Financial Constraints and Synergy Gains from Mergers and Acquisitions

Yang Duan
Hong Kong Baptist University
E-mail: yangduan@hkbu.edu.hk

Yong Jin
Hong Kong Polytechnic University
E-mail: jimmy.jin@polyu.edu.hk

Aug 22, 2018

Abstract[1]

This paper examines mergers and acquisitions motivated by financial constraints. Synergy gain is measured as the cumulative abnormal return of a value-weighted portfolio of the acquirer and the target around the acquisition announcement. By constructing a financial constraint difference between the target and the acquirer, we find a positive relationship between the financial constraint difference and synergy gains generated from the acquisition. The positive effect of the financial constraint difference is only significant for high growth targets and severely constrained targets. The acquirer's corporate governance also enhances the synergy gains created from the financial constraint difference. Additional evidence shows that both acquirer's and target's shareholders benefit from the financial constraint difference. Our results are robust for different measures of financial constraint.

[1] We thank Richard Levich (the editor), the anonymous reviewer for their very thorough and constructive comments during the review process. All errors are our own. This work was supported by PolyU AF Departmental Research Grant [project number 1-ZE6V]. Yong (Jimmy) Jin is the corresponding author.

Financial Constraints and Synergy Gains from Mergers and Acquisitions

Abstract

This paper examines mergers and acquisitions motivated by financial constraints. Synergy gain is measured as the cumulative abnormal return of a value-weighted portfolio of the acquirer and the target around the acquisition announcement. By constructing a financial constraint difference between the target and the acquirer, we find a positive relationship between the financial constraint difference and synergy gains generated from the acquisition. The positive effect of the financial constraint difference is only significant for high growth targets and severely constrained targets. The acquirer's corporate governance also enhances the synergy gains created from the financial constraint difference. Additional evidence shows that both acquirer's and target's shareholders benefit from the financial constraint difference. Our results are robust for different measures of financial constraint.

Keywords: financial constraint; synergy gains; mergers; acquisitions

JEL classification: G34; G30

1 Introduction

MM theory tells us that in a frictionless world, a firm's investment can always reach the optimal level; however, in reality, with imperfect capital markets, some companies face difficulty in raising external funds and, thus, forgo valuable investment projects. As a result, mergers or acquisitions can be a way to solve financing difficulty by generating an internal capital market or gaining better direct access to the capital market. Erel, Jang and Weisbach (2015) documents that target firms are financially constrained before an acquisition announcement and these constraints are relieved after the acquisition, suggesting that easing the financial constraints can be a motive for an acquisition However, they do not pin down that financial constraints of the targets are the main driver of the acquisitions. Thus, instead of studying how an acquisition affects a firm's financial constraint, this paper examines how financial constraints ex ante affect synergy gains generated from mergers or acquisitions.

This paper is also motivated by real merger and acquisition decisions we can observe in practice. For example, on November 10, 2010, Chevron, a global giant, disclosed plans to acquire Atlas Energy, Inc., a leading producer of gas from Marcellus Shale, for its "competitive cost structure" and "strong growth potential." Atlas developed new technologies that unlocked huge troves of natural gas locked in a type of dense rock known as shale; however, the company struggled when the new supply, combined with reduced energy demand due to the recession, glutted the US market. Scrambling for cash, Atlas, like many of the companies that pioneered the shale boom, was forced to sell assets to the big international companies. Meanwhile, for cash-rich major players such as Chevron, U.S. shale gas presented an opportunity to gain access to big new fields when older fields were dying. Thus, the two companies reached a mutually beneficial

agreement with a deal at 3.2 million USD.[2] Practitioners consider it a good strategy to sell a constrained firm to a cash-rich firm. In this case, Chevron could undertake new investment projects due to Atlas's new technologies after the acquisition was complete. Any positive NPV project can be fulfilled if there is no financial constraint; otherwise, without the acquisition, the positive NPV project can be ceased by Atlas because of the lack of capital. Thus, Chevron's shareholders are happy as the internal capital could give them better returns on potential good investments. In other words, by better matching investment opportunities with financial slack, acquisitions generate synergy. Although prior studies show synergy could also be motivated by investment opportunities (e.g., Lang, Stulz and Walkling, 1989; Servaes, 1991), this paper aims to examine whether synergy can be generated from the potential financial improvement that results from the combination of two firms. Thus, rather than focus on the investment opportunities, we focus on the financial constraint status of the two firms.

This paper evaluates acquisitions motivated by financial constraint, hypothesizing that the difference in financial constraint between the target and the acquirer is positively related to synergy gains generated from an acquisition. The more constrained the target is compared to the acquirer, the higher the potential synergy. Focusing on mergers and acquisitions in which acquirers and targets operate in the same industry presents several advantages. First, this eliminates the possibility that the difference in the financial constraint between two firms is only because they are in different industries. Secondly, potential financing improvements could be weakened by the diversification discount (e.g., Lang and Stulz, 1994) that results from cross-industry acquisitions. Last, focusing on mergers where the acquirer and target are from the same

[2] The source is obtained from Chevron's press release. See http://investor.chevron.com/phoenix.zhtml?c=130102&p=irol-newsArticle&ID=1493777.

industry makes the comparison on financial constraints more convincing. For these reasons, this paper examines the effect of the financial constraint difference between the target and the acquirer in a sample of within-industry acquisitions.

The final sample consists of 802 US public mergers and acquisitions between 1983 and 2011 in which the acquirer and target have the same two-digit sic code. We use the KZ index as the primary measure of financial constraints and construct a financial constraint difference as of the target's KZ index minus the acquirer's KZ index. We find that the KZ index difference between the target and the acquirer has a positive relationship with acquisition synergies, calculated as the announcement-period abnormal return of a value-weighted portfolio of the acquirer and the target. This result supports our conjectures that synergy is higher for deals in which the target is more constrained than the acquirer.

To further investigate the effect of the financial constraint difference between the target and the acquirer, we divide the sample based on target's growth opportunities and target's financial constraint. Regression results show that the effect of the financial constraint difference is stronger when the target has higher growth opportunities or when the target is more constrained, suggesting that the difference in financial constraint plays a role only when there is a potential for financial improvement caused by the acquisition. Additionally, we find that the positive effect of the financial constraint difference is more pronounced in competitive industries, as, pressure from industry competition forces managers to search for better matches and to make better use of capital. Otherwise, any potential benefit resulting from the financial constraint difference may be diminished by the acquirer's bad management.

In addition to synergy gain, this paper also investigates how the financial constraint difference affects the acquirer and the target, respectively. Empirical results demonstrate a positive relationship between the target's financial constraint relative to the acquirer's and the acquirer's cumulative abnormal return as well as the target's cumulative abnormal return, which means both acquirer shareholder and target shareholder benefit from the difference in financial constraint. It is possible that a relatively constrained target reduces the acquirer's agency cost from free cash flow. Results additionally show that the takeover premium paid by the acquirer is positively related to the financial constraint difference as well; this is consistent with the positive effect on target shareholder valuation. The results on the acquirer and target shareholder wealth effect further support our conjectures that the financial constraint difference between the target and the acquirer creates value for an acquisition. Moreover, our main empirical results are robust to alternative measures of financial constraint: either WW index or a dummy strategy.

This paper contributes to a line of research on synergies in mergers and acquisitions. It has long been viewed that synergies are key drivers of mergers and acquisitions. Prior research studies the sources of synergy gains from mergers by examining either abnormal returns of the portfolio firms or post-merger operating performance (e.g., Devos, Kadapakkam and Krishnamurthy, 2009). Hoberg and Phillips (2010) finds synergy is higher for transactions with similar product market language but also when targets are less similar to acquirer's rivals and when targets have unique products. Wang and Xie (2009) presents the evidence that acquisitions of firms with poor corporate governance by firms with good corporate governance generate higher total gains, indicating the benefits of changes in control. This paper examines whether there is value creation from mitigation of the target's financial constraint. The findings indicate that synergy is generated by financial improvement of two firms facing different levels of

financial constraint. Smith and Kim (1994) compares total returns for deals that combine slack-poor firms and cash-rich firms with those that perpetuate slack and free-cash-flow problems. They argue that the gain is based "partly on using acquisitions to resolve information asymmetry" and "partly on using acquisition to limit the discretion of managers" (p.281). We argue that the gain is generated from potential resource re-allocation between two firms in the same industry. Besides, our results are based on a broader sample of observations and regression analysis.

The remainder of this paper is organized as follows. Section 2 describes the sample and variable construction. Section 3 presents empirical results, in which subsection 3.1 shows OLS regression results on synergy gain, subsection 3.2 presents cross-sectional tests on the financial constraint difference, 3.3 presents OLS regression results of acquirer return, target return and target premium and 3.4 presents robustness tests. Section 4 concludes the paper.

2 Sample Construction and Measure of Financial Constraint

2.1 Measure of Financial Constraint

The literature suggests several ways to measure the severity of financial constraints, including investment-cash flow sensitivities (e.g., Fazzari et al., 1988), the Kaplan and Zingales (KZ) index of constraints (e.g., Lamont et al., 2001), the Whited and Wu (WW) index of constraints (e.g., Whited and Wu, 2006), the SA index of constraints (e.g., Hadlock and Pierce, 2010) and a variety of different sorting criteria based on firm characteristics. There is, so far, no perfect measure since each measurement relies on certain empirical and/or theoretical assumptions that may or may not be valid.

This paper mainly relies on the KZ index as a proxy for financial constraint, while also including other methods of measurement (for example, WW index and SA index) as robustness

checks. Although there is no uncontroversial measure of financial constraints, the KZ index is attractive because it is based on an in-depth study of firms (e.g., Lamont et al., 2001). The KZ index is computed as a linear combination of five accounting ratios and their corresponding regression coefficients[3]. The five variables, along with the signs to their coefficients in the KZ index, are as follows: cash flow to total capital (negative), the market-to-book ratio (positive), debt to total capital (positive), dividends to total capital (negative), and cash holdings to capital (negative). The KZ index is higher for firms that are more financially constrained. To avoid classifying financially distressed firms as financially constrained firms in our sample, we further require firms to have positive real sales growth (deflated by the Consumer Price Index, CPI) in the prior year. All the variables in the KZ index are constructed following Hadlock and Pierce (2010).

The interesting variable is the difference in the financial constraint status between the target and the acquirer; more specifically, it is the target's financial constraint relative to the acquirer's, which is equal to the target's KZ index minus the acquirer's KZ index. The KZ difference can be positive or negative; it is positive when the acquirer is less constrained than the target. The larger the difference, the higher financial flexibility the acquirer has compared to the target, or, equivalently, the more likely it is the target has a lack of operating capital compared to the acquirer. Given the acquirer and the target are from the same industry, the comparison captures only firm-level differences between these two related firms. Although a high difference may be caused by an acquirer defined as financially slack and a target defined as financially

[3] The KZ index is calculated as: -1.001909*[(IB+DP) / PPENT] + 0.2826389*[(AT + CRSP December Market Equity-CEQ-TXDB) / AT] + 3.139193* [(DLTT+DLC) / (DLTT+DLC+SEQ)] - 39.3678*[(DVC+DVP)/PPENT] - 1.314759*[CHE/PPENT]. PPENT is lagged. The PPENT and AT are of inflation adjusted year 2011 dollars.

constrained in their industry, this is not always the case. An acquisition could be two constrained or two unconstrained firms but still with large gap in financial constraint between them. Thus, this difference captures the relative difference between the target and the acquirer and predicts potential financing improvement from a merger.

Table 2 presents the summary statistics of the financial constraint measure both for the acquirer and the target as well as the difference between the two. Consistent with Erul et al. (2015), targets in our sample are relatively constrained to the acquirers, as their median value KZ indexes are higher. Thus, the difference between the target's KZ index and the acquirer's KZ index is positive, as the median value is 0.836. The financial constraint measures are highly skewed due to a high difference between the mean value and the median value. Therefore, in the empirical analysis, we also winsorize the financial constraint measures at 1% level as a robustness check.

2.2 Sample Description

We extract the acquisition sample from Securities Data Corporation's (SDC) US Mergers and Acquisitions database. Since the paper attempts to examine the acquisitions motivated by financial constraint, it could be more difficult to interpret results if we consider the merger motivations between two companies from different industries. For example, acquiring a firm from another industry could help diversify the product line and reduce operating risk, resulting in higher potential efficiency; however, due to the industry effect, those two firms may also have different firm characteristics and, thus, different financial constraint statuses. For this reason, it is difficult to conclude that any synergy gain from the merger is purely caused by the relative

difference in financial constraint between two firms. Additionally, acquisitions that involve two firms from different industries suffer from "diversification discount" documented in prior studies (Lang and Stulz, 1994), which could weaken any potential efficiency gain from the financial constraint difference. Finally, the comparison between two companies from the same industry is more straightforward. Two firms with the same KZ index but in two different industries may be regarded as constrained in one industry and unconstrained in another industry. Given the above reasons, this paper only includes a sample of acquirers and targets from the same industries.

We start with 4,722 deals between 1983 and 2011 in SDC that satisfy 1) deal value above $ 1 million; 2) the target is a public firm; 3) the acquirer controls less than 50% of the shares of the target before and owns more than 50% after the acquisition. Deleting firms either from financial industry (SIC codes 6000-6000) or from regulated utilities (4900-4949) reduces the number of deals to 3,325. If we require the acquirer and the target are from the same 2-digit industries, then the sample is reduced to 2,029.Among that the number of deals that have available stock return information (in CRSP) to calculate the acquirer's CAR, the target's CAR and the combined CAR is 1,646. We further require both the acquirer and the target has available data from COMPUSTAT to compute the firm-level variables such as firm size, leverage, Tobin's Q and ROA, and obtain a sample of 1,133 deals. Last, deleting deals with missing financial constraint measures (KZ index) for either the acquirer or the target results in a final sample of 802 deals. For all US corporations between 1983 and 2011, excluding financial firms (SIC Codes 6000-6999) and regulated utilities (SIC Codes 4900-4949) in Compustat, only 37% have sufficient

accounting data to construct a KZ index. This can explain why our sample looks much smaller than that in other studies but using similar criteria[4].

Table 1 presents the sample distribution by announcement year. The number of deals is shown year by year for the entire sample as well as for the subsamples based on the KZ difference. Dif_L, Dif_M and Dif_H capture the bottom 25%, middle 50% and top 25% KZ difference of the entire sample[5]. The year trend for all deals closely resembles the merger activities in the 1980s, 1990s and 2000s. The acquisitions were concentrated in the late 1980s and reached its highest in the late 1990s. Acquisition activities became weaker after the internet bubble in 2000 and climbed up to another peak before the latest financial crisis. The number of deals with a high KZ difference, however, does not show a similar pattern while it appears to be more in the 1990s than in the 2000s. Although no significant year effect seems to be related to the high KZ difference deals, we also control for the announcement year dummies in all the regression analyses.

2.3 Other Variable Constructions

One of the key dependent variables in this paper is acquisition synergy. Following Bradley, Desai, and Kim (1988) and Wang and Xie (2009), we form a value-weighted portfolio of both the acquirer and the target for each deal, with the weights based on their respective market capitalization on the sixth trading day prior to the initial announcement of the acquisition. The target's weight is adjusted by subtracting the value of the target equity held by the acquirer from the target's market capitalization before the announcement. The acquisition synergy is calculated

[4] Our study requires for each deal, both the acquirers and the targets have sufficient accounting and stock data to run the regressions, which may hurt our sample size since a sample of deals with comprehensive data available is small (see Wang and Xie, 2009, 396 observations for deals between 1990 and 2004).
[5] Distribution is similar if we change the cut-off to be 33% and 66%.

as the portfolio's cumulative abnormal return over an event window (-2, +2) as a percentage point. The main results are robust when applying alternative event windows, such as (-5, +5). From Panel C of Table 2, the average portfolio cumulative abnormal return denoted as PCAR, is 1.952%, significantly different from zero at 1%, consistent with the findings in the literature. The paper also examines the 5-day acquirer's cumulative abnormal return, denoted as ACAR and the 5-day target's cumulative abnormal return, denoted as TCAR. On average, the acquirer's return is negative (-1.749%) while the target's return is significantly positive (23.549%). The magnitude of both ACAR and TCAR is similar to what is documented in the literature.

Each regression controls for a number of acquirer, target and deal characteristics following the literature (e.g., Bradley, Desai, and Kim, 1988; Lang, Stulz, and Walkling, 1989; Servaes, 1991; Bhagat et al., 2005; Wang and Xie, 2009). The acquirer and target attributes include firm size, Tobin's Q, leverage and ROA, all of which are measured at the fiscal year end prior to the acquisition announcement. The deal characteristics are relative deal size, methods of payment, whether the acquisition is a tender offer, whether the deal is completed, whether a deal is a merger of equals (MOE) and whether a deal is between two companies both from high tech industries defined by Loughran and Ritter (2004). The Appendix contains details on how to construct these variables.

Table 2 presents a summary of statistics of acquirer characteristics, target characteristics and deal characteristics, both for the entire sample and for subsamples based on the KZ difference. The mean KZ index difference is -3.896 for the full sample, not significantly different from zero. Over 55% of the sample has a positive KZ difference, which means that for the majority of the deals, the target is more financially constrained than the acquirer, consistent with

findings in the literature (e.g., Erel, Jang and Weisbach, 2014). In the high KZ difference subsample, denoted as Dif_H, the average KZ difference is as high as 55.834 while it is as low as -73.646 for the low KZ difference subsample (denoted as Dif_L). For half of the subsample defined as Dif_M, the target has similar financial conditions as the acquirer since the mean KZ difference is 1.139 and is not significantly different from zero. Interestingly, both PCAR and ACAR, are higher in the subsample in which the target's financial constraint measure is similar as the acquirer's than in the other two subsamples (Dif_L or Dif_H). This could be caused by a confounding effect of other firm-level or deal-level characteristics. For example, in the high difference group, over 50% of the deals include an acquirer and target from high-tech industries while this percentage in the middle difference group is only 25%. High-tech combinations are more likely to be value destroying since intangible assets are difficult to value. Another deal-level characteristic associated with financial constraint difference is relative deal size. Deals with a higher level of financial constraint difference (Dif_H) have a significantly smaller deal size, which could be caused by large market capitalization of the acquirers in the Dif_H subsample.

For acquirers in deals where the targets are considered to be highly constrained relative to the acquirers (Dif_H), the firm size is relatively larger, the leverage is relatively lower and the profit is relatively higher than those in the other two subsamples, satisfying the characteristics of a financially slack firm. As expected, the unreported free cash flow measured as the operating cash flow divided by the total assets is also higher in the high difference (Dif_H) subsample. On the other hand, a target's firm size is smallest and ROA is lowest in the Dif_H subsample. Target's leverage is similar among all subsamples. When comparing the same variable between the acquirers and the targets, the target's are generally smaller than the acquirer's, regardless of the subsample they fall in. In deals where the target is much more constrained than the acquirer,

however, the target's leverage is much higher than the acquirer's, and the target's profitability is much lower than the acquirer's.

What is interesting is the variable Q, which is proxy for growth opportunities. In general, the acquirer's Q is higher than target's Q both in the entire sample and in any of the subsamples. Among three distinct groups, acquirer's Q (or target's Q) is higher in subsamples that have great disparity of financial condition between two firms (Dif_L and Dif_H) than acquirer's Q in the subsample where the acquirer and the target have financial constraints of a similar magnitude (Dif_M). It appears that less constrained acquirers, with abundant internal funds, are not lacking good investment opportunities. It could also be that cash richness allows these firms to take advantage of growth opportunities while constrained targets, despite having good investment plans, are forced to forgo good projects which could greatly increase their market valuation, due to lack of cash. Thus, a lower Q may indicate that firms are undervalued compared to their industry peers.

Table 3 presents the correlation matrix for PCAR, ACAR, TCAR and KZ Difference. ACAR is highly correlated with PCAR and the coefficient between the two is as high as 0.82 while the coefficient between TCAR and PCAR is only 0.34. This is because of the size effect since targets are much smaller than acquirers in our sample. Additionally, the KZ difference is positively related to PCAR and ACAR both at a significance level of 10% while its correlation with TCAR is weak.

3 Empirical results

3.1 Baseline Regression

To see how a target's financial constraint relative to the acquirer's affects total synergy gains, we perform an OLS regression of synergy measure on the financial constraint difference and other control variables. The dependent variable is a 5-day cumulative abnormal return of a value-weighted portfolio of acquirer and target, i.e., PCAR. Regression results are presented in Table 3. All regressions control for both announcement year fixed effect and industry fixed effect.

We include column (1) to show that target's financial constraint relative to the acquirer's alone has a significant impact on the total synergy gains and to ensure that any identified effect of the financial constraint difference on synergies is not driven by the potential endogeneity of control variables, like the Q, leverage or the method of payment. From results in column (1), we find that the estimated coefficient on the KZ difference variable is 0.002, significant at 1% level. After adding the control variables in the regression in column (2), the adjusted R-square is increased to 12.4% from 4% without control variables. The coefficient on the KZ difference is still positive and significant, which means the higher the target's financial constraint relative to the acquirer's financial constraint, the larger the efficiency gains generated from the acquisition. The magnitude of the coefficient is 0.002, indicating that one standard deviation higher in financial constraint difference will result in 0.7% higher total synergies. Given that the average synergy gain of the sample is 1.95%, the increase is economically meaningful. Most of the control variables in column (2) have expected signs consistent with the findings in prior studies. For example, larger acquirers are more likely to conduct value-destroying acquisitions and synergy gain is significantly negatively correlated with acquirers' profit (ROA), suggesting that

high-profit firms generating more free cash flow suffer from agency problems and thus, are more likely to make bad acquisition decisions. Moreover, synergy gain is significantly lower in deals where payment is fully composed of stock and in "merger of equals" deals, while it is higher in tender offers. However, the coefficient on the high-tech dummy is not significant albeit negative.

In column (3), instead of a difference measure, we include the acquirer's financial constraint measure and the target's financial constraint measure separately in the regression and intend to find out which side's financial condition drives the synergy gains from the acquisition. Controlling for acquirer's financial slack, more constrained targets could be those small companies that grow faster but cannot fulfill their growth with their own financial resources, we expect that they benefit more and such capital reallocation creates more value if they are acquired by some cash-rich companies. On the other hand, controlling for the target's financial constraint, cash richer companies could suffer more as indicated by agency cost of free cash flow, thus the effect of acquirer's financial slack on the synergy may be weaken. Regression result in column (3) supports our argument. The total synergy created from the acquisition is positively related to the acquirer's KZ while negatively related to the target's KZ, consistent with our hypothesis. Moreover, the deal's total synergy is affected more by the target's financial condition, since only the coefficient of the target's KZ index is statistically significant and its magnitude is larger than the coefficient of the acquirer's KZ index. This may suggest that the motivation of the financial synergies comes from mitigating the financial constraint of small companies in the industry and thus re-allocate financial resource within the industry.

We also consider alternative sources of synergy gains. Wang and Xie (2009) suggest that acquisitions of firm with poor corporate governance by firms with good corporate governance

create value for both acquirer and target shareholders. Therefore, in an unreported table, we include corporate governance difference between the target and the acquirer measured by G index (Masulis, Wang and Xie, 2007; Wang and Xie (2009) in Column (2) of Table 4, as well as acquirer's and target's corporate governance measures separately in Column (3) of Table 4 and re-run the regressions. Though including the corporate governance measures reduces the sample to only 95 observations, both findings are consistent with our arguments.

3.2 Cross-sectional variations on the financial constraint difference

This section shows that the financial constraint difference has a more pronounced effect in deals where targets are from higher growing industries, where targets are in more constrained industries and where acquirers are from industries with higher competition.

3.2.a Target's growth opportunities

One source of the synergy gains in our paper is the potential reallocation of acquirer's capital to fulfill otherwise undergone growth opportunities in the constrained target. Being in the same industry makes "transferring growth opportunities" more feasible than for two firms from different industries. Thus, we expect that the effect of the financial constraint difference is stronger in deals where the target has higher growth opportunities. This is reasonable since the higher the target's growth opportunity is, the more financing improvement is generated from the combination of the acquirer's financial slack with the target's financial constraint. It should be noted that targets do not need to have higher growth opportunities than the acquirers. As long as the acquirer has capital to implement a target's projects, the acquisition could create value for both while not affecting the acquirer's own growth opportunities.

To test this hypothesis, we divide the sample based on the target's growth opportunities. Tobin's Q is used to proxy for growth opportunities. Since a firm's growth prospect is highly related to which industry it belongs to, a target is defined as "HGrowth" if its Tobin's Q is higher than the median value of all firm's Tobin's Q in its industry and as "LGrowth" if its Tobin's Q is lower than the industry's median value Tobin's Q. It shows that 474 deals happened in lower growth industries while 328 took place in higher growth industries.

Columns (1) and (2) in Table 5 report estimated coefficients from regressions on synergy gains PCAR for the two subsamples based on target's growth opportunities. In Column (1) where targets own higher growth opportunities, we find the coefficient on the KZ difference is positive and significant at 1% level while the KZ difference has an insignificant effect on synergy gain in column (2), indicating that acquisitions motivated by financial constraints only create value for high growth firms[6]. The magnitude of coefficient on the KZ difference is 0.002, suggesting a standard deviation increase in the KZ difference will result in 1.028% increase in synergy gain for the deals where targets have higher growth opportunities, which is much higher than the increase (0.7%) in synergy gain for the entire sample of deals.

3.2.b Target's financial constraint

If synergy is generated from mitigating the target's financial constraint, then we expect that synergy should be greater when the potential financing improvement is greater. Thus, we examine whether synergy gain is higher when the target is more constrained.

[6] We also compare whether the coefficients on the KZ difference between the "HGrowth" and "LGrowth" groups differ from each other significantly using seemingly unrelated estimation (i.e., "suest" command in STATA). We fail to find there are statistically significant differences between them.

A more constrained target is defined as a firm that has a higher KZ index than the median value of the KZ index of all firms in the industry. A less constrained target refers to a firm that has a lower KZ index than the industry median. We divide the sample into more constrained target group (Hconstr) and less constrained target group (Lconstr), and regress KZ difference on synergy gain for the two subgroups, respectively. We expect to observe that the KZ difference has a stronger effect for the more constrained target group than the less constrained target group. Regression results in Column (3) and (4) in Table 5 support our conjecture. In column (3), the coefficient on the KZ difference is 0.002, significant at 1% level, while the coefficient is negative and insignificant in column (4)[7]. The results indicate that acquisitions in our context only benefit those targets that are severely constrained.

3.2.c The effect of industry competition

One challenge to our hypothesis on the effect of the target's financial constraint relative to the acquirer's is that the managers of acquiring firms may not be able to take advantage of the target's growth opportunity but rather waste money, suffering from the free cash flow problem proposed in Jensen (1986). This concern can be mitigated in industries with high competition since managers in competitive industries have strong incentive to reduce slack and increase merger efficiency or else the firm could be acquired by others. Thus, we expect that the positive effect of the financial constraint difference is more pronounced for acquirers in competitive industries.

[7] To test whether the coefficients on the KZ difference between the two groups differ from each other significantly, we perform seemingly unrelated estimation (i.e., "suest" command in STATA). However, we fail to find there are statistically significant differences between them.

The Herfindahl index is used to measure industry competition, which is constructed at the end of the fiscal year prior to an announcement date. A lower Herfindahl index means higher industry competition. To test the hypothesis, we separate the high industry competition sample from the low industry competition sample. "Hcompet" refers to the sample in which the acquirer's Herfindahl index is among the bottom half of the Herfindahl index of all industries in that year and "Lcompet" refers to the remaining sample.

Columns (5) and (6) report regression coefficients for the two different samples based on industry competition. The coefficient on the KZ difference in Column (5) is positive and significant, with a magnitude of 0.002, while in Column (6) is insignificant and even negative at -0.001.[8]. This finding is consistent with our expectation that industry competition mitigates the concerns of poor corporate governance and thus enhances the value creation from mergers and acquisitions motivated by financial constraint differences.

3.3 Acquirer- and Target- Shareholder Wealth Effect

The regression result on synergy gain indicates that increasing the target's relative financial constraint difference to that of the acquirer's could add value to the total valuation of the deal. To examine the value implication of the relative financial constraint difference between the target and the acquirer, it is interesting to investigate how the financial constraint difference affects the acquirer and the target respectively. Table 6 presents a regression analysis of acquirer's CAR, target's CAR, takeover premium and acquirer's share of synergy on the financial constraint difference and other control variables.

[8] To test whether the coefficients on the KZ difference between the two groups differ from each other significantly, I perform seemingly unrelated estimation (i.e., "suest" command in STATA). The result shows that the coefficients are significantly different between "Hcompet" and "Lcompet" subsamples (χ^2=2.88, Prob>χ^2=0.09).

We find that the KZ difference has a significant and positive coefficient in both columns (1) and (2), suggesting that both acquirer's shareholders and target's shareholders benefit from a target having higher financial constraint relative to the acquirer. The value increase for the acquiring shareholders could come from mitigation of the acquirer's free cash flow problem and increased value of cash holding. Higher stock performance for target shareholders may be caused by an expected higher premium paid by acquirers or by undervaluation of the target's stock.

To further examine why target shareholder value is positively related to the financial constraint difference, we study the relationship between the financial constraint difference and the takeover premium paid by the acquirer. The takeover premium is calculated as the difference between the offer price (listed in SDC) and the target stock price divided by the target stock price four weeks before the announcement. Following Officer (2003), to rule out outliers, we winsorize the takeover premium at 1% level. In column (3) of Table 6, there are 503 observations with sufficient data to calculate the takeover premium (in percentage point). The coefficient on the KZ difference is positive and significant at 10% level. The magnitude indicates that 1 standard deviation increase in the KZ difference will result in 1.31% increase in takeover premium[9]. This increase can be regarded as trivial given the average premium for the sample is 45.05%. Nevertheless, this result is consistent with a positive relationship between the financial constraint difference and the target's abnormal return.

[9] The standard deviation for the KZ difference in a sample where a premium is available (i.e., 503 observations) is 437.56.

3.4 Robustness Tests

Additional tests are added in this section to show that the results on the effect of the target's financial constraint relative to the acquirer's are not driven by our selection of the financial constraint measure.

3.4.a Alternative measures of financial constraints

One issue with the KZ index is its appropriateness to proxy for financial constraint. The literature shows a long debate on whether the KZ index captures the actual level of a firm's financial constraint (e.g., Whited and Wu ,2006; Hadlock and Pierce, 2010, etc.).

To address this concern, alternative measures for financial constraint are used. The first is the White and Wu (2006) (WW) index. Similar to the KZ index, the WW index is a linear combination of firm-level or industry-level variables and their corresponding estimated coefficients[10]. All the variables in the WW index are computed at the fiscal year end prior to any announcement date. Similar to the KZ difference, the WW difference is measured as the target's WW index minus the acquirer's WW index. Finally, 789 deals have sufficient data to get WW difference measure. The second measure is SA index as proposed by Hadlock and Pierce(2010). This index is simple since it only considers the firm's size and age as explanatory variables. We have 820 deals with available SA index for both the acquirer and the target. The Pearson's correlation is 0.058 between KZ difference and WW difference, -0.043 between KZ difference

[10] The WW index is -0.091*[(IB+DP)/Lag (AT)] - 0.062*DIVPOS+0.021*[DLTT/ACT]-0.044*[Log (AT)] +0.102*ISG-0.035*SG. If DVC>0 or DVP>0 then DIVPOS=1, else DIVPOS=0. SG is firm-level sales growth. ISG is industry-level sales growth. AT and Sale is adjusted for inflation.

and SA difference and 0.074 between WW difference and SA difference. It seems that these three commonly used financial constraint measures are not highly correlated in our sample.

We also apply a dummy approach regarding to the KZ index. When the acquirer's KZ is among the bottom half of all firms and the target's KZ is among the top half of all firms in their industry at the end of fiscal year prior to the announcement date, then we define a dummy variable, *KZ_LH*, equal to one. Otherwise, this variable is equal to zero. This variable is constructed to exactly capture the situation when the acquirer is unconstrained and the target is constrained. This differs from the KZ index in that the KZ difference emphasizes the relative difference between the target and the acquirer while this measure also takes into account the acquirer's or target's ranking relative to their industry peers. In fact, both the acquirer and target can be defined as unconstrained (or constrained) but still have a large difference in the KZ index. For the entire sample (802 observations), 22.7% belongs to the group in which the acquirer is defined as unconstrained while the target is defined as constrained.

Panel A of Table 7 presents the regression results using alternative financial constraint measures. Columns (1) through (3) use the WW index difference and Columns (4) through (6) use the SA index difference. Regressions are performed on all PCAR, ACAR and TCAR and all the other control variables are the same as those in the regressions in Table 4. The results in Columns (1) through (3) and Column (4) through (6) both show that alternative financial constraint measures, such as WW index difference and SA index difference, are significantly positively related to the synergy gain measure as the KZ index difference, indicating that the effect of the financial constraint difference on acquisition performance is robust to alternative measures of financial constraint.

Panel B of Table 7 show the result using a dummy measure. When the KZ index difference is replaced by a dummy variable, the results hold. KZ_LH has a coefficient equal to 1.53, significant at 10% level for the regression on PCAR, which means, all else being equal, deals where an unconstrained firm acquires a constrained firm have a 1.53% higher synergy gain than in deals with other situations in the firms' financial constraint statuses. The magnitude is even larger when compared on the ACAR; however, the KZ_LH dummy is insignificant to the TCAR while the coefficient is positive.

3.4.b Sensitivity tests

Our results are generally robust to the following alternate specifications of the empirical results: 1) using different market models to estimate the abnormal return; 2) using an alternative event window, for example, (-5, 5); 3) controlling for whether a deal is hostile and whether a deal has competing bidders; and 4) adding acquirer's financial constraint or target's financial constraint as an additional control. Concerning on the outlier of financial constraint measure, we winsorize the KZ measurement at 1% level and use them in the regressions and still obtain robust results.

4 Conclusion

This paper provides evidence to support the hypothesis that the target's financial constraint relative to the acquirer's is positively related to the synergy gain generated from the acquisition. We use the KZ index as a primary measure of financial constraints and construct the KZ index difference as the target KZ index minus the acquirer KZ index. The paper shows that acquisition synergy is higher when the KZ difference is larger. The KZ difference has a significantly positive effect on synergy gain only in deals where the targets have higher growth opportunities, where the targets are more constrained and where the industry competition is stronger.

We also find a positive relationship between financial constraint difference and acquirer's abnormal return as well as target's abnormal return, indicating that both acquirer's shareholders and target's shareholders benefit from a higher financial constraint difference between the target and the acquirer. Further investigation shows that target shareholder's value could come from a higher takeover premium paid by the acquirer for deals where the target is relatively more constrained than the acquirer. Finally, additional tests show that the effect of the financial constraint difference in this paper is robust to different measures of financial constraint.

Reference

Almeida, Heitor, and Murillo Campello, 2007. Financial Constraints, Asset Tangibility, and Corporate Investment. Review of Financial Studies 20: 1429-1460

Almedia, Heitor, Murillo Campello, and Dirk Hackbarth. 2011. Liquidity Mergers. Journal of Financial Economics 102: 526-558

Alti, Aydogan. 2003. How Sensitive is Investment to Cash Flow When Financing is Frictionless? The Journal of Finance 58-2: 707-722

Andrade, G., Mitchell, M., Stafford, E., 2001. New evidence and perspectives on mergers. Journal of Economic Perspectives 15: 103-120.

Bradley, M., A.Desai, and E.H.Kim.1988. Synergistic Gains from Corporate Acquisitions and Their Division between the Stockholders of Target and Acquiring Firms. Journal of Financial Economics 21: 3-40

Campbell, John L., Dan S. Dhaliwal., and William C. Schwartz, Jr. 2012. Financing Constraints and the Cost of Capital: Evidence from the Funding of Corporate Pension Plans. Review of Financial Studies 25: 869-912

Devos, Erik, Kadapakkam Palani-Rajan, and Krishnamurthy S. 2009. How Do Mergers Create Value? A Comparison of Taxes, Market Power, and Efficiency Improvements as Explanations for Synergies. Review of Financial Studies 23: 1180-1211

Erel, Isil, Jang, Y.J., and Michael S. Weisbach. 2015. Do Acquisitions Relieve Target Firms' Financial Constraints? Journal of Finance 70(1): 289-328

Fazzari, Steven M., R.Glenn Hubbard, and Bruce P. Petersen. 1988. Financing Constraints and Investment. Brookings Papers on Economic Activity 1: 141-195

Hadlock, C.J., and Pierce, J.R. 2010. New Evidence on Measuring Financial Constraints: Moving Beyond the KZ Index. Review of Financial Studies 23: 1909-1940

Healy, Paul, Krishna Palepu, and Richard S. Ruback. 1992. Does Corporate Performance Improve After Mergers? Journal of Financial Economics 31: 135-175

Hoberg. G., and Phillips, G. 2010. Product Market Synergies and Competition in Mergers and Acquisitions: A Text-Based Analysis. Review of Financial Studies 23: 3773-3911

Jensen, M.C., Ruback, R., 1983. The market for corporate control: the scientific evidence. Journal of Financial Economics 11: 5-50.

Kaplan, Steven N., and Luigi Zingales. 1997. Do Investment-Cash Flow Sensitivities Provide Useful Measures of Financial Constraints? Quarterly Journal of Economics 112: 159-216

Lang, L.H.P., and R. M. Stulz, 1994. Tobin's q, Corporate Diversification, and Firm Performance. Journal of Political Economy 102: 1248-80

Lang, L. H. P., R. M. Stulz, and R. A. Walkling. 1989. Managerial Performance, Tobin's Q, and the Gains from Successful Tender Offers. Journal of Financial Economics 24:137–54

Lamont, Owen, Vhristopher Polk, and Jesus Saa-Requejo. 2001. Financial Constraints and Stock Returns. Review of Financial Studies 14-2: 529-554

Loughran, T., Ritter, J.R., 2004. Why has IPO underpricing changed over time? Financial Management 33: 5-37.

Masulis, R., Wang, C., Xie, F., 2007. Corporate governance and acquirer returns. Journal of Finance 62:1851-1889.

Moyen, Nathalie. 2004. Investment-Cash Flow Sensitivities: Constrained vesus Unconstrained Firms. Journal of Finance 59-4: 2061-2092

Petersen, M., 2009. Estimating standard errors in finance panel data sets: Comparing approaches. Review of Financial Studies 22: 435-480.

Ran Duchin, Oguzhan Ozbas, and Berk A.Sensoy.2010. Costly external finance, corporate investment, and the subprime mortgage credit crisis. Journal of Financial Economics 97:418-435

Servaes, H. 1991. Tobin's Q, Agency Costs, and Corporate Control: An Empirical Analysis of Firm Specific Parameters. Journal of Finance 46:409–19.

Smith, Richard L. and Kim, J.H. 1993. The Combined Effects of Free Cash Flow and Financial Slack on Bidder and Target Stock Returns. The Journal of Business 67: 281-310

Wang, C. and Xie, F. 2009. Corporate Governance Transfer and Synergistic Gains from Mergers and Acquisitions. Review of Financial Studies 22:829-858

White, H., 1980. A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. Econometrica 48: 817-838.

Whited, M., Toni., and G.J. Wu. 2006. Financial Constraints Risk. Review of Financial Studies 19:531-559

Appendix: Variable Definitions

Variable	Definition
Panel A: Total returns, target's returns, acquirer's returns/share of synergies	
PCAR (-2,+2)	5-day portfolio cumulative abnormal return (in percentage points) calculated using the market model. The market model parameters are estimated using the return for the period (-210,-10). CRSP value-weighted index return is the market return. The weights for the acquirer and the target are based on their market capitalizations at the sixth trading day prior to the announcement. The target's weight is adjusted for the acquirer's toehold.
TCAR (-2,+2)	5-day target cumulative abnormal return (in percentage points) calculated using the market model. The market model parameters are estimated using the return for the period (-210,-10). CRSP value-weighted index return is the market return.
ACAR (-2,+2)	5-day Acquirer cumulative abnormal return (in percentage points) calculated using the market model. The market model parameters are estimated using the return for the period (-210,-10). CRSP value-weighted index return is the market return.
Panel B: Financial constraint variables	
KZ index	KZ index computed at the end of fiscal year prior to the announcement date, following Lamont et al. (2001)
KZ difference	Target KZ index minus acquirer KZ index at the end of fiscal year prior to the announcement date
WW index	WW index computed at the end of fiscal year prior to the announcement date, following Lamont et al. (2001)
WW difference	Target WW index minus Acquirer WW index at the end of fiscal year prior to announcement date
KZ_LH	Dummy equal to 1 if target KZ index is on the top half and the acquirer KZ index in on the bottom half of all firms in their industry at the end of fiscal year prior to the announcement date
Panel C: Acquirer's and target's characteristics	
Size	Market value of equity (in US$ million) 4 weeks prior to the announcement date.
Tobin's Q	Market value of assets 4 weeks prior to announcement date divided by book value of assets at the fiscal year-end immediately prior to announcement date.
Leverage	Book value of debts divided by the book value of total assets for the fiscal year prior to the announcement date.
ROA	Operating income before depreciation, scaled by book value of total assets.
Panel D: Deal Characteristics	
Relative deal size	Value of the transaction from SDC divided by the acquirer's market

	capitalization 4 weeks prior to the announcement.
Pure Cash Deals	Dummy variable: 1 for deals where the sole consideration is cash, 0 otherwise.
Pure Stock Deals	Dummy variable: 1 for deals where the sole consideration is stock, 0 otherwise.
Completed Deals	Dummy variable: 1 if the deal is completed, 0 otherwise.
High Tech	Dummy variable: 1 if target is from the high tech industries defined by Loughran and Ritter (2004), 0 otherwise.
Tender offer	Dummy variable: 1 for tender offer, 0 otherwise.
Merger of equals	Dummy variable: 1 if a deal is classified as merger of equals by SDC, 0 otherwise.

Table1. Sample distribution by announcement year

This table consists of 802 US mergers and acquisitions between 1983 and 2011. Acquirers and targets are from the same two-digit industries and have sufficient data from CRSP and Computat to construct the KZ index. This table presents the number of deals tabulated by deal announcement year for the entire sample and for sub-samples divided by KZ difference. KZ difference is measured as target's KZ index minus Acquirer's KZ index. Dif_L, Dif_M, and Dif_H represents bottom 25%, middle 50% and top 25% KZ difference, respectively.

Year	All	Dif_L	Dif_M	Dif_H	H/All (in percent)
1983	1	0	0	1	100.00%
1984	7	1	4	2	28.57%
1985	16	7	7	2	12.50%
1986	22	3	14	5	22.73%
1987	20	1	8	11	55.00%
1988	18	5	9	4	22.22%
1989	20	4	12	4	20.00%
1990	15	4	6	5	33.33%
1991	15	2	5	8	53.33%
1992	19	2	11	6	31.58%
1993	20	3	13	4	20.00%
1994	45	7	25	13	28.89%
1995	43	9	23	11	25.58%
1996	46	13	22	11	23.91%
1997	60	15	35	10	16.67%
1998	67	12	37	18	26.87%
1999	52	15	22	15	28.85%
2000	38	15	15	8	21.05%
2001	45	14	20	11	24.44%
2002	30	11	12	7	23.33%
2003	19	8	6	5	26.32%
2004	21	5	14	2	9.52%
2005	21	5	10	6	28.57%
2006	31	10	16	5	16.13%
2007	27	10	10	7	25.93%
2008	30	5	18	7	23.33%
2009	26	8	10	8	30.77%
2010	25	5	15	5	20.00%
2011	3	2	1	0	0.00%
Total	802	201	400	201	25.00%

Table2. Summary Statistics

This table consists of 802 US mergers and acquisitions between 1983 and 2011. Acquirers and targets are from the same two-digit industries and have sufficient data from CRSP and Compustat to construct the KZ index. Definitions of the variables are in the Appendix. This table presents acquirer-, target- and deal-characteristics for the entire sample and for sub-samples divided by KZ difference between the target and the acquirer. Dif_L, Dif_M, and Dif_H represents bottom 25%, middle 50% and top 25% KZ difference, respectively.

	All			L			M			H		
	Mean	Median	N	Mean	Median	N	Mean	Median	N	Mean	Median	N
Panel A: Acquirer Characteristics												
KZ	-16.773	-3.085	802	-3.806	-2.567	201	-2.404	-1.013	400	-58.333	-14.725	201
Firm Size	7.167	7.079	802	7.237	7.124	201	6.904	6.869	400	7.621	7.351	201
Leverage	0.221	0.198	802	0.216	0.168	201	0.269	0.259	400	0.131	0.067	201
Q	2.572	1.846	802	3.206	2.058	201	1.868	1.530	400	3.338	2.612	201
ROA	0.032	0.059	802	-0.032	0.054	201	0.041	0.050	400	0.080	0.096	201
Panel B: Target Characteristics												
KZ	-20.669	-1.595	802	-77.452	-14.338	201	-1.265	0.334	400	-2.499	-1.579	201
Firm Size	5.140	5.052	802	5.217	5.049	201	5.160	5.071	400	5.023	5.057	201
Leverage	0.218	0.169	802	0.112	0.024	201	0.279	0.263	400	0.202	0.126	201
Q	2.054	1.491	802	2.636	1.987	201	1.566	1.306	400	2.445	1.566	201
ROA	-0.043	0.031	802	-0.019	0.047	201	-0.012	0.031	400	-0.126	0.019	201
Panel C: Deal Characteristics												
Relative Deal size	0.557	0.263	802	0.528	0.261	201	0.657	0.331	400	0.387	0.142	201
Allcash (dummy)	0.282	0.000	802	0.303	0.000	201	0.270	0.000	400	0.284	0.000	201
Allstock (dummy)	0.383	0.000	802	0.468	0.000	201	0.325	0.000	400	0.413	0.000	201
Tender offer (dummy)	0.223	0.000	802	0.204	0.000	201	0.233	0.000	400	0.224	0.000	201
Completed (dummy)	0.813	1.000	802	0.826	1.000	201	0.795	1.000	400	0.836	1.000	201
Merger of Equal (dummy)	0.021	0.000	802	0.025	0.000	201	0.020	0.000	400	0.020	0.000	201
High-tech combination (dummy)	0.394	0.000	802	0.562	1.000	201	0.255	0.000	400	0.502	1.000	201
KZ Difference	-3.896	0.836	802	-73.646	-9.808	201	1.139	0.836	400	55.834	13.002	201
Synergy Gain (-2,2)	1.952	1.221	802	1.585	0.592	201	2.550	1.716	400	1.129	0.850	201
Acquirer CAR (-2,2)	-1.749	-1.889	802	-2.309	-2.225	201	-1.275	-1.908	400	-2.135	-1.545	201
Target CAR (-2,2)	23.549	19.544	802	21.888	19.632	201	22.028	17.616	400	28.235	25.177	201

Table 3 Correlation matrix

This table consists of 802 US mergers and acquisitions between 1983 and 2011. The bAcquirer and the target are from the same two-digit industries and have sufficient data from CRSP and Compustat to construct the KZ index. KZ difference (KZ_Dif) is measured as target's KZ index minus acquirer's KZ index. Definitions of other variables are in Appendix. P-Values are in parentheses. ***,**,* stands for statistical significance at 1%, 5%, and 10% level respectively.

	PCAR	ACAR	TCAR
ACAR	0.82***		
	(0.00)		
TCAR	0.34***	0.12***	
	(0.00)	*(0.00)*	
KZ_Dif	0.07*	0.06*	0.00
	(0.06)	*(0.10)*	*(0.92)*

Table 4. OLS regressions of synergy gains on financial constraint difference

This table consists of 802 US mergers and acquisitions between 1983 and 2011. The bAcquirer and the target are from the same two-digit industries and have sufficient data from CRSP and Compustat to construct the KZ index. The dependent variable, synergy gain is measured as 5-days value weighted portfolio CAR. KZ difference is measured as target's KZ index minus acquirer's KZ index. Definitions of other variables are in Appendix. All regressions control for both announcement year fixed effect and industry fixed effect, whose coefficients are suppressed for brevity. In parentheses are standard errors adjusted for heteroskedasticity and acquirer clustering. **, **,* stand for statistical significance at 1%, 5% and 10% level, respectively.

	(1)	(2)	(3)
KZ difference	0.002***	0.002***	
	(0.001)	(0.000)	
Acquirer's KZ			-0.001
			(0.000)
Target's KZ			0.003***
			(0.001)
Acquirer Characteristics			
Firm Size		-0.806***	-1.421***
		(0.263)	(0.336)
Leverage		0.292	0.189**
		(2.516)	(0.094)
Tobin's Q		0.170*	1.277
		(0.097)	(2.285)
ROA		-8.911***	-6.865***
		(2.594)	(1.642)
Target Characteristics			
Firm Size		0.282	0.807**
		(0.296)	(0.338)
Leverage		-3.653*	-0.276*
		(1.998)	(0.163)
Tobin's Q		-0.313*	-2.681
		(0.174)	(1.899)
ROA		1.017	-0.036
		(1.930)	(1.697)
Deal Characteristics			
Relative deal size		0.258	-0.551
		(0.408)	(0.869)
Allcash		-0.895	-0.425
		(0.899)	(0.873)
Allstock		-2.390**	-3.033***
		(0.987)	(0.919)
Completed		-1.047	-0.637
		(1.018)	(0.871)
Tender offer		2.647***	1.503*
		(0.834)	(0.871)
Merger of Equals		-9.289**	-6.741*
		(4.517)	(3.807)
High tech combination		-1.331	-1.330

		(1.013)	(0.993)
Constant	13.747	18.894**	20.164**
	(8.580)	(8.838)	(8.744)
Year fixed effect	Y	Y	Y
Industry fixed effect	Y	Y	Y
Observations	802	802	802
Adjusted R2	0.004	0.124	0.125

Table 5. Cross-sectional variations on the effect of financial constraint difference

This table consists of 802 US mergers and acquisitions between 1983 and 2011. The bAcquirer and the target are from the same two-digit industries and have sufficient data from CRSP and Compustat to construct the KZ index. The dependent variables are 5-days value-weighted portfolio abnormal return (PCAR). KZ difference is measured as target's KZ index minus acquirer's KZ index. Definitions of other independent variables are in the Appendix. HGrowth defines the deals in which target's Tobin's Q is higher than its industry's median Tobin's Q and LGrowth defines the deals in which target's Tobin's Q is lower than its industry's median Tobin's Q. HConst defines the deals in which target's KZ index is higher than its industry's median KZ index and LConst defines the deals in which target's KZ index is lower than its industry's median KZ index. HCompet defines the deals in those industries with higher industry competition (measured as below average Herfindahl index) and LCompet defines the deals in those industries with lower industry competition (measured as above average Herfindahl index). All regressions control for both announcement year fixed effect and industry fixed effect, whose coefficients are suppressed for brevity. In parentheses are standard errors adjusted for heteroskedasticity and acquirer clustering. ***, **, * stand for the statistical significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	HGrowth	LGrowth	HConst	LConst	Hcompet	LCompet
KZ difference	0.002***	0.009	0.002***	-0.034	0.002***	-0.001
	(0.001)	(0.008)	(0.001)	(0.045)	(0.001)	(0.001)
Acquirer Characteristics						
Firm Size	-0.387	-1.141***	-0.749**	-0.348	-0.465	-2.042***
	(0.426)	(0.366)	(0.325)	(0.560)	(0.326)	(0.580)
Leverage	0.197*	0.162	0.144	0.41	-1.36	6.173
	(0.110)	(0.345)	(0.120)	(0.386)	(3.306)	(4.129)
Tobin's Q	2.588	-1.677	1.307	-6.933	0.116	1.274***
	(4.790)	(3.075)	(3.157)	(4.626)	(0.131)	(0.460)
ROA	2.803	-10.510***	-9.594***	-8.516***	-9.894***	-2.399
	(5.629)	(2.747)	(3.630)	(3.261)	(3.045)	(3.692)
Target Characteristics						
Firm Size	0.137	0.349	0.209	0.049	-0.123	0.992**
	(0.484)	(0.430)	(0.357)	(0.538)	(0.373)	(0.499)
Leverage	-0.271	0.996	-0.335	-0.523	-3.938	-6.712
	(0.214)	(1.902)	(0.211)	(0.400)	(2.653)	(4.502)
Tobin's Q	-2.696	-2.316	-5.462**	-1.129	-0.329*	-0.233
	(3.331)	(2.895)	(2.739)	(3.891)	(0.193)	(0.372)
ROA	1.311	0.174	1.272	0.647	1.375	2.236
	(1.837)	(4.084)	(3.174)	(2.363)	(2.285)	(3.697)
Deal Characteristics						
Relative deal size	0.49	0.383	0.882*	-0.185	0.871	-0.486
	(0.846)	(0.458)	(0.456)	(0.507)	(0.545)	(0.458)
Allcash	1.916	4.215***	2.428**	1.644	-1.614	1.368

	(1.372)	(1.184)	(1.057)	(1.564)	(1.230)	(1.484)
Allstock	-2.461	-0.125	-2.774**	0.348	-3.098**	-2.099
	(1.669)	(1.427)	(1.366)	(1.716)	(1.404)	(1.676)
Completed	-1.329	-1.566	-0.033	-3.13	-1.243	-2.744
	(1.433)	(1.232)	(1.122)	(1.926)	(1.299)	(1.828)
Tender	-3.223*	-1.918*	-1.799	-4.639**	2.281**	4.079**
	(1.761)	(1.158)	(1.246)	(1.929)	(1.108)	(1.757)
Merger of Equal	-5.032	-18.263**	-5.058	-24.554**	-12.230*	-3.516
	(5.282)	(9.114)	(4.912)	(11.446)	(6.316)	(4.847)
High tech	-1.889	-1.973	-1.735	-0.945	-1.806	1.23
	(1.584)	(1.424)	(1.277)	(1.631)	(1.283)	(1.841)
Constant	8.497*	37.712***	27.831***	4.793	9.780**	43.951***
	(5.010)	(2.856)	(10.064)	(3.351)	(4.334)	(6.466)
Industry fixed effect	Y	Y	Y	Y	Y	Y
Year fixed effect	Y	Y	Y	Y	Y	Y
Observations	366	436	562	240	505	297
Adjusted R2	0.070	0.159	0.130	0.216	0.133	0.081

Table 6 Acquirer return, target return and takeover premium

This table consists of 802 US mergers and acquisitions between 1983 and 2011. The bAcquirer and the target are from the same two-digit industries and have sufficient data from CRSP and Compustat to construct the KZ index. KZ difference is measured as target's KZ index minus acquirer's KZ index. Definitions of other independent variables are in the Appendix. Dependent variable in column (1) is acquirer's 5-days CAR, in column (2) is target's 5-days CAR, in column (3) is takeover premium calculated as offer price divided by target stock price 4 week before announcement minus 1. All the dependent variables are in percentage point. All regressions control for both announcement year fixed effect and industry fixed effect, whose coefficients are suppressed for brevity. In parentheses are standard errors adjusted for heteroskedasticity and acquirer clustering. ***, **, * stand for the statistical significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)
VARIABLES	ACAR(-2,2)	TCAR(-2,2)	Premium
KZ difference	0.002***	0.002**	0.003*
	(0.000)	(0.001)	(0.002)
Acquirer Characteristics			
Firm Size	0.484	3.170***	6.220***
	(0.299)	(0.736)	(1.615)
Leverage	1.922	-3.252	1.859
	(2.755)	(5.240)	(11.142)
Tobin's Q	0.072	0.486*	1.723**
	(0.106)	(0.261)	(0.713)
ROA	-13.281***	-0.905	1.492
	(4.424)	(3.449)	(10.839)
Target Characteristics			
Firm Size	-0.921***	-4.611***	-11.368***
	(0.291)	(0.990)	(2.113)
Leverage	-3.745*	-1.597	2.268
	(2.216)	(4.790)	(9.944)
Tobin's Q	-0.185	-1.021**	0.845
	(0.195)	(0.514)	(1.098)
ROA	-0.851	6.655	7.555
	(1.682)	(6.254)	(8.269)
Deal Characteristics			
Relative deal size	-0.616**	0.872	11.986***
	(0.310)	(0.743)	(3.990)
Allcash	-0.613	4.159*	-0.840
	(1.006)	(2.519)	(4.530)
Allstock	-2.959***	0.146	4.002
	(1.046)	(2.332)	(5.219)
Completed	-1.375	-0.438	4.117
	(1.077)	(2.208)	(5.450)
Tender offer	1.177	8.618***	1.815
	(0.887)	(2.934)	(5.036)
Merger of Equals	-2.619	-22.134***	-29.349**
	(3.725)	(7.185)	(11.831)
High tech combination	-1.071	-2.966	2.951
	(1.124)	(2.694)	(5.213)
Constant	12.820	29.148**	44.077***
	(7.948)	(13.318)	(13.316)
Year fixed effect	Y	Y	Y

Industry fixed effect	Y	Y	Y
Observations	802	802	553
Adjusted R2	0.128	0.122	0.158

Table 7. Robustness tests

This table consists of US mergers and acquisitions between 1983 and 2011. The bAcquirer and the target are from the same two-digit industries and have sufficient data from CRSP and Compustat. Dependent variables are 5-days value-weighted portfolio abnormal return (PCAR), 5-days acquirer abnormal return (ACAR) and 5-days target abnormal return (TCAR). In Column (1)-(3, the independent variable is WW Difference, measured as target's WW index minus acquirer's WW index. In Column (4)-(6), the independent variable is KZ_LH, a dummy variable which equals 1 if target KZ index is on the top half and the acquirer KZ index in on the bottom half of all firms in their industry. All regressions control for both calendar year-fixed effects and industry fixed effects, whose coefficient estimates are suppressed for brevity. In parentheses are standard errors adjusted for heteroskedasticity and acquirer clustering. ***, **, * stand for the statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A:						
	(1)	(2)	(3)	(4)	(5)	(6)
	WW Difference	WW Difference	WW Difference	SA Difference	SA Difference	SA Difference
	PCAR(-2,2)	ACAR(-2,2)	TCAR(-2,2)	PCAR(-2,2)	ACAR(-2,2)	TCAR(-2,2)
FC Difference	0.106***	0.102***	0.122***	1.222*	1.678**	0.440
	(0.015)	(0.014)	(0.030)	(0.687)	(0.754)	(1.996)
Acquirer Characteristics						
Firm Size	-0.624**	0.468	3.332***	-1.368***	0.347	-1.065
	(0.266)	(0.301)	(0.808)	(0.369)	(0.411)	(1.047)
Leverage	0.088	0.011	0.410	-0.132	0.018	0.316
	(0.140)	(0.131)	(0.270)	(0.196)	(0.146)	(0.253)
Tobin's Q	-0.274	1.546	-5.949	2.860	2.409	-3.519
	(2.507)	(2.788)	(5.164)	(2.323)	(2.613)	(4.523)
ROA	-8.655***	-12.850***	-1.436	-8.906***	-12.648***	-0.996
	(2.608)	(4.458)	(3.373)	(2.627)	(4.500)	(3.761)
Target Characteristics						
Firm Size	0.180	-0.841***	-4.616***	0.934**	-1.012**	1.146
	(0.298)	(0.296)	(1.055)	(0.400)	(0.454)	(1.124)
Leverage	-0.318*	-0.196	-0.999*	-0.212	-0.457***	-1.111**
	(0.174)	(0.195)	(0.511)	(0.164)	(0.162)	(0.445)
Tobin's Q	-4.761**	-4.381*	-3.556	-5.364***	-3.468	-5.139
	(2.014)	(2.262)	(4.756)	(1.982)	(2.184)	(4.448)
ROA	0.703	-1.135	5.936	0.668	-1.783	5.060
	(1.908)	(1.684)	(6.263)	(2.134)	(1.929)	(6.268)
Deal Characteristics						
Relative deal size	0.742	-0.747*	1.581	0.283	1.452*	-10.248***
	(0.457)	(0.449)	(1.002)	(0.878)	(0.824)	(2.126)
Allcash	-0.828	-0.541	3.865	0.075	-0.023	7.529***
	(0.903)	(1.009)	(2.529)	(0.911)	(1.035)	(2.405)
Allstock	-2.336**	-2.859***	-0.077	-3.239***	-3.992***	0.007
	(0.989)	(1.053)	(2.322)	(0.933)	(0.980)	(1.993)
Completed	-0.987	-1.249	-0.033	-0.978	-1.547	0.227
	(1.008)	(1.070)	(2.166)	(0.929)	(1.006)	(1.876)
Tender offer	2.525***	1.254	8.368***	1.331	-0.436	7.956***
	(0.845)	(0.907)	(2.925)	(0.903)	(0.952)	(2.437)
Merger of Equal	-9.874**	-3.018	-22.956***	-7.895**	-1.529	-22.424***
	(4.585)	(3.794)	(7.270)	(3.938)	(3.135)	(6.051)

High tech	-1.236	-0.984	-2.293	-1.992***	-2.199***	0.209
	(1.047)	(1.169)	(2.694)	(0.700)	(0.810)	(1.800)
Constant	18.115**	12.619	28.299**	19.388**	13.495*	28.877**
	(8.737)	(7.958)	(12.946)	(8.946)	(7.788)	(12.407)
Year fixed effect	Y	Y	Y	Y	Y	Y
Industry fixed effect	Y	Y	Y	Y	Y	Y
Observations	789	789	789	822	822	822
Adjusted R2	0.129	0.133	0.118	0.116	0.131	0.127

Panel B:			
	(1)	(2)	(3)
	KZ_LH	KZ_LH	KZ_LH
	PCAR(-2,2)	ACAR(-2,2)	TCAR(-2,2)
FC Difference	1.530*	2.028**	1.537
	(0.856)	(0.987)	(2.475)
Acquirer's characteristics			
Firm Size	-0.807***	0.484	3.169***
	(0.266)	(0.301)	(0.738)
Leverage	0.639	2.404	-2.898
	(2.492)	(2.755)	(5.222)
Tobin's Q	0.102	0.013	0.425
	(0.138)	(0.131)	(0.269)
ROA	-8.740***	-13.233***	-0.776
	(2.580)	(4.381)	(3.484)
Target's characteristics			
Firm Size	0.249	-0.957***	-4.642***
	(0.300)	(0.297)	(0.991)
Leverage	-4.556**	-4.912**	-2.497
	(2.087)	(2.343)	(4.976)
Tobin's Q	-0.269	-0.137	-0.979*
	(0.173)	(0.196)	(0.506)
ROA	1.618	-0.047	7.260
	(1.942)	(1.752)	(6.482)
Deal characteristics			
Relative deal size	0.278	-0.588*	0.893
	(0.398)	(0.309)	(0.742)
Allcash	-0.880	-0.597	4.173*
	(0.893)	(0.999)	(2.514)
Allstock	-2.363**	-2.922***	0.174
	(0.984)	(1.041)	(2.333)
Completed	-1.209	-1.537	-0.588
	(1.019)	(1.076)	(2.203)
Tender offer	2.512***	1.027	8.489***
	(0.828)	(0.888)	(2.927)
Merger of Equal	-9.284**	-2.615	-22.129***
	(4.554)	(3.742)	(7.226)

High tech	-1.176	-0.866	-2.811
	(1.017)	(1.118)	(2.739)
Constant	19.147**	13.042	29.374**
	(8.908)	(8.001)	(13.387)
Year fixed effect	Y	Y	Y
Industry fixed effect	Y	Y	Y
Observations	802	802	802
Adjusted R2	0.122	0.130	0.122