{i,t} = 1) \\ 2, & \text{if hasLTCR}_{i,t} = 0 \text{ and hasSTCR}_{i,t} = 0 \end{cases} \tag{1}
$$

where hasLTCR is an indicator variable that takes the value 1 if the firm has a S&P long-term debt credit rating and 0 otherwise, hasSTCR is an indicator variable for whether the firm has a S&P commercial paper credit rating, hasInvGrLTCR is an indicator variable for whether the firm has an investment-grade S&P long-term debt credit rating, and hasInvGrSTCR is an indicator variable for whether the firm has an investment-grade S&P commercial paper credit rating. CR3 is defined such that higher values of CR3 translate to higher degrees of being financially constrained for consistency with WW and HPSA.

Finally, we add all three measures together to define a composite measure, FC5:

$$
\text{FC5}_{i,t} = \text{WW5}_{i,t} + \text{HPSA5}_{i,t} + \text{CR3}_{i,t} \tag{2}
$$

where WW5 is the quintile based on the Whited and Wu (2006) index, HPSA5 is the quintile based on the Hadlock and Pierce (2010) size-age index, and CR3 is the credit rating classification defined above in equation (1). Summing the *rankings* based on the three measures, rather than summing the three measures directly, allows us to give equal weight to each of the three measures, which differ in scale. FC5 takes on values ranging from 0, the least financially constrained firms, to 10, the most financially constrained firms. This composite measure has the advantage of using the ranking

of all three measures (WW5, HPSA5, and CR3) to arrive at the ultimate ranking of firms. That is, we can categorize a firm which ranks high in WW5, HPSA5 and CR3 as financially constrained with more confidence than a firm that ranks high in only one of these measures.

Approximately 6.7% of the sample are classified as FC5=0 (least constrained) and 15.7% of the sample are classified as FC5=10 (most constrained). In order to be able to sort firms into bins of relatively equal size and to be better able to compare the relative constraint status between firms, we create a continuous version of the measure, FC5Pred, by estimating the following equation:

$$\begin{aligned} \mathrm{FC5}_{i,t} = \quad &\alpha_0 + \alpha_1\mathrm{WW}_{i,t} + \alpha_2\mathrm{HPSA}_{i,t} + \alpha_3\mathrm{hasLTCR}_{i,t} + \alpha_4\mathrm{hasSTCR}_{i,t} \\ &+\alpha_5\mathrm{hasInvGrLTCR}_{i,t} + \alpha_6\mathrm{hasInvGrSTCR}_{i,t} + \varepsilon_{i,t} \end{aligned}$$

and calculating predicted values:

$$\begin{aligned} \mathrm{FC5Pred}_{i,t} = \quad &\hat{\alpha}_0 + \hat{\alpha}_1\mathrm{WW}_{i,t} + \hat{\alpha}_2\mathrm{HPSA}_{i,t} + \hat{\alpha}_3\mathrm{hasLTCR}_{i,t} + \hat{\alpha}_4\mathrm{hasSTCR}_{i,t} \\ &+\hat{\alpha}_5\mathrm{hasInvGrLTCR}_{i,t} + \hat{\alpha}_6\mathrm{hasInvGrSTCR}_{i,t} \end{aligned} \quad (3)$$

where WW is the Whited and Wu (2006) financing constraint index, HPSA is the Hadlock and Pierce (2010) size-age index, hasLTCR (hasSTCR) is an indicator for whether the firm has a S&P long-term debt (commercial paper) credit rating, and hasInvGrLTCR (hasInvGrSTCR) is an indicator for whether the firm has an investment-grade S&P long-term debt (commercial paper) credit rating. We focus on our predicted composite measure, FC5Pred, as our main measure for financing constraints. In unreported analysis, we repeat all analysis using WW, HPSA, and FC5, individually. All results hold and are available upon request. The choice of financing constraint measure does not affect our results. Altogether, the measure, FC5Pred, provides us with firm-specific financing constraints that vary both cross-sectionally and over time.

## 2.2 Corporate Financial Statement Data

We use quarterly data to construct our financing constraint variable, FC5Pred, detailed above. Corporate financial statement data comes from the Standard & Poor's Compustat North American quarterly database from 1985 to 2013. All dollar amounts are chained to 2004 dollars using CPI

to adjust for inflation.[4]  We remove any firms with negative book asset value, market equity, book equity, capital stock, sales, dividends, debt, and inventory. Such firms have either unreliable Compustat data or are likely to be distressed or severely unprofitable.  In addition, we delete observations in which book assets or sales growth over the quarter is less than -1 and remove firms with book or market values less than $5 million in 2004 dollars to remove observations that have abnormally large or sensitive to changes driven by small asset bases.  Next, outliers, defined as firm-quarter observations that are in the first and 99th percentile for all relevant variables used in our analysis, are eliminated from the sample.  We also remove all firms in the financial and insurance, utilities, and public administration industries as they tend to be heavily regulated.

Requiring the resulting sample to contain non-missing observations for the main financing constraint measure, FC5Pred, produces a sample of 16,117 unique firms spanning 450,829 firm-quarters from 1985 to 2013.  Panel A of Table I provides the summary statistics for the various constraint measures along with firm characteristics that are relevant for the study.  The summary statistics for WW and HPSA are similar to those used in other studies using a similar sample (e.g., Almeida, Hsu, and Li, 2013).  Approximately 19.3% of the sample has credit ratings.  Half of the sample with long-term credit ratings are investment grade, while almost all of the sample with commercial paper credit ratings are investment-grade.  Firm size is skewed as in other studies and not surprisingly the typical firm does not pay dividends and has no reported research and development (R&D) expense.

To examine the quality of our main financing constraint measure, FC5Pred, we examine its correlation with other financing constraint measure as well as firm characteristics commonly associated with financially constrained firms. In Panel B of Table I, we find that FC5Pred correlates over 90% with WW, HPSA, and FC5. Reassuringly, firms with higher payouts, dividend payments, and credit ratings are less financially constrained. In addition, constrained firms tend to hold more cash which is consistent with prior research (e.g., Almeida, Campello, and Weisbach, 2004). To distinguish between regular cash holdings and excess cash, we calculate excess cash holdings as in Opler, et al (1999). The results show that despite holding more cash than unconstrained firms, constrained firms have *less* excess cash than unconstrained firms, consistent with saving cash from

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[4]We chain to 2004 dollars for consistency with the construction of HPSA, which is chained to 2004 dollars as described in Hadlock and Pierce (2010) and Appendix A.

cash flow in anticipation of being constrained in the future.

## 2.3 Evolution of Financing Constraints and Firm Structure

Before examining the impact of acquisition on constraint status, it is useful to investigate the time variation of financing constraints and the relation between constraints and firm structure. Firm financing constraints may change across time driven by the external, macro environment, as well as by internal, firm-specific, conditions. If firm financing constraints change across time, the changes could be driven by firm level actions and firm structure. This section validates that constraints change across time and are related to firm structure.

### 2.3.1 Timing and Persistence of Financing Constraints

To study the persistence of financing constraints, we sort firms based on FC5Pred into terciles each quarter and compute the time it takes for a firm to move from one tercile of financing constraints to another. A change of -1 (+1) indicates that a firm moved into the next lower (higher) tercile and has become relatively less (more) financially constrained. A change of -2 (+2) indicates that a firm moved two terciles lower (higher), becoming substantially less (more) constrained. Panel A of Table II calculates the number of quarters it takes for each change to occur and calculate the number of changes, the mean, median, and maximum number of quarters by firm. Approximately 13.2% of the firms in an average quarter change bins, with the average firm switching 7.1 times over the sample period, taking 6.3 quarters on average, 4.5 quarters at the median, and 16.4 quarters at the maximum.[5] To further examine the persistence of constraints, in unreported results, we sort firms into financing constraint quintiles and deciles. The results show that over 20% of firms in an average quarter switch quintiles and over 40% switch deciles, further supporting the level of movement in constraints over time. All in all, the results suggest that firms do change their financing constraints over time and relative to each other, and, in general, take under two years to switch terciles for the average firm.

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[5]In unreported analysis, we repeat this procedure for WW and HPSA, we find that on average firms change terciles slightly faster (slower) using WW (HPSA) than using FC5Pred. This is not surprising given that FC5Pred is a composite of WW, HPSA, and credit rating status.

### 2.3.2 Firm Structure

Next, we examine the structure of the firms and whether being more diversified matters for financing constraints. Changes in financing constraints may occur through changes in the external capital markets or through changes in firm structure. One approach to investigating the potential impact of changing financing constraints is to examine diversified or multi-segment firms against focused or single-segment firms. Single-segment firms that are in financially constrained industries should have a difficult time accessing needed capital and will remain constrained. On the other hand, multi-segment firms in which their main industry is financially constrained may have business segments in other industries that are un- or less constrained, allowing the firm to access funds through the less constrained segments and alleviating their constraints. Hence, one would expect diversified firms to be less constrained than focused firms, in general.

We obtain corporate segment data from Standard & Poor's Compustat Segment database from 1985 to 2013 and merge this to our main sample discussed above. Firms with no segment data are assumed to be single segment firms. We construct three measures to capture the idea of being a diversified firm. First, isDiverse is an indicator variable for being a diversified firm that takes the value 1 if a firm has more than one distinct 3-digit SIC business segment. Otherwise, the firm is classified as a focused or single-segment firm and isDiverse has a value of 0. Second, nDistSeg is the firm's actual number of distinct SIC3 business segments. Third, although some firms may report several distinct business segments, they may have an overwhelming majority of their business in one particular industry, operating like a focused firm. To account for this possibility, we create a Herfindahl-Hirschman index of segment concentration weighted by the sales of each business segment, HHI_Seg. A higher HHI_Seg indicates that the firm is more focused than a firm with a lower HHI_Seg. As such, 1-HHI_Seg is the third measure for a diversified firm. In addition, industry financing constraint measures are calculated by taking the average financing constraint measures in each quarter across all firms in the same 3-digit SIC industry. This measures whether an industry is constrained or not, allowing us to control for industry trends in financing constraints faced by a firm.

To examine whether diversified firms are more or less constrained than focused firms, we run

the following regression:

$$\text{FC5Pred}_{i,t} = \alpha_0 + \alpha_1 \text{DiverseVar}_{i,t} + \varepsilon_{i,t} \qquad (4)$$

where we run isDiverse, nDistSeg, and 1-HHI_Seg as our diversification variable, DiverseVar. Standard errors are double clustered by firm and time as in Petersen (2009). We include year and quarter dummies to control for time varying macro-economic factors and seasonality that may impact the main results.

Panel B of Table II present the results. Columns (i) through (iii) present the results for whether the firm is diversified (isDiverse), the number of distinct segments (nDistSeg), and the Herfindahl-Hirschman index in the direction of being diversified (1-HHI_Seg), respectively. Column (iv) uses 1-HHI_Seg in the sub-sample of diversified firms, i.e., firms that have 2 or more business segments. This checks whether the effect of 1-HHI_Seg in column (iii) is driven entirely by single-segment firms and whether our segment concentration measure has explanatory power among diversified firms. Consistent with our hypothesis, the results show that diversified firms, firms with more distinct 3-digit SIC segments, and firms that are less concentrated in any one segment have lower financing constraints than focused firms, firms with fewer distinct segments, and firms that are more concentrated in any one segment.

Next, we identify firms that are constrained or unconstrained in their main 3-digit SIC industries and explore whether firms whose primary industries are constrained are more likely to benefit from being diverse than firms whose primary industries are unconstrained. MainSIC3_FC is the average FCPred5 for firms within the same main SIC3 industry. We interact MainSIC3_FC with our DiverseVar and run the following regression:

$$\text{FC5Pred}_{i,t} = \alpha_0 + \alpha_1 \text{DiverseVar}_{i,t} + \alpha_2 \text{MainSIC3\_FC}_{i,t} + \alpha_3 \text{DiverseVar}_{i,t} * \text{MainSIC3\_FC}_{i,t} + \varepsilon_{i,t} \quad (5)$$

with time dummies and double clustered standard errors.

The results are shown in columns (v) through (viii) in Panel B of Table II. First, we expect that firms in constrained main industries are more likely to be constrained. This is confirmed by the positive and significant coefficient on MainSIC3_FC in all columns. Second, we expect

that firms in more constrained main industries benefit more from being diversified than firms in less constrained main industries i.e., we expect the coefficient on the interaction term, $\alpha_3$, to be negative and significant. In column (v), using isDiverse for DiverseVar, while the main effect, $\alpha_1$, is negative and significant, the interaction term, $\alpha_3$, is positive and significant, counter to expectations. However, when turning to the number of distinct segments in column (vi), both the main effect and the interaction effect are negative and significant at the 10% and 1% levels respectively. Taken together, these results are supportive of the idea that the number of segments are important in mitigating the financing constraints of the main industry. Finally, the interaction effect using 1-HHI_Seg in the full sample is insignificant in column (vii), but negative and significant at the 5% level when the sample is restricted to only multi-segment firms in column (viii). These results support the hypothesis that firm structure is important to financial constraints and motivate the idea that firms can alleviate being financially constrained by being diversified.

## 3 Acquisitions and Changes in Financing Constraints

The previous sections show that diversified firms have lower financing constraints, particularly for firms with constrained main industries. Additionally, we observe that constrained firms tend to hold more cash but have less excess cash than unconstrained firms. Li, Taylor, and Wang (2016) argue that constrained firms may make acquisitions, even using undervalued equity to acquire valuable synergies. This suggests that firms may be able to use acquisitions to ease their financing constraints through the development of synergies. In this section, we study mergers and acquisitions to determine whether corporate decisions, such as mergers, alleviate financing constraints. The goal is not to argue that easing financing constraints is necessarily the primary motivation for the acquisition but instead to show that the acquisition can alleviate constraints.

Our mergers and acquisitions data comes from Thomson Reuters SDC database and includes all merger and acquisition events from 1985 to 2013. Only successful deals with effective dates within 180 days of the announcement date are included.[6] Furthermore, we restrict our M&A sample to include only the events in which an acquirer is involved in one event within a centered four year window (i.e., no other M&A events two years before and two years after the current event).

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[6]Over 90% of the successful acquisitions have effective dates within two quarters of the announcement dates and over 75% have effective dates within one quarter of the announcement dates.

This allows us to follow acquirers two years out as cleanly as possible and ensure current firm characteristics are not influenced by previous events.[7]

We merge this sample to our main sample described in Section 2 by the announcement date of the deal and by acquirer CUSIP to obtain a sample of acquirer-merged-only transactions, resulting in 5,994 events from 1985 to 2013 with non-missing data. We sort firms based on FC5Pred each quarter and classify firms to be constrained if they are in the top tercile for FC5Pred and unconstrained if they are in the bottom tercile. For ease of exposition, where the discussion refers to constrained and unconstrained firms, conceptually this is capturing firms that are more constrained versus firms that are less constrained relative to the median firm. It is important to point out that that the cutoffs are based on the main sample described in Section 2, rather than the merged M&A sample, to keep the definition of unconstrained and constrained consistent across samples. Overall, there is a good balance between unconstrained acquirers (34.2% of the sample) and constrained acquirers (31.1% of the sample). The results using the other financing constraint measures (WW, HPSA, FC5) are qualitatively similar.

## 3.1 Method of Payment for Constrained Acquirers

First, one potential concern is the ability of a firm with financing constraints to make an acquisition. A firm faces financing constraints if it is not able to use its first best source of financing, i.e., financing that allows the firm to invest at first-best levels. Given the diluting effect of issuing new equity and documented decline in returns following seasoned equity offerings, using undervalued equity is particularly costly for acquirers. All else equal, an acquirer should prefer using cash (either existing cash holdings or raising cash through debt issuances) to acquire. Since financially constrained acquirers are unable to issue debt to raise the cash necessary for acquisitions, we expect a constrained acquirer to be more likely to use shares to make the acquisition, even undervalued shares.[8]

To examine this possibility, we run a logistic regression using the sample of acquirers with

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[7]In unreported analysis and for robustness, we relax this restriction to no window restrictions. Our results are qualitatively similar and in some cases stronger due to higher power from more observations. In other words, we have placed ourselves under the harsher and cleaner restriction.

[8]The implicit assumption in this statement is as long as the net benefit to doing the M&A exceeds the cost to using undervalued stock.

merged financial statement information to predict the likelihood of using shares as the payment method in a M&A event:

$$
\begin{aligned}
Pr(\text{isShares} = 1)_{i,t} \ &= \alpha_0 + \alpha_1 \text{Acq\_FC5Pred}_{i,t-4} + \alpha_2 \text{Acq\_DealVal/TA}_{i,t} \\
&+ \alpha_3 \text{Acq\_LnTA}_{i,t-4} + \varepsilon_{i,t} + \alpha_4 \text{Acq\_BTM}_{i,t-4} + \varepsilon_{i,t}
\end{aligned}
\tag{6}
$$

with controls for the firm's financing constraint measure one year prior to the bid announcement (Acq_FC5Pred), the ratio of the value of the bid to the acquirer's book assets one year prior as a measure for the size of the acquisition and the importance of the deal to the acquirer (Acq_DealVal/TA), the natural log of acquirer's book assets one year prior (Acq_LnTA), and the book-to-market ratio of the acquirer one year prior (Acq_BTM). Standard errors are double clustered by acquirer and quarter as recommended in Petersen (2009).

The results of this analysis are shown in Table III. Column (i) of the table uses all observations from the sample of acquirers merged with Compustat. The results indicate that firms are less likely to use stock as a method of payment in general and more likely to use stock for larger acquisitions. Importantly, firms that are more financially constrained are more likely to use stock to fund acquisitions than firms that are less constrained. In column (ii), we focus on the sub-sample of firms that have undervalued equity, IsUnderVal = 1. We define firm misvaluation using the firm-specific error based on the Rhodes-Kropf, Robinson, and Viswanathan (2005) decomposition of the market-to-book ratio into three components: firm-specific error, time-series sector error, and long-run market-to-book. A firm is defined to be undervalued if it has a negative firm-specific error based on the Rhodes-Kropf, Robinson, and Viswanathan (2005) decomposition.[9] Column (ii) shows that, as expected, undervalued firms are less likely to use stock for acquisition. However, undervalued firms are more likely to use stock for acquisitions when they have higher financing constraints.

Finally, in column (iii) we focus on the sub-sample of firms that have overvalued equity, IsOverVal = 1. A firm is defined to be overvalued if it has a positive firm-specific error based

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[9] For robustness, we use a simpler, but potentially more naive measure, of misvaluation by taking the difference between a firm's market equity-to-book equity ratio (MTB) and the median MTB in the firm's SIC3 industry. A firm is defined to be undervalued if it falls into the lower half among all firms with MTBs less than their median industry MTBs. Similarly a firm is defined to be overvalued if it falls into the upper half among all firms with MTBs higher than their median industry MTBs. All results hold.

on the Rhodes-Kropf, Robinson, and Viswanathan (2005) decomposition. On average, though the constant is negative, overvalued firms are not significantly less likely to use shares to fund acquisitions compared to other methods of payment. In addition, the t-test on the difference in the constants between columns (ii) and (iii) finds that firms with overvalued stock are more likely to use stock to fund acquisitions relative to firms with undervalued stock, i.e., the difference in the constants is statistically significant at the 10% level. When focusing on overvalued firms, firms with higher financing constraints are not significantly more likely to use stock relative to firms with lower financing constraints. The t-test on the difference between the coefficients on FC5Pred between columns (ii) and (iii) is marginally significant at the 10% level. The results in Table III suggest that firms facing financing constraints are able to make acquisitions and are more likely to use undervalued equity than firms that are less constrained.

## 3.2    Target Selection of Constrained Acquirers

As the main focus of the paper is to explore whether acquisitions are effective in alleviating financing constraints for the acquirer, it is useful to ascertain whether constrained acquirers engage in target selection for the purpose of alleviating constraints. If financially constrained firms seek to use acquisitions for loosening their financing constraints, they should target firms that potentially increase liquid assets or are less correlated to provide coinsurance. Consequently, constrained acquirers are expected to acquire targets that have lower financing constraints, higher cash flows (as suggested in the opening quote), larger cash holdings, or are diversifying. Targets with lower financing constraints would directly loosen the constraints of the acquirer while targets with higher cash and cash flow would increase the availability of internal cash to fund future projects of the constrained acquirers. Constrained firms may also consider targets with high sales growth to potentially increase its future liquidity or access to external funds as well as target firms with less correlated cash flows to provide coinsurance for the main segment.

In order to study the target choice of constrained acquirers, a list of all possible target considerations is needed. As this data of all counterfactuals is not possible, we instead use a sample of completed acquisitions along with withdrawn acquisitions to proxy for firms that the acquirers may have considered as targets. To investigate the characteristics of target firms, a dyadic sample

of acquirer-target pairs is merged to Compustat by announcement dates and acquirer and target CUSIPs. The benefit of using this dyadic sample is to allow for examination of the relative firm characteristics between the acquirer and target. However, this drastically reduces the sample as most targets are private and therefore not in the Compustat database. Following previous sample construction, only effective deals in which the acquirer makes one acquisition within a centered four year window are retained. We add to this sample withdrawn acquisitions with available Compustat data to better reflect possible target choices of the acquirers. This process produces a sample of 231 acquirer-target pairs with non-missing data for which the acquirer is categorized as either constrained or unconstrained. Acquirers are categorized as constrained (Acq_isFC=1) if their FC5Pred one year prior to announcement fall within the top tercile and as unconstrained (Acq_isFC=0) if their FC5Pred falls within the bottom tercile.

Table IV runs logistic regressions to examine whether a constrained acquirer is more likely to select a target with lower financing constraints one year prior than itself (isLessFC) in column (i), higher cash flow to assets (hasMoreCF) in column (ii), larger cash holding to assets (hasMoreCash) in column (iii), higher sales growth (hasMoreSalesGr) in column (iv), and in a different SIC3 industry (isDiffSIC3) in column (v). We include controls for both the acquirer and target: deal value as a ratio to total assets (DealVal/TA), natural log of total assets (LnTA), and book-to-market ratio (BTM).

In Panel A of Table IV we first examine the full sample of acquirer-target pairs. The results from column (i) show that the target is significantly less constrained than the acquirer. This is supportive of the idea that financially constrained acquirers tend to target firms that are less constrained than themselves. Column (ii) examines the relative cash flows between the target and acquirer. Consistent with constrained acquirers using acquisitions to potentially loosen financing constraints, targets have higher cash flow to assets than constrained acquirers. Additionally, column (iii) shows that cash holdings to assets are significantly larger for targets relative to acquirers. Column (iv) shows that constrained firms more likely to target firms with higher sales growth than themselves, though the result is insignificant.

Finally, given the previous finding in Section 2.3 that diversified firms are less constrained than focused firms, column (v) investigates whether constrained acquires are more likely to target

firms from other industries. To do this we identify whether an acquirer is initially focused or diversified. This serves two purposes. First, there are diminishing returns for diversification. That is, the marginal effect of diversification is strongest for the first diversification and weakens with subsequent diversifications. Second, it is difficult to identify truly diversifying acquisitions as the target may be in a different main SIC industry than the acquirer, but within a SIC segment of the acquirer. Having identified acquirers that are focused, we interact being focused with whether the acquirer is constrained or not. This interaction term captures the additional likelihood of engaging in diversifying acquisitions for focused, constrained acquirers. The results show that focused acquirers are less likely to make diversifying acquisitions. However, focused, constrained acquirers are more likely to make diversifying acquisitions, though this result is not statistically significant.

As mentioned previously, constrained firms tend to have more cash than unconstrained firms due to saving cash out of cash flow (Almeida, Campello, and Weisbach, 2004). However, previous studies show that high cash firms make poor investment choices (Jensen, 1986; Harford, 1999). In order to distinguish between the competing propensity to save versus the agency cost of free cash flow motivations for investment, we calculate the excess cash holdings following Opler, et al (1999). In Panels B and C of Table IV, we repeat the analysis on acquirers with low and high excess cash holdings, respectively. Firms are classified as having low (high) excess cash if they have below (above) the median excess cash in a particular quarter.

For acquirers with low excess cash, Panel B shows that these constrained acquirers are significantly more likely to target firms that are less constrained and, not surprisingly, with higher cash holdings than themselves. The results corroborate the idea that constrained firms with low excess cash focus on loosening financing constraints by targeting firms that will potentially loosen internal cash constraints. In contrast, for acquirers with high excess cash, Panel C suggests that constrained acquirers tend to target firms with higher cash flows and higher sales growth than themselves. This suggests that constrained acquirers with high excess cash are concerned with saving cash and thus target those firms that will enable them to do so.

While this analysis is helpful in understanding the types of firms that constrained acquirers are observed to target, there may be unobserved differences in the opportunity set of targets between

unconstrained and constrained acquirers that cannot be measured. Overall, the implications of this analysis show that constrained acquirers may target firms that will help to loosen their financing constraints through targeting firms that are less constrained, have higher cash flows, with more cash, and have higher sales growth. In addition, there appears to be evidence that constrained, focused acquirers are more likely to make diversifying acquisitions. We will return to examining the impact of diversification in acquisitions in a later section.

## 3.3 The Impact of Acquisitions on the Easing of Financing Constraints

In the previous sections, the analysis shows that financially constrained acquirers are more likely to use undervalued stock to make acquisitions, consistent with being financially constrained, and are more likely to target firms that are less constrained, have more cash flow, and larger cash holdings than themselves. This section explores the main research question by studying whether constrained firms that make acquisitions experience easing of their financing constraints.

To examine the impact of acquisitions on financing constraints, we perform a propensity score matching algorithm to identify potential acquirers with characteristics similar to actual acquirers but did not actually undergo a merger and acquisition.[10] This approach allows for a direct test of the ability of firms to improve their financial constraint status through acquisitions, especially for constrained acquirers. Furthermore, the approach addresses the issue of whether the reduction in financing constraints are driven by characteristics of acquirers that lead to improvement of financing constraints or whether financing constraints are mitigated through the M&A event.

Using the propensity score approach, firms are matched based on the determinants of making an acquisition that is consistent with existing literature (Billett and Xue, 2007; Jordan, Liu, and Wu 2014). In addition, we include the firm's financing constraints, FC5Pred, in the matching algorithm as easing constraints may motivate constrained firms to make an acquisition. It is interesting to note that after accounting for other determinants of being an acquirer, financing constraints do not enter significantly into the decision. Nevertheless, by doing so, we control for financial constraints and ensure we have a set of treatment and control firms that are matched on their constraints. Firms are benchmarked to their financial constraint status one year prior to the announcement

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[10]This approach and variations of this approach have been used extensively in the literature. See, e.g., Almeida et al (2011), Aggarwal et al (2009), and Bartram, Brown, and Stulz (2012).

date of acquisition. This adjusts for any information leakage leading up to the announcement of the acquiring bid. The treatment in this propensity score match is whether the firm actually makes an acquisition. We use the nearest neighbor approach with replacement to find the five nearest matches for each acquirer and take averages of the five matched firms.[11] Appendix C details the construction of the propensity score matched sample. This provides us with a sample of actual acquirers (treatment) and their non-acquiring matches with similar characteristics (controls), allowing us to isolate the impact of the acquisition on financing constraints.

### 3.3.1 Post-Acquisition Reductions in Financing Constraints

Section 2.3, finds in general, the average and median time it takes for the average firm to switch financing constraints is under two years and about a year for the typical firm. Therefore, firms are followed for 2, 4, 6, and 8 quarters (i.e., up to two years) beyond the (potential) announcement date to observe whether there are changes to firms' financing constraints. Based on the hypotheses that acquisition enables acquirers to ease their financing constraints, there should be significant improvements in constraints for our actual acquirers relative to the matched (non-acquiring) firms. Panels A through D of Table V present the results for changes in FC5Pred 2, 4, 6, and 8 quarters post the relevant quarter relative to FC5Pred one year prior to the relevant quarter, respectively. Column (i) reports the change in FC5Pred for the actual acquirers and column (ii) reports the change in FC5Pred for the matched non-acquirers. Column (iii) reports the difference in these changes between the actual acquirers and the matched non-acquirers. This difference-in-difference (DID) identifies whether the acquisition leads to an improvement in constraints for acquirers relative to matched non-acquirers. Finally, column (iv) reports the difference in DID between the constrained and unconstrained acquirers. This difference-in-difference-in-difference tests the significance of the relative changes in constraints between constrained and unconstrained acquirers in relation to their matched non-acquiring firms.

Panel A of Table V presents the results for two quarters post (potential) acquisition. In columns (i) and (ii) for the full sample, there are significant improvements in financing constraints for both the acquirer and the matched firms, as shown by the reductions in FC5Pred. This is consistent

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[11]We repeat this exercise using the nearest neighbor approach without replacement as well as using the single nearest neighbor or the ten nearest neighbors. In all cases, the matched samples show good covariate balance and the results hold.

with the idea that financing constraints improve over time in general. Indeed, conditional on a firm surviving and having positive growth, by definition it will be older and, most likely, larger, the two variables comprising the Hadlock and Pierce (2010) size-age index (HPSA). Importantly, in column (iii), the difference-in-difference between the acquirer and matched firms is negative and significant at the 1% level. In other words, actual acquirers realize an improvement significantly more over their matched non-acquiring counterparts.

Next, firms are partitioned into unconstrained and constrained as well as highly unconstrained and highly constrained. Firms are designated as unconstrained if they fall into the bottom tercile and as constrained if they fall into the top tercile when sorted based on FC5Pred one year prior to (potential) acquisition. Recall that the cutoffs are based on the full Compustat sample for consistency in defining constrained and unconstrained. Firms are designated as highly unconstrained if they fall into the bottom quintile and highly constrained if they fall into the top quintile when sorted based on FC5Pred one year prior to (potential) acquisition. These definitions will remain consistent for the remainder of the paper.

Panel A of Table V shows that although unconstrained acquirers experience a reduction in financing constraints as evidenced in column (i), they improve significantly less than the matched, unconstrained non-acquirers, as shown in column (iii). Consistent with expectations, it is only within the constrained acquirers that there is a significant (at the 1% level) improvement in financing constraints relative to their matched, constrained non-acquiring counterparts. In other words, only the constrained acquirers experience a significant improvement in financing constraints through acquisition. This is corroborated by the results for the highly unconstrained and highly constrained firms. Hence, the significant improvement in the overall financing constraints is driven by the constrained acquirers. Finally, column (iv) shows that the difference between the difference-in-differences observed in column (iii) is statistically significant. That is, the alleviation in constraints for constrained acquirers relative to their matched non-acquirers is significantly different from the alleviation in constraints for unconstrained acquirers relative to their matched non-acquirers between 2 quarters post-acquisition and one year prior to acquisition.

Panels B through D of Table V repeat the above analysis and examine the changes in financing constraints for 4, 6, and 8 quarters following the (potential) acquisition, respectively, to study

whether the improvement in financing constraints continues long after the acquisition. The significance of the improvements in constraints persist at the 1% level for up to eight quarters for the constrained and highly constrained acquirers relative to the matched, constrained non-acquirers. In fact, the improvements in constraints for unconstrained acquirers are significantly less than their matched, unconstrained non-acquiring counterparts up to 8 quarters post acquisition, as shown in column (iv) of each panel. This is strong evidence supportive of the idea that constrained firms can reduce their financing constraints through acquisitions.

### 3.3.2 Further Support of Post-Acquisition Reductions in Constraints

In the previous sections, we have shown that acquisitions can be used to ease financing constraints using a propensity score matching approach that examines the change in financing constraints between constrained and unconstrained acquirers relative to their matched non-acquiring counterparts. One potential explanation for this finding is that financially constrained firms that loosen constraints through acquisitions are those that expect to be unconstrained in the near future. That is, the reduction in constraints is not a result of the acquisition, but were anticipated by management. Almeida, Campello, and Weisbach (2004) argue that firms that anticipate being constrained in the future will save more cash from cash flow than firms that do not expect to be constrained. In our setting, if constrained firms that make acquisitions expect to be unconstrained in the future, they would save less cash from cash flows than matched constrained non-acquirers. We investigate the cash-to-cash flow sensitivity of constrained acquirers and non-acquirers one year prior to the acquisition. The un-tabulated results show no difference in the cash-to-cash flow sensitivities between constrained acquirers and constrained (matched) non-acquirers. Hence, it does not appear that constrained acquirers anticipate future reductions in constraints prior to acquisition, relative to constrained non-acquirers.

To further support the argument that acquisition alleviates financing constraints for constrained acquirers, we run a placebo test using withdrawn acquisitions. Withdrawn M&As are events in which the acquisition is announced but later withdrawn. In other words, the actual acquisition never takes place. If, despite the propensity score matching algorithm, there are still unobserved differences in firm characteristics between actual acquirers and the matched non-acquirers that may

drive the change in financing constraints, there should be an improvement for withdrawn acquirers relative to the matched non-acquirers. If the actual completion of the acquisition provides constraint alleviation, then acquirers in withdrawn acquisitions do not experience this benefit and therefore should not experience an improvement in constraints over their matched counterparts.

The bottom of each panel in Table V presents the results for the sample of withdrawn M&A's. While withdrawn M&A's do experience alleviation of constraints over time, the constraint reduction is less than their matched non-acquiring counterparts. The results in column (iii) of each panel indicate no improvements in financing constraints for withdrawn acquirers relative to matched non-acquirers, providing support for the hypothesis that withdrawn acquisitions do not benefit from alleviation of constraints. Therefore, it appears that acquisition itself results in the improvement in financing constraints.

Next, as detailed in Section 2.1, we use FC5Pred as our measure of financing constraints, which is a composite of the Whited and Wu (2006) index, the Hadlock and Pierce (2006) size-age index, and the firm's credit rating status. In this composite measure, size plays an important role as it is a component of both the Whited and Wu (2006) and Hadlock and Pierce (2006) indices, as well as being correlated with having a credit rating. In addition, we have shown that constrained acquirers are more likely to make stock acquisitions. It has been shown in the literature that stock acquisitions are typically relatively larger than non-stock acquisitions. Therefore, our results could be driven by a larger increase in size for constrained acquirers relative to unconstrained acquirers.

To examine this possibility, we measure the relative size differentials for all firms (actual acquirers and their matched non-acquiring counterparts) by calculating the change in total assets between 2-quarters post-acquisition and one year prior to acquisition as a ratio to total assets one year prior to acquisition. In essence, this controls for the size of the acquirer relative to the target. We sort all firms based on their relative size differentials into terciles each quarter. In order to properly compare acquirers and their matched non-acquiring firms, we retain only the observations where the acquirer and its matched non-acquirers sort into the same relative size differential tercile.

Table VI repeats the analysis in Table V for the Low Size Change (bottom) and High Size Change (upper) terciles. As before, Panels A through D present the results for changes in FC5Pred 2, 4, 6, and 8 quarters post the relevant quarter relative to FC5Pred one year prior to the relevant

quarter, respectively. The results are consistent with those for the full sample in both the Low Size Change and High Size Change bins. That is, for both acquirers that experience a small size change or a large size change, constrained acquirers realize a significant improvement in financing constraints relative to their matched counterparts and relative to unconstrained acquirers. Column (iv) which reports the difference in the difference-in-differences is statistically significant at the 1% level in all panels. This confirms that the relative reduction in financing constraints observed previously is not driven by constrained firms making larger acquisitions relative to unconstrained firms.

So far, the results show that firms which face financing constraints and make acquisitions can loosen their constraints through acquisitions. To make these acquisitions, the paper posits that firms may use equity, even undervalued equity, to make these constraint-easing acquisitions. One potential concern is whether firms that undergo a seasoned equity offering (SEO) could simply ease constraints by directly using these proceeds rather than making constraint-easing acquisitions. To examine this possibility, along with our previous matching criteria, we also require that the matched non-acquirer to have undergone a SEO within the same quarter as the acquisition to which it is matched. This allows for a direct comparison of the easing of constraints between two otherwise similar firms with one having undergone an acquisition and one having undergone a SEO.

The results of this analysis are shown in Table VII. The results show that unconstrained acquirers realize less of a reduction in constraints relative to matched unconstrained firms that do an acquisition/SEO. This relation persists up to 8 quarters following the acquisition/SEO. For constrained acquirers, relative to constrained non-acquirers that do a SEO, we observe opposite results. That is, the constrained acquirer has a significantly greater reduction in financing constraints relative to the matched non-acquiring SEO firm up to 8 quarters following the acquisition/SEO. Reinforcing this relation, we see that the difference-in-difference-in-differences are significant at the 1% level for up to eight quarters following the acquisition/SEO.

To further examine the relative impact of the acquisition or SEO in alleviating constraints, we also restrict the acquirers to stock or cash acquisitions as well as restrict the acquirers to having undergone a SEO in the past year. In untabulated results, these analyses support the idea that acquisitions ease constraints for constrained acquirers more than matched constrained firms that do

a SEO. Finally, we also restrict the acquirers to having undervalued equity. While this requirement severely reduces our sample and the power of the results, the results generally support the argument that acquisitions by firms with undervalued equity loosens financing constraints more than firms that simply do a SEO, though not significantly so.

Altogether, these results provide robust evidence that acquisitions can alleviate financing constraints for constrained acquirers.

## 3.4 Diversifying Acquisitions and the Easing of Financing Constraints

Finally, Section 2.3 finds that diversified firms tend to be less constrained than focused firms, implying that diversifying acquisitions may alleviate financing constraints for constrained firms. The previous analysis on relative characteristics between the acquirer-target pair suggests that focused, constrained acquirers are more likely to select targets in different SIC industries ex-ante. For additional support, it is worthwhile to examine whether diversifying acquisitions lead to more substantial lowering of financing constraints than focused acquisitions ex-post.

Table VIII investigates this possibility. The propensity score matched sample is partitioned into diversifying and non-diversifying acquisitions. Panels A through D reflect post acquisition changes in constraints for 2, 4, 6, and 8 quarters following acquisition. Consistently across each panel, there are several strong outcomes. First, there is a reduction in financing constraints for both diversifying and focused firms following an acquisition for the full sample, consistent with the above results. Next, the reduction in financing constraints is significantly more pronounced for constrained acquirers than for unconstrained acquirers for both diversifying and focused acquisitions, also consistent with the above results. Finally, among financially constrained acquirers, the improvement in financing constraint status is significantly greater for diversifying acquisitions than for focused acquisitions. This result provides evidence that not only are constrained firms more likely to target firms that are not in their own industries, there is also a greater reduction in financing constraints for diversifying acquisitions than for focused acquisitions.

# 4 Post-Acquisition Implications for Financing Constraints

The previous results show that constrained firms are more likely to make acquisitions using undervalued equity than unconstrained firms. This suggests that firms that face financing constraints are able to make acquisitions, and as expected, face higher costs than unconstrained firms. Using a propensity score matching technique, we compare actual acquirers to matched non-acquirers. If an acquirer is constrained one year prior to acquisition, it becomes less constrained 2, 4, 6, and 8 quarters following the acquisition while unconstrained acquirers are more constrained than their non-acquiring counterparts. These results are stronger for diversifying acquisitions than for focused acquisitions. This confirms that constrained firms may improve their financing constraints by engaging in mergers and acquisitions.

If firms are able to loosen financing constraints through acquisitions, then this should impact firm cash liquidity policy. Almeida, Campello and Weisbach (2004) argue that firms that anticipate future financing constraints will have higher cash to cash flow sensitivities since these firms will save cash from cash flow to fund future investments. The implication of this view is that firms that loosen constraints through an acquisition should have a reduction in cash to cash flow sensitivity following the acquisition. In unreported results, we measure the cash to cash flow sensitivity one year prior to the acquisition and up to two years following the acquisition and find that constrained firms making an acquisition exhibit a reduction in cash to cash flow sensitivity from the pre to post acquisition period. This suggests that the acquisition loosens constraints and impacts firm liquidity policy. If firms appear to have improved their financing constraint status and liquidity status, this should translate into real improvements in the firms ability to access external financing and make investments following acquisition. This section investigates improvements in access to external capital, investments, and firm performance.

## 4.1 Post-Acquisition Debt Issuance

With the relaxing of financing constraints, firms should have better access to external financing. To investigate whether the loosening of financing constraints post acquisitions leads to firms making use of their improved access to external financing, we track post-acquisition debt issuances of the treatment and control firms in our propensity score matched sample. Panels A through D of

Table IX take the natural log of long-term debt issuance as reported in firm quarterly reports and observe the changes in long-term debt issuance 2, 4, 6, and 8 quarters post acquisition relative to one year prior to acquisition, respectively. As before, column (i) of each panel reports the change in log of long-term debt issuance for the actual acquirers and column (ii) for the matched non-acquirers. Column (iii) reports the difference in changes between the actual acquirers and matched non-acquirers and the significance of this difference-in-difference. Finally, column (iv) reports the difference in DID between the constrained and unconstrained acquirers.

Overall, consistent with acquisitions alleviating constraints, there is an increase in long-term debt for all acquirers following an acquisition relative to their matched non-acquiring counterparts. Specifically, we see increases of approximately 11.3%, 7.2%, 2.4%, and 0.8.% in long-term debt for acquiring firms relative to matched non-acquirers 2, 4, 6, and 8 quarters post acquisition, respectively. These changes are significant at 2 and 4 quarters, but insignificant at 6 and 8 quarters post acquisition.

As before, the full sample is partitioned into unconstrained and constrained firms. For the unconstrained acquirers, there is a decrease in long-term debt issuances for the quarters following the acquisition relative to the matched non-acquiring firms, significant at 6 and 8 quarters post-acquisition. For the constrained firms, there is an increase in long-term debt for acquirers relative to matched non-acquirers following the acquisition. This increase in long-term debt is increasing in both magnitude, from a 5.3% increase over matched non-acquirers 2 quarters post to a 12.8% increase 8 quarters post, and significant, with the difference-in-difference significant at the 5% level by 4 quarters post acquisition and 1% level by 6 and 8 quarters post. That the relative increase in debt issuance for constrained acquirers is more pronounced over time supports the idea that the acquisition has a long-term effect on financially constrained firms' ability to access external capital markets. A comparison of the constrained and unconstrained acquirers relative to their matched non-acquirers shows that the constrained acquirers increase their long-term debt by 12.8% relative to matched non-acquirers at 8 quarters after acquisition while the unconstrained acquirers decrease long-term debt by 23.7% relative to matched non-acquirers 8 quarters post. The difference in DID in column (iv) is higher for constrained acquirers relative to unconstrained acquirers and with at least a 5% significance for 4, 6, and 8 quarters following acquisition, providing strong evidence of

easing of financing constraints for constrained acquirers.

These results are corroborated by the analysis on the highly unconstrained and constrained firms and are consistent with the previous finding that alleviation of constraints in M&A is enjoyed primarily by the constrained acquirers. The results for the highly constrained firms take longer to increase significance, indicating that the impact on access to external markets could take more time the more initially constrained the firm.

The above results are based on long-term debt issuances as reported by firms on their statement of cash flows. For robustness, we also collect data on debt issues from the Thomson Reuters SDC Global Issues database from 1985 to 2013. Total proceeds from debt financing across debt issuances are aggregated by firm-quarter and merged into the propensity score matched sample. Table X repeats the above analysis examining changes in the natural log of debt issuances 2, 4, 6, and 8 quarters post acquisition relative to one year prior to acquisition for (i) actual acquirers, (ii) matched non-acquirers, (iii) the difference-in-difference, and (iv) the difference-in-difference-in-difference. Although significances are weaker using debt issuance from the SDC database, the results are generally consistent with those observed in Table IX, evidencing an increase in debt issuance for constrained acquirers relative to their matched non-acquirers. Altogether, these results from Tables IX and X confirm that the relaxing of financing constraints post acquisition by constrained acquirers lead to increases in debt issuance. More specifically, the relaxing of financing constraints documented in the above sections do appear to translate to actual better access to and use of debt markets for constrained acquirers following an acquisition.

## 4.2 Post-Acquisition Investments

Financing constraints prevent firms from accessing their first-best source of financing and, as a result, prevent firms from making their first-best level of investment. The relaxing of financing constraints and the increasing of debt issuance for constrained acquirers, evidenced in the previous sections, are important as they potentially impact real investments. Defining investments as the sum of capital expenditures and research and development (R&D) expense, this section repeats the previous analysis using the propensity score matched sample by tracking changes in investments post acquisition in Table XI.

Panels A through D of Table XI present the changes in the natural log of investments 2, 4, 6, and 8 quarters post acquisition relative to one year prior to acquisition for the (i) actual acquirers, (ii) matched non-acquirers, (iii) difference-in-difference between actual acquirers and matched non-acquirers, and (iv) difference-in-difference-in-difference. In the full sample, there is a significant increase in investments for actual acquirers relative to non-acquirers 2 and 4 quarters post-acquisition, but no change at 6 and 8 quarters.

For the constrained and unconstrained partitions, there is a reduction in investment following acquisition for unconstrained acquirers while for constrained acquirers there is a significant increase in investment 2 quarters post acquisition. When acquiring firms are compared to the matched non-acquirers, unconstrained acquirers decrease investment by 20.3%, 28.2%, 35.1% and 38.1% relative to unconstrained non-acquires for 2, 4, 6, and 8 quarters following acquisitions, respectively. In contrast, constrained acquirers increase investment relative to non-acquirers by 0.6%, 3.6%, 3.6% and 6.8% for 2, 4, 6, and 8 quarters post acquisition. Though this increase is only significant at the 1% level at 8 quarters post-acquisition, the difference in DID is significant for all periods, as shown in column (iv) of each panel. That is, relative to the unconstrained acquirers, constrained acquirers significantly invest more in relation to their matched non-acquiring firms. Importantly, at a minimum, constrained acquirers maintain their investment level following acquisitions and there is a positive trend in the relative investment level, which is opposite of that observed for the unconstrained acquirers.

The results are even stronger for the highly unconstrained and highly constrained firms. There is a more severe drop in investment for highly unconstrained acquirers relative to matched non-acquirers, significant at the 1% level in every quarter post acquisition. Similarly, there is a stronger increase in investments for highly constrained acquirers relative to their matched counterparts, significant at the 10% level 6 quarters post acquisition and at the 5% level 8 quarters post acquisition. As with the above findings, constrained acquirers can loosen their financing constraints through acquisitions and this results in real improvements in the firm's ability to raise debt financing and make investments, above those observed in the matched non-acquirers, post acquisition. These results are counter to the results for unconstrained acquirers who reduce debt issuance and investments relative to their matched firms following acquisition.

Similar to the general results on constraints, one potential concern may be that the relative increase in investments for constrained acquirers is driven by larger relative size of acquisitions. In other words, the increase in investment could simply be driven by the size of the target relative to acquirers. For robustness, we repeat the approach in to control for the potential influence of relative size, see Section 3.3.2, by sorting firms based on their relative size differentials (total assets 2 quarters post acquisition relative to one year prior to acquisitions over total assets one year prior to acquisition) and repeating the analysis in Table XI for the Low Size Change and High Size Change firms.[12] The results are robust to this procedure and find significant relative increases in investments for constrained acquirers among both the Low Size Change and High Size Change bins.

Consistent with the above findings, constrained acquirers can loosen their financing constraints through acquisitions and this results in real improvements in the firms use of external debt financing and real investments, relative to their matched non-acquirers. These results are counter to the results for unconstrained acquirers who reduce debt issuance and investments relative to their matched non-acquiring firms following acquisition.

## 4.3 Firm Performance Following Announcement

Finally, having shown that acquisitions alleviate constraints for constrained acquirers and that this translates into real improvements in use of external capital and increases in investments, it is informative to examine whether this ultimately improves firm value by examining investor reaction to the acquisition. To evaluate the market reaction to the acquisition, we examine firm performance around the announcement date through an event study. Daily returns and market factors are obtained from the CRSP database from 1984 to 2012 and daily buy-and-hold abnormal returns are estimated for all acquirers in our M&A sample with non-missing returns data. Daily abnormal returns are calculated as actual daily returns net of expected daily returns. Expected daily returns are estimated using the Carhart (1997) four factor model that includes the Fama and French (1993) 3-factors (MKTRF, SMB, HML) and includes a momentum factor (UMD) over a one-year estimation window of [-395,-30] that allows for news leakage of the acquisition to the market in the 30 days prior to announcement.

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[12]For brevity, results are unreported, but available from the authors.

Figure 1 shows the buy-and-hold abnormal returns over the [-21,21] day window around the announcement date for all acquirers in our M&A sample merged with returns data. On average, there is a 0.71% (or 71 basis point) increase in abnormal returns over the 2 day window that covers [-1,1] days around announcement. By week three, abnormal returns have almost returned to where they were prior to acquisition. Figure 2, Panel A splits acquirers into Constrained and UnConstrained based on sorting FC5Pred into terciles. As before, Constrained (UnConstrained) acquirers are those with FC5Pred in the top (bottom) tercile of FC5Pred one year prior to announcement. The abnormal returns for constrained acquirers are more volatile than for the unconstrained acquirers. In general, unconstrained acquirers have higher abnormal returns than constrained acquirers. However, the increase in abnormal returns over the [-1,1] day window around announcement is larger for constrained acquirers (1.04%) than for unconstrained acquirers (0.19%). This difference is statistically significant at the 1% level.

One implication from previous results is that a diverse firm has lower constraints than a single-segment firm. This suggests that there may a benefit to diversifying acquisitions for constrained acquirers and these acquirers should see an improvement in firm performance following announcement. On the other hand, existing literature in the M&A literature document a diversification discount from mergers between firms in different industries (e.g., Lang and Stulz (1994), Berger and Ofek (1995)), implying investors find more valuable synergies from mergers between firms within the same industry. This would suggest that diversifying acquisitions would have a negative effect on firm performance following announcement.

We further split Constrained (UnConstrained) acquirers into those that make a diversifying acquisition and those that do not. Figure 2, Panel B presents the difference in abnormal returns between diversifying and focused acquisitions for constrained and unconstrained firms. During the day of announcement, constrained firms that make a diversifying acquisition see an abnormal return of 1.0% higher than constrained firms that make a focused acquisition, suggesting that the market sees value in acquiring a target in a different industry for constrained acquirers. In contrast, on the day of announcement, unconstrained firms that make a diversifying acquisition see an abnormal return of -1.1% relative to unconstrained acquirers that acquire a target in the same industry, confirming the diversification discount. This difference is statistically significant at the 1% level.

Indeed, over the next three weeks, diversifying acquisitions by constrained firms on average earn positive abnormal returns over focused acquisitions by constrained firms whereas unconstrained firms realize a diversification discount. This suggests that the diversification discount does not exist (and may possibly point to a diversification premium) for the constrained acquirers. This is consistent with a general improvement in the health of constrained firms following acquisitions, specifically diversifying acquisitions that has the potential to alleviate financing constraints.

## 5  Conclusion

With imperfect capital markets, firms with financing constraints may have to pass on positive NPV investments as they lack access to external capital markets at reasonable costs. To date, the financing constraints literature assumes that firms are not able to impact their own financing constraint status and changes in a firm's financing constraints are primarily driven by changes in the external capital markets or changes to the firm's environment due to the actions of other firms (e.g., being acquired). This paper studies the extent to which acquisitions can alleviate financing constraints for the acquirers.

Using a measure of financing constraints that combines popular measures in the literature, the paper examines the persistence of financing constraints across time and whether firms can use acquisitions to ease financing constraints. The results show that financing constraints change over time, taking on average under two years to make a substantial change. Additionally, multi-segment firms face lower financing constraints than single-segment firms. The paper next investigates the effectiveness of using acquisitions to alleviate financing constraints for the constrained acquirer. First, the paper finds that acquirers constrained one year prior to acquisition are more likely to use undervalued equity to fund the acquisition. Consistently, constrained acquirers are more likely to target firms that are less constrained, have more cash flows, and have larger cash holdings relative to themselves. Focused constrained firms are slightly more likely to make diversifying acquisitions than focused unconstrained firms.

Next, using a propensity score matched sample, the results show that constrained acquirers are less constrained from two quarters up to two years post acquisition relative to the matched, constrained, non-acquiring firms. Interestingly, unconstrained acquirers are more constrained

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relative to their matched, unconstrained non-acquirers post acquisition. These findings are stronger for diversifying acquisitions than for non-diversifying acquisitions and are not driven by constrained acquirers making larger acquisitions. Additionally, there is a significantly greater loosening of financing constraints for constrained acquirers relative to matched constrained non-acquirers that do a SEO. This provides robust evidence that acquisition activity eases financing constraints for constrained acquirers.

Additionally, the post-acquisition impact from the easing of financing constraints through the acquisition reveals that constrained acquirers issue more debt relative to their propensity score matched, constrained, non-acquirers post acquisition. Constrained acquirers also have higher combined capital expenditures and R&D expenses post acquisition relative to their matched, constrained non-acquirers. In contrast, unconstrained acquirers issue less debt and invest less than their matched, unconstrained counterparts. These results confirm that the observed improvement of financing constraints for the constrained acquirers translate to improved access to external capital and increases real investment. Finally, the results show that constrained acquirers realize positive abnormal returns to the acquisition and do not experience a diversification discount whereas unconstrained acquirers do.

Overall, this paper finds that mergers and acquisitions can be a useful tool in alleviating financing constraints for constrained firms. Importantly, the results highlight the importance and benefits of considering financial synergies in mergers and acquisitions.

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## Appendix A

### Appendix A.1   Whited and Wu Index (WW)

Whited and Wu (2006) provide a structural approach to financing constraints by extending the model introduced in Whited (1992). In Whited (1992) and Whited and Wu (2006), firms optimize their value subject to financing constraints. The Lagrange multiplier on the financing constraint captures the firm's degree of being financially constrained. Whited and Wu (2006) parameterize the Lagrange multiplier using firm characteristics and estimate its coefficients using generalized method of moments. The resulting Whited and Wu (2006) measure is comprised of an index of firm characteristics that are related to a firm being financially constrained. This index is defined as:

$$
\begin{aligned}
\text{WW}_{i,t} = \quad &-0.091 \times \text{CF}_{i,t} - 0.062 \times \text{DDIV}_{i,t} + 0.021 \times \text{LTD}_{i,t} - 0.044 \times \text{SIZE}_{i,t} \\
&+0.102 \times \text{ISG}_{i,t} - 0.035 \times \text{SG}_{i,t},
\end{aligned}
\tag{A.1}
$$

where CF is cashflows over total assets, DDIV is an indicator for a dividend-paying firm, LTD is long-term debt over total assets, SIZE is the natural log of book assets, ISG is the sales growth in the firm's 3-digit SIC industry, and SG is the firm's one quarter sales growth. Since this approach proxies for growth opportunities using sales growth relative to industry sales growth, this approach has the additional benefit of avoiding mismeasurement errors in Tobin's Q (Erickson and Whited, 2000 and 2010). Effectively, the WW index suggests that a firm is financially constrained if it is a slow growing firm in a fast growing industry. The higher the WW index, the more constrained the firm.

### Appendix A.2   Hadlock and Pierce Size-Age Index (HPSA)

Hadlock and Pierce (2010) propose a new measure for financing constraints based on the size and age of a firm. The authors follow the approach introduced in Kaplan and Zingales (1997) by collecting qualitative information provided in the annual reports and classifying firms into financial constraint categories. Firms are classified into five groups: not financially constrained (NFC), likely not financially constrained (LNFC), potentially financially constrained (PFC), likely financially constrained (LFC), and financially constrained (FC). Using this classification scheme, ordered

logit models are estimated to determine the impact of firm characteristics on being financially constrained. Among various the firm characteristics that are tested, Hadlock and Pierce (2010) find that firm size and firm age are the two characteristics that appear to be more related to being financially constrained while being less likely to be endogenous. They construct an index using only firm size and age to measure financial constrainedness. This index is defined as:

$$\text{HPSA}_{i,t} = -0.737 \times \text{FirmSize}_{i,t} + 0.043 \times \text{FirmSize}_{i,t}^2 - 0.040 \times \text{FirmAge}_{i,t}, \qquad \text{(A.2)}$$

where FirmSize is the log of book assets adjusted for inflation using 2004 dollars and replaced with log($4.5billion) if the actual value is greater, and FirmAge is the number of years the firm has been on Compustat with a non-missing stock price and replaced with 37 if the actual age is greater. The higher the HPSA index, the more constrained the firm.

## Appendix B

Here, we provide detailed descriptions of the variables used in the analysis and variables included in the summary statistics reported in Table I. Abbreviations in parentheses indicate the corresponding Compustat quarterly industrial data items.

| Variable | Description |
|---|---|
| Total Assets | Assets - Total (ATQ) * Adjustment to 2004 Dollars |
| Mkt Equity | Price-Close-Quarter (PRCCQ) * Common Shares Outstanding (CSHOQ) * Adjustment to 2004 Dollars |
| Ln Total Assets (LnTA) | ln{Total Assets} |
| Book-to-Market Ratio (BTM) | $\frac{\text{Total Common Equity (CEQQ)}}{\text{Price-Close-Quarter (PRCCQ) * Common Shares Outstanding (CSHOQ)}}$ |
| Long-term Debt Ratio (LTDebt/TA) | $\frac{\text{Debt - Long-term - Total (DLTTQ)}}{\text{Assets - Total (ATQ)}}$ |
| Sales Growth (SaleGr) | $\frac{\text{Sales/Turnover (Net)} - lag(\text{Sales/Turnover (Net)})}{lag(\text{Sales/Turnover (Net)})}$ |
| Tangibility / TA  as defined in Almeida and Campello (2007) | $\frac{0.715*\text{Receivables} + 0.547*\text{Inventory} + 0.535*\text{Capital}}{\text{Assets - Total (ATQ)}}$ |
| Cash / TA | $\frac{\text{Cash and Short Term Investments}}{\text{Assets - Total (ATQ)}}$ |
| Capex / TA | $\frac{\text{Quarterly Capital Expenditure}}{\text{Assets - Total (ATQ)}}$,    0 if missing |

where Quarterly Capital Expenditure is the capital expenditure over the quarter. Compustat Quarterly provides the accumulated capital expenditure over the fiscal year, i.e., Capital Expenditure in quarter 1 is the capital expenditure over quarter 1 and Capital Expenditure in quarter 2 includes the capital expenditure made in both quarters 1 and 2.

| | |
|---|---|
| Quarterly Capital Expenditure | $\begin{cases} \text{Capital Expenditure (CAPXY)}_t & \text{for t=1} \\ \Delta\text{Capital Expenditure (CAPXY)}_{t-1,t} & \text{for t=2 to 4} \end{cases}$ |
| R&D / TA | $\frac{\text{Research and Development Expense (XRDQ)}}{\text{Assets - Total (ATQ)}}$,    0 if missing |
| Payout Ratio | $\frac{\text{Total Dividends+Shares Repurchased (PRSTKCQ)}}{\text{Operating Income (OIBDPQ)}}$ |
| hasDiv | = 1 if Total Dividends >0, 0 otherwise |

| Variable | Description |
|---|---|
| hasLTDR | = 1 if S&P long-term debt credit rating is non-missing, 0 otherwise |
| hasSTDR | = 1 if S&P commercial paper rating is non-missing, 0 otherwise |
| hasInvGrLTDR | = 1 if S&P long-term debt credit rating is investment grade, 0 if S&P Long-term debt credit rating is not investment grade but non-missing |
| hasInvGrSTDR | = 1 if S&P commercial paper credit rating is investment grade, 0 if S&P Short-term debt credit rating is not investment grade but non-missing |

**Appendix C**

In order to address the issue of whether financing constraints are mitigated through the M&A event or whether characteristics of acquirers lead to the improvement of financing constraints, we perform a propensity score matching algorithm to identify potential acquirers with similar characteristics to the actual acquirers but did not actually undergo a merger and acquisition.

First, we use our main sample described in section 2 and identify firms that actually acquired in a particular quarter, isAcq=1, and firms that are non-acquirers, isAcq=0. To be considered a non-acquirer, the firm must not have acquired within a four year window centered on the relevant quarter, i.e., within two years on either side of the relevant quarter. This restriction allows us to cleanly track firms over two years. Next, we run the following logitistic regression of isAcq on a set of lagged firm characteristics:

$$
\begin{aligned}
\text{isAcq}_{i,t} = \quad & \alpha_0 + \alpha_1 \text{SIC3Adj\_ROA}_{i,t-1} + \alpha_2 \text{LnMktEquity}_{i,t-1} + \alpha_3 \text{SIC3Adj\_LTDebt/TA}_{i,t-1} \\
& + \alpha_4 \text{Tangibility/TA}_{i,t-1} + \alpha_5 \text{SaleGr}_{i,t-1} + \alpha_6 \text{MTB}_{i,t-1} + \alpha_7 \text{DivYield}_{i,t-1} \\
& + \alpha_8 \text{NOInc/TA}_{i,t-1} + \alpha_9 \text{isDiverse}_{i,t-1} + \alpha_{10} \text{LnTotAcqSIC3}_{i,t-1} \\
& + \alpha_{11} \text{FC5Pred}_{i,t-1} + \varepsilon_{i,t}.
\end{aligned}
$$

$$(\text{C.1})$$

In choosing our list of characteristics for acquirers, we follow Billett and Xue (2007) and Jordan, Liu, and Wu (2014). We match based on the firm's return on assets adjusted by the average SIC3 industry ROA (SIC3Adj_ROA), natural log of market equity (LnMktEquity), long-term debt to total assets adjusted by the average SIC3 industry leverage ratio (SIC3Adj_LTDebt/TA), the tangibility of the firm to assets as defined in Appendix B and detailed in Almeida and Campello (2007) (Tangibility/TA), the one quarter sales growth (SaleGr), market equity to book equity (MTB), dividend yield (DivYield), and non-operating income to total assets (NOInc/TA). In addition, we also add an indicator variable for a diversified firm (isDiverse) to proxy for the firm's tendency to acquire and the natural log of one plus the total number of acquirers in the firm's SIC3 industry to proxy for industry trends in mergers and acquisitions (LnTotAcqSIC3). Finally, we include the firm's financing constraints as measured by FC5Pred, defined in Section 2.1 and equation (3). Controlling for constraints not only allows us to match accounting for constraints between the acquirer and matched non-acquirers, but also allows us to observe whether being

constrained factors significantly into the decision to become an acquirer. All controls are lagged one quarter and we include year and quarter dummies.

Column (i) in Table C.I presents the results from the logit analysis. It is interesting to note that the coefficient on FC5Pred is positive but insignificant. The predicted values from this logit regression provide us with the propensity scores upon which we base our matches. We match each acquirer with the five nearest neighbor non-acquirers with replacement in the relevant quarter. Column (ii) repeats the logit analysis using only the matched sample consisting of the actual acquirers and the matched non-acquirers. The results confirm that in our matched sample our covariates have no significant explanatory power between our treatment (actual acquirers, isAcq=1) and control groups (matched non-acquirers, isAcq=0) and the pseudo $R^2$ is close to 0. In other words, we have good covariate balance in our match.

Columns (iii) and (iv) of Table C.I report the means of each control variable for the actual acquirers and matched non-acquirers, respectively. Column (v) presents the p-value from the t-test on the difference in means between the actual acquirers and the matched firms. Reassuringly, and as expected, all of the control variables are statistically indistinguishable between the actual acquirers and matched non-acquirers.

Table C.I: Logit regression for propensity score matching. The dependent variable is isAcq, an indicator variable that equals to 1 if the firm is an acquirer in a specific firm-quarter and 0 if the firm has not acquired within the two years surrounding the relevant quarter. All explanatory variables are lagged one quarter. SIC3Adj_ROA is the return on assets adjusted by the average SIC3 industry ROA. LnMktEquity is the log of the market capitalization. SIC3Adj_LTDebt/TA is the ratio of long-term debt to total book assets adjusted by the average SIC3 industry long-term debt ratio. SaleGr is the one quarter sales growth for the firm. Tangibility/TA is the firm's tangible assets to total assets as defined in Almeida and Campello (2007). MTB is the ratio of market equity to book equity. DivYield is the dividend yield. NOInc/TA is the non-operating income as a ratio to total assets. isDiverse is an indicator variable for whether the firm has business segments in more than one 3-digit SIC industry. LnTotAcqSIC3 is the natural log of one plus the total number of acquirers in a SIC3 industry in the quarter to proxy for industry trends in M&As. FC5Pred is the composite financing constraint measure defined in Section 2.1 and equation (3). Standard errors are reported in the parentheses and clustered by both firm and year-quarter as in Petersen (2009). Significance at the 10% level is indicated by *, 5% level by **, and 1% level by ***.

| | All Firms Logit (i) | Matched Sample Logit (ii) | Matched Acquirers (iii) | Non-Acquirers (iv) | p-value (v) |
|---|---|---|---|---|---|
| l1_SIC3_ROA | 2.138 *** | 0.067 | -0.001 | -0.001 | 0.982 |
| | (0.349) | (0.359) | | | |
| l1_LnMktEquity | 0.076 *** | 0.010 | 5.543 | 5.548 | 0.860 |
| | (0.018) | (0.018) | | | |
| l1_SIC3_LTDebt/TA | -0.254 *** | 0.103 | 0.021 | 0.020 | 0.489 |
| | (0.092) | (0.095) | | | |
| l1_Tangibility/TA | 0.767 *** | 0.107 | 0.542 | 0.540 | 0.366 |
| | (0.108) | (0.104) | | | |
| l1_SaleGr | -0.119 ** | 0.016 | 0.044 | 0.043 | 0.715 |
| | (0.058) | (0.062) | | | |
| l1_MTB | -0.008 | 0.000 | 2.823 | 2.798 | 0.487 |
| | (0.007) | (0.007) | | | |
| l1_DivYield | -0.302 | -0.457 | 0.007 | 0.007 | 0.419 |
| | (1.119) | (1.159) | | | |
| l1_NOInc/TA | 0.294 | -1.314 | 0.002 | 0.002 | 0.886 |
| | (3.037) | (3.459) | | | |
| l1_isDiverse | -0.104 *** | 0.032 | 0.296 | 0.292 | 0.572 |
| | (0.038) | (0.040) | | | |
| l1_LnTotAcqSIC3 | -0.013 | -0.004 | 0.704 | 0.701 | 0.763 |
| | (0.022) | (0.024) | | | |
| l1_FC5Pred | 0.001 | 0.009 | 5.596 | 5.568 | 0.502 |
| | (0.013) | (0.014) | | | |
| Constant | -5.968 *** | -1.781 *** | | | |
| | (0.272) | (0.166) | | | |
| | | | | | |
| Time Dummies? | Y | Y | | | |
| No. Obs. | 312498 | 34044 | 5675 | 28369 | |
| Pseudo $R^2$ | 0.0097 | 0.0001 | | | |

Table I: Sample summary statistics of financing constraint variables and common firm characteristics for the sample of Compustat firm-quarter observations that have non-missing financing constraint variables from 1985 to 2013. Panel A provides the summary statistics. Panel B presents the pairwise correlation matrix. WW is the Whited and Wu (2006) financing constraint index and HPSA is the Hadlock and Pierce (2010) size-age index. FC5 is a composite financing constraint measure defined as WW5+HPSA5+CR3, where WW5 sorts WW into quintiles (0 to 4) each quarter, HPSA5 sorts HPSA into quintiles (0 to 4) each quarter, and CR3 is defined as 0 for a firm with investment-grade credit ratings, 1 for a firm with non-investment grade credit ratings, and 2 for a firm with no credit ratings. The composite measure, FC5, ranges from 0 (least constrained) to 10 (most constrained). FC5Pred is obtained by taking the predicted value from regressing FC5 on WW, HPSA, hasLTCR, hasSTCR, hasInvGrLTCR, and hasInvGrSTCR, where hasLTCR (hasSTCR) is an indicator variable for whether the firm has a S&P long-term debt (commercial paper) credit rating and hasInvGrLTCR (hasInvGrSTCR) is an indicator for whether the firm has an investment-grade S&P long-term debt (commercial paper) credit rating. BTM is the firm's book equity to market equity ratio, LTDebt/TA is the long-term debt to total assets, Sales Growth is the one-year growth rate in the firm's sales, PPE/TA is the firm's plants, properties, and equipment (i.e., tangible assets) to total assets, Cash/TA is the cash holdings to total assets, Capex/TA is the firm's capital expenditure to total assets, R&D/TA is the firm's research and development expense to total assets, CapexRD/TA is the sum of capital expenditure and R&D expense to total assets, and the payout ratio is the firm's dividends and share repurchases to total assets.

Panel A: Sample w/ Non-Missing Financing Constraint Measures

| | No. Obs | Mean | Std Dev | 1% | 25% | 50% | 75% | 99% |
|---|---|---|---|---|---|---|---|---|
| WW | 450829 | -0.243 | 0.114 | -0.512 | -0.320 | -0.236 | -0.161 | -0.004 |
| HPSA | 450829 | -2.994 | 0.795 | -4.621 | -3.524 | -3.012 | -2.468 | -1.109 |
| FC5 | 450829 | 5.935 | 3.048 | 0 | 4 | 6 | 8 | 10 |
| FC5Pred | 450829 | 5.943 | 2.936 | -1.013 | 4.110 | 6.251 | 8.035 | 11.695 |
| | | | | | | | | |
| Total Assets ($M) | 450829 | 1753.0 | 8260.0 | 2.9 | 35.5 | 144.2 | 701.7 | 30116.0 |
| Mkt Equity ($M) | 450829 | 1840.5 | 9166.5 | 2.1 | 31.9 | 141.6 | 708.5 | 32641.6 |
| BTM | 450829 | 0.677 | 0.564 | 0.067 | 0.305 | 0.523 | 0.860 | 2.947 |
| LTD/TA | 448491 | 0.155 | 0.168 | 0.000 | 0.002 | 0.104 | 0.261 | 0.640 |
| Sales Growth | 442645 | 0.050 | 0.279 | -0.559 | -0.069 | 0.021 | 0.121 | 1.216 |
| PPE/TA | 446797 | 0.294 | 0.242 | 0.006 | 0.097 | 0.223 | 0.435 | 0.905 |
| Cash/TA | 449890 | 0.176 | 0.213 | 0.000 | 0.022 | 0.084 | 0.254 | 0.882 |
| Capex/TA | 439571 | 0.016 | 0.019 | 0.000 | 0.004 | 0.009 | 0.020 | 0.098 |
| RD/TA | 445811 | 0.009 | 0.019 | 0.000 | 0.000 | 0.000 | 0.009 | 0.094 |
| CapexRD/TA | 440819 | 0.027 | 0.029 | 0.000 | 0.007 | 0.017 | 0.036 | 0.142 |
| Payout Ratio | 433032 | 0.137 | 0.412 | 0.000 | 0.000 | 0.000 | 0.067 | 2.209 |
| hasDiv | 450829 | 0.289 | 0.453 | 0 | 0 | 0 | 1 | 1 |
| hasLTCR | 450829 | 0.193 | 0.395 | 0 | 0 | 0 | 0 | 1 |
| hasSTCR | 450829 | 0.057 | 0.233 | 0 | 0 | 0 | 0 | 1 |
| hasInvGrLTCR | 450829 | 0.096 | 0.295 | 0 | 0 | 0 | 0 | 1 |
| hasInvGrSTCR | 450829 | 0.056 | 0.229 | 0 | 0 | 0 | 0 | 1 |

Panel B: Pairwise Correlation Matrix

| | WW | HPSA | FC5 | FC5Pred |
|---|---|---|---|---|
| WW | 1.0000 | | | |
| HPSA | 0.8007 | 1.0000 | | |
| FC5 | 0.8951 | 0.8908 | 1.0000 | |
| FC5Pred | 0.9353 | 0.9298 | 0.9582 | 1.0000 |
| | | | | |
| hasLTCR | -0.5532 | -0.5215 | -0.6759 | -0.7032 |
| hasSTCR | -0.4237 | -0.3610 | -0.4539 | -0.4761 |
| hasInvGrLTCR | -0.5110 | -0.4377 | -0.5860 | -0.6095 |
| hasInvGrSTCR | -0.4185 | -0.3577 | -0.4506 | -0.4724 |
| hasDiv | -0.5956 | -0.4751 | -0.5735 | -0.5540 |
| Cash/TA | 0.2588 | 0.2658 | 0.3055 | 0.2833 |
| Excess Cash/TA | -0.0476 | -0.0516 | -0.0459 | -0.0510 |

Table II: Basic analysis and validity check for the composite financing constraint measure, FC5Pred. Panel A reports the frequency and timing of switching between financing constraint bins. Firms are sorted based on FC5Pred and assigned into terciles every quarter. For each firm, the number of switches is recorded under Num Switches, the average number of quarters between switches is recorded under Avg. Num Qrtrs, the median number of quarters between switches is recorded under Med. Num Qrtrs, and the maximum number of quarters between switches is recorded under Max. Num Qrters. The distribution for the average, median, and maximum switch times for all firms are reported below. Panel B tests the relationship between firm structure and financing constraints. We use three variables to measure a diversified firm. isDiverse is an indicator variable for whether the firm has business segments in more than one 3-digit SIC industry. nDistSeg is the number of distinct 3-digit SIC industries in which the firm has business segments. HHI_Seg is the Herfindahl-Hirschman Index for the distinct business segments of the firm using sales and proxies for the sales concentration by business segments within the firm. 1-HHI_Seg measures the diversification of the firm's business segments by sales. MainSIC3_FC is the average FCPred5 for firms within the same main SIC3 industry. isDiverse*MainSIC3_FC, nDistSeg*MainSIC3_FC, and 1-HHI_Seg*MainSIC3_FC are the interaction terms between the diversification state of a firm and the constrainedness of its main SIC3 industry. Standard errors are reported in the parentheses and clustered by both firm and year-quarter as in Petersen (2009). Significance at the 10% level is indicated by *, 5% level by **, and 1% level by ***.

| Panel A: FC5Pred sorted into terciles | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Change in Bins | | -2 | -1 | 0 | 1 | 2 | | |
| Frequency | | 459 | 26832 | 345595 | 24827 | 370 | | |
| % of Sample | | 0.1% | 6.7% | 86.8% | 6.2% | 0.1% | | |
| | N | Mean | Std Dev | 1% | 25% | 50% | 75% | 99% |
| Num Switches By Firm | 7317 | 7.136 | 7.813 | 1.0 | 2.0 | 4.0 | 9.0 | 38.0 |
| Avg. Num Qrtrs By Firm | 7317 | 6.266 | 8.492 | 1.0 | 2.0 | 3.5 | 7.0 | 44.0 |
| Med. Num Qrtrs By Firm | 7317 | 4.495 | 8.511 | 1.0 | 1.0 | 1.5 | 3.5 | 44.0 |
| Max. Num Qrtrs By Firm | 7317 | 16.440 | 16.621 | 1.0 | 4.0 | 11.0 | 23.0 | 76.0 |

| | Panel B: Financing Constraint Composite FC5Pred | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (i) | (ii) | (iii) | (iv) | (v) | (vi) | (vii) | (viii) |
| isDiverse | -1.352 *** | | | | -1.526 *** | | | |
| | (0.064) | | | | (0.162) | | | |
| nDistSeg | | -0.976 *** | | | | -0.552 *** | | |
| | | (0.032) | | | | (0.067) | | |
| 1-HHI_Seg | | | -2.270 *** | -1.768 *** | | | -1.843 *** | -0.828 *** |
| | | | (0.089) | (0.110) | | | (0.215) | (0.269) |
| MainSIC3_FC | | | | | 0.910 *** | 0.947 *** | 0.933 *** | 1.022 *** |
| | | | | | (0.019) | (0.027) | (0.018) | (0.032) |
| isDiverse*MainSIC3_FC | | | | | 0.111 *** | | | |
| | | | | | (0.027) | | | |
| nDistSeg*MainSIC3_FC | | | | | | -0.021 * | | |
| | | | | | | (0.013) | | |
| 1-HHI_Seg*MainSIC3_FC | | | | | | | 0.048 | -0.089 ** |
| | | | | | | | (0.037) | (0.044) |
| Constant | 7.179 *** | 8.339 *** | 7.034 *** | 6.633 *** | 0.953 *** | 1.591 *** | 0.751 *** | 0.014 |
| | (0.090) | (0.097) | (0.086) | (0.130) | (0.133) | (0.172) | (0.126) | (0.213) |
| Quarter Dummies? | Y | Y | Y | Y | Y | Y | Y | Y |
| Year Dummies? | Y | Y | Y | Y | Y | Y | Y | Y |
| No. Obs. | 450829 | 450829 | 450829 | 140767 | 450829 | 450829 | 450829 | 140767 |
| Adjusted $R^2$ | 0.0861 | 0.1260 | 0.0992 | 0.0969 | 0.2888 | 0.3075 | 0.2967 | 0.3064 |

Table III: Method of payments, results from estimation of equation (6). isShares is a binary variable that takes the value of 1 if the firm uses shares as a method of payment in the acquisition, and 0 otherwise. Column (i) uses the sample of acquirers with Compustat data. Column (ii) uses only the acquisitions in which the acquirer is defined to be undervalued (IsUnderVal=1) and column (iii) uses only the acquisitions in which the acquirer is defined to be overvalued (IsOverVal=1). We define a firm to be undervalued (overvalued) if it has a negative (positive) firm-specific error based on the Rhodes-Kropf Robinson, and Viswanathan (2005) decomposition of the market-to-book ratio into three components: firm-specific error, time-series sector error, and long-run market-to-book. FC5Pred is the firm's financing constraint measure one year prior to announcement. DealVal/TA is the total dollar value of the deal as a ratio to total assets one year prior to announcement. LnTA is the natural log of total assets one year prior to announcement. BTM is the book equity-to-market equity ratio one year prior to announcement. Standard errors are reported in the parentheses and clustered by both firm and year-quarter as in Petersen (2009). Significance at the 10% level is indicated by *, 5% level by **, and 1% level by ***.

|  | isShares | | |
|---|---|---|---|
|  | All | isUnderVal=1 | isOverVal=1 |
|  | (i) | (ii) | (iii) |
| Acq_FC5Pred | 0.251 *** | 0.397 ** | 0.131 |
|  | (0.071) | (0.186) | (0.144) |
| Acq_DealVal/TA | 0.133 * | 0.364 *** | 0.298 |
|  | (0.070) | (0.135) | (0.228) |
| Acq_LnTA | 0.100 | 0.441 * | -0.116 |
|  | (0.091) | (0.262) | (0.187) |
| Acq_BTM | -0.493 ** | -0.212 | -0.262 |
|  | (0.202) | (0.391) | (0.319) |
| Constant | -4.080 *** | -7.369 *** | -2.026 |
|  | (0.934) | (2.609) | (1.796) |
| No. Obs. | 3702 | 516 | 803 |
| Pseudo $R^2$ | 0.0517 | 0.0570 | 0.0829 |

Table IV: Type of acquisitions, results from logit estimation using the sample of acquirer-target pairs merged with Compustat. Panel A runs the analysis for the full sample of acquirer-target pairs, Panel B for the sample of acquirers with low excess cash holdings to total assets one year prior to M&A, and Panel C for the sample of acquirers with high excess cash holdings to total assets one year prior to M&A. Excess cash holdings to total assets is estimated according to Opler, et al (1999). Acquirers are sorted on excess cash holding to total assets one year prior to M&A and categorized as having low (high) excess cash holdings if they fall into the bottom (top) half of the sample. Column (i) runs a logit estimation using isLessFC on acquirer and target characteristics. isLessFC is defined as an indicator variable that takes the value of 1 if the difference between the target's FC5Pred measure one year prior to M&A announcement and acquirer's FC5Pred one-year prior is negative (i.e., the target is less financially constrained than the acquirer), and 0 otherwise. Column (ii) runs a logit estimation using hasMoreCF on acquirer and target characteristics. hasMoreCF is defined as an indicator variable that takes the value of 1 if the difference between the target's cashflow to total assets ratio one year prior to M&A and the acquirer's cashflow to total assets ratio one year prior is positive (i.e., the target has a higher cashflow to assets ratio than the acquirer), and 0 otherwise. Column (iii) runs a logit estimation on hasMoreCash, which takes the value 1 if the target has a higher cash to net assets (total assets minus cash) ratio than the acquirer one year prior to M&A and 0 otherwise. Column (iv) runs a logit estimation on hasMoreSalesGr, which takes the value of 1 if the target has a higher sales growth than the acquirer one year prior to M&A, and 0 otherwise. Given that the SDC M&A database provides the SIC for both acquirers and their targets, column (v) runs a logit estimation on isDiffSIC using the the full sample requiring only acquirers to be merged with Compustat, which takes the value 1 if the target is in a different SIC than the acquirer, and 0 otherwise. Acq_isFC takes the value of 1 if the acquirer has a FC5Pred that falls into the top tercile one year prior to M&A announcement and 0 if FC5Pred falls into the bottom tercile. Acq_isFocused takes the value of 1 if the acquirer is a single-segmented firm prior to acquisition. DealVal/TA is the total dollar value of the deal as a ratio to total assets one year prior to announcement. LnTA is the natural log of total assets one year prior to M&A announcement. BTM is the ratio of book equity to market equity one year prior to announcement. Standard errors are reported in the parentheses and clustered by both firm and year-quarter as in Petersen (2009). Significance at the 10% level is indicated by *, 5% level by **, and 1% level by ***.

Panel A: Full Sample

|  | Pr(is LessFC) (i) | Pr(has MoreCF) (ii) | Pr(has MoreCash) (iii) | Pr(hasMore SalesGr) (iv) | Pr(is DiffSIC) (v) |
|---|---|---|---|---|---|
| Acq_isFC | 2.065 *** | 0.911 * | 1.472 *** | 0.708 | -0.027 |
|  | (0.949) | (0.495) | (0.551) | (0.547) | (0.228) |
| Acq_isFocused |  |  |  |  | -1.019 *** |
|  |  |  |  |  | (0.123) |
| Acq_isFC*isFocused |  |  |  |  | 0.059 |
|  |  |  |  |  | (0.186) |
| Acq_DealVal/TA | -0.271 *** | 0.170 ** | 0.006 | -0.024 | -0.022 |
|  | (0.064) | (0.078) | (0.055) | (0.051) | (0.022) |
| Acq_LnTA | -2.058 *** | 0.224 | 0.413 *** | 0.147 | -0.082 ** |
|  | (0.349) | (0.137) | (0.121) | (0.144) | (0.034) |
| Acq_BTM | 0.575 | 0.513 | -0.257 | -0.193 | -0.093 |
|  | (0.446) | (0.323) | (0.374) | (0.383) | (0.077) |
| Trg_DealVal/TA | 0.119 *** | -0.035 * | 0.223 * | 0.184 * |  |
|  | (0.026) | (0.020) | (0.115) | (0.100) |  |
| Trg_LnTA | 2.497 *** | -0.128 | -0.126 | 0.025 |  |
|  | (0.369) | (0.112) | (0.117) | (0.110) |  |
| Trg_BTM | 0.097 | -0.386 | -0.174 | -0.129 |  |
|  | (0.454) | (0.297) | (0.342) | (0.365) |  |
| Constant | -3.860 ** | -1.040 | -2.421 *** | -1.281 | 1.670 *** |
|  | (1.689) | (0.958) | (0.895) | (0.986) | (0.289) |
| No. Obs. | 231 | 231 | 231 | 231 | 2831 |
| Pseudo $R^2$ | 0.4528 | 0.0305 | 0.0627 | 0.0267 | 0.0354 |

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Panel B: Acquirer with Low Excess Cash / TA

| | Pr(is LessFC) (i) | Pr(has MoreCF) (ii) | Pr(has MoreCash) (iii) | Pr(hasMore SalesGr) (iv) | Pr(is DiffSIC) (v) |
|---|---|---|---|---|---|
| Acq_isFC | 4.142 ** (1.662) | 0.870 (0.924) | 3.588 *** (1.205) | 0.113 (0.903) | -0.169 (0.341) |
| Acq_isFocused | | | | | -1.079 *** (0.160) |
| Acq_isFC*isFocused | | | | | 0.055 (0.282) |
| Acq_DealVal/TA | -0.062 (0.496) | 0.148 (0.125) | 0.286 (0.226) | 0.069 (0.118) | -0.070 * (0.042) |
| Acq_LnTA | -2.278 *** (0.794) | 0.313 (0.206) | 0.633 *** (0.214) | 0.163 (0.215) | -0.079 * (0.047) |
| Acq_BTM | 0.704 (0.666) | 0.524 (0.468) | -0.328 (0.436) | -0.149 (0.772) | -0.167 (0.125) |
| Trg_DealVal/TA | 0.261 (0.262) | 0.518 * (0.312) | 0.174 (0.269) | 0.278 (0.191) | |
| Trg_LnTA | 3.167 *** (0.904) | -0.219 (0.199) | -0.152 (0.209) | 0.086 (0.195) | |
| Trg_BTM | -0.008 (0.810) | 0.186 (0.440) | -0.314 (0.551) | -0.215 (0.622) | |
| Constant | -7.122 ** (3.006) | -2.395 (1.983) | -3.513 ** (1.448) | -1.834 (1.537) | 1.760 *** (0.403) |
| No. Obs. | 101 | 101 | 101 | 101 | 1370 |
| Pseudo $R^2$ | 0.5536 | 0.0827 | 0.1161 | 0.0595 | 0.0455 |

Panel C: Acquirer with High Excess Cash / TA

| | Pr(is LessFC) (i) | Pr(has MoreCF) (ii) | Pr(has MoreCash) (iii) | Pr(hasMore SalesGr) (iv) | Pr(is DiffSIC) (v) |
|---|---|---|---|---|---|
| Acq_isFC | 1.062 (1.172) | 1.359 * (0.747) | 0.278 (0.781) | 1.466 * (0.818) | 0.109 (0.313) |
| Acq_isFocused | | | | | -0.872 *** (0.211) |
| Acq_isFC*isFocused | | | | | -0.060 (0.270) |
| Acq_DealVal/TA | -0.386 * (0.235) | 0.148 (0.148) | 0.231 (0.163) | 0.229 (0.170) | 0.001 (0.044) |
| Acq_LnTA | -2.120 *** (0.718) | 0.191 (0.213) | 0.297 (0.233) | 0.392 (0.251) | -0.093 * (0.055) |
| Acq_BTM | -0.680 (0.833) | 0.449 (0.678) | -0.575 (0.969) | -0.781 (0.755) | 0.031 (0.105) |
| Trg_DealVal/TA | 0.108 *** (0.039) | -0.060 (0.044) | 0.194 (0.173) | 0.134 (0.135) | |
| Trg_LnTA | 2.411 *** (0.706) | 0.041 (0.147) | -0.336 * (0.174) | -0.091 (0.188) | |
| Trg_BTM | 0.275 (0.597) | -0.415 (0.422) | -1.397 ** (0.681) | 0.295 (0.515) | |
| Constant | -2.503 (2.057) | -1.688 (1.518) | -0.109 (1.517) | -2.584 * (1.570) | 1.547 *** (0.442) |
| No. Obs. | 106 | 106 | 106 | 106 | 1457 |
| Pseudo $R^2$ | 0.4084 | 0.0414 | 0.1418 | 0.0625 | 0.0290 |

Table V: Change in financing constraints, using the propensity-score matched sample. For each actual acquirer, we use logit analysis (detailed in Appendix C and presented in Table C.I) to find its five closest matches based on propensity score. Panel A reports the average difference between the FC5Pred composite financing constraint measure two quarter post M&A announcement and one-year prior for (i) the actual acquirer and (ii) its matched non-acquirers. Column (iii) reports the difference-in-difference between the actual acquirer and its matched non-acquirers. Column (iv) reports the difference-in-difference-in-difference between the actual constrained acquirer and its matched unconstrained acquirers and the actual unconstrained acquirers and its matched non-acquirers. Results for all firms, unconstrained firms one year prior to M&A, and constrained firms one year prior to M&A are reported. Firms are classified as unconstrained (constrained) if it falls into the bottom (top) tercile of FC5Pred in a given quarter. Firms are classified as highly unconstrained (constrained) if it falls into the bottom (top) quintile of FC5Pred in a given quarter. Panels B through D reports the difference in FC5Pred between 4, 6, 8 quarters post M&A announcement and one year prior, respectively. Significance of each difference at the 10% level is indicated by *, 5% level by **, and 1% level by ***.

### Panel A: FC5Pred 2-Qrts Post - FC5Pred 1-Yr Prior

| | Acquirer (i) | Matched Firms (ii) | Acquirer − Matched (iii) | ConsDID − UnCDID (iv) |
|---|---|---|---|---|
| **Effective M&A** | | | | |
| Full Sample | -0.348 *** (0.013) | -0.248 *** (0.007) | -0.103 *** (0.014) | |
| UnConstrained | -0.219 *** (0.021) | -0.266 *** (0.014) | 0.054 ** (0.022) | |
| Constrained | -0.567 *** (0.027) | -0.230 *** (0.016) | -0.330 *** (0.028) | -0.385 *** (0.035) |
| Highly UnConstrained | -0.170 *** (0.027) | -0.291 *** (0.018) | 0.126 *** (0.028) | |
| Highly Constrained | -0.662 *** (0.042) | -0.239 *** (0.024) | -0.414 *** (0.045) | -0.541 *** (0.050) |
| **Withdrawn M&A** | | | | |
| Full Sample | -0.184 (0.138) | -0.292 *** (0.056) | 0.108 (0.129) | |

### Panel B: FC5Pred 4-Qrts Post - FC5Pred 1-Yr Prior

| | Acquirer (i) | Matched Firms (ii) | Acquirer − Matched (iii) | ConsDID − UnCDID (iv) |
|---|---|---|---|---|
| **Effective M&A** | | | | |
| Full Sample | -0.408 *** (0.012) | -0.324 *** (0.006) | -0.093 *** (0.014) | |
| UnConstrained | -0.296 *** (0.020) | -0.328 *** (0.013) | 0.039 * (0.022) | |
| Constrained | -0.580 *** (0.026) | -0.292 *** (0.016) | -0.291 *** (0.030) | -0.330 *** (0.036) |
| Highly UnConstrained | -0.250 *** (0.025) | -0.355 *** (0.016) | 0.109 *** (0.028) | |
| Highly Constrained | -0.644 *** (0.043) | -0.278 *** (0.025) | -0.373 *** (0.050) | -0.482 *** (0.053) |
| **Withdrawn M&A** | | | | |
| Full Sample | -0.118 (0.123) | -0.355 *** (0.051) | 0.237 ** (0.120) | |

### Panel C: FC5Pred 6-Qrts Post - FC5Pred 1-Yr Prior

| | Acquirer (i) | Matched Firms (ii) | Acquirer − Matched (iii) | ConsDID − UnCDID (iv) |
|---|---|---|---|---|
| **Effective M&A** | | | | |
| Full Sample | -0.445 *** (0.015) | -0.395 *** (0.008) | -0.055 *** (0.016) | |
| UnConstrained | -0.300 *** (0.023) | -0.420 *** (0.015) | 0.128 *** (0.026) | |
| Constrained | -0.670 *** (0.030) | -0.367 *** (0.019) | -0.296 *** (0.033) | -0.424 *** (0.041) |
| Highly UnConstrained | -0.227 *** (0.031) | -0.448 *** (0.020) | 0.228 *** (0.033) | |
| Highly Constrained | -0.780 *** (0.049) | -0.369 *** (0.029) | -0.408 *** (0.055) | -0.636 *** (0.061) |
| **Withdrawn M&A** | | | | |
| Full Sample | -0.297 ** (0.133) | -0.406 *** (0.079) | 0.109 (0.148) | |

### Panel D: FC5Pred 8-Qrts Post - FC5Pred 1-Yr Prior

| | Acquirer (i) | Matched Firms (ii) | Acquirer − Matched (iii) | ConsDID − UnCDID (iv) |
|---|---|---|---|---|
| **Effective M&A** | | | | |
| Full Sample | -0.512 *** (0.014) | -0.440 *** (0.008) | -0.075 *** (0.016) | |
| UnConstrained | -0.368 *** (0.021) | -0.460 *** (0.015) | 0.099 *** (0.025) | |
| Constrained | -0.703 *** (0.030) | -0.408 *** (0.019) | -0.295 *** (0.034) | -0.394 *** (0.041) |
| Highly UnConstrained | -0.305 *** (0.027) | -0.481 *** (0.018) | 0.178 *** (0.031) | |
| Highly Constrained | -0.756 *** (0.049) | -0.375 *** (0.031) | -0.385 *** (0.057) | -0.563 *** (0.060) |
| **Withdrawn M&A** | | | | |
| Full Sample | -0.288 ** (0.121) | -0.470 *** (0.063) | 0.181 (0.123) | |

Table VI: Change in financing constraints controlling for relative size differentials, using the propensity-score matched sample. For each actual acquirer, we use logit analysis (detailed in Appendix C and presented in Table C.I) to find its five closest matches based on propensity score. Panel A reports the average difference between the FC5Pred composite financing constraint measure two quarter post M&A announcement and one-year prior for (i) the actual acquirer and (ii) its matched non-acquirers. Column (iii) reports the difference-in-difference between the actual acquirer and its matched non-acquirers. Column (iv) reports the difference-in-difference-in-difference between the actual constrained acquirer and its matched non-acquirers and the actual unconstrained acquirers and its matched non-acquirers. Results for all firms, unconstrained firms one year prior to M&A, and constrained firms one year prior to M&A are reported. Firms are classified as unconstrained (constrained) if it falls into the bottom (top) tercile of FC5Pred in a given quarter. Firms are classified as Low (High) Size Change if both their relative size differential sorts into the lower (upper) tercile in each quarter. Relative size differential is calculated by taking ratio of the change in total assets between 2-quarters post-acquisition and one year prior to acquisition over total assets one year prior to acquisition. Only observations where both the actual acquirer and its matched non-acquiring firms sort into the same tercile are retained. Panels B through D reports the difference in FC5Pred between 4, 6, 8 quarters post M&A announcement and one year prior, respectively. Significance of each difference at the 10% level is indicated by *, 5% level by **, and 1% level by ***.

Panel A: FC5Pred 2-Qrts Post - FC5Pred 1-Yr Prior

| | Acquirer (i) | Matched Firms (ii) | Acquirer – Matched (iii) | ConsDID – UnCDID (iv) |
|---|---|---|---|---|
| **Low Size Change** | | | | |
| Full Sample | -0.300 *** (0.021) | -0.254 *** (0.013) | -0.053 ** (0.023) | |
| UnConstrained | -0.206 *** (0.027) | -0.267 *** (0.019) | 0.061 ** (0.030) | |
| Constrained | -0.629 *** (0.053) | -0.215 *** (0.041) | -0.414 *** (0.062) | -0.475 *** (0.066) |
| **High Size Change** | | | | |
| Full Sample | -0.390 *** (0.024) | -0.240 *** (0.011) | -0.169 *** (0.026) | |
| UnConstrained | -0.270 *** (0.049) | -0.233 *** (0.026) | -0.037 (0.052) | |
| Constrained | -0.529 *** (0.042) | -0.214 *** (0.022) | -0.316 *** (0.043) | -0.279 *** (0.076) |

Panel B: FC5Pred 4-Qrts Post - FC5Pred 1-Yr Prior

| | Acquirer (i) | Matched Firms (ii) | Acquirer – Matched (iii) | ConsDID – UnCDID (iv) |
|---|---|---|---|---|
| **Low Size Change** | | | | |
| Full Sample | -0.373 *** (0.020) | -0.336 *** (0.012) | -0.051 ** (0.023) | |
| UnConstrained | -0.301 *** (0.027) | -0.323 *** (0.018) | 0.021 (0.031) | |
| Constrained | -0.604 *** (0.053) | -0.319 *** (0.039) | -0.284 *** (0.067) | -0.306 *** (0.070) |
| **High Size Change** | | | | |
| Full Sample | -0.427 *** (0.023) | -0.310 *** (0.011) | -0.133 *** (0.025) | |
| UnConstrained | -0.286 *** (0.049) | -0.290 *** (0.027) | 0.004 (0.056) | |
| Constrained | -0.539 *** (0.039) | -0.266 *** (0.022) | -0.273 *** (0.043) | -0.276 *** (0.077) |

Panel C: FC5Pred 6-Qrts Post - FC5Pred 1-Yr Prior

| | Acquirer (i) | Matched Firms (ii) | Acquirer – Matched (iii) | ConsDID – UnCDID (iv) |
|---|---|---|---|---|
| **Low Size Change** | | | | |
| Full Sample | -0.402 *** (0.024) | -0.416 *** (0.014) | -0.005 (0.027) | |
| UnConstrained | -0.305 *** (0.031) | -0.421 *** (0.021) | 0.116 *** (0.034) | |
| Constrained | -0.692 *** (0.060) | -0.360 *** (0.048) | -0.331 *** (0.074) | -0.448 *** (0.077) |
| **High Size Change** | | | | |
| Full Sample | -0.480 *** (0.026) | -0.378 *** (0.013) | -0.125 *** (0.029) | |
| UnConstrained | -0.286 *** (0.052) | -0.385 *** (0.037) | 0.099 (0.062) | |
| Constrained | -0.621 *** (0.047) | -0.333 *** (0.026) | -0.288 *** (0.049) | -0.387 *** (0.088) |

Panel D: FC5Pred 8-Qrts Post - FC5Pred 1-Yr Prior

| | Acquirer (i) | Matched Firms (ii) | Acquirer – Matched (iii) | ConsDID – UnCDID (iv) |
|---|---|---|---|---|
| **Low Size Change** | | | | |
| Full Sample | -0.469 *** (0.022) | -0.450 *** (0.013) | -0.038 (0.026) | |
| UnConstrained | -0.379 *** (0.029) | -0.451 *** (0.020) | 0.072 ** (0.033) | |
| Constrained | -0.773 *** (0.064) | -0.395 *** (0.046) | -0.378 *** (0.076) | -0.450 *** (0.076) |
| **High Size Change** | | | | |
| Full Sample | -0.536 *** (0.026) | -0.425 *** (0.013) | -0.128 *** (0.030) | |
| UnConstrained | -0.318 *** (0.055) | -0.421 *** (0.037) | 0.103 (0.070) | |
| Constrained | -0.656 *** (0.045) | -0.380 *** (0.026) | -0.276 *** (0.049) | -0.380 *** (0.090) |

Table VII: Change in financing constraints, using the propensity-score matched sample requiring control firms to have net equity issuances. For each actual acquirer, we use logit analysis (detailed in Appendix C and presented in Table C.I) to find its five closest matches based on propensity score. Furthermore, we place the additional restriction that all controls must also have net equity issuance over the matched quarter. This ensures we are comparing actual acquirers to their matched firms that are issuing equity over the same quarter. Panel A reports the average difference between the FC5Pred composite financing constraint measure two quarter post M&A announcement and one-year prior for (i) the actual acquirer and (ii) its matched non-acquirers. Column (iii) reports the difference-in-difference between the actual acquirer and its matched non-acquirers. Column (iv) reports the difference-in-difference-in-difference between the actual constrained acquirer and its matched non-acquirers and the actual unconstrained acquirers and its matched non-acquirers. Results for all firms, unconstrained firms one year prior to M&A, and constrained firms one year prior to M&A are reported. Firms are classified as unconstrained (constrained) if it falls into the bottom (top) tercile of FC5Pred in a given quarter. Panels B through D reports the difference in FC5Pred between 4, 6, 8 quarters post M&A announcement and one year prior, respectively. Significance of each difference at the 10% level is indicated by *, 5% level by **, and 1% level by ***.

Panel A: FC5Pred 2-Qrts Post - FC5Pred 1-Yr Prior

| | Acquirer (i) | Matched Firms (SEO) (ii) | Acquirer – Matched (iii) | ConsDID – UnCDID (iv) |
|---|---|---|---|---|
| Effective M&A UnConstrained | -0.219 *** (0.021) | -0.325 *** (0.018) | 0.117 *** (0.026) | |
| Constrained | -0.567 *** (0.027) | -0.301 *** (0.022) | -0.263 *** (0.034) | -0.380 *** (0.042) |

Panel B: FC5Pred 4-Qrts Post - FC5Pred 1-Yr Prior

| | Acquirer (i) | Matched Firms (SEO) (ii) | Acquirer – Matched (iii) | ConsDID – UnCDID (iv) |
|---|---|---|---|---|
| Effective M&A UnConstrained | -0.296 *** (0.020) | -0.401 *** (0.018) | 0.110 *** (0.026) | |
| Constrained | -0.580 *** (0.026) | -0.388 *** (0.023) | -0.219 *** (0.037) | -0.329 *** (0.044) |

Panel C: FC5Pred 6-Qrts Post - FC5Pred 1-Yr Prior

| | Acquirer (i) | Matched Firms (SEO) (ii) | Acquirer – Matched (iii) | ConsDID – UnCDID (iv) |
|---|---|---|---|---|
| Effective M&A UnConstrained | -0.300 *** (0.023) | -0.504 *** (0.021) | 0.209 *** (0.030) | |
| Constrained | -0.670 *** (0.030) | -0.482 *** (0.027) | -0.193 *** (0.042) | -0.402 *** (0.050) |

Panel D: FC5Pred 8-Qrts Post - FC5Pred 1-Yr Prior

| | Acquirer (i) | Matched Firms (SEO) (ii) | Acquirer – Matched (iii) | ConsDID – UnCDID (iv) |
|---|---|---|---|---|
| Effective M&A UnConstrained | -0.368 *** (0.021) | -0.553 *** (0.020) | 0.192 *** (0.029) | |
| Constrained | -0.703 *** (0.030) | -0.522 *** (0.028) | -0.209 *** (0.043) | -0.401 *** (0.050) |

Table VIII: Change in financing constraints between diversifying and non-diversifying acquisitions, using the propensity-score matched sample. For each actual acquirer, we use logit analysis (detailed in Appendix C and presented in Table C.I) to find its five closest matches based on propensity score. Panel A reports the average difference between the FC5Pred composite financing constraint measure two quarter post M&A announcement and one-year prior for (i) the actual acquirer and (ii) its matched non-acquirers. Column (iii) reports the difference-in-difference between the actual acquirer and its matched non-acquirers. Column (iv) reports the difference-in-difference-in-difference between the actual constrained acquirer and its matched non-acquirers and the actual unconstrained acquirers and its matched non-acquirers. Non-Diversifying acquisitions are ones in which both the acquirer and target are in the same SIC3 industry and diversifying acquisitions are ones in which the acquirer and target are in different SIC3 industries. Results for all firms, unconstrained firms one year prior to M&A, and constrained firms one year prior to M&A are reported. Firms are classified as unconstrained (constrained) if it falls into the bottom (top) tercile of FC5Pred in a given quarter. Diversifying M&A's are acquisitions in which target is in a different SIC3 industry than the acquirer and Non-Diversifying M&A's are acquisitions in which both the acquirer and target are in the same SIC3 industry. Panels B through D reports the difference in FC5Pred between 4, 6, 8 quarters post M&A announcement and one year prior, respectively. Significance of each difference at the 10% level is indicated by *, 5% level by **, and 1% level by ***.

**Panel A: FC5Pred 2-Qrts Post - FC5Pred 1-Yr Prior**

| | | Acquirer (i) | Matched Firms (ii) | Acquirer – Matched (iii) | ConsDID – UnCDID (iv) |
|---|---|---|---|---|---|
| Diversifying M&A | Full Sample | -0.352 *** (0.032) | -0.255 *** (0.020) | -0.110 *** (0.032) | |
| | UnConstrained | -0.259 *** (0.042) | -0.297 *** (0.033) | 0.042 (0.044) | |
| | Constrained | -0.660 *** (0.074) | -0.253 *** (0.045) | -0.409 *** (0.082) | -0.451 *** (0.085) |
| Non-Diversifying M&A | Full Sample | -0.348 *** (0.032) | -0.216 *** (0.021) | -0.135 *** (0.035) | |
| | UnConstrained | -0.259 *** (0.054) | -0.219 *** (0.036) | -0.041 (0.057) | |
| | Constrained | -0.461 *** (0.066) | -0.182 *** (0.043) | -0.285 *** (0.071) | -0.244 *** (0.091) |

**Panel B: FC5Pred 4-Qrts Post - FC5Pred 1-Yr Prior**

| | | Acquirer (i) | Matched Firms (ii) | Acquirer – Matched (iii) | ConsDID – UnCDID (iv) |
|---|---|---|---|---|---|
| Diversifying M&A | Full Sample | -0.387 *** (0.031) | -0.309 *** (0.021) | -0.087 ** (0.035) | |
| | UnConstrained | -0.276 *** (0.044) | -0.347 *** (0.032) | 0.074 (0.049) | |
| | Constrained | -0.639 *** (0.072) | -0.254 *** (0.048) | -0.385 *** (0.084) | -0.459 *** (0.091) |
| Non-Diversifying M&A | Full Sample | -0.418 *** (0.030) | -0.312 *** (0.020) | -0.107 *** (0.034) | |
| | UnConstrained | -0.321 *** (0.045) | -0.342 *** (0.031) | 0.026 (0.051) | |
| | Constrained | -0.466 *** (0.063) | -0.241 *** (0.040) | -0.233 *** (0.069) | -0.259 *** (0.084) |

**Panel C: FC5Pred 6-Qrts Post - FC5Pred 1-Yr Prior**

| | | Acquirer (i) | Matched Firms (ii) | Acquirer – Matched (iii) | ConsDID – UnCDID (iv) |
|---|---|---|---|---|---|
| Diversifying M&A | Full Sample | -0.436 *** (0.036) | -0.384 *** (0.024) | -0.063 (0.039) | |
| | UnConstrained | -0.325 *** (0.049) | -0.425 *** (0.036) | 0.103 * (0.055) | |
| | Constrained | -0.798 *** (0.085) | -0.376 *** (0.053) | -0.424 *** (0.091) | -0.528 *** (0.100) |
| Non-Diversifying M&A | Full Sample | -0.446 *** (0.035) | -0.361 *** (0.027) | -0.088 ** (0.041) | |
| | UnConstrained | -0.355 *** (0.059) | -0.418 *** (0.045) | 0.063 (0.063) | |
| | Constrained | -0.513 *** (0.073) | -0.313 *** (0.051) | -0.208 ** (0.082) | -0.271 *** (0.103) |

**Panel D: FC5Pred 8-Qrts Post - FC5Pred 1-Yr Prior**

| | | Acquirer (i) | Matched Firms (ii) | Acquirer – Matched (iii) | ConsDID – UnCDID (iv) |
|---|---|---|---|---|---|
| Diversifying M&A | Full Sample | -0.490 *** (0.034) | -0.402 *** (0.025) | -0.095 ** (0.041) | |
| | UnConstrained | -0.338 *** (0.046) | -0.453 *** (0.037) | 0.118 ** (0.057) | |
| | Constrained | -0.791 *** (0.085) | -0.329 *** (0.056) | -0.458 *** (0.098) | -0.576 *** (0.106) |
| Non-Diversifying M&A | Full Sample | -0.539 *** (0.036) | -0.415 *** (0.024) | -0.128 *** (0.042) | |
| | UnConstrained | -0.407 *** (0.056) | -0.455 *** (0.036) | 0.050 (0.062) | |
| | Constrained | -0.611 *** (0.074) | -0.359 *** (0.049) | -0.264 *** (0.083) | -0.314 *** (0.103) |

Table IX: Change in long-term debt issuance, using the propensity-score matched sample. For each actual acquirer, we use logit analysis (detailed in Appendix C and presented in Table C.I) to find its five closest matches based on propensity score. Panel A reports the average difference between the natural log of long-term debt issuance (LTDebtIssue) two quarter post M&A announcement and one-year prior for (i) the actual acquirer and (ii) its matched non-acquirers. Column (iii) reports the difference-in-difference between the actual acquirer and its matched non-acquirers. Column (iv) reports the difference-in-difference-in-difference between the actual constrained acquirer and its matched non-acquirers and the actual unconstrained acquirers and its matched non-acquirers. Results for all firms, unconstrained firms one year prior to M&A, and constrained firms one year prior to M&A are reported. Firms are classified as unconstrained (constrained) if it falls into the bottom (top) tercile of FC5Pred in a given quarter. Firms are classified as highly unconstrained (constrained) if it falls into the bottom (top) quintile of FC5Pred in a given quarter. Panels B through D reports the difference in FC5Pred between 4, 6, 8 quarters post M&A announcement and one year prior, respectively. Significance of each difference at the 10% level is indicated by *, 5% level by **, and 1% level by ***.

Panel A: Ln(LTDebtIssue) 2-Qrts Post − Ln(LTDebtIssue) 1-Yr Prior

| Effective M&A | Acquirer (i) | Matched Firms (ii) | Acquirer − Matched (iii) | ConsDID − UnCDID (iv) |
|---|---|---|---|---|
| Full Sample | 0.152 *** (0.024) | 0.039 *** (0.011) | 0.113 *** (0.026) | |
| UnConstrained | 0.026 (0.064) | 0.067 *** (0.023) | -0.042 (0.067) | |
| Constrained | 0.069 *** (0.022) | 0.016 (0.021) | 0.053 * (0.030) | 0.095 (0.076) |
| Highly UnConstrained | -0.041 (0.092) | 0.061 ** (0.031) | -0.102 (0.095) | |
| Highly Constrained | 0.070 *** (0.025) | -0.010 (0.028) | 0.079 ** (0.037) | 0.182 (0.114) |

Panel B: Ln(LTDebtIssue) 4-Qrts Post − Ln(LTDebtIssue) 1-Yr Prior

| Effective M&A | Acquirer (i) | Matched Firms (ii) | Acquirer − Matched (iii) | ConsDID − UnCDID (iv) |
|---|---|---|---|---|
| Full Sample | 0.054 ** (0.024) | -0.018 (0.011) | 0.072 *** (0.026) | |
| UnConstrained | -0.108 * (0.064) | -0.016 (0.023) | -0.092 (0.066) | |
| Constrained | 0.041 * (0.022) | -0.041 ** (0.021) | 0.082 *** (0.030) | 0.175 ** (0.075) |
| Highly UnConstrained | -0.164 * (0.092) | -0.007 (0.031) | -0.158 * (0.094) | |
| Highly Constrained | 0.028 (0.026) | -0.065 ** (0.028) | 0.093 ** (0.038) | 0.251 ** (0.113) |

Panel C: Ln(LTDebtIssue) 6-Qrts Post − Ln(LTDebtIssue) 1-Yr Prior

| Effective M&A | Acquirer (i) | Matched Firms (ii) | Acquirer − Matched (iii) | ConsDID − UnCDID (iv) |
|---|---|---|---|---|
| Full Sample | -0.027 (0.024) | -0.051 *** (0.012) | 0.024 (0.026) | |
| UnConstrained | -0.258 *** (0.066) | -0.044 * (0.024) | -0.215 *** (0.067) | |
| Constrained | 0.017 (0.022) | -0.064 *** (0.021) | 0.081 *** (0.030) | 0.296 *** (0.076) |
| Highly UnConstrained | -0.335 *** (0.095) | -0.057 * (0.031) | -0.278 *** (0.096) | |
| Highly Constrained | 0.015 (0.026) | -0.077 *** (0.029) | 0.092 ** (0.038) | 0.370 *** (0.116) |

Panel D: Ln(LTDebtIssue) 8-Qrts Post − Ln(LTDebtIssue) 1-Yr Prior

| Effective M&A | Acquirer (i) | Matched Firms (ii) | Acquirer − Matched (iii) | ConsDID − UnCDID (iv) |
|---|---|---|---|---|
| Full Sample | -0.070 *** (0.024) | -0.078 *** (0.012) | 0.008 (0.026) | |
| UnConstrained | -0.321 *** (0.065) | -0.084 *** (0.024) | -0.237 *** (0.066) | |
| Constrained | 0.024 (0.023) | -0.104 *** (0.021) | 0.128 *** (0.031) | 0.365 *** (0.075) |
| Highly UnConstrained | -0.355 *** (0.093) | -0.051 * (0.031) | -0.304 *** (0.093) | |
| Highly Constrained | -0.005 (0.026) | -0.124 *** (0.029) | 0.119 *** (0.039) | 0.423 *** (0.112) |

Table X: Change in debt issuance, using the propensity-score matched sample and SDC Global Issuance database. For each actual acquirer, we use logit analysis (detailed in Appendix C and presented in Table C.I) to find its five closest matches based on propensity score. We obtain debt issuance from the SDC Global Issuance database. Panel A reports the average difference between the natural log of debt issuance (DebtIssue) two quarter post M&A announcement and one-year prior for (i) the actual acquirer and (ii) its matched non-acquirers. Column (iii) reports the difference-in-difference between the actual acquirer and its matched non-acquirers. Column (iv) reports the difference-in-difference-in-difference between the actual constrained acquirer and its matched non-acquirers and the actual unconstrained acquirers and its matched non-acquirers. Results for all firms, unconstrained firms one year prior to M&A, and constrained firms one year prior to M&A are reported. Firms are classified as unconstrained (constrained) if it falls into the bottom (top) tercile of FC5Pred in a given quarter. Firms are classified as highly unconstrained (constrained) if it falls into the bottom (top) quintile of FC5Pred in a given quarter. Panels B through D reports the difference in FC5Pred between 4, 6, 8 quarters post M&A announcement and one year prior, respectively. Significance of each difference at the 10% level is indicated by *, 5% level by **, and 1% level by ***.

Panel A: Ln(DebtIssue) 2-Qrts Post - Ln(DebtIssue) 1-Yr Prior

| Effective M&A | Acquirer (i) | Matched Firms (ii) | Acquirer − Matched (iii) | ConsDID − UnCDID (iv) |
|---|---|---|---|---|
| Full Sample | 0.082 *** (0.017) | 0.001 (0.007) | 0.081 *** (0.019) | |
| UnConstrained | 0.138 *** (0.053) | 0.000 (0.014) | 0.138 ** (0.055) | |
| Constrained | 0.018 * (0.010) | -0.013 (0.012) | 0.031 ** (0.015) | -0.106 * (0.059) |
| Highly UnConstrained | 0.201 ** (0.084) | -0.017 (0.020) | 0.218 ** (0.085) | |
| Highly Constrained | 0.000 (0.000) | -0.024 (0.016) | 0.024 (0.016) | -0.194 * (0.099) |

Panel B: Ln(DebtIssue) 4-Qrts Post - Ln(DebtIssue) 1-Yr Prior

| Effective M&A | Acquirer (i) | Matched Firms (ii) | Acquirer − Matched (iii) | ConsDID − UnCDID (iv) |
|---|---|---|---|---|
| Full Sample | 0.021 (0.016) | -0.013 * (0.007) | 0.034 * (0.017) | |
| UnConstrained | 0.005 (0.050) | -0.016 (0.015) | 0.021 (0.052) | |
| Constrained | 0.008 (0.009) | -0.021 * (0.012) | 0.030 ** (0.015) | 0.009 (0.056) |
| Highly UnConstrained | -0.009 (0.077) | -0.017 (0.020) | 0.009 (0.079) | |
| Highly Constrained | 0.014 (0.009) | -0.027 * (0.016) | 0.041 ** (0.018) | 0.033 (0.092) |

Panel C: Ln(DebtIssue) 6-Qrts Post - Ln(DebtIssue) 1-Yr Prior

| Effective M&A | Acquirer (i) | Matched Firms (ii) | Acquirer − Matched (iii) | ConsDID − UnCDID (iv) |
|---|---|---|---|---|
| Full Sample | 0.011 (0.016) | -0.008 (0.007) | 0.019 (0.017) | |
| UnConstrained | -0.032 (0.049) | -0.011 (0.014) | -0.021 (0.051) | |
| Constrained | 0.011 (0.009) | -0.018 (0.012) | 0.030 * (0.015) | 0.051 (0.055) |
| Highly UnConstrained | -0.041 (0.076) | -0.025 (0.019) | -0.016 (0.078) | |
| Highly Constrained | 0.020 * (0.010) | -0.039 ** (0.016) | 0.058 *** (0.019) | 0.075 (0.091) |

Panel D: Ln(DebtIssue) 8-Qrts Post - Ln(DebtIssue) 1-Yr Prior

| Effective M&A | Acquirer (i) | Matched Firms (ii) | Acquirer − Matched (iii) | ConsDID − UnCDID (iv) |
|---|---|---|---|---|
| Full Sample | -0.013 (0.015) | -0.014 ** (0.007) | 0.001 (0.017) | |
| UnConstrained | -0.083 * (0.048) | -0.002 (0.015) | -0.081 (0.051) | |
| Constrained | 0.015 (0.010) | -0.033 *** (0.012) | 0.048 *** (0.015) | 0.130 ** (0.055) |
| Highly UnConstrained | -0.116 (0.074) | -0.003 (0.020) | -0.114 (0.078) | |
| Highly Constrained | 0.030 ** (0.013) | -0.033 ** (0.017) | 0.063 *** (0.021) | 0.176 * (0.092) |

Table XI: Change in capital expenditure and R&D expense, using the propensity-score matched sample. For each actual acquirer, we use logit analysis (detailed in Appendix C and presented in Table C.I) to find its five closest matches based on propensity score. Panel A reports the average difference between the natural log of capital expenditure and R&D expense (CapExRD) two quarter post M&A announcement and one-year prior for (i) the actual acquirer and (ii) its matched non-acquirers. Column (iii) reports the difference-in-difference between the actual acquirer and its matched non-acquirers. Column (iv) reports the difference-in-difference between the actual constrained acquirer and its matched unconstrained acquirers and the actual unconstrained acquirers and its matched non-acquirers. Results for all firms, unconstrained firms one year prior to M&A, and constrained firms one year prior to M&A are reported. Firms are classified as unconstrained (constrained) if it falls into the bottom (top) tercile of FC5Pred in a given quarter. Firms are classified as highly unconstrained (constrained) if it falls into the bottom (top) quintile of FC5Pred in a given quarter. Panels B through D reports the difference in FC5Pred between 4, 6, 8 quarters post M&A announcement and one year prior, respectively. Significance of each difference at the 10% level is indicated by *, 5% level by **, and 1% level by ***.

**Panel A: Ln(CapExRD) 2-Qrts Post - Ln(CapExRD) 1-Yr Prior**

| Effective M&A | Acquirer (i) | Matched Firms (ii) | Acquirer − Matched (iii) | ConsDID − UnCDID (iv) |
|---|---|---|---|---|
| Full Sample | 0.121 *** (0.015) | 0.052 *** (0.008) | 0.069 *** (0.015) | |
| UnConstrained | -0.149 *** (0.033) | 0.054 *** (0.018) | -0.203 *** (0.031) | |
| Constrained | 0.046 *** (0.017) | 0.041 *** (0.014) | 0.005 (0.020) | 0.208 *** (0.038) |
| Highly UnConstrained | -0.200 *** (0.046) | 0.050 ** (0.025) | -0.249 *** (0.042) | |
| Highly Constrained | 0.050 ** (0.023) | 0.018 (0.019) | 0.032 (0.027) | 0.282 *** (0.054) |

**Panel B: Ln(CapExRD) 4-Qrts Post - Ln(CapExRD) 1-Yr Prior**

| Effective M&A | Acquirer (i) | Matched Firms (ii) | Acquirer − Matched (iii) | ConsDID − UnCDID (iv) |
|---|---|---|---|---|
| Full Sample | -0.004 (0.017) | -0.037 *** (0.010) | 0.033 ** (0.017) | |
| UnConstrained | -0.346 *** (0.037) | -0.064 *** (0.021) | -0.282 *** (0.034) | |
| Constrained | -0.020 (0.018) | -0.056 *** (0.016) | 0.036 * (0.021) | 0.318 *** (0.041) |
| Highly UnConstrained | -0.413 *** (0.052) | -0.069 ** (0.029) | -0.344 *** (0.046) | |
| Highly Constrained | -0.005 (0.023) | -0.058 *** (0.020) | 0.054 ** (0.027) | 0.398 *** (0.058) |

**Panel C: Ln(CapExRD) 6-Qrts Post - Ln(CapExRD) 1-Yr Prior**

| Effective M&A | Acquirer (i) | Matched Firms (ii) | Acquirer − Matched (iii) | ConsDID − UnCDID (iv) |
|---|---|---|---|---|
| Full Sample | -0.152 *** (0.018) | -0.135 *** (0.011) | -0.017 (0.018) | |
| UnConstrained | -0.538 *** (0.042) | -0.188 *** (0.024) | -0.351 *** (0.039) | |
| Constrained | -0.099 *** (0.021) | -0.136 *** (0.018) | 0.036 (0.024) | 0.387 *** (0.047) |
| Highly UnConstrained | -0.599 *** (0.060) | -0.174 *** (0.032) | -0.425 *** (0.054) | |
| Highly Constrained | -0.051 ** (0.025) | -0.136 *** (0.023) | 0.086 *** (0.030) | 0.511 *** (0.068) |

**Panel D: Ln(CapExRD) 8-Qrts Post - Ln(CapExRD) 1-Yr Prior**

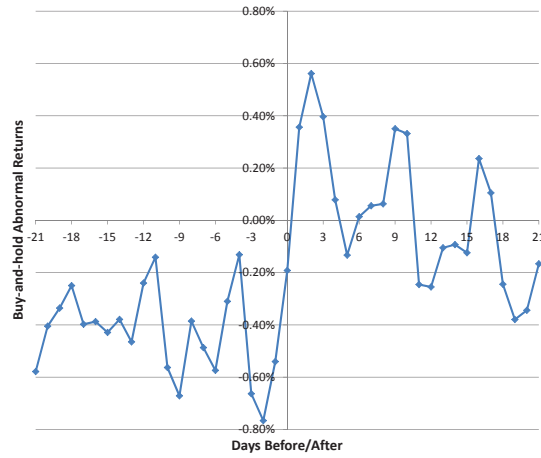| Effective M&A | Acquirer (i) | Matched Firms (ii) | Acquirer − Matched (iii) | ConsDID − UnCDID (iv) |
|---|---|---|---|---|
| Full Sample | -0.240 *** (0.019) | -0.220 *** (0.012) | -0.020 (0.018) | |
| UnConstrained | -0.659 *** (0.044) | -0.278 *** (0.026) | -0.381 *** (0.040) | |
| Constrained | -0.150 *** (0.021) | -0.217 *** (0.019) | 0.068 *** (0.025) | 0.449 *** (0.048) |
| Highly UnConstrained | -0.722 *** (0.061) | -0.245 *** (0.034) | -0.477 *** (0.054) | |
| Highly Constrained | -0.105 *** (0.024) | -0.206 *** (0.025) | 0.100 *** (0.031) | 0.578 *** (0.068) |

Figure 1: Daily buy-and-hold abnormal returns for [-21,21] day window around acquisition announcement date. Estimation of abnormal returns is based on the four-factor Carhart (1997) model over an estimation window of [-395,-30] days to allow for information leakage in the month prior to acquisition announcement. On average, acquirers face a negative abnormal return at the end of the announcement day and an increase in abnormal returns in the first 2-3 days following announcement.
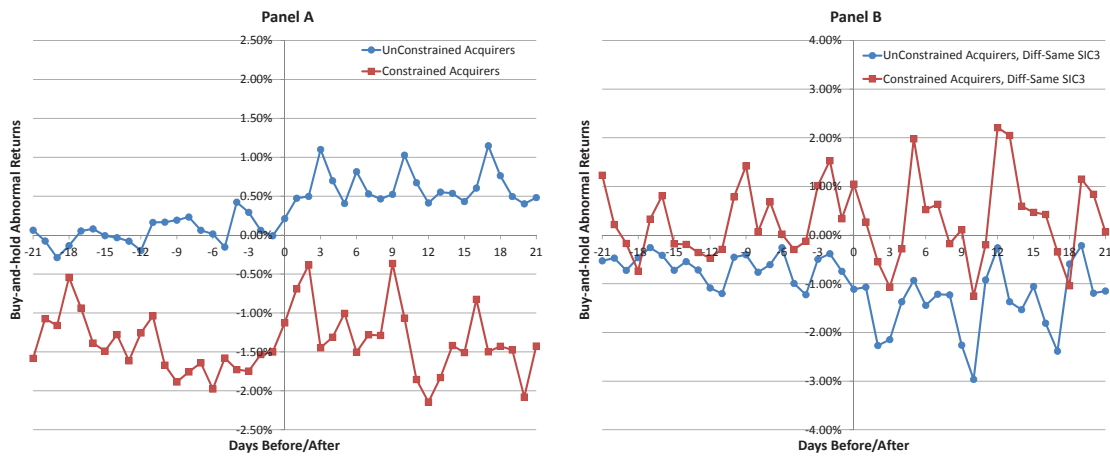


Figure 2: Daily buy-and-hold abnormal returns for [-21,21] day window around acquisition announcement date for Constrained and UnConstrained acquirers. Constrained (UnConstrained) firms are those with FC5Pred in the top (bottom) tercile of FC5Pred one year prior to acquisition. Estimation of abnormal returns is based on the four-factor Carhart (1997) model over an estimation window of [-395,-30] days to allow for information leakage in the month prior to acquisition announcement. Panel A presents the graphs for the Constrained (Unconstrained) portfolios, respectively. Panel B further splits Constrained (UnConstrained) acquirers into those that make a diversifying acquisition (i.e., acquire a target out of its SIC3 industry) and those that make a focused acquisition (i.e., acquire a target within its SIC3 industry). The difference between focused versus diversifying acquisitions for Constrained and UnConstrained firms are presented in this panel.