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CORPORATE LIQUIDITY, ACQUISITIONS, AND MACROECONOMIC CONDITIONS

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ABSTRACT

Firms hold liquid assets to enhance their ability to invest efficiently when external financing costs are high, especially during poor macroeconomic conditions. Using a sample of 47,378 acquisitions from 36 countries between 1997 and 2014, we study how the relation between firms' cash holdings and their acquisition decisions changes over macroeconomic cycles. We find that higher cash holdings increase the likelihood a firm will make an acquisition. Better macroeconomic conditions, which lower the cost of external finance, also increase the likelihood of an acquisition. However, larger cash holdings decrease the sensitivity of acquisitions to macroeconomic factors, suggesting that cash holdings lower financing constraints during times when the cost of external finance is high. Announcement day abnormal returns for acquirers follow a consistent pattern: they decrease with acquirer cash holdings and with better macroeconomic conditions. The results are consistent with the view that firms choose liquidity levels to insure against poor macroeconomic conditions.

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1. Introduction

One of the most important decisions a financial manager must make is to determine how liquid his firm's balance sheet should be. More liquidity means that a firm can make investment decisions without having to raise external capital.¹ Consequently, liquidity on the balance sheet is most valuable to a firm when the cost of external finance is relatively high. One such time occurs during poor macroeconomic conditions, since both practitioners' viewpoints and the academic literature suggest that most firms' external financing costs are strongly pro-cyclical.² Therefore, liquidity should be particularly important in facilitating firms' abilities to invest efficiently during poor macroeconomic conditions.

Liquidity, however, comes at a cost. In addition to being inefficient from a tax perspective, too much liquidity can exacerbate agency problems, since managers are less likely to face capital market discipline for their investments. In other words, if firms hold sufficient liquidity to ensure optimal investments even in bad times, then they will have too much liquidity in normal times, when cash flows tend to be larger and financial markets have fewer frictions. A cost of having too much liquidity is that firms potentially will use this excess liquidity to make value-reducing investments.

This paper provides evidence on the nature of this tradeoff. It considers the way that macroeconomic conditions and firms' liquidity affect firms' acquisition decisions, one of the most important investment decisions that firms face. The idea is that a firm chooses its liquidity with these factors (and possibly others) in mind. Once the choice is made, however, it is sunk, and will affect a firm's future investment decisions in predictable ways. A more liquid balance

¹ The idea that liquidity can mitigate the cost of external financing was introduced in Keynes (1936) and developed by many others, most notably by Myers and Majluf (1984). The seminal paper about the way in which agency problems can occur when firms have too much liquidity is Jensen (1986), and many authors have provided related evidence.

² See Passov (2003) and Graham and Harvey (2001) for practitioners' viewpoints, and Erel et al. (2012) for empirical evidence on how firms' capital-raising varies over the business cycle.

sheet should provide insurance against unreliable capital markets in bad times at the potential cost of exacerbating the firm's free cash flow problem and leading to value-reducing investments in good times.

We study the effect of liquidity on the interaction of macroeconomic conditions and investment decisions using a sample of 47,378 acquisitions by public and private acquirers from 36 countries between 1997 and 2014. We focus on acquisitions because they are large, observable investments, over which firms have substantial discretion. Therefore, if liquidity affects investment, it is more likely to be observed doing so for acquisitions than for capital investments. We estimate the likelihood that a firm makes an acquisition as a function of both its own financial position and overall macroeconomic conditions. The international sample provides us with variation in economic conditions that allows us to identify the way that firms' liquidity affects their investment decisions in differing economic conditions.

Similar to Harford (1999), we find that firms with higher cash holdings are more likely to make acquisitions in our much larger and non-overlapping sample. This finding could mean that cash relieves financial constraints and allows firms to invest efficiently, or it could mean that cash leads firms to overinvest and to make value-reducing acquisitions. In fact, if firms are choosing liquidity to trade off the costs and benefits of incremental liquidity, this positive relation between cash holdings and acquisitions could reflect both effects. During bad times, we expect higher liquidity to lessen the impact of credit rationing and consequently lower the impact of poor economic conditions in firms' investments, while in normal times, we expect higher liquidity to lead to overinvestment.

We analyze the relation between cash holdings and the propensity to make acquisitions over different macroeconomic conditions. Since down cycles cannot be perfectly predicted and

have a large impact on the firm's ability to raise capital, they are an exogenous factor that identifies the impact of liquidity. We estimate the extent to which macroeconomic conditions affect the likelihood of making an acquisition, as well as the extent to which the impact of macroeconomic conditions on acquisitions is affected by firms' cash positions. If the purpose of holding cash is to provide liquidity in times when the cost of external finance is high, then we would expect that firms with large cash holdings would be less affected by macroeconomic shocks than firms with less liquid balance sheets.

The results suggest that macroeconomic conditions positively affect the likelihood of making an acquisition. This finding is consistent with the common observation that merger waves tend to be pro-cyclical (Harford (2005)). However, the results also suggest that impact of macroeconomic conditions on firms' acquisition behavior is smaller when firms have larger cash positions. The fact that cash holdings reduce cyclicity suggests that part of the explanation for the cyclicity of merger waves comes from a financing channel. Since it is harder to raise external sources of capital when the market is not doing well, firms neglect some potential value-increasing acquisitions (and other investments) during bear markets. Holding cash mitigates this effect and enables firms to make valuable investments during poor times. However, incremental cash comes at the cost of potentially making financing too easy during bull markets, which can lead to poor quality acquisitions.

The view that firms choose liquidity to trade off the agency costs coming from excess liquidity with the benefit of ensuring the ability to invest even in bad times also has predictions about the quality of investments over the business cycle. It suggests when firms make acquisitions at times when they have excess liquidity, they will be more prone to overinvest, and more cash will lead to lower quality acquisitions, especially during bull markets. In addition, if

firms are credit-rationed during poor financial times, incremental cash will help to alleviate these constraints. If manager would undertake only the most valuable investments in the absence of cash, then additional cash would allow them to take some positive NPV investments that the firm could not finance otherwise. These additional investments, while creating value, are nonetheless worse than the investments that the firm would have taken without the cash on hand. Thus, the incremental effect of cash on investment quality is negative despite the fact that the cash enables firms to finance positive NPV investments.

To evaluate this idea, we rely on the market reaction to the announcement of the acquisition, which measures the market's expectation of the value added to the acquiring firm from the deal. For our sample, market reactions tend to be slightly positive, with a mean of 0.78% and a median of 0.29%. In the cross-section, we find that acquirers' announcement returns are, on average, negatively related to the acquirer's cash holdings. Consistent with these arguments, when acquirers have more cash, the acquisitions they make tend to be worse.

In addition, acquisition announcement returns are negatively related to macroeconomic conditions. Combined with the result that there is a lower probability of a firm of making an acquisition in worse macroeconomic conditions, this pattern suggests that financing constraints force firms to be relatively selective during bad economic times, undertaking fewer but higher quality deals. During normal times, firms undertake relatively more deals, but potentially lower quality ones, since they are able to raise capital to finance the deals more easily. Overall, the results support the idea that firms view incremental liquidity as insurance against poor states of the world. Higher liquidity allows them to make better investments in bad states but the cost is that they will make worse ones in good states, on average.

The paper combines the ideas in several disparate literatures in corporate finance, including work on the precautionary demand for corporate liquidity, on the effect of free cash flow on firms' investments, on the impact of macroeconomic conditions on the cost of raising external financing, and on the reasons why mergers and acquisitions tend to vary pro-cyclically over the business cycle. The literature on the precautionary demand for cash dates to Keynes (1936), who originally proposed that firms can hold cash as a hedge against potential future financial constraints. Opler, Pinkowitz, Stulz, and Williamson (1999) was the first to examine this idea empirically, and started a literature that generally concludes that the precautionary motive is an important determinant of firms' liquidity management decisions.³ This paper contributes to this literature by documenting directly that cash helps enable firms finance investments during poor macroeconomic times when liquidity is likely to be scarce. While most of the literature on liquidity examines it from an *ex ante* sense by studying the factors that affect firms' choices of liquidity, our paper extends the analysis by looking *ex post* at the way that firms' liquidity choices actually affect their investment decisions at times when it is needed.

Jensen (1986) introduced the notion that liquidity can have a dark side, and that too much liquidity can lead firms to take value-reducing investments. A number of papers have documented that empirically, firms with unusually large cash holdings take a number of poor investments, especially acquisitions.⁴ This paper supports the notion that cash can contribute to poor acquisitions in good economic times when it is relatively easy to raise capital. When economic conditions are strong, firm can more easily raise capital than when economic

³ See Almeida, Campello, and Weisbach (2004), Bates, Kahle, and Stulz (2009), Lins, Servaes, and Tufano (2010), Campello, Giambona, Graham, and Harvey (2011), Hoberg, Phillips, and Prabhala (2014), Morellec, Nikolov and Zucchi (2014), and Lin, Schmid, and Weisbach (2017). Almeida, Campello, Cunha, and Weisbach (2014) provide a survey of this literature.

⁴ See Lehn and Poulsen (1989), Lang, Stulz and Walkling (1991), Blanchard, Lopez de Silanes and Shleifer (1994), Harford (1999), Richardson (2006), and Cunha (2015).

conditions are weak, so the cash firms have saved historically becomes superfluous, and can be used for value-reducing investments such as poor acquisitions.

An emerging literature has documented that firms' capital raising decisions differ substantially over the business cycle (see Koraczyk and Levy (2003), Erel, Julio, Kim, and Weisbach (2012), Kahle and Stulz (2013), and Covas and Den Haan (2013)). This literature finds that during booms, even poorly rated firms are able to raise capital through equity or debt issues. However, during poor macroeconomic times, raising capital appears to be much more expensive. During downturns, equity issues are rare and bond issues are restricted to the highest quality issuers. Our paper suggests that because of the high costs of external finance during poor times, firms hold cash to be able to make investments during these poor times without having to raise external financing.

Finally, one of the major unsolved problems in finance concerns the reasons why mergers tend to follow pro-cyclical waves (see Brealey, Myers and Allen (2015)). Our results suggest that differential financing costs over the business cycle could be part of the reason why mergers follow this pattern. In the context of private equity, Axelson, Strömberg and Weisbach (2009) present a model in which during boom times, capital is "too loose" and firms make all of the positive NPV acquisitions they can, but make some negative NPV ones as well. In contrast, in poor times, capital is "too tight" and even profitable deals do not get financed. The empirical evidence on acquisitions by private equity firms suggests that they tend to follow this pattern (see Axelson, Jenkinson, Strömberg, and Weisbach (2013)). The results presented in this study imply that acquisitions by corporations follow a similar pattern to that of private equity firms; acquirers tend to be unconstrained during boom times and make too many acquisitions, but are constrained during poor times so they underinvest and ignore value-increasing acquisitions.

Holding liquidity helps solve the problem of underinvestment in poor times but comes at the cost of exacerbating the problem of overinvestment during boom times.

2. Sample

2.1. Data Sources

Our sample of firms is taken from the *OSIRIS* database that provides financial information on publicly traded and major unlisted companies.⁵ We require firms to report at least one year of financial information during the fiscal year of 1997 and 2014. We exclude financial firms (US SIC code 6000-6999), as well as firm-years for which the firm has less than 10 employees or total asset less than \$1 million USD. *OSIRIS's* coverage of firm-level financial information varies widely by country. We restrict our sample to countries with at least 20 firms in every fiscal year to ensure a comprehensive set of firms in each country in our analysis. These sample selection criteria limit our sample to 36 countries.

To identify acquisitions made by the sample firms, we rely on the *Zephyr* database on worldwide mergers and acquisition transactions.⁶ We include all mergers and acquisitions announced between January 1, 1997 and December 31, 2014 and completed as of December 31, 2014. We focus on acquisitions of majority interests in which the acquirer owns less than 50% of the target shares prior to the deal, but more than 50% subsequent to the deal. We additionally exclude buyouts, privatizations, reverse mergers, restructurings, and exits from private equity

⁵ The *OSIRIS* database mainly includes public companies over the world, but major private companies are included in the database if they are subsidiaries of public companies, they have issued a public bond, or they keep reporting financial information after delisting. 34% of firms in our sample are private firms with the average total assets of \$1,230 million USD. Our main results are not qualitatively different when we exclude private firms in our sample.

⁶ We rely on *Zephyr* instead of *SDC* because our two databases – *OSIRIS* and *Zephyr*- are provided by the same data provider, *Bureau Van Dyck*, reducing any errors that could potentially come from data merging process.

deals. Finally, we merge the acquisition transactions information in *Zephyr* to the firm-year panel data of *OSIRIS*.

To evaluate the impact of liquidity on firms' decisions to make acquisitions, we wish to estimate the likelihood that a given firm makes an acquisition in a particular year. Our goal is to construct as large a sample of potential acquirers as possible, but only to include firms that realistically could make an acquisition. For this reason, we include all firms into our sample that, according to the *Zephyr* database, make at least one acquisition in our sample period.⁷

One limitation of the *Zephyr* database is that, for about 45% of deals, deal values are not reported. We neither drop these deals nor impose a size criterion for our acquisitions to avoid oversampling larger deals (see the discussion by Netter, Stegemoller, and Wintoki (2011)). We rather focus our filters on firms' decisions on whether to make at least one acquisition in a particular year, regardless of the acquisition's size.⁸ When we pool firms across countries and years, the final sample contains 129,874 firm years, in which 47,378 acquisitions are made.

We organize the sample in two ways, depending on the type of the analysis for which it will be used. First, when estimating the likelihood of acquisitions, we use the firm-year panel data that include 129,874 observations of 12,583 firms in 36 countries from 1997 to 2014. Second, in the analysis of acquirers' cumulative abnormal returns around announcement dates, we organize the sample at the individual deal level. For this second test, we use stock return data from *Datastream* and estimate the acquiring firm's CAR from day -1 to day +1 (CAR[-1,+1]) relative to the acquisition announcement date. Abnormal returns are calculated from the market model estimated from day -260 to day -100 relative to the announcement date with at least 60 days of returns available. When a firm makes multiple acquisition announcements in a short

⁷ 33% of firms are dropped from the sample because they do not make any acquisitions during our sample period.

⁸ We repeat our main tests using only acquisitions for which we know the valuation, imposing minimum size criteria of \$1 million and \$10 million. The results are similar to those we report.

period, we take the first acquisition transaction and drop any other transactions that are announced within 30 days. We additionally include the acquiring firm's return from day -210 to -10 in the regression as a control, losing 837 deals from our sample. We end up with using a sample of 33,410 acquisition transactions in 36 countries with cumulative abnormal announcement returns available.

We use annual GDP growth in constant 2015 US dollars obtained from World Bank to measure country-level macroeconomic conditions. We construct indicator variables for low GDP growth years when we evaluate whether the effect of cash changes across macroeconomic cycles. Because countries have different distributions of GDP growth, to identify abnormal levels of GDP growth rates, we first normalize the GDP growth by subtracting the mean and scaling by the standard deviation of each country. For an observation of GDP growth for a particular country and year, the mean and standard deviation that are used for normalization are estimated from time-series GDP growth rates over the previous 20 years ending two years before the event time (i.e. from $t-23$ to year $t-3$). *Low GDP Growth* is defined as the years when normalized GDP growth rate is below the bottom 20th percentile of the normalized GDP growth distribution of 648 country-year observations.⁹

Our main measure for corporate liquidity is cash, scaled by the book value of total assets, which has been the literature's standard measure of corporate liquidity since Opler, Pinkowitz, Stulz, and Williamson (1999). The literature has likely focused on this measure of liquidity two reasons. First, cash normalized by assets is straightforward to measure.¹⁰ Second, there are theoretical reasons why cash is the preferred way of managing liquidity. Lines of credit and debt

⁹ In Appendix Table 1, we confirm our results with alternative definitions using different normalization methods. The main results remain similar.

¹⁰ However, its name is somewhat misleading, since for most firms, their "cash" holdings actually are an aggregation of a number of different securities, some of which are risky. See Duchin, Gilbert, Harford, and Hrdlicka (2017) for more discussion and a characterization of the "cash" portfolios of typical public firms.

capacity can disappear during poor financial conditions when they are most needed, effectively being used to fund overinvestments in good times rather than efficient investments in poor times (see Acharya, Almeida, and Campello (2007) or Almeida, Campello, Cunha, and Weisbach (2014)).

As firm-level control variables, we use firm size, profitability, and sales growth, all of which are taken from *OSIRIS*. At the deal level, we construct indicator variables for public targets, cross-border deals and related-industry deals from *Zephyr*. To minimize the effect of outliers, we winsorize cash, profitability, and sales growth variables, and trim CARs.¹¹ Detailed definitions for all variables are provided in the Appendix.

2.2. Sample Description

Table 1 summarizes the distribution of our sample of firms and acquisition transactions. Panel A presents the way in which the sample changes over the sample period. It begins in 1997 with 3,922 firms in 17 countries. The sample increases to 36 countries and more than 8,000 firms for most of the sample period. The “Acquisition Rate”, which is the fraction of sample firms making at least one acquisition, varies from 16.3% to 30.9%, with an average of 24% per year. In addition, the last two columns show the mean and standard deviation for one-year lagged GDP growth rates of 36 countries by fiscal year. There is a substantial year-to-year variation in average GDP growth rates over time, from a high of 4.9% in 2008 to a low of -1.7% following the financial crisis in 2010.

Panel B of Table 1 breaks down the sample by country. We categorize countries into high GDP country and low GDP country. A country is defined as a high (low) GDP country when its

¹¹ Cash is winsorized at the top and bottom 1% of the distribution. After examining the outliers, profitability is winsorized at the top 1% and bottom 5%, and sales growth at the top 5% and bottom 1%. Because of the extreme outliers, CARs are trimmed at the top and bottom 1% of the distribution.

mean real GDP per capita over the period of 1996 to 2013 is above (below) the median of mean real GDP per capital of 36 countries. Countries range in size from Columbia, with an average of 7 firms per year, to the United States, with over 2,500 firms per year. The acquisition rate varies substantially across countries as well, from a low of Hong Kong with an acquisition rate of 11.6%, to a high of Netherlands, in which firms make acquisitions in 35.2% of years. The large difference in acquisition rates could reflect a number of factors, including legal or cultural obstacles to acquisitions, or differences in reporting requirements, across countries that affect the likelihood that we can observe a given acquisition, so that it makes it into our sample. Regardless of the reason why they occur, these differences strongly suggest that it is important to control for country specific factors in any equations of acquisition rates.

In addition, there is substantial variation in economic growth rates across countries. China has the largest average growth rate, with an average of 9.6% while Italy has the smallest, with a growth rate of 0.5%. Even within countries, GDP growth rates change over time at different rates, with the standard deviation of GDP growth equal to 0.9% in Australia and 4.7% in Greece.

Table 2 summarizes the characteristics of the acquirers in our sample. Since our focus is on the factors that lead to acquisitions, we compare the characteristics of firms in acquisition years to those in non-acquisition years. These comparisons between acquisition years and non-acquisition years include both cross-sectional differences in the likelihoods that different firms will make acquisitions, and differences over time in the likelihood of a particular firm doing an acquisition.

Table 2 indicates that there are stark differences between acquirers and non-acquirers. Acquirers have about 50% larger total book assets. In addition, acquirers tend to be more

profitable and have higher sales growth. However, the differences in cash holdings, while statistically significant, are small. In addition, there is no noticeable difference in GDP growth rates between acquirers and non-acquirers' countries. This pattern could reflect the fact that some firms in developed countries like US and UK, which compose 45% of the sample firms, have relatively low GDP growth rates but a large number of acquisitions. To account for the different level and volatility of GDP growth rates by country, we compare the difference in normalized GDP growth rates between acquirers and non-acquirers. We find that acquisitions tend to occur when the GDP growth, normalized by the historical mean and standard deviation, is higher than usual.

3. Estimating the Effects of Liquidity and Macroeconomic Conditions on Acquisition Likelihoods

3.1. Specification

Using this sample of firms and acquisitions, we estimate the likelihood that a firm makes an acquisition in a particular year. Because we include interaction terms in some specifications and there are well-known problems interpreting interacted coefficients in probit or logit specifications (Ai and Norton (2003)), we estimate the equation using a linear probability model. As our independent variable, we use our measure of corporate liquidity, a firm's cash holdings normalized by its assets.

An important consideration in designing an empirical specification to understand acquisition decisions are the substantial cross-firm differences in both firms' propensities to hold cash and their likelihood to make acquisitions. As documented in Panel B of Table 1, firms' cash holdings vary noticeably across countries, as do the fraction of firms that make acquisitions. There are a number of reasons for why such cross-country variation could exist, including tax,

regulatory and cultural factors. In addition to cross-country factors, there are firm-specific factors that affect firms' cash holdings (see Opler, Pinkowitz, Stulz, and Williamson (1999)). Because of the importance of firm and country specific factors that affect both cash holdings and acquisitiveness, we include firm-specific fixed effects into the specification. Consequently, our results should be interpreted as estimates of the effect of additional cash on a particular firm's acquisition decisions, rather than on cross-firm differences.¹²

We also wish to control for other factors that potentially affect the likelihood that firms make acquisitions. Larger firms generally have better access to capital and more synergies with potential targets, both of which make it more likely to make acquisitions. For this reason, we include $\ln(\text{Assets})$ and $\ln(\text{Assets})^2$ into the specification. In addition, more profitable firms and ones that have been growing recently are more likely to make deals, so we also include *Profitability* and *Sales Growth* in the equation. Finally, in a number of specifications, we include measures of one-year lagged macroeconomic conditions in the acquirer's home country; when these variables are not included, we add year fixed effects to the equation to control for any potential unmodeled factors that vary over time.

3.2. Acquirer Firms' Liquidity and Acquisitions

We present estimates of this equation in Column 1 of Table 3. The statistically significant coefficient of 0.272 on *Cash* means that the likelihood of an acquisition increases with additional cash. Since the standard deviation of cash holdings is 0.14 (see Table 2), this equation implies that a one standard deviation increase in cash holdings leads to about a 3.8 percentage point

¹² Our main results hold when we use alternative specifications that include country and industry fixed effects rather than firm fixed effects.

increase in the likelihood of an acquisition. Given the average acquisition rate of 24%, this increase corresponds to about a 15.9% increase in the acquisition rate.

This finding replicates a well-known result from Harford (1999), who estimates similar equations on large US corporations between 1977 and 1993. Our sample period begins in 1997, after Harford's ends, is from 36 countries and contains smaller as well as private acquirers. Our sample, therefore, is both non-overlapping and very different in makeup from Harford's. The fact that cash holdings predict acquisition likelihoods in such different samples suggests that the pattern is robust, and reflects the way that additional cash is associated with higher acquisition rates for all types of firms.

The causal interpretation of this finding is that having more cash allows firms to make more acquisitions. If financial conditions are strong, this effect could lead to a free cash flow problem, and provide capital for managers to undertake acquisitions that shareholders would prefer them not to take. If financial markets are weak and it is costly for firms to raise capital, managers can use cash on the balance sheet to finance valuable investments at times when accessing external capital markets would be difficult.

Alternatively, it could be that the observed relation between cash and acquisitions reflects firms accumulating cash when their managers think it likely that future acquisitions will occur. In other words, acquisitions could occur following cash accumulation not because the cash affects financing policy, but because the cash is accumulated to pay for acquisitions that are known to be occurring in the near future. The natural way to distinguish between these views is to consider acquisition behavior following exogenous inflows of cash, which sometimes do occur (for example, see Blanchard, Lopez de Silanes, and Shleifer (1994)). However, these

circumstances are rare, and for most firms, their cash holdings are determined endogenously as a function of many factors, including the likelihood of future acquisitions.

3.3. The Impact of Macroeconomic Conditions

A potential approach to identifying the effect of cash on acquisitions comes from the insight that while the quantity of cash that firms hold is under their control, the value of their cash holdings is not. As Keynes (1936) originally noted, if financial markets allowed firms to transact costlessly at assets' fundamental values, then there would be no reason for firms to hold cash. When macroeconomic conditions are strong, financial markets tend to work well. In good times, therefore, cash becomes less important since financial markets approach Keynes' benchmark in which transactions costs are negligible. However, when the economy is weak, it becomes harder to raise capital externally through financial markets, and transactions costs tend to be higher (see Erel, Julio, Kim, and Weisbach (2012) for evidence). Consequently, cash becomes more valuable in bad economic times than in good times. We use this idea to identify the effect of firms' cash holdings on their acquisition decisions.

We first estimate the direct impact of macroeconomic conditions on acquisition activity by adding the GDP growth in the acquirer's country to the equation. Because of the international nature of the sample, there is substantially more variation in this variable than there would be if the data were only from one country, since macroeconomic conditions are not perfectly correlated across countries. The results from this specification are presented in Column 2 of Table 3. They indicate that GDP growth positively affects the likelihood that a firm makes an acquisition in a particular year even after controlling for a firm's cash holdings. The coefficient on GDP growth of 0.343 implies that a one standard deviation increase in GDP growth (0.027) leads to about a

one percentage point increase in the likelihood a potential acquirer makes an acquisition. This finding is consistent with the prior literature documenting the pro-cyclicality of acquisitions (Harford (2005), Netter, Stegemoller, and Wintoki (2011)).

As an alternative specification, we replace GDP growth with our *Low GDP Growth* indicator variable in Column 3 of Table 3. The results suggest that in unusually bad periods of growth, it is 2.6 percentage points less likely that a firm makes an acquisition in a particular year. This result also is consistent with the notion that acquisitions follow a pro-cyclical pattern.

3.4. Interactions of Cash and Macroeconomic Conditions

We next analyze the interaction of macroeconomic conditions with the effect of cash holdings on acquisitions. Under the causal interpretation of the results in Table 3, we expect cash holdings to have a larger effect on acquisition likelihoods during poor times than during normal times, since cash holdings will serve to mitigate the impact of financial constraints. Econometrically, in the equation of acquisition likelihoods, we expect to observe a negative effect on the interaction between macroeconomic conditions and cash holdings. If cash causally affects firms' acquisition decisions, the extent to which it does should vary counter-cyclically.

In Column 1 of Table 4, we present estimates in which we add GDP growth interacted with firms' cash holdings to the prior specification. The estimated coefficient on this variable is -1.651, which is statistically significantly different from zero. This negative coefficient suggests that the effect of cash on acquisitions is countercyclical. Cash holdings appear to affect acquisition likelihoods more when the economy is doing poorly, consistent with the notion that

its value is higher when the economy is doing poorly and the cost of accessing external capital markets is high.¹³

In Column 2 of Table 4, we measure macroeconomic conditions using the indicator variable that indicates whether the GDP is substantially lower than its historical average and the interaction of this indicator variable with firms' cash holdings. Similar to the results in Column 1 using GDP growth, cash appears to affect acquisitions more during periods of extreme low growth. While these periods contain fewer acquisitions, the effect of cash holdings mitigates this effect, presumably by allowing firms to make acquisitions that they could not have financed if they had to access external capital markets.

4. Factors Affecting the Impact of Corporate Liquidity over the Business Cycle

4.1. Firms' Access to Capital and the Importance of Cash for Acquisitions

The argument that the value of cash varies over the business cycle depends on the idea that macroeconomic conditions affect firms' abilities to access capital markets. However, the impact of macroeconomic conditions on firms' access to capital varies substantially across firms. For example, Erel, Julio, Kim, and Weisbach (2012) find that poorly rated firms decrease capital raising substantially during market downturns, but highly rated firms actually increase capital raising during these periods. Therefore, we expect cash to have a larger impact on the acquisition decisions of lower-rated or non-rated firms during market downturns than on those of highly rated firms.

In the remaining columns of Table 4, we re-estimate the equations from Columns 1 and 2 on the subsamples of investment grade firms and on firms with either a speculative rating or no

¹³ This result also holds when we restrict our sample to non-equity deals (i.e. deals financed at least partially by cash). See Appendix Table 2.

rating.¹⁴ Columns 3 and 5 present the results using GDP growth as the measure of macroeconomic conditions, while the equations in Columns 4 and 6 use the indicator variable indicating whether macroeconomic conditions are unusually bad.

The results in Columns 3 and 5 suggest that while more cash affects all firms' acquisition likelihoods similarly, the impact of macroeconomic conditions is very different between the two groups. In the estimates in Column 3 using investment grade firms, there is no effect of GDP growth on the likelihood of making an acquisition. In addition, the interaction of GDP growth and cash affect does not affect acquisition likelihoods either. In contrast, in the estimates in Column 5 using the subsample of speculative and unrated firms, GDP growth is strongly positively related to the likelihood of an acquisition. For these firms, which are likely to be relatively financially constrained, the effect of GDP growth on the likelihood of an acquisition is mitigated to some extent if the firm has more cash. The coefficient on the interaction term between GDP growth and cash holdings is negative and statistically significant at the 1% level. The clear interpretation of this finding is that when the economic conditions are poor, firms without an investment grade rating have a difficult time raising capital so are unlikely to make acquisitions. However, if these firms have more cash, then their acquisition decisions become less sensitive to macroeconomic conditions since they can finance acquisitions through their cash holdings during downturns.

In Columns 4 and 6 we present estimates of the specification using the indicator variable to indicate particularly low growth rates for the subsamples of firms with investment grade or speculative/no rating. As with the specification using GDP growth rates, there are stark differences between the estimates for the two sets of firms. The speculative and unrated firms

¹⁴ Ratings are taken from *S&P Issuer Ratings* as of the time of the potential acquisition. We obtain these ratings from *Capital IQ*.

have strongly pro-cyclical acquisition behavior (Column 6), with the estimated likelihood of an acquisition lower is when *Low GDP Growth* equals one. Higher cash lowers the macroeconomic effect since the coefficient on the interaction of cash with *Low GDP Growth* is positive and statistically significant. In contrast, there is no effect of *Low GDP Growth* for the investment grade firms (Column 4).

These findings support the causal interpretation of our results, in which firms with limited access to capital markets are less likely to make acquisitions during poor macroeconomic conditions because of a lack of access to external financial markets. However, holding more cash can mitigate this effect and provide financing for firms to make potentially valuable acquisitions regardless of the financial conditions they face.

4.2. Diversifying and Related Acquisitions

We have focused our analysis on the likelihood that a firm makes an acquisition, without controlling for the characteristics of the acquisition. Unfortunately, a downside of a large sample such as the one we use is that it is difficult to know much detail about the acquirers and targets. However, we do know if the acquirer and target are in the same industry as one another, so we can classify each acquisition as either related or diversifying.¹⁵ The distinction between related and diversifying acquisitions is likely to be relevant because substantial literature has documented that diversifying acquisitions are more likely to be agency-motivated than acquisitions of related companies (e.g. Graham, Lemmon, and Wolf (2002)) In addition, diversifying acquisitions are more likely to be discretionary, while related ones are more likely to be part of a long-term corporate strategy. Consequently, the extent to which cash affects the

¹⁵ We classify an acquisition as related if the target and acquiring firms have the same first two digits of the primary U.S. SIC industry codes according to *Zephyr*. Using this classification scheme, 13.6% firm-year observations are defined as related acquisition years and 10.4% as diversifying acquisition years in our sample.

likelihood of related and diversifying acquisitions potentially provides insights into its role. In particular, if cash holdings lead related acquisition deals to be less pro-cyclical, then it likely to be mitigating financial constraints.

We estimate equations similar to those reported above that distinguish between related or diversifying acquisitions. The distinction between related and diversifying acquisitions leads to an empirical specification in which there are three possible outcomes: in any given year, a firm can make a related acquisition, a firm can make a diversifying acquisition, or a firm does not make any acquisitions.¹⁶ We estimate a multinomial logit model because we want to estimate the way the firm chooses among these three options. We report estimates of this model in Table 5, with the base case being that the firm does not make any acquisitions. Each estimated equation is presented in two columns in the table. Coefficients in the odd numbered columns represent the impact of the dependent variable on the likelihood of a related acquisition relative to the likelihood of no acquisition. In even numbered columns, they represent the likelihood of a diversifying acquisition relative to no acquisition.

The estimates in Table 5 indicate that the likelihood of a related acquisition is less sensitive to both cash holdings and to macroeconomic conditions than the likelihood of a diversifying acquisition. As noted above, related acquisitions are more likely to be part of an overall corporate strategy to invest in a particular area, while diversifying acquisitions are more likely to be discretionary, in that they can be undertaken without affecting the firm's other businesses. The results presented in Table 3 suggest that better macroeconomic conditions and higher cash holdings both increase the probability that a firm can finance a potential acquisition. Therefore, the higher sensitivity of diversifying acquisitions to both cash holdings and

¹⁶ If an acquirer makes both a diversifying and a related acquisition in the same year, we consider that firm as making a diversifying acquisition for the purposes of our statistical tests.

macroeconomic conditions suggest that being able to finance a deal more easily leads firms to undertake more discretionary acquisitions. In addition, these higher sensitivities are consistent with the notion that diversifying acquisitions are more likely to be a consequence of agency problems, since they are more likely to occur when financing is plentiful, in good macroeconomic conditions and when the acquiring firm has more cash.

4.3. *International Comparisons*

In Table 6, we evaluate the extent to which the results are robust across different countries. We first consider U.S. firms separately, since the U.S. is the largest country and the subject of the most other studies. The results for the U.S., presented in Columns 1 and 2, are similar to the full sample: cash increases the likelihood of acquisitions, GDP growth increases the likelihood of acquisitions, and cash holdings mitigate the extent to which acquisitions are pro-cyclical.

In Columns 3 and 4, we pool firms from all countries other than the U.S. and re-estimate the equations on this sample. The estimates using this sample are also similar to those from the full sample as well as those from U.S. firms. The pattern of coefficient signs and statistical significance is the same, and the coefficients are close in magnitude to those using the full sample and the U.S. firms.

In Columns 5, 6, 7 and 8, we split the sample by the GDP of the country where the firms are located. Estimates for firms in *High GDP Countries* are presented in Columns 5 and 6, while estimates for firms from *Low GDP Countries*, are presented in Columns 7 and 8.¹⁷ Again the pattern is similar to the results for the full sample, and other subsamples. For the wealthier

¹⁷ The countries are classified based on the country's GDP per capita relative to the median across countries. See Table 2, Panel B, for the identities of the countries in each group.

countries, the signs and significance levels are the same as for the full sample. For the poorer countries, higher cash holdings increase the likelihood a firm makes an acquisition, as does better macroeconomic conditions. Unlike the other subsamples, the coefficient on the interaction between cash and macroeconomic conditions is not statistically significantly different from zero. However, the positive coefficient on the interaction term between *Low GDP Growth* and *Cash* implies that high cash holdings mitigate the effect of negative impact of low GDP growth on acquisition decisions. Overall, it appears that the pattern between liquidity, macroeconomic conditions, and the likelihood of making an acquisition is robust across countries.

5. Quality of Acquisitions

The causal interpretation of the results presented above is that additional cash eases financing constraints and allows firms to make value-increasing investments. The ability to make value-increasing investments is particularly important when macroeconomic conditions are poor and financial markets are relatively costly to access. However, when times are good and firms can raise capital easily in the financial markets, excess cash becomes superfluous and could even be harmful by exacerbating free cash flow problems.

The results we have presented so far concern the way in which the quantity of acquisitions varies with firms' cash holdings and business cycles. The view that cash holdings can affect firms' investments by relaxing financing constraints also has predictions for the quality of acquisitions we observe. If firms are capital-rationed during poor macroeconomic conditions, then we expect them to take only the highest quality acquisitions and ignore some positive NPV ones. Therefore, during poor macroeconomic conditions, while we expect there to be fewer deals, the ones that do occur should be of higher quality than those observed in better

economic times. Additional cash allows firms to undertake some of the deals that would have been otherwise forsaken, which are likely to be positive NPV but less valuable than the ones that would be taken with the capital constraints. Consequently, we expect to observe that during poor macroeconomic conditions, higher cash holdings should be associated with lower quality acquisitions.

Similarly, in normal times, we expect that firms should be able to finance relatively more, if not all, valuable acquisitions. However, the increased access to finance in good times potentially will lead firms to overinvest and to undertake poor quality acquisitions in addition to good ones. Therefore, we expect acquisitions made during normal economic times to be lower quality than average. More cash potentially exacerbates this problem, since it allows firms to make acquisitions without having to raise external capital.

5.1. Announcement Day Cumulative Abnormal Returns

Measuring the success of acquisitions is difficult to do *ex post*, since target firms are integrated in to acquirers, and one cannot separately identify the change in the performance of the acquired firm. For this reason, it has become standard at least since Jensen and Ruback (1983) to measure an acquisition's performance by the acquirer's abnormal stock movements around the time of the announcement of the deal. We present these abnormal returns, as well as other statistics about the sample of acquisitions, in Panel A of Table 7.

This panel indicates that the average cumulative abnormal return (CAR) around the time of the acquisition is about 0.77%, regardless of whether we measure the returns in the 3 days around the announcement or the 5 days around the announcement. This small positive announcement return is similar to that reported by other studies that use samples similar to

ours.¹⁸ The positive acquirer's CAR reflects the fact that the majority of our CAR sample is the acquisition of private targets (93%) and acquirer CARs for acquisitions of private targets tend to be positive (see Fuller, Netter, and Stegemoller (2002)).

In Panel B of Table 7, we present univariate comparison of CARs by macroeconomic conditions. Acquisitions that occur in low GDP growth times have lower CARs on average, but higher median CARs than those in normal times. However, these differences are not statistically significant. In next section, we examine the difference in CARs by macroeconomic conditions in multivariate setting.

5.2. Announcement Return Variation Across Cash Holdings and Macroeconomic Conditions

To evaluate the extent to which cash holdings and macroeconomic factors affect announcement day abnormal returns, we estimate equations of these returns. In addition to *Acquirer Cash* and the variables indicating the macroeconomic conditions, we include a number of variables that also potentially affect announcement returns. In particular, our equation contains: *Acquirer Ln(Assets)*, *Acquirer Ln(Assets)²*, *Acquirer Profitability*, *Acquirer Sales Growth*, the indicator variables indicating whether the deal was for public target, cross border or related industry, as well as the return for the period prior to the deal (from trading days -210 to -10 relative to the announcement day). In addition, we include country, year and industry fixed effects into the equation.¹⁹

¹⁸ See Table 6 of Betton, Eckbo, and Thorburn (2008) for a summary of the announcement day abnormal returns found by a number of merger studies.

¹⁹ Previous studies document that the relative size of the target firms would affect the acquisition announcements effects (e.g. Asquith, Bruner, and Mullins (1983), Travlos (1987), and Moeller, Schlingemann, and Stulz. (2004)). In Appendix Table 3, we additionally control for the relative transaction value to acquirer's total assets in the regressions, and find the consistent results. Since in these equations, we have to drop about 45% of the deals because of the missing transaction values, we do not include the relative target size as a control in our main regressions.

In Column 1 of Table 8, we estimate the way that acquirer CARs vary with the acquiring firm's cash holdings (but exclude macroeconomic variables from this specification). The estimated coefficient on cash holdings is negative and statistically significantly different from zero. Like the earlier finding on the relation between cash holdings and the likelihood of an acquisition, this finding replicates a similar finding in Harford (1999) on a much larger and non-overlapping sample. In Column 2, we include GDP growth into the specification. The estimated coefficient on GDP growth is also negative and statistically significantly different from zero. In Column 3, we replace GDP growth with the indicator variable indicating a low GDP; the coefficient on this variable is not statistically significantly different from zero.

The finding on cash is consistent with both effects of liquidity. During normal times, cash lowers returns by facilitating negative NPV acquisitions and making the free cash flow problem worse. However, in bad times, it lowers the financing constraints firms face, enabling them to take more positive NPV but less valuable acquisitions. Results on GDP growth are consistent with this interpretation, which suggests that regardless of the incremental effect of cash, the level of abnormal returns tends to be higher in worse markets.

6. Summary and Discussion

When financial managers make decisions about the liquidity of their balance sheets, an important factor they consider is the possibility of shocks to their firms' cost of raising external capital that could affect future investment decisions. Higher liquidity, which usually comes in the form of cash holdings, increases the ability of firms to invest without having to raise capital from the external capital markets. However, it comes at the cost of exacerbating agency problems, potentially leading to overinvestment. Since an important source of shocks to financial markets

are changes in macroeconomic conditions, an important role of corporate liquidity is to enable firms to invest efficiently at different parts of the business cycle. This paper provides evidence on the impact of liquidity management decisions by measuring the way that firms' investments respond to macroeconomic shocks as a function of the quantity of cash that they have on their balance sheets.

Using a sample of 12,583 firms from 36 countries between 1997 and 2014, we estimate the likelihood that our sample firms make at least one acquisition in a particular year. Consistent with the notion that mergers tend to follow pro-cyclical waves, we find that the likelihood of an acquisition increases with the GDP growth in the country where a firm is located. However, as firms' cash holdings increase, this effect becomes smaller, suggesting that higher cash holdings mitigate the effect of business cycles on firms' acquisitiveness. Larger cash holdings appear to enable firms to make valuable acquisitions when they are available, even if there is a recession that increases the cost of external finance. This effect holds for U.S. firms and for firms from other countries. Moreover, it is largest in firms with speculative or no rating, for which capital market downturns have the largest impact on the cost of external financing.

We also consider the way that the abnormal returns on the announcements of these acquisitions vary with both cash holdings and macroeconomic conditions. Our estimates indicate that abnormal returns are negatively related to the country's GDP growth, so they are higher during market downturns than when the economy is doing well. This result is consistent with the view that when times are good, firms can raise capital and potentially overinvest. However, when times are bad, capital is rationed so the only deals that get done are the most profitable ones. In addition, more cash is associated with lower abnormal returns, suggesting that a more liquid balance sheet eases capital rationing during bad times but worsens free cash flow problems

during good times. Overall, the abnormal return results are consistent with the estimates of the equations predicting acquisition likelihoods; they suggest that cash holdings provide valuable liquidity that enables firms to make acquisitions during poor macroeconomic conditions but do so at the cost of providing too much liquidity during good conditions.

The results in this paper have implications for our understanding of both corporate liquidity and the determinants of mergers and acquisitions. Much of the prior literature on liquidity focuses on the level of cash holdings, which serve as a hedge against potential financial shocks. This literature generally takes an *ex ante* perspective on liquidity management in that it considers the way firms choose their liquidity prior to any potential shocks. We extend this literature by using an *ex post* approach in which we examine the way in which liquidity affects firms once the shocks have occurred. Subsequent to shocks to firms' financial conditions, differences in cash positions have a meaningful impact on firms' abilities to invest.

In addition, the paper adds to our understanding of merger waves, which according to Brealey, Myers, and Allen (2015), is one of the most important unsolved questions in finance. The two leading (non-mutually exclusive) explanations for pro-cyclical merger waves are that opportunities for profitable acquisitions vary over the business cycle, and that acquirers' financial resources vary over the business cycle. Our results provide evidence suggesting that the second explanation is at least part of the story: since having more cash can lessen the pro-cyclical of acquisition decisions, it must be that part of the underlying reason why mergers are pro-cyclical is the inability of firms to finance deals during poor times. As such, our results suggest that the argument in the private equity literature that the cyclical of private equity backed deals is a function of financing constraints and agency costs is more general, and applies to non-private equity backed deals as well.

Firms decide to hold cash to ensure that they can invest efficiently, even at times when the cost of accessing external financial markets is extremely high. We provide evidence suggesting that liquidity does have this effect, as firms with higher liquidity appear to be less affected by market downturns in their investment decision. The cost of doing so is that cash can facilitate unprofitable acquisitions during other times. Yet, a number of questions remain. While we focus our analysis on acquisitions, it is not clear whether cash holdings affect other types of investments during market downturns? Do other forms of liquidity such as lines of credit affect investments over the business cycle in the same manner as cash holdings? Can we identify if firms on average have the optimal level of cash, or if it is too high or too low in most firms? Finally, for a typical firm, does incremental cash add or destroy value? The answers to these and other related questions would be excellent topics for future research.

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Table 1: Sample of acquisitions in 36 countries during the period from 1997 to 2014

This table displays statistics on sample firms in 36 countries from 1997 to 2014, with at least one year of financial data available in OSIRIS. The sample includes firms that make at least one acquisition during the fiscal year 1997 and 2014 reported by the Zephyr database. Financial firms and firms with total assets less than 1 million USD are excluded. Panel A presents the distribution of sample firms tabulated by fiscal year. The acquisition rate is calculated as the percentage of firms that make at least one acquisition during the fiscal year. We calculate mean and standard deviation of GDP growth each year for 36 countries and GDP growth rate is lagged by one year. Panel B presents the distribution of sample firms tabulated by acquirer country. A country is defined as high (low) GDP country if its average real GDP per capita over the period of 1996 and 2013 is above (below) the median of average GDP per capita of 36 countries. Average number of firms by year and average annual acquisition rate are calculated as annual averages over the sample period by each country. For each country, we calculate mean and standard deviation (Std) of GDP growth rates during 1996 and 2013.

Panel A. Sample of acquisitions by year

Year	Total Number of Countries	Total Number of Firms	Acquisition Rate	Mean GDP Growth	Std GDP Growth
1997	17	3922	16.3%	4.2%	2.7%
1998	22	4719	19.9%	4.6%	2.2%
1999	23	5254	21.1%	1.8%	4.4%
2000	29	6596	30.9%	3.8%	3.1%
2001	31	7169	26.2%	5.1%	2.2%
2002	33	7556	24.0%	2.2%	1.8%
2003	35	7971	22.9%	2.8%	2.2%
2004	36	8168	27.0%	2.8%	2.3%
2005	36	8303	27.3%	4.6%	2.1%
2006	36	8613	27.2%	4.0%	2.4%
2007	36	8722	27.8%	4.8%	2.3%
2008	36	8683	22.7%	4.9%	2.7%
2009	36	8568	18.9%	1.9%	2.7%
2010	36	8300	21.1%	-1.7%	3.8%
2011	36	8065	22.4%	4.3%	3.7%
2012	35	7834	21.3%	3.0%	3.0%
2013	35	7658	22.6%	1.8%	3.0%
2014	33	3773	29.3%	2.3%	2.6%
Total	36	12583	24.0%	3.2%	3.2%

Panel B. Sample of acquisitions by country

Country	Sample Period	Average Number of Firms by Year	Average Annual Acquisition Rate	Total Number of Acquisitions	Mean GDP Growth 1996-2013	Std GDP Growth 1996-2013	Mean GDP per capita 1996-2013
<i>High GDP Country</i>							
Australia	1998-2014	303.7	23.9%	1939	3.3%	0.9%	47529
Austria	1997-2014	40.6	22.0%	227	1.9%	1.8%	43919
Belgium	1997-2014	67.9	26.8%	536	1.8%	1.6%	41801
Canada	1998-2014	442.8	23.6%	2573	2.6%	1.8%	45293
Denmark	1997-2014	60.5	22.0%	321	1.2%	2.2%	56682
Finland	1997-2014	81.2	32.2%	914	2.4%	3.4%	43088
France	1997-2014	313.7	28.3%	2407	1.7%	1.6%	39354
Germany	1997-2014	285.9	22.1%	1621	1.3%	2.2%	39576
Ireland	1997-2014	44.2	33.9%	553	4.7%	4.6%	45909
Japan	2000-2014	553.9	13.7%	1262	0.8%	2.2%	41642
Luxembourg	1998-2014	13.0	22.1%	67	3.6%	3.6%	94878
Netherlands	1997-2014	108.0	35.2%	1306	1.9%	2.3%	47437
Norway	1997-2014	72.6	25.8%	456	2.1%	1.7%	84975
Singapore	1998-2014	147.8	12.2%	429	5.7%	4.4%	38835
Sweden	1997-2014	164.5	29.9%	1474	2.4%	2.6%	47838
Switzerland	1997-2014	116.8	25.2%	823	1.9%	1.6%	69770
United Kingdom	1997-2014	717.6	32.0%	6809	2.1%	1.8%	37283
USA	1997-2014	2563.6	25.8%	18856	2.5%	1.9%	46555
<i>Low GDP Country</i>							
Brazil	2002-2014	82.3	20.2%	310	3.2%	2.1%	9722
Chile	2003-2013	33.1	14.8%	67	4.2%	2.3%	11321
China	2003-2014	283.5	12.2%	532	9.6%	1.8%	3015
Colombia	2002-2014	7.0	18.4%	21	3.5%	2.6%	5524
Greece	1997-2011	43.5	14.7%	140	0.9%	4.7%	25230
Hong Kong	2000-2014	31.3	11.6%	63	3.6%	3.7%	27361
India	2000-2014	251.5	15.9%	729	6.9%	2.2%	1017
Indonesia	2001-2013	17.4	15.8%	35	4.2%	4.5%	2637
Israel	1998-2014	66.0	15.3%	202	3.9%	2.3%	27935
Italy	1997-2014	81.1	21.2%	380	0.5%	2.1%	35940
Malaysia	2000-2014	308.8	16.8%	1082	4.8%	4.0%	7955
Mexico	2000-2014	37.9	17.9%	157	3.0%	2.8%	8624
New Zealand	2000-2014	40.6	23.3%	162	2.6%	1.8%	32065
Peru	2004-2014	12.0	17.7%	25	4.9%	2.9%	4081
Philippines	1999-2014	16.4	13.3%	46	4.6%	2.1%	1857
Republic of Korea	2001-2014	104.4	13.2%	228	4.4%	3.5%	18225
South Africa	1997-2014	67.9	16.6%	263	3.1%	1.7%	6758
Spain	1997-2014	64.2	23.3%	363	2.1%	2.7%	29439
Total	1997-2014	7215.2	23.8%	47378	3.2%	3.2%	32530

Table 2: Summary Statistics on Acquirer Characteristics

This table presents summary statistics for the accounting variables of the acquirers in the sample. The sample includes firm-year observations from OSIRIS of the firms that make at least one acquisition between 1997 and 2014. Firm-year observations are categorized into non-acquisition years and acquisition years. Total Assets are in USD million. We normalize the GDP growth by subtracting the mean and scaling by the standard deviation calculated from previous 20 years of GDP Growth data of each country. *Low GDP growth* is an indicator variable for the years when the normalized GDP growth is in bottom 20% of the country-year distribution. Firm-level variables and GDP growth variables are lagged by one year. Variable definitions are provided in the Appendix A. We assess the differences in means using the mean difference test and medians using the Wilcoxon rank-sum test. The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels. + denotes cases where two sample have the same medians.

	Total			Non-acquisition Year		Acquisition Year	
	Mean	Median	Std	Mean	Median	Mean	Median
Total Assets	3,409.58	297.14	16,198.81	2997.17	263.56	4,716.98***	428.17***
Cash	0.1235	0.0745	0.1396	0.1229	0.0742	0.1256**	0.0756***
Profitability	0.0951	0.1046	0.1244	0.0898	0.1000	0.1117***	0.1187***
Sales Growth	0.1582	0.0896	0.3524	0.1451	0.0815	0.1996***	0.1159***
Investment Grade	0.0925	0.0000	0.2898	0.0791	0.0000	0.1353***	0.0000+
Speculative Grade	0.0716	0.0000	0.2578	0.0685	0.0000	0.0814***	0.0000+
Unrated	0.8359	1.0000	0.3704	0.8524	1.0000	0.7833***	1.0000+
GDP Growth	0.0279	0.0267	0.0271	0.0283	0.0267	0.0268***	0.0267+
Normalized GDP Growth	-0.3462	-0.1784	1.2040	-0.3583	-0.1784	-0.3078***	-0.1553***
Low GDP Growth	0.2095	0.0000	0.4070	0.2169	0.0000	0.1861***	0.0000+
Observations	129,874			98,730		31,144	

Table 3: The effect of cash on the probability that a firm acquires during the fiscal year

This table presents estimates from equations of the likelihood that a firm acquires during the fiscal year. The estimation is from the OLS regression, where the dependent variable is the indicator of the fiscal year of making at least one acquisition. All firm-level controls and macroeconomic variables are lagged by one year. *GDP growth* is included in column (2), and *Low GDP Growth* is included in column (3). *Low GDP growth* is an indicator variable for the years when the normalized GDP growth is in bottom 20% of the country-year distribution. We normalize the GDP growth by subtracting the mean and scaling by the standard deviation calculated from previous 20 years of GDP Growth data of each country. Definitions and sources of other variables are provided in Appendix A. Country, year, and industry fixed effects are included in column (1). All regressions include firm fixed effects. Year fixed effect is included in column (1). Standard errors are corrected for clustering of observations at the firm level and associated t-statistics are in parentheses. The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels.

	(1)	(2)	(3)
Dependent Variable:	D(Acquire)		
Sample:	Full Sample		
Cash	0.272*** (18.47)	0.276*** (18.57)	0.275*** (18.50)
GDP Growth		0.343*** (5.75)	
Low GDP Growth			-0.026*** (-8.62)
Ln(Asset)	0.029*** (4.94)	0.034*** (5.71)	0.034*** (5.85)
Ln(Asset) ²	-0.002*** (-3.67)	-0.002*** (-3.11)	-0.002*** (-3.27)
Profitability	0.310*** (18.89)	0.288*** (17.44)	0.287*** (17.41)
Sales Growth	0.034*** (8.10)	0.031*** (7.40)	0.031*** (7.44)
Year FE	Y	N	N
Firm FE	Y	Y	Y
Observations	129,874	129,874	129,874
Adj-R ²	0.115	0.105	0.105

Table 4: The effect of cash on the probability that a firm acquires during the fiscal year by macroeconomic conditions

This table presents estimates from equations of the probability that a firm acquires during the fiscal year. The estimation is from the OLS regression, where the dependent variable is the indicator of the fiscal year of making at least one acquisition. All firm-level controls and macroeconomic variables are lagged by one year. *GDP growth* is included in columns (1), (3), (5), and *Low GDP Growth* is included in columns (2), (4), (6). *Low GDP growth* is an indicator variable for the years when the normalized GDP growth is in bottom 20% of the country-year distribution. We normalize the GDP growth by subtracting the mean and scaling by the standard deviation calculated from previous 20 years of GDP Growth data of each country. The sample is divided into investment grade firms in columns (3) and (4) and speculative grade and unrated firms in columns (5) and (6). Definitions and sources of other variables are provided in Appendix A. All regressions include firm fixed effects. Standard errors are corrected for clustering of observations at the firm level and associated t-statistics are in parentheses. The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels.

Dependent Variable: Sample:	(1)	(2)	(3)	(4)	(5)	(6)
	D(Acquire)					
	Full Sample		Investment Grade		Speculative Grade & Unrated	
Cash	0.326*** (17.24)	0.257*** (16.63)	0.319** (2.48)	0.373*** (2.93)	0.331*** (17.21)	0.257*** (16.43)
GDP Growth	0.559*** (7.23)		0.157 (0.46)		0.591*** (7.39)	
Cash x GDP Growth	-1.651*** (-4.30)		0.541 (0.17)		-1.743*** (-4.45)	
Low GDP Growth		-0.038*** (-9.52)		0.001 (0.09)		-0.042*** (-9.89)
Cash x Low GDP Growth		0.102*** (4.46)		-0.227 (-1.54)		0.115*** (4.94)
Ln(Asset)	0.033*** (5.61)	0.033*** (5.71)	0.156* (1.65)	0.155 (1.64)	0.029*** (4.43)	0.029*** (4.48)
Ln(Asset) ²	-0.002*** (-2.95)	-0.002*** (-3.12)	-0.009* (-1.82)	-0.010* (-1.83)	-0.001* (-1.73)	-0.001* (-1.83)
Profitability	0.287*** (17.39)	0.287*** (17.41)	0.560*** (5.07)	0.558*** (5.04)	0.277*** (16.56)	0.278*** (16.59)
Sales Growth	0.031*** (7.48)	0.031*** (7.48)	0.042* (1.74)	0.042* (1.75)	0.029*** (7.00)	0.029*** (6.98)
Observations	129,874	129,874	12,019	12,019	117,855	117,855
Adj-R ²	0.105	0.106	0.179	0.180	0.0926	0.0930

Table 5: The effect of cash on the probability that a firm makes related-industry or diversifying acquisitions during the fiscal year by macroeconomic conditions – Multinomial logit

This table presents estimates from equations of the probability that a firm makes different types of acquisitions during the fiscal year. The estimation is from the multinomial logit regression, in which the dependent variable includes the indicator of making related-industry acquisitions, diversifying acquisition, or no acquisitions (base outcome) during the fiscal year. An acquisition is defined as a related-industry acquisition if the first 2-digit of the primary U.S. SIC code of a target is the same as that of the acquiring firm, and as a diversifying acquisition, otherwise. Definitions and sources of other variables are provided in Appendix A. All regressions include country fixed effects. Standard errors are corrected for clustering of observations at the firm level and associated t-statistics are in parentheses. The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels.

Dependent Variable:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Related	Diversifying	Related	Diversifying	Related	Diversifying	Related	Diversifying
Cash	0.454*** (6.64)	1.431*** (16.80)	0.487*** (4.97)	1.527*** (12.67)	0.460*** (6.74)	1.419*** (16.62)	0.368*** (4.97)	1.357*** (15.12)
GDP Growth	-0.623 (-1.50)	4.676*** (9.17)	-0.474 (-0.92)	5.123*** (8.06)				
Cash x GDP Growth			-1.153 (-0.50)	-3.463 (-1.16)				
Low GDP Growth					-0.057*** (-2.71)	-0.288*** (-11.78)	-0.118*** (-4.22)	-0.331*** (-10.40)
Cash x Low GDP Growth							0.477*** (3.30)	0.350** (2.08)
Ln(Asset)	0.000 (0.01)	0.298*** (9.63)	0.000 (0.01)	0.298*** (9.62)	0.002 (0.08)	0.298*** (9.63)	0.000 (0.00)	0.297*** (9.59)
Ln(Asset) ²	0.002 (1.20)	-0.005* (-1.87)	0.002 (1.21)	-0.005* (-1.86)	0.002 (1.18)	-0.005* (-1.91)	0.002 (1.25)	-0.005* (-1.88)
Profitability	0.940*** (12.47)	1.475*** (14.45)	0.940*** (12.47)	1.474*** (14.44)	0.927*** (12.31)	1.482*** (14.49)	0.928*** (12.32)	1.481*** (14.49)
Sales Growth	0.450*** (18.55)	0.465*** (15.53)	0.450*** (18.55)	0.465*** (15.55)	0.440*** (18.24)	0.474*** (15.96)	0.441*** (18.27)	0.475*** (15.98)
Observations	129,874		129,874		129,874		129,874	
Pseudo R ²	0.0511		0.0511		0.0513		0.0513	
Chi-square	5357		5364		5418		5442	
<i>Differences in Coefficients</i>	(1)-(2)		(3)-(4)		(5)-(6)		(7)-(8)	
Cash	-0.977***		-1.040***		-0.959***		-0.989***	
GDP Growth	-5.299***		-5.597***					
Cash x GDP Growth			2.311					
Low GDP Growth					0.231***		0.213***	
Cash x Low GDP Growth							0.128	

Table 6: The effect of cash on the probability that a firm acquires during the fiscal year by macroeconomic conditions by country

This table presents estimates from equations of the probability that a firm acquires during the fiscal year. The estimation is from the OLS regression, where the dependent variable is the indicator of the fiscal year of making at least one acquisition. All firm-level controls and macroeconomic variables are lagged by one year. *GDP growth* is included in columns (1), (3), (5), (7), and *Low GDP Growth* is included in columns (2), (4), (6), (8). *Low GDP growth* is an indicator variable for the years when the normalized GDP growth is in bottom 20% of the country-year distribution. We normalize the GDP growth by subtracting the mean and scaling by the standard deviation calculated from previous 20 years of GDP Growth data of each country. The sample is divided into U.S. firms in columns (1) and (2), non-U.S. firms in columns (3) and (4), firms in high GDP countries in (5) and (6) and those in low GDP countries in columns (7) and (8). A country is defined as high (low) GDP country if its average real GDP per capita over the period of 1996 and 2013 is above (below) the median of average GDP per capita of 36 countries. Definitions and sources of other variables are provided in Appendix A. All regressions include firm fixed effects. Standard errors are corrected for clustering of observations at the firm level and associated t-statistics are in parentheses. The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels.

Dependent Variable: Sample:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	D(Acquire)							
	U.S.		Non-U.S.		High GDP Country		Low GDP Country	
Cash	0.301*** (9.64)	0.231*** (9.58)	0.345*** (14.14)	0.279*** (13.95)	0.334*** (16.79)	0.254*** (15.23)	0.340*** (5.05)	0.285*** (7.01)
GDP Growth	0.344** (2.07)		0.663*** (7.58)		0.633*** (6.73)		0.532*** (3.72)	
Cash x GDP Growth	-1.871** (-2.33)		-1.523*** (-3.45)		-2.310*** (-4.97)		-0.648 (-0.74)	
Low GDP Growth		-0.022*** (-3.34)		-0.048*** (-9.61)		-0.041*** (-9.27)		-0.026*** (-2.63)
Cash x Low GDP Growth		0.094*** (2.76)		0.099*** (3.25)		0.102*** (4.21)		0.122* (1.87)
Ln(Asset)	0.060*** (6.14)	0.061*** (6.27)	0.018** (2.40)	0.018** (2.42)	0.027*** (4.28)	0.029*** (4.57)	0.050*** (3.37)	0.048*** (3.25)
Ln(Asset) ²	-0.001 (-1.00)	-0.001 (-1.13)	-0.002*** (-3.30)	-0.002*** (-3.35)	-0.001 (-1.38)	-0.001* (-1.70)	-0.004*** (-3.38)	-0.004*** (-3.36)
Profitability	0.265*** (10.32)	0.265*** (10.33)	0.282*** (13.22)	0.283*** (13.28)	0.296*** (16.60)	0.296*** (16.57)	0.204*** (4.81)	0.214*** (5.06)
Sales Growth	0.025*** (3.66)	0.025*** (3.62)	0.038*** (7.48)	0.038*** (7.38)	0.033*** (7.23)	0.033*** (7.10)	0.022** (2.38)	0.024*** (2.68)
Observations	46,145	46,145	83,729	83,729	107,202	107,202	22,672	22,672
Adj-R ²	0.118	0.118	0.0996	0.100	0.115	0.115	0.00287	0.00242

Table 7: Summary Statistics on Cumulative Abnormal Returns around Acquisition Announcements

The table presents the summary statistics on deal-level information including the acquirer firms' cumulative abnormal returns around acquisition announcements. The sample includes completed deals, where acquirers owned less than 50% shares prior to the announcement and acquired more than 50% shares. Transactions by the financial firms and those by the acquirers with total assets less than 1 million USD are excluded. Panel A includes summary statistics of the sample of acquisitions reported in the Zephyr database in 36 countries announced from 1997 to 2014. All firm-level controls and macroeconomic variables are from the fiscal year end prior to the announcement date. CAR[-1, +1] and CAR[-2, +2] are in percentage points. We assess whether the mean of CAR is different from zero using t-test and the median using the sign rank test. In Panel B, we present the mean and median cumulative abnormal returns of subsample firms divided based on acquirer cash and macroeconomic conditions. *Low GDP growth* is an indicator variable for the years when the normalized GDP growth is in bottom 20% of the country-year distribution. We normalize the GDP growth by subtracting the mean and scaling by the standard deviation calculated from previous 20 years of GDP growth data of each country. *Low (High) Cash* is defined as the acquirer firms with the cash to total asset ratio is below (above) the median of the distribution every year by country. We assess the differences in means using the mean difference test and medians using the Wilcoxon-Mann-Whitney test. The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels.

Panel A. Summary statistics on deal-level characteristics

	Count	Mean	Median	Std
Acquirer CAR[-1, +1]	33410	0.779***	0.293***	5.518
Acquirer CAR[-2, +2]	33257	0.769***	0.315***	6.517
Acquirer Cash	33410	0.120	0.074	0.131
Acquirer Ln(Asset)	33410	6.416	6.390	2.207
Acquirer Ln(Asset) ²	33410	46.030	40.832	29.250
Acquirer Profitability	33410	0.117	0.124	0.117
Acquirer Sales Growth	33410	0.197	0.117	0.330
Public Target	33410	0.069	0.000	0.254
Cross Border	33410	0.382	0.000	0.486
Related Industry	33410	0.516	1.000	0.500
Return[-210, -10]	33410	0.203	0.163	0.424
Deal Value (USD Million)	18773	327.760	22.285	2592.843
Relative Deal Value	18773	0.215	0.057	0.516

Panel B. Univariate CAR by macroeconomic conditions

	Low GDP growth (A)			Normal Time (B)			Diff. (A-B)	
	N	Mean	Median	N	Mean	Median	Mean	Median
CAR[-1, +1]	6181	0.720***	0.356***	27229	0.793***	0.280***	-0.073	0.076
Acquirer Cash	6181	0.129	0.085	27229	0.118	0.072	0.011***	0.013***

Table 8: The effect of cash on 3-day CAR around the acquisition announcement date

This table presents estimates from equations of the acquirer firm's announcement returns. The estimation is from the OLS regression, where the dependent variable is the acquiring firm's cumulative abnormal returns from day -1 to day +1 relative to the acquisition announcement date. Abnormal returns are calculated from the market model estimated from day -260 to day -100 relative to the announcement date (no less than 60 days). All firm-level controls and macroeconomic variables are from the fiscal year end prior to the announcement date. *GDP growth* is included in column (2), and *Low GDP Growth* is included in column (3). *Low GDP growth* is an indicator variable for the years when the normalized GDP growth is in bottom 20% of the country-year distribution. We normalize the GDP growth by subtracting the mean and scaling by the standard deviation calculated from previous 20 years of GDP growth data of each country. Definitions and sources of other variables are provided in Appendix A. Country, year, and industry fixed effects are included in column (1). Country and industry fixed effects are included in columns (2) and (3). Standard errors are corrected for clustering of observations at the acquirer firm level and associated t-statistics are in parentheses. The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels.

Dependent Variable:	(1)	(2)	(3)
	Acquirer CAR[-1,+1]		
Acquirer Cash	-0.793** (-2.47)	-0.781** (-2.44)	-0.762** (-2.38)
GDP Growth		-2.996* (-1.92)	
Low GDP Growth			0.044 (0.56)
Acquirer Ln(Asset)	-0.658*** (-7.61)	-0.658*** (-7.61)	-0.656*** (-7.58)
Acquirer Ln(Asset) ²	0.026*** (4.45)	0.026*** (4.50)	0.026*** (4.49)
Acquirer Profitability	0.584 (1.49)	0.528 (1.35)	0.508 (1.30)
Acquirer Sales Growth	-0.020 (-0.16)	-0.052 (-0.43)	-0.079 (-0.66)
Public Target	-0.719*** (-4.86)	-0.709*** (-4.79)	-0.706*** (-4.77)
Cross Border	0.126* (1.85)	0.117* (1.73)	0.115* (1.69)
Related Industry	0.174*** (2.72)	0.170*** (2.65)	0.170*** (2.65)
Return[-210, -10]	-0.673*** (-6.39)	-0.615*** (-5.99)	-0.610*** (-5.95)
Country FE	Y	Y	Y
Year FE	Y	N	N
Industry FE	Y	Y	Y
Observations	33,410	33,410	33,410
Adj-R ²	0.0189	0.0174	0.0173

Appendix A. Variable Definition

Variable	Description
Firm-level variables	
D(Acquire)	Indicator variable equal to one if a firm announces at least one acquisition during the fiscal year
Cash	Cash and cash equivalent/Total Assets (OSIRIS item 13050/13077)
Ln(Asset)	Log of total assets in USD (OSIRIS item 13077)
Profitability	EBITDA/Total Assets (OSIRIS item 13018/13077)
Sales Growth	[Net sales(t)-Net sales(t-1)]/Net sales(t-1) (OSIRIS item 13002)
Investment Grade	A firm that has a S&P investment grade issuer rating (AAA, AA+, AA, or AA-) (Capital IQ)
Speculative Grade	A firm that has a S&P speculative grade issuer rating (A+, A, A-, BBB+, BBB, BBB-) (Capital IQ)
Unrated	A firm that does not have any public bond rating
Macroeconomic variables (Source: World Bank)	
GDP Growth	Annual percentage growth rate of GDP in constant 2015 US dollars
Normalized GDP Growth	GDP growth rate normalized by subtracting the mean and scaling by the standard deviation. For each GDP growth rate of year t, the mean and standard deviation are estimated from time-series GDP growth rates of the country over the previous 20 years with 2-year gap (i.e. from year t-23 to year t-3)
Low GDP Growth	Indicator variable equal to one for the years when normalized GDP growth is below the bottom 20% of the normalized GDP growth distribution of country-year observations.
High GDP Country	Countries with the mean real GDP per capita over the period of 1996 to 2013 above the median of mean GDP per capital of 36 countries.
Low GDP Country	Countries with the mean real GDP per capita over the period of 1996 to 2013 below the median of mean GDP per capital of 36 countries.
Deal-level variables	
CAR[-1,+1]	Cumulative abnormal return from day -1 to day +1 relative to the acquisition announcement date. Abnormal returns are calculated from the market model estimated from day -260 to day -100 relative to the announcement date with at least 60 days of returns available. (Datastream, Zephyr)
CAR[-2,+2]	Cumulative abnormal return from day -2 to day +2 relative to the acquisition announcement date. Abnormal returns are calculated from the market model estimated from day -260 to day -100 relative to the announcement date with at least 60 days of returns available. (Datastream, Zephyr)
Public Target	Indicator variable denoting the acquisition of public target. (Zephyr)
Cross Border	Indicator variable equal to one if the target and acquiring firms are from the different nation. (Zephyr)
Related Industry	Indicator variable equal to one if the target is in the same industry as the acquiring firm, based on the first two digits of the primary U.S. SIC codes. (Zephyr)
Return[-210,-10]	Cumulative returns from day -210 to day -10 of acquiring firm relative to the acquisition announcement date. (Datastream)
Deal Value	Transaction value in USD (Zephyr)
Relative Deal Value	Deal value/Acquirer total assets (Zephyr, OSIRIS)

Appendix Table 1. Robustness on the definitions of Low GDP Growth and High GDP Growth variables

This table presents estimates of our basic regressions but with different definitions for Low GDP Growth variable. In columns (1) and (2), we normalize the GDP growth by subtracting the mean and scaling by the standard deviation, where the mean and standard deviations are calculated from GDP growth rates between 1975 and 1994 for each country. *Low GDP growth* is an indicator variable for the years when the normalized GDP growth is in bottom 20% of the country-year distribution. In columns (3) and (4), we normalize the GDP growth by subtracting the mean and scaling by the standard deviation, where the mean and standard deviations are calculated from previous 20 year GDP growth rates for each country. *Low GDP growth* is an indicator variable for the years with the normalized GDP growth below -1. In Panel A, we estimate equations predicting the probability that a firm acquires during the fiscal year. All regressions include firm fixed effects. In Panel B, we estimate equations predicting the acquirer firm's announcement returns. All regressions include country, year, and industry fixed effects. Standard errors are corrected for clustering of observations at the firm level and associated t-statistics are in parentheses. The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels.

Panel A. The effect of cash on the probability that a firm acquires during the fiscal year

	(1)	(2)	(3)	(4)
Dependent Variable:	D(Acquire)			
Normalization Method:	Using 1975-1994		Using previous 20 years	
Cutoff for normalized GDP growth	Top and bottom 20%		> 1, < -1	
Cash	0.277*** (18.66)	0.267*** (17.34)	0.275*** (18.51)	0.258*** (16.80)
Low GDP Growth	-0.038*** (-10.77)	-0.048*** (-10.07)	-0.023*** (-7.58)	-0.036*** (-8.71)
Cash x Low GDP Growth		0.081*** (3.13)		0.104*** (4.45)
Ln(Asset)	0.033*** (5.71)	0.033*** (5.62)	0.034*** (5.81)	0.033*** (5.67)
Ln(Asset) ²	-0.002*** (-3.03)	-0.002*** (-2.93)	-0.002*** (-3.27)	-0.002*** (-3.12)
Profitability	0.287*** (17.45)	0.287*** (17.40)	0.288*** (17.46)	0.288*** (17.46)
Sales Growth	0.030*** (7.29)	0.030*** (7.31)	0.031*** (7.55)	0.031*** (7.59)
Observations	129,874	129,874	129,874	129,874
Adj-R ²	0.106	0.106	0.105	0.106

Panel B. The effect of cash on 3-day CAR around the acquisition announcement date

	(1)	(2)	(3)	(4)
Dependent Variable:	Acquirer CAR[-1,+1]			
Normalization Method:	Using 1975-1994		Using previous 20 years	
Cutoff for normalized GDP growth	Top and bottom 20%		> 1, < -1	
Acquirer Cash	-0.757** (-2.37)	-0.647* (-1.90)	-0.761** (-2.38)	-0.590* (-1.68)
Low GDP Growth	-0.002 (-0.02)	0.115 (0.90)	0.034 (0.42)	0.158 (1.42)
Acquirer Cash x Low GDP Growth		-0.897 (-1.10)		-0.966 (-1.32)
Acquirer Ln(Asset)	-0.655*** (-7.57)	-0.654*** (-7.56)	-0.656*** (-7.58)	-0.653*** (-7.55)
Acquirer Ln(Asset) ²	0.026*** (4.49)	0.026*** (4.46)	0.026*** (4.49)	0.026*** (4.45)
Acquirer Profitability	0.502 (1.29)	0.515 (1.32)	0.506 (1.30)	0.498 (1.28)
Acquirer Sales Growth	-0.086 (-0.71)	-0.088 (-0.73)	-0.081 (-0.67)	-0.083 (-0.69)
Public Target	-0.705*** (-4.76)	-0.706*** (-4.77)	-0.706*** (-4.76)	-0.705*** (-4.76)
Cross Border	0.114* (1.67)	0.113* (1.66)	0.114* (1.68)	0.114* (1.68)
Related Industry	0.170*** (2.65)	0.170*** (2.64)	0.170*** (2.65)	0.169*** (2.64)
Return[-210, -10]	-0.610*** (-5.95)	-0.610*** (-5.95)	-0.610*** (-5.95)	-0.611*** (-5.96)
Observations	33,410	33,410	33,410	33,410
Adj-R ²	0.0173	0.0173	0.0173	0.0174

Appendix Table 2. The effect of cash on the probability of acquisitions – Cash acquisitions only

This table presents estimates of our basic regressions in Table 3 and Table 4 with considering cash acquisitions only. We estimate OLS regressions, predicting the probability of a firm acquires during the fiscal year, where the dependent variable, D(Cash Acquisition), is the indicator of the fiscal year of making at least one cash acquisition. All firm-level controls and macroeconomic variables are lagged by one year. *GDP growth* is included in columns (2) and (3), and *Low GDP Growth* is included in columns (4) and (5). *Low GDP growth* is an indicator variable for the years when the normalized GDP growth is in bottom 20% of the country-year distribution. We normalize the GDP growth by subtracting the mean and scaling by the standard deviation calculated from previous 20 years of GDP Growth data of each country. Definitions and sources of other variables are provided in Appendix A. All regressions include firm fixed effects and in column (1) year fixed effects is included. Standard errors are corrected for clustering of observations at the firm level and associated t-statistics are in parentheses. The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels.

	(1)	(2)	(3)	(4)	(5)
Dependent Variable:	D(Cash Acquisition)				
Cash	0.249*** (18.19)	0.253*** (18.31)	0.303*** (17.25)	0.252*** (18.24)	0.234*** (16.26)
GDP Growth		0.332*** (5.78)	0.548*** (7.38)		
Cash x GDP Growth			-1.649*** (-4.60)		
Low GDP Growth				-0.026*** (-9.25)	-0.039*** (-10.10)
Cash x Low GDP Growth					0.101*** (4.78)
Ln(Asset)	0.035*** (6.29)	0.039*** (6.99)	0.038*** (6.87)	0.039*** (7.13)	0.039*** (6.99)
Ln(Asset) ²	-0.002*** (-3.81)	-0.002*** (-3.40)	-0.002*** (-3.24)	-0.002*** (-3.56)	-0.002*** (-3.41)
Profitability	0.296*** (19.33)	0.277*** (18.00)	0.275*** (17.93)	0.276*** (17.95)	0.276*** (17.95)
Sales Growth	0.028*** (7.23)	0.026*** (6.65)	0.026*** (6.74)	0.025*** (6.64)	0.026*** (6.69)
Year FE	Y	N	N	N	N
Firm FE	Y	Y	Y	Y	Y
Observations	129,874	129,874	129,874	129,874	129,874
Adj-R ²	0.130	0.121	0.121	0.121	0.121

Appendix Table 3. The effect of cash on 3-day CAR around the acquisition announcement date with control for relative size

This table presents estimates from equations on the acquirer firm's announcement returns, including the relative deal value as an additional control variable. The estimation is from the OLS regression, where the dependent variable is the acquiring firm's cumulative abnormal returns from day -1 to day +1 relative to the acquisition announcement date. Relative Deal Value is defined as the total transaction value divided by the acquirer's total assets in USD. All firm-level controls and macroeconomic variables are from the fiscal year end prior to the announcement date. Definitions and sources of other variables are provided in Appendix A. Acquiring firms' country, industry, and announcement year fixed effects are included in column (1). Acquiring firms' country and industry fixed effects are included in columns (2) to (5). Standard errors are corrected for clustering of observations at the acquirer firm level and associated t-statistics are in parentheses. The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels.

Dependent Variable:	(1)	(2)	(3)	(4)	(5)
	Acquirer CAR[-1,+1]				
Acquirer Cash	-1.149*** (-2.77)	-1.121*** (-2.70)	-0.985* (-1.67)	-1.083*** (-2.61)	-0.854* (-1.88)
GDP Growth		-6.540*** (-2.72)	-5.891** (-2.00)		
Acquirer Cash x GDP Growth			-4.791 (-0.33)		
Low GDP Growth				-0.004 (-0.03)	0.169 (1.02)
Acquirer Cash x Low GDP Growth					-1.232 (-1.32)
Acquirer Ln(Asset)	-0.497*** (-4.14)	-0.500*** (-4.16)	-0.499*** (-4.15)	-0.495*** (-4.12)	-0.492*** (-4.09)
Acquirer Ln(Asset) ²	0.013 (1.59)	0.014* (1.69)	0.014* (1.68)	0.014* (1.66)	0.013 (1.63)
Acquirer Profitability	0.915* (1.92)	0.812* (1.71)	0.813* (1.71)	0.761 (1.61)	0.754 (1.59)
Acquirer Sales Growth	-0.147 (-0.94)	-0.204 (-1.31)	-0.203 (-1.30)	-0.265* (-1.71)	-0.267* (-1.73)
Public Target	-1.197*** (-7.30)	-1.178*** (-7.15)	-1.179*** (-7.16)	-1.162*** (-7.05)	-1.161*** (-7.05)
Cross Border	0.162 (1.58)	0.143 (1.39)	0.143 (1.39)	0.138 (1.34)	0.136 (1.32)
Related Industry	0.245*** (2.63)	0.243*** (2.61)	0.243*** (2.61)	0.243*** (2.61)	0.241*** (2.59)
Return[-210, -10]	-0.650*** (-4.53)	-0.596*** (-4.24)	-0.597*** (-4.24)	-0.590*** (-4.20)	-0.592*** (-4.21)
Relative Deal Value	0.658*** (4.42)	0.651*** (4.38)	0.651*** (4.38)	0.640*** (4.31)	0.637*** (4.30)
Acquirer Country FE	Y	Y	Y	Y	Y
Announced Year FE	Y	N	N	N	N
Acquirer Industry FE	Y	Y	Y	Y	Y
Observations	18,773	18,773	18,773	18,773	18,773
Adj-R ²	0.0264	0.0229	0.0229	0.0225	0.0226

