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To what extent does corporate liquidity affect M&A decisions, method of payment and performance? Evidence from China

Junhong Yang [a,*], Alessandra Guariglia [b], Jie (Michael) Guo [c]

[a] Sheffield University Management School, University of Sheffield, Conduit Road, Sheffield S10 1FL, United Kingdom
[b] Department of Economics, University of Birmingham, Birmingham B15 2TT, United Kingdom
[c] Durham University Business School, Durham University, Mill Hill Lane, Durham DH1 3LB, United Kingdom

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ABSTRACT

Using a panel of Chinese listed firms over the period 1998–2015, we examine the extent to which liquidity impacts firms' acquisition decisions, method of payment choice, and performance following mergers. We observe that cash-rich firms are more likely to attempt acquisitions, especially if they are subject to tunneling. Next, we find that bidders with higher growth opportunities are less likely to use cash payments in acquisitions. This effect is stronger for financially constrained bidders, who face greater opportunity costs of holding cash. Our last set of results highlights the under-performance of cash acquisitions in both the short and long term.

1. Introduction

China's Mergers and Acquisition (M&A) transactions, including domestic consolidation, as well as outward and inward takeovers, have significantly increased in recent years (see Table 1). According to Bloomberg's 2012 M&A outlook, China engaged in 158 billion US dollars' worth of takeover deals in 2011. This represents a 9% increase from the 145 billion US dollars announced in 2010.

Several explanations have been put forward to explain this phenomenon. First, the gradual establishment and development of China's capital markets and the impact of globalization have played a significant role. Specifically, China's accession to the World Trade Organization (WTO) in 2001 encouraged Chinese enterprises to restructure and consolidate through M&As, in order to defend themselves from the influx of strong foreign competitors and/or to expand their business territories overseas. Second, given the high growth rates and large amounts of profits generated by Chinese firms, strategic mergers, including inward and outward M&A investments, have offered Chinese firms opportunities to seek further economies of scale or other synergies, enhancing their competitive advantage. Third, M&As have become easier in the light of the relaxation of obstacles to their approval process, and of the constantly evolving regulatory and taxation framework surrounding them. Fourth, Chinese state-owned enterprises (SOEs) have been restructuring their assets through M&As. In particular, SOEs operating in strategically relevant sectors such as basic materials, energy, utilities, telecommunications, aerospace, and defense have been encouraged to form global conglomerates. At the same time, other SOEs have been required to reduce their equity to generate efficiency improvements and increase competitiveness. This has offered opportunities of market entry for other potential investors (Devonshire-Ellis et al., 2011). However, could other factors also contribute to explaining the surge in Chinese M&As?

* Corresponding author.
E-mail address: junhong.yang@sheffield.ac.uk (J. Yang).

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Table 1
Distribution of the number of M&A deals in China by year.

Year	*Non-Bidders*	*Bidders*	*Stock Only*	*Mixed PYMT*	*Cash Only*	*Completed*	*Total No.*	*Bidder Perc.*
1998	709	15	0	1	14	9	724	2.07%
1999	789	21	0	0	21	8	810	2.59%
2000	913	20	0	0	20	7	933	2.14%
2001	984	21	0	1	20	8	1005	2.09%
2002	979	88	2	6	80	40	1067	8.25%
2003	939	184	1	17	166	75	1123	16.38%
2004	948	265	2	24	239	79	1213	21.85%
2005	1045	172	0	9	163	51	1217	14.13%
2006	1083	182	11	17	154	57	1265	14.39%
2007	1094	266	31	14	221	83	1360	19.56%
2008	1072	349	63	9	277	124	1421	24.56%
2009	1180	298	48	17	233	97	1478	20.16%
2010	1374	325	39	23	263	109	1699	19.13%
2011	1505	341	28	14	299	117	1846	18.47%
2012	1606	318	30	14	274	115	1924	16.53%
2013	1611	327	56	11	260	148	1938	16.87%
2014	1567	368	82	11	275	162	1935	19.02%
2015	1494	436	115	15	306	190	1930	22.59%
Total	20,892	3996	508	203	3285	1479	24,888	16.06%

Notes: this table reports the time-series distribution of the number of observations. *Bidders* represent the firms who announced a bid in a given year. *Non-Bidders* represent the firms who did not announce a bid in a given year. *Stock Only* includes deals that were financed only by stock. *Cash Only* includes deals that were financed only by cash. *Mixed PYMT* consists of those deals whose payments were not solely completed through stock or cash. *Completed* represents the deals whose transactions were completed. *Total No.* represents the total number of observations in a given year.

Cash is an important source of finance for firms operating in imperfect capital markets. In a recent study, Guariglia et al. (2011) highlight the relatively high financial capacity which characterizes Chinese firms due to their high growth rates and ability to generate large amounts of internal funds. Along similar lines, Guariglia and Yang (2016a) document that, in their sample of Chinese listed firms covering the period 1998–2010, the median level of cash holdings to total assets is 12.1%, much higher than the overall median (6.2%) of the 45 countries analyzed by Dittmar et al. (2003). In addition, the average level of cash holdings in China almost doubled over their sample period. An interesting question is therefore whether these high and growing levels of corporate liquidity are linked to the surge in Chinese M&As. This paper seeks to investigate this issue.

Theories that focus on corporate liquidity and the costs of cash holdings can help to understand what drives acquisitions. From a micro perspective, the existence of capital market imperfections (CMI) contributes to financial frictions, as a consequence of which firms face a cost premium on external finance. Under these circumstances, it is suggested that firms prefer to use internal finance like cash or retained earnings rather than external finance such as bank loans, debt, and equity (Myers, 1984). In particular, compared to their financially healthy counterparts, financially constrained firms value their cash holdings more since liquidity allows them to invest without having to access new costly debt or equity (Faulkender and Wang, 2006). Thus, corporate liquidity should play a crucial role in investment decisions, including acquisitions. In particular, liquidity may enable firms to undertake acquisitions, as it can be used directly as a measure of payment or can be used to meet interest payments on debt finance. It follows that an increase in corporate liquidity should enhance firms' acquisition activities. In line with this argument, Shleifer and Vishny (1992) note that high corporate liquidity has driven world merger waves in the last century.[1] More recently, focusing on data from 36 countries, Erel et al. (2017) find that higher cash holdings increase the probability a firm will undertake an acquisition.

Furthermore, consistent with the agency costs theory, the free cash flow hypothesis (Jensen, 1986) may also explain why firms with high liquidity are more likely to engage in takeovers: A high liquidity offers in fact managers the incentive to make self-interested and entrenched decisions on low-benefit projects or acquisitions. Hanson (1992) finds evidence that acquiring firms with large free cash flow tend to undertake low-benefit acquisitions. Harford (1999) also finds a positive relation between cash-richness and the likelihood of a bid, which he attributes to the presence of agency conflicts between management and shareholders. In line with the agency costs of free cash flow explanation for acquisitions, a negative market reaction for acquiring firms with excess cash has been observed, due to the expectation of poor future performance. For instance, Oler (2008) finds that the level of cash flow of acquirer firms is significantly negatively related to their performance in terms of post-acquisition returns on net operating assets.[2]

Despite the numerous studies that rationalize the liquidity reason of the occurrence of mergers and acquisitions, only a few papers have paid attention to the motives behind China's takeovers (Chi et al., 2011; Zhou et al., 2015; Black et al., 2015). To the best of our

[1] Along similar lines, according to the neoclassical hypothesis, industry assets can be restructured via mergers, in response to technological, regulatory, or supply shocks, provided that sufficient capital liquidity is available. Harford (2005) argues that economic motivation and high macro-level capital liquidity have generated a large number of merger deals over time. Similarly, Eisfeldt and Rampini (2006) observe that procyclical capital liquidity goes hand in hand with capital reallocation among firms, suggesting that liquidity is a critical factor for industry shocks to generate merger waves.

[2] Similarly, using a sample of pure stock acquisitions, Gao (2011) observes lower announcement returns for acquiring firms with excess cash, and explains this finding not in the light of agency costs, but of adverse selection costs associated with corporate cash holdings in the presence of asymmetric information. Yet, it should also be noted that M&As represent a quick way to spend excess cash, which may limit the discretion of management and relieve the agency problems of free cash flow. According to Myers and Majluf (1984) and Smith and Kim (1994), mergers can in fact create value by reducing resource misallocations (e.g. combining the resources of cash-surplus firms with firms without sufficient financial slack).

knowledge, none of these studies has analyzed the role of corporate liquidity. Given the substantial increase in M&As characterizing the country, the Chinese case represents an ideal laboratory to further our understanding of the motives behind acquisitions and other aspects of merger policies.

Our work contributes to existing literature in the following two ways. First, it analyzes for the first time, the interactions between corporate liquidity and M&As in the Chinese context. Considering the very high levels of cash holdings characterizing Chinese firms, this represents an interesting research question. In particular, we investigate the extent to which takeovers in China are driven by free cash flow and/or expropriation motives. This will enable us to assess whether it is agency costs between managers and owners that can explain mergers, as proposed in Western countries (Jensen, 1986; Hanson, 1992; Smith and Kim, 1994; Harford, 1999; Oler, 2008); or if, instead, in emerging economies such as China, where weak corporate governance coexists with high ownership concentration, it is the agency conflict between majority and minority shareholders, which is responsible for M&As. Second, we investigate the extent to which opportunity costs of holding cash and financing constraints can explain the novel finding that cash bidders in the Chinese context perform worse than stock bidders, which goes in sharp contrast to the existing evidence from Western countries. Third, our paper conducts a comprehensive analysis of acquiring firms' short- and long-term performance in relation to different methods of payment.

Overall, our study, which is based on a panel of 2013 listed firms over the period 1998–2015, provides a portrait of the nature and implications of M&As in China, and sheds light on how liquidity affects firms' acquisition decisions, method of payment choices, and post-merger performance. We provide support for the agency costs of free cash flow hypothesis, according to which cash-rich Chinese firms tend to make use of their excess cash to take over other firms. We also find that the role of cash manifests itself more for firms with a greater likelihood of tunneling, which provides further support to the agency costs of free cash flow hypothesis. Next, given the impact of the opportunity cost of holding cash, we find that, especially for financially constrained firms, greater growth prospects, reflected by a higher Tobin's *Q*, reduce bidders' willingness to use cash payments in acquisitions. Our results also indicate that cash acquisitions underperform stock ones: Abnormal announcement returns are found to be worse for cash bidders. This is consistent with the explanation that given their lower opportunity cost of holding cash, financially rich firms with few growth prospects are more likely to use excess cash as payment to undertake value-destroying M&A deals. Taking a longer-term perspective, we also observe a decrease in average bidders' performance one to two years after acquisitions financed in cash, which once again supports the opportunity cost of holding cash hypothesis as an explanation for acquisitions by firms with excess cash.

The remainder of this paper is organized as follows. Section 2 provides a review of related research and develops our hypotheses. In Section 3, we describe the main features of our data and present summary statistics. Section 4 presents our empirical analysis. Section 5 concludes.

2. Theoretical background and hypotheses development

2.1. Tunneling motive of acquisitions in China

In the presence of information asymmetries, liquid assets can protect firms from the costs associated with capital market imperfections. According to Keynes (1936), holding a sufficient amount of liquid assets enables firms to undertake valuable projects once the opportunity arises. However, liquidity may also give management flexibility to pursue its own objectives, which may be detrimental to the firm. The free cash flow hypothesis advanced by Jensen (1986) suggests that managers endowed with free cash flow are likely to expand their firms beyond the optimal size or undertake unprofitable projects. Given the fact that excess cash can be seen as hoarded free cash flow, excess cash reserves can lead to agency conflicts over the disposal of cash. In the light of these considerations, it should be noted that M&As represent a quick way to spend cash instead of paying it out to shareholders. Thus, when a firm accumulates more than its normal level of cash, it is more likely to engage in takeovers (Harford, 1999).

Yet, the divergence of interests between majority shareholders and minority shareholders might play an even more important role in explaining mergers and acquisitions, especially in an emerging market economy such as China. This is because, in China, tunneling (which refers to the appropriation of a firm's assets and the expropriation of minority investors by controlling shareholders or managers for personal gain) is widespread among listed firms. This is due to their unique concentrated ownership structure and the share segmentation system,[3] as well as to the weak corporate governance mechanisms and public enforcement (Liu and Lu, 2007; Jiang et al., 2010; Peng et al., 2011; Bhaumik and Selarka, 2012). Firms subject to tunneling might make strategically self-interested and entrenched decisions such as M&As to divert resources away from disbursal among shareholders (Bhaumik and Selarka, 2012). In other words, M&As or other related party transactions between Chinese listed firms may provide direct opportunities for controlling shareholders, management and/or local governments to direct assets or profits out of firms, helping them in this way achieve their personal or political benefits at the expense of minority shareholders.[4]

We suggest that an acquisition decision in China is unlikely to be motivated by purely economic considerations for the following reasons. First, in China, most publicly listed companies are carve-outs or spin-offs from large state-owned enterprises, formed through the divestment of less profitable or unrelated subsidiary businesses. These listed firms are strongly dependent on their parent firms, as

[3] Before the 2005 split share structure reform, which was gradually implemented by Chinese firms over the period 2005–2010, the shares of listed firms in China could be either tradable or non-tradable (J. Chen et al., 2016; Cumming and Hou, 2014). After the implementation of the reform, all shares became tradable.

[4] A related party transaction is defined as any transaction such as asset acquisitions, asset sales, equity transfers, loan guarantees, accounts receivable, and so on, between listed subsidiaries and their affiliated parent companies (controlling shareholders). Related party transactions in the form of M&As are common in China (Chi et al., 2011). These transactions give direct opportunities to controlling shareholders to extract cash from their related listed firms through tunneling (Djankov et al., 2008).

they typically share personnel, capital, and assets (Liu and Lu, 2007). As a result, the former often need to provide resources for their inefficient parents. In some cases, the listed firms may be asked to take over the poor-performing assets or shares of their parent firms or controlling shareholders, or to purchase the assets or shares at a higher price (than the real value), particularly when these listed firms experience high profitability or hold excess cash in hand. A case study that illustrates this issue is presented in Appendix 1.

Second, in China, it is very common for acquirers and targets to have strong connections with or belong to the same local government supervision. Local government-controlled shareholders have a strong incentive to intervene in corporate business activities, as listed firms play a significant role in the regional economic development and social welfare. Moreover, the management of listed SOEs is often appointed by the government (their controlling shareholders). In order to support loss-making small and medium-sized enterprises (SMEs) achieve political objectives, avoid unemployment, and maintain social stability, the management of these listed firms with high profitability or excess liquidity may be required by the government to absorb the SMEs, and engage in administrative restructuring plans to turn around their performance (Chi et al., 2011). Especially, when local governments face large fiscal deficits, or when unemployment is high, they may have higher incentives to interfere in the M&A deals of firms affiliated with them.

Third, controlling shareholders or local governors have a strong motivation to build empires and/or to stimulate regional economic growth through M&As, which may not maximize shareholders' wealth, but increase instead the resources and power in their hands and give them the chance to stand out in the political competition for promotion (Liu and Lu, 2007; Guariglia and Yang, 2016b).

In summary, tunneling may be a strong motivation behind acquisition activities in China, as controlling shareholders (local governments) and management may use M&As as opportunities to spend excess cash for their private benefit instead of paying it out to their shareholders. We, therefore, propose our first hypothesis:

H_I: *In the Chinese context, cash-rich firms are more likely to make acquisitions, especially if they are subject to tunneling.*

2.2. Opportunity cost of holding cash

Substantial empirical evidence has documented a precautionary motive for cash holdings (Opler et al., 1999; Han and Qiu, 2007; Bates et al., 2009). In the event of unexpected earnings shortfalls or costly external finance, ex-ante cash reserves prevent firms from underinvesting ex-post. Especially when high-*Q* "glamor" firms have difficulties in accessing external capital due to asymmetric information problems, liquidity management can play an important role. In line with these arguments, Almeida et al. (2004) argue that financially constrained firms have a greater propensity to save cash out of cash flow. Furthermore, Faulkender and Wang (2006) find that firms with higher financial constraints benefit more from holding cash than their financially healthier counterparts.

The level of financial frictions has been found to have a large bearing on firms' investment decisions (Fazzari et al., 1988; Harford, 1999). As a particular type of investment, M&A activities should also be strongly influenced by these frictions. Acquiring firms face a choice of payment between cash and stock. In line with the opportunity cost of holding cash hypothesis, Alshwer et al. (2011) show that financially constrained US bidders with high growth opportunities (reflected by a high Tobin's *Q*) face a higher opportunity cost of holding cash, and prefer therefore to save more cash to avoid the costs of forgoing positive net present value (NPV) projects in the future. This suggests that opportunity costs of holding cash and financing constraints can both explain the method of payment. Extending Alshwer et al.'s (2011) arguments to the Chinese case, we argue that in the presence of a higher Tobin's *Q*, financially constrained bidders would rather not spend cash on acquisitions since they face higher opportunity costs of holding cash. By contrast, firms with easier access to financial markets may not have such a strong preference for payment methods, since they may easily fund their current or future investments using debt or equity. In the light of these considerations, our second hypothesis takes the following form:

H_{II}: *In the Chinese context, acquirers' cash payment decisions are negatively related to growth opportunities (Tobin's Q). This association is stronger for financially constrained bidders compared to their financially healthier counterparts.*

Based on the opportunity cost of holding cash hypothesis, we argue that, in the Chinese context, acquiring firms prefer to use cash in acquisitions when they face a lower opportunity cost of holding cash, i.e. when investment opportunities are low. This may result in cash being wasted on acquisitions, which may, in turn, result in underperformance of acquiring firms. This is in contrast to evidence from Western countries, where cash acquisitions outperform stock acquisitions as the former signal positive information, while the latter signal asymmetric information (Travlos, 1987; Fishman, 1989; Loughran and Anand, 1997; Andrade et al., 2001; Linn and Switzer, 2001; Abhyankar et al., 2005). Our third hypothesis posits therefore that, in the Chinese context, contrary to what is observed in Western countries, cash payments have a negative effect on market reaction and post-merger operating performance. In other words:

H_{III}: *In the Chinese context, acquirers who use cash to finance their acquisitions perform significantly worse than acquirers who use stock. Specifically, compared to stock bidders, cash bidders exhibit lower short-run abnormal returns. Additionally, cash bidders show decreasing operating performance from the pre- to the post-merger period.*

3. Data and descriptive statistics

3.1. The dataset

To test our hypotheses, we construct a sample of firms that issued A-shares on either the Shanghai Stock Exchange (SHSE) or the Shenzhen Stock Exchange (SZSE) during the period 1998–2015. The data is based on annual observations and taken from the China Stock Market and Accounting Research (CSMAR) database and China Center for Economics Research (CCER) database. Following the literature, we exclude firms in the financial sector, due to their different measurement of liquidity, and their dissimilar

operating, investing, and financing activities. We further winsorize observations in the 1% tails of the regression variables to minimize the potential influence of outliers. Finally, we drop all firms with less than three years of consecutive observations, as our models contain leads and lags of relevant variables. All variables are deflated using the gross domestic product (GDP) deflator (National Bureau of Statistics of China).

In addition, our sample includes all Chinese acquisitions announced between January 1st 1998 and December 31st 2015, taken from the Thomson Financial SDC (Securities Data Corporation) Mergers and Acquisitions database. Acquiring firms are Chinese public firms listed on either the Shanghai or the Shenzhen Stock Exchange. Target firms are both publicly and privately held corporations, located in China. Both successful and unsuccessful deals are taken into consideration. When the bidder makes multiple acquisition attempts during a year, we only consider the first attempt during that year as we are unable to identify the others. The M&A sample is matched with the accounting information from our main dataset.

Our final unbalanced panel consists of 24,888 firm-year observations representing 2013 listed firms. The number of years available for each firm varies between three and eighteen, while the number of firm-year observations varies from a minimum of 724 in 1998 to a maximum of 1938 in 2013. The sample includes 1152 unique acquirers making 3966 deals.[5] Table 1 provides a breakdown of non-bidders and bidders by year, differentiated by method of payment. We observe a clear increasing trend of the number of M&As in our sample period. This could be explained by the significant increase in the level of cash held by Chinese companies over the same period (Guariglia and Yang, 2016a). In addition, the majority of our acquiring firms (82.2%) use cash as payment in acquisitions, whereas only 12.7% of bidders use pure stock.[6]

3.2. Summary statistics

Table 2 presents means and medians of key variables for the full sample, and provides a comparison of these same statistics for bidders and non-bidders. We also conduct statistical tests for equality of the means (*t*-test) and sample medians (Wilcoxon rank-sum test) of each variable across the two groups. All variables are defined in Appendix 2. With regard to liquidity variables [*Cash*, net working capital (*NWC*)], bidders show lower mean and median liquidity ratios (e.g. 0.154 and 0.128 for *Cash*) compared to non-bidders (e.g. 0.175 and 0.137 for *Cash*). Moreover, bidders exhibit, on average, a slightly higher *leverage* (mean: 0.219; median: 0.21) than non-bidders (mean: 0.192; median: 0.173). *P*-values associated with tests for equality of both sample means (*t*-test) and sample medians (Wilcoxon rank-sum test) show that, in both cases, the differences are significant at the 1% level. The higher leverage and lower liquidity shown by bidders might be due to the fact that they need to increase leverage and spend liquidity to engage in acquisitions. In unreported results, we also find that the liquidity of bidding firms is significantly higher than that of non-bidders in the year prior to acquisitions. This confirms that bidders spend a large amount of cash in acquisitions.

We also observe that acquiring firms are larger than their non-acquiring counterparts, regardless of whether size is measured in terms of assets or number of employees, and show better performance than non-bidders in terms of *sales growth* and stock returns (*Return*). Once again, *p*-values associated with tests for equality of both sample means (*t*-test), and sample medians (Wilcoxon rank-sum test) show that the differences are significant at the 1% level.

In order to measure incentives for tunneling, following Jiang et al. (2010), we use the ratio of other receivables to total assets (*OREC*),[7] and the separation of the blockholder's controlling right and her/his ownership right (*DIF_Blockholders*).[8] We observe that 42.3% of the bidders in our sample exhibit a divergence between the blockholder's controlling ownership and cash flow ownership (*DIF_Blockhoders*), which is significantly larger than the corresponding value observed for non-bidders (31.8%). However, bidders do not display a higher ratio of other receivables to total assets (*OREC*) compared to non-bidders (the corresponding ratios for the two groups of firms are 0.032 and 0.041, respectively). This suggests that acquisitions are not solely fueled by tunneling.

Table 2 also shows that bidders are more likely to pay dividends (*Payout*). This suggests that they might distribute cash via dividends to reduce the agency costs of free cash flow. Finally, CEOs in bidder companies are less likely to hold shares in their own company compared to non-bidders. Given that managerial ownership (*Shareholding_CEO*) aligns the managers' interests with those of the firm's shareholders, firms with higher managerial ownership are in fact less likely to make entrenched decisions on value-decreasing acquisitions.

[5] See Table 1 for more details about the structure of our sample. Given the unbalanced nature of our panel, which allows for both entry and exit, potential selection and survivor bias are eased.

[6] The split share structure of China's stock markets led to difficulties in valuing firms' stocks, particularly for non-tradable shares. For this reason, pure stock-for-stock was not a popular payment method before the mid-2000s. As seen from Table 1, over 99% of stock acquisitions took place after the 2005 split share structure reform. Moreover, the category of *Mixed PYMT* in our study refers to all methods of payment different from all-cash or all-stock. They include acquisitions made with mixed payments (e.g. cash and stock), debt-arrangements, and asset swaps.

[7] As evidence, a survey of 130 listed Chinese firms undertaken by the Shenying and Wanguo Securities Co., Ltd. documents that, on average, 40 million US dollars are owed by the controlling shareholders to their listed companies in the form of accounts receivable or lending to the parent firms (Liu and Lu, 2007). In addition, Jiang et al. (2010) claim that "during 1996–2006, tens of billions in RMB were siphoned [through inter-corporate loans] from hundreds of Chinese listed firms by controlling shareholders" (p.2). The authors explain that these inter-corporate loans can be found in the balance sheets of the majority of listed firms in China and are typically reported as "Other Receivables". A more in-depth discussion of the *OREC* variable can be found in Section 4.2.

[8] According to Claessens et al. (2002), Lemmon and Lins (2003), and Jiang et al. (2010), the separation of cash flow and control rights tends to give blockholders effective control on the firms by only holding a relatively low proportion of shares, via pyramid structures and cross-holding among firms. The probability and danger of the exploitation of minority shareholders by the controlling shareholder (i.e. "tunneling") is high if these two agents do not have the same interests. A more in-depth discussion of the *DIF_Blockholders* variable can be found in Section 4.2.

Table 2
Summary statistics.

	Non-Bidders		*Bidders*		*All*		*Diff.Mean*	*Diff.Median*
	Mean	*Median*	*Mean*	*Median*	*Mean*	*Median*		
Cash	0.175	0.137	0.154	0.128	0.171	0.135	0.00***	0.00***
Xcash	0	−0.009	0	−0.006	0	−0.008	0.61	0.08*
Size	20.58	20.4	21.06	20.91	20.65	20.48	0.00***	0.00***
Employees	4361	1934	5867	2552	4610	2019	0.00***	0.00***
ROA	0.03	0.035	0.03	0.029	0.03	0.034	0.87	0.00***
Sales growth	0.141	0.071	0.176	0.085	0.147	0.073	0.00***	0.00***
Return	0.295	0.07	0.394	0.117	0.311	0.077	0.00***	0.00***
CAPEX	0.056	0.04	0.054	0.04	0.056	0.04	0.12	0.83
PE	108.9	35.92	85.73	31.7	105.2	35.33	0.66	0.00***
CF	0.054	0.058	0.055	0.054	0.054	0.057	0.47	0.00***
Var_CF	0.111	0.088	0.11	0.088	0.111	0.088	0.60	0.00***
Tobin	2.039	1.57	2.095	1.513	2.048	1.562	0.03	0.00***
Leverage	0.192	0.173	0.219	0.21	0.196	0.179	0.00***	0.00***
NWC	−0.036	−0.016	−0.089	−0.086	−0.044	−0.027	0.00***	0.00***
OREC	0.041	0.013	0.032	0.013	0.04	0.013	0.00***	0.25
Blockholders	0.385	0.364	0.37	0.355	0.383	0.363	0.00***	0.00***
Payout	55.3%		57.9%		55.7%		0.00***	0.00***
Shareholding_CEO	34.5%		24.6%		32.9%		0.00***	0.00***
DIF_Blockholders	31.8%		42.3%		33.5%		0.00***	0.00***
SOEs	60.1%		65.2%		60.9%		0.00***	0.00***

Notes: firms that are flagged as *bidders* (*non-bidders*) are those who did (did not) announce a bid in a given year. *Cash* (Cash-to-assets ratios) is the ratio of the sum of cash and cash equivalents to total assets. *Xcash* is the unexpected (excess) cash holdings predicted by the OPSW (1999) model estimated with the fixed-effects estimator. *Size* is the natural logarithm of total assets. *Employees* is the number of employees. *ROA* is return on assets. *Sales growth* is the annual rate of growth of real sales. *Return* is the annual stock returns. *CAPEX* is defined as the ratio of capital expenditures to total assets. *PE* is the price-to-earnings ratio. *CF* is the ratio of the sum of net profits and depreciation to total assets. *Var_CF* is the mean of the standard deviations of the cash flow over total assets for all firms in a given industry in a given year. *Tobin (Q)* is the market-to-book ratio. *Leverage* is the ratio of the sum of short- and long-term debt to total assets. *NWC* is the ratio of net working capital (working capital minus cash holdings) to total assets. *OREC* is the ratio of other receivables scaled by total assets. *Blockholders* is the percentage of shares controlled by the largest shareholder. *Payout* is a dummy variable that takes the value of one if the firm is paying dividends in a given year, and 0 otherwise. *Shareholding_CEO* is a dummy variable that takes the value of one if the firm's CEO is holding shares in his/her own company, and 0 otherwise. *DIF_Blockholders* is a dummy variable that takes the value of one if the firm's blockholder's cash flow ownership is lower than the controlling ownership in a given year, and 0 otherwise. *SOEs* is a dummy variable, that takes the value of 1 if the firm is state owned in a given year, and 0 otherwise. For the last four dummy variables (*Payout*, *Shareholding_CEO*, *DIF_Blockholders*, *SOEs*), we present the percentage of firms for which each dummy variable takes value of one in the sample. All variables (with the exception of the dummies) are deflated using the GDP deflator. *Diff.Mean* and *Diff.Median* are the *p*-values associated with the *t*-test and the Wilcoxon rank-sum test for equality of means and equality of medians of corresponding variables between bidders and non-bidders. *, *** indicate significance at the 10% and 1% level, respectively.

4. Empirical analysis

4.1. Do cash holdings help predict the probability of being a bidder?

Following Harford (1999), we first study the link between firms' characteristics and acquisition decisions. In particular, by investigating whether high cash reserves are associated with a higher chance of attempting acquisitions, we examine whether the behavior of cash-rich firms is consistent with the agency costs of free cash flow explanation. To this end, we estimate the following model whereby the dependent variable is coded as one if the firm announces a bid in year $t+1$, and zero otherwise:

$$\begin{aligned}\Pr(Bidder=1)_{i,t+1} = a + \textstyle\sum_k b_k X_{k,i,t} = a + b_1 Xcash_{i,t} + b_2\ Return_{i,t} + b_3 Q_{i,t} + b_4 ROA_{i,t} + b_5 Sales\,growth_{i,t} + b_6 NWC_{i,t} \\ + b_7 Leverage_{i,t} + b_8 PE_{i,t} + b_9 Size_{i,t} + b_{10} Shareholding\_CEO_{i,t} + b_{11} Blockholders_{i,t} + b_{12} SOEs_{i,t} \\ + b_{13} ROA_{i,t} * Q_{i,t} + v_i + v_t + v_j + v_p + \varepsilon_{i,t}\end{aligned} \quad (1)$$

The subscript i indexes firms; t, years ($t = 1998$–2015); j, industries; and p, provinces. $X_{k,i,t}$ is a vector of explanatory variables, including firms' financial characteristics and ownership structure variables, which might affect firms' acquisition decisions (Harford, 1999). Our primary variable of interest is unexpected (excess) cash (*Xcash*), defined as the difference between real cash holdings and the optimal cash level predicted by the Opler et al. (1999, hereafter OPSW) model.[9] *Return* represents annual stock returns; *Tobin (Q)*, the market-to-book ratio; *ROA*, the return on assets; *Sales growth*, the annual rate of growth of real sales; *NWC*, the ratio of net working capital (working capital minus cash holdings) to total assets; *Leverage*, the ratio of the sum of short- and long-term debt to total assets; *PE*, the price-to-earnings ratio; *Size*, the natural logarithm of total assets. *Shareholding_CEO* is a dummy variable that takes the value of 1 if the firm's CEO is holding shares in his/her own company, and 0 otherwise. *Blockholders* is the percentage

[9] Definitions of all variables used in this paper can be found in Appendix 2. Appendix 3 describes in detail how *Xcash* is calculated.

of shares controlled by the largest shareholder. *SOEs* is a dummy variable, that takes the value of 1 if the firm is state owned in a given year, and 0 otherwise. Additionally, we include $ROA * Tobin$ to estimate the interaction effect between the two variables.

The error term in Eq. (1) consists of five components. v_i is a firm-specific effect, embracing any time-invariant firm characteristics which might influence firms' acquisitions strategies, as well as the time-invariant component of the measurement error affecting any variable in our regression. v_t is a time-specific effect, which we control for by including time dummies capturing possible business cycle effects, as well as the impact of changes in interest rates. Year dummies also account for exogenous shocks which may potentially affect firms' acquisitions decisions (e.g. the 2005 split share structure reform, the 2005 Chinese exchange rate system reform, and the financial crisis of 2007–2008). v_j is an industry-specific effect, which we take into account by including industry dummies.[10] v_p is a province-specific effect, controlling for uneven developments across different provinces, which we take into account by including province dummies.[11] Finally, $\varepsilon_{i,t}$ represents an idiosyncratic component.

Given the discrete and limited nature of the dependent variable and the fact that our dataset is a panel, Eq. (1) is initially estimated using the random-effects Probit estimator, which controls for the v_i component of the error term.[12] In order to take into account the potential endogeneity of some of our right-hand side variables, we further use the instrumental variable (IV) Probit method.[13] We instrument *Xcash* as well as all our financing, efficiency, growth, and firm size variables using their own values lagged twice. Table 3 presents the results. We observe that, regardless of whether we use the random-effects Probit (column 1) or the instrumental variable (IV) Probit method (column 4), the probability of being a bidder increases with the level of excess cash held (*Xcash*). This suggests that cash-rich firms are more likely to attempt acquisitions than their cash-poor counterparts. The marginal effects suggest that holding all other controls equal, a 10 percentage-point increase in *Xcash* is associated with a 1.59–1.89 percentage-point higher probability of engaging in M&As. This finding is consistent with results reported by Harford (1999) and Opler et al. (1999) for US firms, with the free cash flow hypothesis, and with the first part of Hypothesis I.[14]

Both *Tobin's Q* and *ROA* exhibit positive marginal effects, suggesting that better performing firms are more likely to engage in acquisitions. Yet, we observe that the marginal effect associated with the interaction between these two variables is negative and significantly different from zero. This suggests that the probability of being a bidder decreases when firms have higher operating performance (*ROA*) as well as valuable investment opportunities (*Tobin's Q*). In other words, the relation between the likelihood to make acquisitions and *Tobin's Q* (*ROA*) is weaker for firms with higher *ROA* (*Tobin's Q*). The reason might be that when a firm has both high growth opportunities and a high operating capacity, it does not need to rely on external investments like M&As to grow and expand. Expanding via acquisitions is, in fact, more likely to generate a higher price paid for the acquired assets, as well as integration expenses (Margsiri et al., 2008). In addition, there is a relatively high uncertainty about the synergies created by the acquisitions (Moeller et al., 2005). A thorough discussion of the marginal effects of other regressors included in Eq. (1) is presented in Appendix 4.

4.2. Are cash-rich firms subject to tunneling more likely to make acquisitions?

We next provide tests of the second part of Hypothesis I. In particular, in columns 2, 3, 5 and 6 of Table 3, we investigate a particular scenario of takeover motivation, in which controlling shareholders tunnel excess cash through M&A transactions.

Following Jiang et al. (2010), we use the ratio of other receivables to total assets (*OREC*) to proxy how likely primary shareholders are of expropriating resources from minority investors. The "Other Receivables" account is commonly used by Chinese listed firms to record transactions with related parties. The vague definition of "Other Receivables", as well as the low level of disclosure requirements make manipulation possible. This account is therefore frequently used to cover up tunneling (Li, 2010). According to Jiang et al. (2010), tens of thousands of inter-corporate loans borrowed by controlling shareholders are classified as "Other Receivables" on the balance sheets of Chinese listed firms, and represent a large portion of companies' total assets. In our sample, other receivables constitute about 6.3% on average, and up to around 60% of total assets, confirming the severity of the tunneling problem in China.

[10] According to the industry classification taken from the China Securities Regulatory Commission (CSRC), firms in China's listed sector are assigned to one of the following twelve industrial sectors: Farming, forestry, animal husbandry & fishing; Mining; Manufacturing; Utilities; Construction; Transportation & warehouse; Information technology; Wholesale & retailing; Real estate; Social services; Communications & cultural; Conglomerates; Finance & insurance. Following previous literature, we exclude the Finance & insurance sector from our study.

[11] There are 31 provinces in China: Coastal provinces (Beijing, Fujian, Guangdong, Hainan, Hebei, Jiangsu, Liaoning, Shandong, Shanghai, Tianjin, and Zhejiang); Central provinces (Chongqing, Anhui, Heilongjiang, Henan, Hubei, Hunan, Jiangxi, Jilin, and Shanxi); and Western provinces (Gansu, Guangxi, Guizhou, Neimenggu, Ningxia, Qinghai, Shaanxi, Sichuan, Xinjiang, and Yunnan).

[12] To check robustness, we also estimated Eq. (1) using a conditional fixed-effects Logit model and a linear probability model. The former does not require the crucial assumption that firm-specific unobserved effects must be independent of the regressors. However, a drawback of the fixed-effects Logit estimator is that all the firms for whom the dependent variable is constant over the sample period are dropped in estimation. The estimates based on the conditional Logit estimator and the linear probability model were similar to those obtained with the random-effects Probit model. For brevity, these results are not reported, but are available upon request.

[13] In all our IV specifications, we report the Wald test and the Anderson Rubin test. The former tests the null hypothesis that all regressors are exogenous, while the latter tests whether the model is identified. In all cases, we reject the null hypothesis that all regressors are exogenous, which suggests it is appropriate to use an IV estimator. We also find that our model is identified, meaning that the relationship between the included endogenous regressors and the instruments is sufficiently strong to justify inference from the results.

[14] A positive relationship between cash holdings and M&A decisions could also be explained by the financial constraints hypothesis, according to which cash reserves can increase financially constrained firms' ability to invest without accessing costly external capital markets. In these circumstances, the investments made by firms with more cash holdings would not necessarily be worse than those undertaken by other firms. Hence, firms who engage in M&As would not necessarily experience a lower value of cash holdings. By contrast, according to the free cash flow hypothesis, cash-rich firms are more likely to make poor acquisitions, and hence experience a lower value of cash holdings. In unreported results, following Faulkender and Wang (2006), we observe a decrease in the operating value of cash for acquirer firms with excess cash. This contradicts the financial constraints explanation for acquisitions by cash-rich firms. We therefore conclude that the positive relationship we observe between cash holdings and M&A decisions is better explained by the free cash flow hypothesis.

Table 3
Predicting bidders using a Probit model.

	(1)	(2)	(3)	(4)	(5)	(6)
	Xtprobit	Xtprobit	Xtprobit	IVprobit	IVprobit	IVprobit
Xcash	0.189***	0.193***	0.187***	0.159*	0.047	−0.001
	(0.035)	(0.035)	(0.035)	(0.355)	(0.487)	(0.534)
*Xcash*Tunneling*		0.175**	0.172**		0.382***	0.426***
		(0.084)	(0.070)		(0.560)	(0.593)
Tunneling		0.014**	0.030***		0.034***	0.030***
		(0.007)	(0.007)		(0.038)	(0.028)
Return	0.010**	0.010**	0.010**	−0.009	−0.008	−0.009
	(0.004)	(0.004)	(0.004)	(0.059)	(0.058)	(0.059)
Tobin	0.007***	0.007***	0.007***	0.013***	0.012***	0.013***
	(0.003)	(0.003)	(0.003)	(0.019)	(0.019)	(0.019)
ROA	0.126**	0.142***	0.126**	0.560**	0.706**	0.567**
	(0.053)	(0.053)	(0.053)	(1.097)	(1.151)	(1.105)
*ROA*Tobin*	−0.025*	−0.026*	−0.024*	−0.131**	−0.148**	−0.132**
	(0.014)	(0.015)	(0.015)	(0.234)	(0.247)	(0.236)
Sales growth	0.005	0.005	0.005	0.151	0.137	0.155
	(0.006)	(0.006)	(0.006)	(0.454)	(0.445)	(0.455)
NWC	−0.019	−0.022	−0.017	−0.003	−0.017	−0.003
	(0.018)	(0.018)	(0.018)	(0.093)	(0.091)	(0.093)
Leverage	0.038	0.033	0.039	0.129***	0.120***	0.127***
	(0.025)	(0.025)	(0.024)	(0.133)	(0.132)	(0.133)
PE	0.000	0.000	0.000	−0.000	−0.000	−0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Size	0.037***	0.037***	0.037***	0.040***	0.040***	0.040***
	(0.004)	(0.004)	(0.004)	(0.023)	(0.023)	(0.023)
Shareholding_CEO	−0.039***	−0.039***	−0.036***	−0.040***	−0.040***	−0.036***
	(0.007)	(0.007)	(0.007)	(0.028)	(0.027)	(0.028)
Blockholders	−0.114***	−0.112***	−0.117***	−0.120***	−0.113***	−0.122***
	(0.023)	(0.023)	(0.023)	(0.114)	(0.110)	(0.114)
SOEs	0.012	0.012	0.023***	0.011	0.012	0.022**
	(0.008)	(0.008)	(0.008)	(0.033)	(0.034)	(0.036)
No. obs.	19,163	19,163	19,163	16,314	16,314	16,314
ρ	0.18	0.18	0.18			
Wald test of exogeneity				0.04**	0.04**	0.05**
Anderson-Rubin				0.00***	0.00***	0.00***
chi^2	798.4	803.4	846.5	787.0	826.5	837.7

Notes: the specifications were estimated using the random-effects Probit estimator (xtprobit) in columns 1 to 3, and the instrumental variable Probit method (IVprobit) in columns 4 to 6, respectively. The dependent variable in all regressions is equal to one if the firm announces a bid in year t + 1, and zero otherwise. *Xcash* is the unexpected (excess) cash holdings predicted by the OPSW (1999) model estimated with the fixed-effects estimator. In columns 2 and 5, we consider a firm as being subject to tunneling if its ratio of other receivables scaled by total assets lies in the top three deciles of the distribution of the corresponding values of all firms belonging to the same industry each year, and 0 otherwise. In columns 3 and 6, we consider a firm as being subject to tunneling if its blockholder's cash flow ownership is lower than the controlling ownership in a given year, and 0 otherwise. All other variables are defined in Appendix 2. The table reports marginal effects and standard errors (in parentheses). The marginal effects associated with the *Xcash* ∗ *Tunneling* interaction are computed based on the difference between the average marginal effects for *Xcash* evaluated in turn for firms more and less likely to tunnel. The marginal effects associated with the *ROA* ∗ *Tobin* interaction are computed based on the ratio of the difference of the average marginal effects relative to *ROA* evaluated at two infinitesimally close values of *Tobin* (near the mean), divided by the difference between these two values (i.e. 0.0001). Time, industry, and province dummies were included in all specifications. ρ represents the proportion of the total error variance accounted for by unobserved heterogeneity. *Wald test of exogeneity* is the *p*-value of the Wald test of exogeneity of the regressors. Anderson-Rubin is the *p*-value of a test for whether the model is identified. Chi^2 represents the likelihood ratio chi-square test of overall significance. *, **, *** indicate significance at the 10%, 5%, and 1% level, respectively.

We expect that the larger the size of "Other Receivables" on the balance sheet, the more likely the firm is to resort to tunneling. Specifically, we classify a firm as being more subject to tunneling in a given year if its *OREC* in that year falls in the top three deciles of the distribution of the *OREC* of all firms operating in the same industry it belongs to. The remaining firm-years will be considered less subject to tunneling. Similar results, not reported for brevity, were obtained when a 50% threshold was used.

As an additional check, we also use the separation of the blockholder's controlling right and her/his ownership right as an alternative proxy for the firm's tunneling incentives. In particular, we construct the dummy variable *DIF_Blockholders*, which takes value one if the firm's blockholder's controlling right exceeds its cash flow right in a given year, suggesting the presence of tunneling, and zero otherwise. According to Claessens et al. (2002), Lemmon and Lins (2003), and Jiang et al. (2010), the incentives of tunneling are greater when a firm has implemented mechanisms of separating cash flow and control. This can be explained considering that in these circumstances, blockholders tend to have exceedingly effective control on the firms, and are able to derive more benefits from tunneling activities by only holding a relatively low stake of shares, through pyramid structures and cross-holding among firms. We therefore classify a firm as being subject (not subject) to tunneling in a given year if the blockholder's controlling right is (is not) greater than his/her ownership right, i.e. if *DIF_Blockholders* is equal to one (zero).

Columns 2 and 3 of Table 3 present an analysis of the impact of tunneling on making acquisition decisions. In particular, this analysis is undertaken by including in Eq. (1) a dummy variable (*Tunneling*) equal to 1 in the presence of tunneling, and 0 otherwise, and an interaction between this dummy variable and excess cash (*Xcash*). Tunneling is defined based on *OREC* (column 2) and

DIF_Blockholders (column 3). The augmented Eq. (1) is estimated using a random-effects Probit model. The marginal effects associated with the interaction terms in columns 2 and 3 are positive and significant (0.175 and 0.172, respectively), implying that, regardless of whether we use *OREC* or *DIF_Blockholders* to proxy for the tendency to expropriate, having excess cash is associated with a significantly higher chance of undertaking an acquisition for those firms more likely to tunnel compared to those less likely to do so. To put our Probit results into economic perspective, based on results in column 2, in the presence of a 10 percentage-point increase in *Xcash*, the implied probability of making a bid will be 1.75 percentage-point higher for firms that are more likely to tunnel compared with those less likely to expropriate. In addition, we find significant marginal effects associated with the variable *Tunneling*, suggesting that practicing tunneling is associated with a higher likelihood to undertake acquisitions. The results based on the IV-Probit method, reported in columns 5 and 6, confirm that the positive relationship between *Xcash* and the likelihood to engage in M&As is stronger for those firms subject to tunneling. Taken together, these results suggest that Chinese firms tend to take advantage of acquisitions to tunnel cash to their controlling shareholders, and are in line with the second part of Hypothesis I.

Next, in Table 4, we compare the average percentage of firms conducting acquisition activities, differentiating firms into those that are more or less likely to tunnel, and those that have *Xcash* above (*High-Xcash*) or below (*Low-Xcash*) zero. We observe a higher proportion of bidders for the *High-Xcash* firms compared with the *Low-Xcash* ones, particularly among those firms with a higher likelihood of tunneling (i.e. those firms with a high ratio of other receivables to total assets, or with blockholder's cash flow ownership lower than the controlling ownership). Both the *t*-test and the Wilcoxon rank-sum test indicate that the differences in the mean and median percentage of firms conducting acquisitions between the *High-Xcash* and *Low-Xcash* groups are only significant among firms characterized by *High_Tunneling*.[15] Hence, the findings in this table once again support Hypothesis I, according to which cash-rich firms are more likely to undertake M&As, especially if they are subject to tunneling. In other words, our finding suggests that tunneling is a key reason for M&As in the Chinese context.

4.3. The choice of payment method

4.3.1. The determinants of method of payment

In order to test Hypothesis II, in this section, we initially provide an analysis of the bidder's payment choice. Following Martin (1996) and Faccio and Masulis (2005), our model of the determinants of the method of payment is given by the following equation:

$$\begin{aligned}\Pr(\textit{Paid by cash or stock})_{i,t} = a + \textstyle\sum_k b_k X_{k,i,t} = a &+ b_1 Q_{i,t} + b_2 Xcash_{i,t} + b_3 CF_{i,t} + b_4 Leverage_{i,t} + b_5 Blockholders_{i,t} \\ &+ b_6 Sharehoding\_CEO_{i,t} + b_7 SOEs_{i,t} + b_8 Experience_{i,t} + b_9 Public\_deals_{i,t} \\ &+ b_{10} Size\_ratio_{i,t} + b_{11} Unfriendly_{i,t} + b_{12} Diversifying_{i,t} \\ &+ b_{13} Completed_{i,t} + b_{14} Rumor_{i,t} + b_{15} Competing_{i,t} \\ &+ b_{16} Financial\,Acquirer_{i,t} + b_{17} Finanical\,Sponsor_{i,t} + \nu_t + \nu_j + \nu_p + \varepsilon_{i,t}\end{aligned} \tag{2}$$

where the subscript *i* indexes firms; *t* indexes years ($t = 1998$–2015); *j* indexes industries; and *p*, provinces. The dependent variable is the bidder's payment choice. Explanatory variables comprise bidder- and deal-specific attributes. Specifically, we measure the bidder's financial, operational and corporate conditions with *Tobin's Q*, the market-to-book ratio; *Xcash* (excess cash); *CF* (the ratio of the sum of net profit and depreciation to total assets); *Leverage* (the ratio of the sum of short- and long-term debt to total assets); *Size* (the natural logarithm of total assets); *Blockholders* (the percentage of shares controlled by the largest shareholder); *Shareholding_CEO* (a dummy variable that takes the value of 1 if the firm's CEO holds shares in his/her own company, and 0 otherwise); *SOEs* (a dummy variable, that takes the value of 1 if the firm is state owned in a given year, and 0 otherwise); and *Experienced* (a dummy variable, which takes the value of 1 if the bidder has announced at least 3 takeover bids over the five years period prior to the deal announcement, and 0 otherwise).

We measure the deal's attributes with *Public_deals* (a dummy variable, that takes the value of 1 for acquisitions of public firms, and 0 otherwise); *Size_ratio* (the ratio of the transaction value divided by the bidder's market value four weeks prior to the announcement); *Unfriendly* (a dummy variable, which takes the value of 1 if the deal is not defined as friendly by Thomson Financial SDC, and 0 otherwise); *Diversifying* (a dummy variable which takes the value of 1 if the bidder was not in the same industry as the target, measured using the bidder's and the target's first two digits of the primary SIC code, and 0 otherwise); *Completed* (a dummy variable, which takes the value of 1 if the transaction was completed, and 0 otherwise); *Rumor* (a dummy variable equal to one if the transaction is currently [or originally began as] a rumor, and zero otherwise); *Competing* (a dummy variable equal to one if a third party launched an offer for the target while the original bid was pending, and zero otherwise); *Financial Acquirer* (a dummy variable equal to one if the bidder is buying a non-financial target company for financial reasons rather than for strategic reasons, and zero otherwise); and *Financial Sponsor* (a dummy variable equal to one if the deal has any buyout or financial sponsor involvement on either the buying side or the selling side, and zero otherwise).[16]

[15] Both the *t*-test and the Wilcoxon rank-sum test also indicate that among the *High-Xcash* firms, *High_Tunneling* firms are significantly more likely to undertake acquisitions than their *Low_Tunneling* counterparts, regardless of how tunneling is measured.

[16] We do not include *Runup_stock*, *Runup_market* and *Sigma_stock* in the regressions as this would significantly reduce the numbers of observations. However, the inclusion of these variables produced qualitatively similar results. These are not presented for brevity, but are available upon request.

Table 4
Excess cash and tunneling.

Constraints criteria	*Low-Xcash*	*High-Xcash*	*Diff.Mean*	*Diff.Median*
OREC				
High_Tunneling	15.74%	19.57%	0.00***	0.00***
Low_Tunneling	15.55%	16.11 %	0.34	0. 34
Diff.Mean	0.78	0.00***		
Diff.Median	0.78	0.00***		
DIF_Blockholders				
High_Tunneling	17.82%	20.32%	0.05*	0.05*
Low_Tunneling	14.41%	15.34%	0.12	0.12
Diff.Mean	0.00***	0.00***		
Diff.Median	0.00***	0.00***		

Notes: this table presents the average proportion of bidders in the high- and low-*Xcash* groups. *Xcash* is the unexpected (excess) cash holdings predicted by the OPSW (1999) model estimated with the fixed-effects estimator. A firm is considered to be in the high- (low-) *Xcash* group in a given year if its *Xcash* is above (below) zero. *High_Tunneling* (*Low_Tunneling*) is a dummy variable, equal to 1 if the firm is more (less) likely to tunnel, and 0 otherwise. According to the first criterion, we consider a firm as being subject to tunneling if its ratio of other receivables scaled by total assets lies in the top three deciles of the distribution of the corresponding values of all firms belonging to the same industry each year. The remaining firm-years will be classified as less likely to tunnel. According to the second criterion, we consider a firm as being subject to tunneling if its blockholder's cash flow ownership is lower than the controlling ownership in a given year. The remaining firm-years will be classified as less likely to tunnel. *Diff.Mean* and *Diff.Median* are the *p*-values associated with the *t*-test and the Wilcoxon rank-sum test for equality of means and equality of medians of the average proportion of cash payments between high- and low-*Xcash* groups and between *High*- and *Low-Tunneling* groups (medians are not reported for brevity). *, *** indicate significance at the 10% and 1% level, respectively.

Our estimates of Eq. (2) are reported in columns 1 to 4 of Table 5. Specifically, in columns 1 and 3, we use a Probit model in which the dependent variable is 1 if the deal is financed only by cash in year t + 1, and zero otherwise. By contrast, the specifications in columns 2 and 4 are estimated using an ordered Probit estimator, whereby the dependent variable takes value of 1 if the acquisition in year t + 1 is stock-financed; 2, if it is mixed-financed; and 3, if it is cash-financed. We estimate all regressions by accounting for clustering, which takes into account the intra-class correlation within the same firm.

It is noteworthy that if poor financial or corporate conditions, which play a crucial role in payment considerations, also prevent some potential bidders from taking part in acquisition activity, then we may understate the importance of the determinants of the choice of payment method. As shown in Table 2, there are significant differences in firm characteristics between bidders and non-bidders, which suggest that our financial variables could be determined endogenously. Additionally, the method of payment could be a matter of choice on the part of the bidder. To control for this selection bias, we implement Heckman's (1976, 1979) two-step procedure and report the results in columns 3 and 4 of Table 5. Specifically, in the first stage, based on Eq. (1), we estimate a selection (Probit) model for the probability of making a bid for each firm-year. We then calculate the inverse Mills ratio for each observation. In the second stage, we include the inverse Mills ratio in the second-step equation to correct for a potential selection problem in our sample. If the inverse Mill's ratio does not carry a significant sign, then we can confirm that the selection bias does not have a significant impact on the second-stage equation for the choice of payment methods (Heckman, 1976, 1979).[17]

We observe that the bidder's stock valuation (*Tobin's Q*) has a significant and negative marginal effect in all specifications, suggesting that better investment prospects are associated with a lower likelihood of cash payments. Focusing on columns 1 and 2, we observe that the marginal effect associated with *Tobin's Q* is −0.020, which suggests that a one standard deviation (1.5) increase in the bidder's stock valuation is associated with a 3.0 percentage-point decline in the probability of the firm using cash in acquisitions. This finding is consistent with the opportunity cost of holding cash hypothesis, according to which acquiring firms with higher investment opportunities would rather not spend cash in acquisitions since they face higher opportunity costs of holding cash. It is also consistent with the first part of Hypothesis II. A thorough discussion of the other determinants of the payment method is presented in Appendix 5.

4.3.2. Financial constraints and method of payment

In order to test the second part of Hypothesis II, we next investigate whether the opportunity costs of cash holdings, as measured by the sensitivity of cash payment decisions to growth opportunities (*Tobin's Q*), is higher for firms that face higher financial constraints compared to their financially healthier counterparts. To this end, an interaction term between *Tobin's Q* and a dummy variable equal to 1 if the firm faces a high degree of financing constraints is added to Eq. (2). If the second part of Hypothesis II is satisfied, then the marginal effect on this interaction term should be negative and statistically significant.

Based on existing literature, we use five different criteria to proxy for the level of financial constraints that bidders face. The first criterion is size, whereby it is assumed that small firms usually do not have sufficient net worth and collateral values, as well as a sufficiently long track record compared with large firms. Thus, they will be more vulnerable to asymmetric information in credit markets and will face more difficulties in obtaining external financing (Gertler and Gilchrist, 1994; Beck et al., 2005; Clementi and Hopenhayn, 2006; Guariglia, 2008).

Second, following Kaplan and Zingales (1997) and Whited and Wu (2006), we construct the *KZ* and *WW* indexes to proxy for firm-specific levels of financial constraints. A firm is more likely to be financially constrained if it has a higher level of the *KZ* or *WW* index. These two indexes are described in detail in Appendix 2.

[17] As we find negative and significant coefficients on the inverse Mills ratios in Table 5, we reject the null hypothesis of independence of the second-stage equations from the selection equations, suggesting the prevalence of self-selection.

Table 5
Determinants of the method of payment taking financial constraints into consideration.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Probit	*Oprobit*	*Probit*	*Oprobit*	*Oprobit*	*Oprobit*	*Oprobit*	*Oprobit*	*Oprobit*
					Total Assets	*No. of Employees*	*KZ*	*WW*	*Dividend Paying*
Tobin	−0.020***	−0.020***	−0.015***	−0.015***	−0.001	−0.011**	−0.013***	−0.014***	−0.008*
	(0.005)	(0.004)	(0.005)	(0.005)	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)
*High_FC*Tobin*					−0.021***	−0.010*	−0.013*	−0.003	−0.020***
					(0.006)	(0.006)	(0.008)	(0.008)	(0.006)
Xcash	0.119	0.070	0.012	−0.029	−0.022	−0.024	−0.049	−0.028	−0.059
	(0.088)	(0.084)	(0.088)	(0.085)	(0.085)	(0.085)	(0.086)	(0.084)	(0.084)
CF	0.479***	0.448***	0.344***	0.319***	0.255**	0.276***	0.288***	0.308***	0.236**
	(0.113)	(0.101)	(0.113)	(0.102)	(0.103)	(0.102)	(0.105)	(0.104)	(0.104)
Leverage	0.019	0.016	−0.042	−0.041	−0.040	−0.046	−0.017	−0.036	−0.021
	(0.049)	(0.048)	(0.050)	(0.048)	(0.048)	(0.048)	(0.050)	(0.048)	(0.048)
Blockholders	0.017	0.044	0.068	0.095**	0.083*	0.091**	0.089**	0.090**	0.080*
	(0.046)	(0.042)	(0.046)	(0.043)	(0.043)	(0.043)	(0.044)	(0.044)	(0.043)
Shareholding_CEO	0.041**	0.049***	0.057***	0.064***	0.055***	0.062***	0.063***	0.062***	0.058***
	(0.016)	(0.016)	(0.017)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
SOEs	−0.007	−0.002	−0.025	−0.019	−0.018	−0.019	−0.018	−0.018	−0.018
	(0.016)	(0.015)	(0.016)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
Experienced	0.057***	0.046***	0.043***	0.033**	0.027*	0.031**	0.033**	0.032**	0.029**
	(0.015)	(0.014)	(0.015)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
Public_deals	−0.107**	−0.124***	−0.133***	−0.147***	−0.140***	−0.146***	−0.150***	−0.148***	−0.146***
	(0.049)	(0.047)	(0.048)	(0.046)	(0.045)	(0.045)	(0.045)	(0.045)	(0.045)
Size_ratio	−0.000	−0.000	0.000	−0.000	−0.000	−0.000	−0.000	−0.000	−0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Unfriendly	−0.113***	−0.105***	−0.113***	−0.105***	−0.103***	−0.108***	−0.105***	−0.105***	−0.103***
	(0.021)	(0.020)	(0.021)	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)
Diversifying	0.003	−0.001	0.008	0.004	0.006	0.005	0.004	0.004	0.005
	(0.014)	(0.013)	(0.014)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Completed	−0.112***	−0.119***	−0.110***	−0.116***	−0.116***	−0.116***	−0.116***	−0.116***	−0.114***
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Rumors	0.010	−0.004	−0.026	−0.040	−0.032	−0.038	−0.037	−0.040	−0.032
	(0.131)	(0.133)	(0.128)	(0.129)	(0.129)	(0.128)	(0.128)	(0.129)	(0.126)
Competing	−0.094***	−0.108***	−0.098***	−0.111***	−0.110***	−0.114***	−0.112***	−0.111***	−0.111***
	(0.016)	(0.015)	(0.016)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
Financial Acquirer	0.363***	0.360***	0.345***	0.342***	0.350***	0.345***	0.337***	0.340***	0.341***
	(0.070)	(0.069)	(0.074)	(0.072)	(0.068)	(0.071)	(0.071)	(0.071)	(0.071)
Financial Sponsor	−0.201***	−0.218***	−0.193***	−0.211***	−0.213***	−0.208***	−0.210***	−0.211***	−0.208***
	(0.033)	(0.033)	(0.032)	(0.032)	(0.032)	(0.032)	(0.032)	(0.032)	(0.032)
Inverse Mills Ratio			−0.241***	−0.228***	−0.185***	−0.219***	−0.226***	−0.216***	−0.213***
			(0.048)	(0.045)	(0.046)	(0.046)	(0.045)	(0.047)	(0.045)
No. obs.	3035	3043	3035	3043	3043	3030	3043	3042	3043
Pseudo R^2	0.17	0.17	0.18	0.18	0.18	0.18	0.18	0.18	0.18
chi^2	388.8	2082.7	416.8	2143.6	2006.1	2150.9	2271.0	2140.5	2359.1

Notes: the specifications in columns 1 and 3 were estimated using the pooled Probit estimator. In this case, the dependent variable is one if the deal was financed only by cash in year t + 1, and zero otherwise. The remaining specifications were estimated using the ordered Probit estimator. In this case, the dependent variable takes a value of 1 for all stock deals, 2 for mixed deals, and 3 for all cash deals, in year t + 1. In columns 5 to 9, we include an interaction term between *Tobin's Q* and a dummy variable, which is equal to 1 if the firm faces a relatively high levels of financial constraints (*High_FC*). Specifically, in columns 5 and 6, we consider a firm as financially constrained if its size (measured by total assets or number of employees) lies in the bottom three deciles of the distribution of the corresponding values of all firms belonging to the same industry in each year, and 0 otherwise. In columns 7 and 8, we consider a firm as financially constrained if its *KZ* or *WW* index falls in the top three deciles of the distribution of the corresponding values of all firms belonging to the same industry each year, and 0 otherwise. In column 9, we consider a firm as financially constrained if it is not paying dividends in a given year, and 0 otherwise. All other variables are defined in Appendix 2. The table reports marginal effects and standard errors (in parentheses). The marginal effects associated with the *Tobin* ∗ *High_FC* interaction are computed based on the difference between the average marginal effects for *Tobin* evaluated in turn at *High_FC* = 1 and *High_FC* = 0. Time, industry, and province dummies were included in all specifications. Apart from columns 1 and 2, we use Heckman's (1976, 1979) two-stage approach by introducing the *Inverse Mills Ratio* into each regression to take account of the selection bias. *Chi^2* represents the likelihood ratio chi-square test of overall significance. *, **, *** indicate significance at the 10%, 5%, and 1% level, respectively.

Third, prior literature documents that financially constrained firms tend to cut or reduce dividend payout to finance their desired investment projects or cover their debt obligations (Fazzari et al., 1988; Kaplan and Zingales, 1997; Cleary, 1999; Almeida et al., 2004; Almeida and Campello, 2007). We therefore expect firms that pay no dividends to face higher capital market imperfections.

Following this literature, we classify a firm as facing a relatively high degree of financial constraints in a given year if its size (measured by total real assets or number of employees) falls in the bottom three deciles of the distribution of the size of all firms operating in the same industry as that firm, in that given year (columns 5 and 6 of Table 5); if its *KZ* or *WW* index in that year falls in the top three deciles of the distribution of the indexes of all firms operating in the same industry as that firm, in that given year (columns 7 and 8);

and if the firm has not made any cash dividend payment in the year (column 9).[18,19] We then construct a dummy variable (*High_FC*), which is equal to 1 in a given year if the firm is likely to face a relatively high degree of financial constraints, and 0 otherwise.

The results of this test appear in columns 5 to 9 of Table 5. Ordered Probit estimates of the modified Eq. (2) are presented, whereby the dependent variable takes the value of 1 if the acquisition in year t + 1 is stock-financed, 2 if it is mixed-financed, and 3 if it is cash-financed. The inverse Mills ratio is included in all specifications to control for selection problems. Once again, we observe that *Tobin's Q* has a significant and negative marginal effect in most specifications. Furthermore, in line with the second part of Hypothesis II, we observe that the marginal effects associated with the interactions between *Tobin's Q* and *High_FC* are generally negative and statistically significant regardless of the criterion used to measure financial constraints.[20] This suggests that in the presence of a rising *Tobin's Q*, compared to their financially healthier counterparts, financially constrained bidders are more likely to save cash and use stock to pay for the acquisitions. To put our Ordered Probit results into economic perspective, based on column 5, if the bidder's *Tobin's Q* rises by one standard deviation (1.5), the implied probability of using cash as payment drops by an additional 3.1 percentage points for firms more likely to face financial constraints, relative to financially healthier firms. This finding can be explained by the opportunity cost of holding cash hypothesis, according to which financially constrained acquirers with better investment opportunities value cash more than their financially healthier counterparts (Alshwer et al., 2011). Therefore, since holding more cash gives more financial flexibility and avoids the high opportunity cost of forgoing positive net present value (NPV) projects in the future, these firms prefer to use stock to finance the deals. By contrast, firms with easier access to financial markets may not have such a strong preference for payment methods in acquisitions, since they may easily fund their current or future investments using debt or equity.

As a further test of the second part of Hypothesis II, we next provide descriptive statistics of the average proportion of cash payments for different categories of bidding firms (Table 6). Specifically, based on firms' financial conditions and *Tobin's Q*, we partition bidding firm-years into 4 sub-groups: Group 1 (financially constrained firms with low *Q*), Group 2 (financially constrained firms with high *Q*), Group 3 (financially unconstrained firms with low *Q*), and Group 4 (financially unconstrained firms with high *Q*).[21] We then compute the average proportion of cash payments (*Payment_cash*) across the four sub-samples. We observe that regardless of how financing constraints are measured, for the financially constrained group, the average percentage of cash transactions for the low *Q* group is much higher than the one for the high *Q* group. The differences in these means and medians between the two groups are always significant at the 1% level.[22]

These statistics suggest that relatively financially constrained bidders with low investment opportunities are more likely to use cash to finance their acquisitions. This finding is in line with the opportunity cost of holding cash hypothesis (Alshwer et al., 2011), according to which, especially for firms facing high investment opportunities, financial constraints increase the opportunity cost of holding cash. It also provides further support to the second part of Hypothesis II.

4.4. The valuation effects of takeovers

4.4.1. Short-run analysis

4.4.1.1. Abnormal returns for different methods of payment. In this section, we use traditional short-window event studies to investigate market reactions of acquirers' stocks across different methods of payment. Table 7 displays bidders' cumulative abnormal returns (*CARs*) within the three-day ($t = -1, +1$) and five-day ($t = -2, +2$) windows of a merger announcement over the period 1998–2015.[23] In line with Chi et al. (2011), Zhou et al. (2015), and Black et al. (2015), for all bidders (n = 2887), the cumulative abnormal returns of the acquirers over a three-day and five-day event window are statistically significant and positive, taking values of 1.85% and 2.16%, respectively. Significant and positive abnormal returns suggest that Chinese stock markets react positively to the announcements of bidding. This could be due to the fact that although acquisitions are more likely to destroy value, they may be less wasteful than investing internally in loss-making projects, especially when the acquirers have substantial cash flows and few growth opportunities.[24] Alternatively, Chi et al. (2011) attribute the positive announcement returns to the low M&A competition in China.

[18] Given the significant capital market imperfections characterizing the Chinese market, the majority of Chinese companies pay stock dividends rather than cash dividends (Lin et al., 2010).

[19] The reason why we use a relatively small (30%) threshold to classify firms as facing relatively high financial constraints is that Chinese acquirers are typically large firms and are therefore less likely to be affected by capital market imperfections. However, similar results were obtained when using 25% and 50% thresholds. For brevity, these results are not reported, but are available upon request.

[20] One exception is observed in column 8, which makes use of the *WW* index to measure the degree of financing constraints faced by firms. In this case, the marginal effect associated with the interaction is not statistically significant.

[21] We classify a firm into the high- (low-) *Q* group in a given year if its *Tobin's Q* is above (below) the median value of the *Q* of all firms operating in the same industry in that year.

[22] Additionally, we observe that regardless of how financing constraints are measured, for the high-*Q* group, the average percentage of cash transactions for the financially constrained group is much lower than the one for the financially unconstrained group, with the differences in means and medians being statistically significant at the 1% level.

[23] See Appendix 2 for details on how bidders' (cumulative) abnormal returns are constructed. When studying valuation effects, we exclude 1109 deals due to relevant trading information on the acquirer being missing. Furthermore, as an additional sensitivity test, we follow Golubov et al. (2012) and winsorize the 1% tails of the *CARs*' distribution to control for outliers. For brevity, these results are not reported, but are available upon request.

[24] A firm with limited growth prospects could benefit by taking on unanticipated investment opportunities such as M&As to reduce free cash flow problems and ease overinvestment (Smith and Kim, 1994).

Table 6
Choice of method of payment taking growth opportunities (Tobin's Q) and financial constraints into account.

Constraints criterion	*Low-Q*	*High-Q*	*Diff. Mean*	*Diff. Median*
Size (Real assets)				
High_FC	84.21%	66.01%	0.00***	0.00***
Low_FC	86.49%	84.37%	0.10*	0.10*
Diff. Mean	0.53	0.00***		
Diff.Median	0.53	0.00***		
Size (Employees)				
High_FC	86.00%	68.97%	0.00***	0.00***
Low_FC	86.36%	82.11%	0.00***	0.00***
Diff. Mean	0.87	0.00***		
Diff.Median	0.87	0.00***		
KZ				
High_FC	85.91%	74.78%	0.00***	0.00***
Low_FC	86.77%	85.30%	0.52	0.52
Diff. Mean	0.62	0.00***		
Diff.Median	0.62	0.00***		
WW				
High_FC	83.73%	73.88%	0.00***	0.00***
Low_FC	88.42%	86.39%	0.26	0.26
Diff. Mean	0.00***	0.00***		
Diff.Median	0.00***	0.00***		
Payout				
High_FC	81.12%	68.80%	0.00***	0.00***
Low_FC	89.19%	85.50%	0.00***	0.00***
Diff. Mean	0.00***	0.00***		
Diff. Median	0.00***	0.00***		

Notes: this table presents the average proportion of cash payments (*Payment_cash*) differentiating firms between *High-* and *Low-Q* groups, and high and low levels of financial constraints. A firm is considered to be in the *High-* (*Low-*) *Q* group in a given year if its *Tobin's Q* lies above (below) the median value of the *Q*s of all firms operating in its same industry in a given year. *High_FC* and *Low_FC* are dummy variables, equal to 1 respectively if the firm is more likely to face high and low financial constraints relatively to all firms operating in the same industry they belong to in a given year, and 0 otherwise. With the first two criteria, we consider a firm as financially constrained if its *size* (measured by total assets or number or employees) lies in the bottom three deciles of the distribution of the corresponding values of all firms belonging to the same industry each year. The remaining firm-years will be classified as facing a low level of financial constraints. For the *KZ* and *WW* indexes, we consider a firm as financially constrained if its *KZ* or *WW* index lies in the top three deciles of the distribution of the corresponding indexes for all firms belonging to the same industry in a given year. The remaining firm-years will be classified as facing low financial constraints. For the last criterion (*Payout*), we partition firms according to their dividend payout status. Specifically, a firm will be classified as facing low financial constraints if it is paying dividends in a given year, and as facing high financial constraints, otherwise. *Diff.Mean* and *Diff.Median* are the *p*-values associated with the *t*-test and the Wilcoxon rank-sum test for equality of means and equality of medians of the average proportion of cash payment between *High-* and *Low-Q* groups, and *High_FC* and *Low_FC* groups (medians are not reported for brevity). *, *** indicate significance at the 10% and 1% level, respectively.

When we partition bidders on the basis of their methods of payment, we see that stock bidders generate the most significant and largest abnormal returns, regardless of the event windows used (*CAR3* = 11.67%; *CAR5* = 15.13%; n = 265). Bidders with mixed payments follow (*CAR3* = 0.88%, *CAR5* = 0.57%, n = 137), and cash bidders are last (*CAR3* = 0.86%, *CAR5* = 0.87%, n = 2485). Both the

Table 7
Cumulative abnormal returns by methods of payment between January 1998 and December 2015.

	Stock only	*Mixed PYMT*	*Cash only*	*All Bidders*	*Diff.Mean*	*Diff.Median*
CAR3	11.67%***	0.88%*	0.86%***	1.85%***		
(p-value)	(0.00)	(0.08)	(0.00)	(0.00)	0.00***	0.00***
No. obs.	265	137	2485	2887		
CAR5	15.13%***	0.57%**	0.87%***	2.16%***		
(p-value)	(0.00)	(0.39)	(0.00)	(0.00)	0.00***	0.00***
No. obs.	265	137	2485	2887		

Notes: cumulative abnormal returns are calculated using the market model with parameters estimated over the period beginning 240 days and ending 41 days prior to the deal announcement for different day event windows around the announcement (day 0). *CAR3* and *CAR5* are the average cumulative abnormal returns in the 3-day (−1, +1) and 5-day (−2, +2) event windows, respectively, where 0 denotes the announcement. *Diff.Mean* and *Diff.Median* are the *p*-values associated with the *t*-test and the Wilcoxon rank-sum test for equality of means and equality of medians of the cumulative abnormal returns between cash and stock acquisitions (medians are not reported for brevity). *, **, *** indicate significance at the 10%, 5% and 1% level, respectively.

t-test and the Wilcoxon rank-sum test indicate that the differences in the mean and median *CAR*s between cash and stock acquisitions are statistically significant.

In short, the results show that the market has different perceptions of acquisitions depending on the methods of payment used. The lowest announcement returns associated with cash payments are in line with Black et al.'s (2015) findings on the Chinese economy, as well as with Hypothesis III. We attribute this to the fact that, due to the lower opportunity costs of holding cash, cash-acquiring firms are more likely to waste cash on unprofitable acquisitions. Other factors may also contribute to a negative market reaction for cash acquisitions. First, bidders have a greater probability to offer high acquisition premiums for cash transactions (Fishman, 1989). Given the high degree of information asymmetry prevalent in the Chinese stock market, cash payments are more likely to be accepted by target firms only if cash offers are attractive or exceed their true value. Second, when stock payments are used in takeover transactions, taxes are deferred until the stock is sold. However, cash payments face immediate capital gains tax implications. Thus, the tax-deferred option in stock may be valued by the market.

Fig. 1 presents a plot of the average acquirer's cumulative abnormal return (*CAAR*) for the bidding firms in the event window ($t = -30, +30$). We observe that during the event window, the *CAAR* starts to decline, and hits a trough around day −12. This is then followed by a picking up until day +4, and a slight decline between day +5 and +30. The most sizeable *CAAR* increase occurs between day −5 and +4, suggesting more significant stock price reactions around the announcement day.

Fig. 2 shows the *CAAR*s for the bidding firms in the event window ($t = -30, +30$), differentiating by method of payment. Specifically, Panels A, B and C report the average acquirer's cumulative abnormal returns for all stock deals, mixed deals and, all cash deals respectively. Panel A shows a positive price reaction for the pure stock acquisition announcement. In particular, there is a significant increase between days −2 and +5. The *CAAR* is relatively flat prior to and following this period. Panel B also shows a generally positive price reaction for the acquisition announcements with mixed payments. However, we observe that the *CAAR* starts falling after day +2, and, over the event window, it starts to drift down becoming negative in day +20. For the pure cash acquisitions in Panel C, the *CAAR* is negative 10 days before the announcement. It then starts to pick up reaching its maximum value of 1.5% on day 1. After that, during the post-announcement period between days +1 and +30, it decreases marginally. Overall, the positive reaction for the stock deals is significantly larger than that for deals financed with cash or mixed payments.

Combined, the results in Figs. 1 and 2 suggest that information about M&As starts to leak to the market before the official announcement (around day −12). In addition, the lowest *CAAR* is associated with cash payments, while the market reaction is most positive for stock announcements, which is entirely consistent with Hypothesis III and with the opportunity cost of holding cash hypothesis.[25]

4.4.1.2. Cross-sectional regression analysis of bidders' CARs. Next, we further investigate the relationship between method of payment and bidders' abnormal returns using a multivariate OLS regression analysis with heteroscedasticity-robust standard errors clustered at the firm level. Following Golubov et al. (2012) and Black et al. (2015), our baseline regression model is:

$$\begin{aligned} CAR_{i,t} = a + \sum_k b_k X_{k,i,t} = a &+ b_1 Payment\_cash_{i,t} + b_2 Q_{i,t} + b_3 Xcash_{i,t} \\ &+ b_4 CF_{i,t} + b_5 Leverage_{i,t} + b_6 Blockholders_{i,t} + b_7 Sharehoding\_CEO_{i,t} \\ &+ b_8 SOEs_{i,t} + b_9 Experience_{i,t} + b_{10} Public\_deals_{i,t} + b_{11} Size\_ratio \\ &+ b_{12} Unfriendly_{i,t} + b_{13} Diversifying_{i,t} + b_{14} Completed_{i,t} + b_{15} Rumor_{i,t} \\ &+ b_{16} Competing_{i,t} + b_{17} Financial Acquirer_{i,t} + b_{18} Finanical Sponsor_{i,t} \\ &+ b_{19} Runup\_stock_{i,t} + b_{20} Runup\_market_{i,t} + b_{21} Sigma\_stock_{i,t} + v_t + v_j + v_p + \varepsilon_{i,t} \end{aligned} \tag{3}$$

where the independent variables are bidder-, target-, deal-, and market-specific factors. The former include the payment dummy (*Payment_cash*), *Tobin's Q (Q)*, excess cash (*Xcash*), cash flow (*CF*), leverage (*Leverage*), the percentage of shares controlled by the largest shareholder (*Blockholders*), an indicator of CEO shareholding (*Shareholding_CEO*), a state ownership dummy (*SOEs*), and an indicator of experience of the bidder (*Experienced*). Target-specific factors include an indicator of the target's listing status (*Public_deals*). Deal-specific-factors include the relative size of the deal (*Size_ratio*), an indicator of acquisition attitude (*Unfriendly*), an indicator of whether the bidder's and target's industries coincide (*Diversifying*), an indicator of deal completion (*Completed*), an indicator of rumored deals (*Rumors*), an indicator of competing bids (*Competing*), an indicator of financial bidder (*Financial Acquirer*), and an indicator of any buyouts and financial sponsor involvement (*Financial Sponsor*). Lastly, market-specific factors include stock performance prior to the announcement (*Runup_stock*), market performance (*Runup_market*), and risk prior to the announcement (*Sigma_stock*). In all specifications, we also incorporate year, industry and province fixed-effects.

Table 8 presents the results of this analysis, which is based on the Heckman two-stage procedure to control for the self-selection bias. Specifically, as in Section 4.3.1, we calculate the inverse Mills ratio for each observation based on a selection (Probit) model (Eq. (1)) for the probability of making a bid. We then include the inverse Mills ratios in the OLS regressions of the bidders' *CAR*s (Eq. (3)) to correct for the potential selection problem in our sample. The dependent variable in the regression is the five-day cumulative abnormal return (*CAR5*) in columns 1 and 3, and the three-day cumulative abnormal return (*CAR3*) in columns 2 and 4, respectively.

As shown in columns 1 and 2, after controlling for various bidder-, target-, deal-, and market-specific factors, we find that the coefficient on *Payment_cash* is negative and statistically significant at the 1% level, which is in line with Hypothesis III and with the opportunity cost of holding cash hypothesis. Keeping other factors constant, the magnitude of the coefficients in columns 1 and 2

[25] If we separate deals according to the dummy *Payment_cash*, we find a significantly more positive market reaction for non-cash acquisitions compared to the ones undertaken with cash payments.

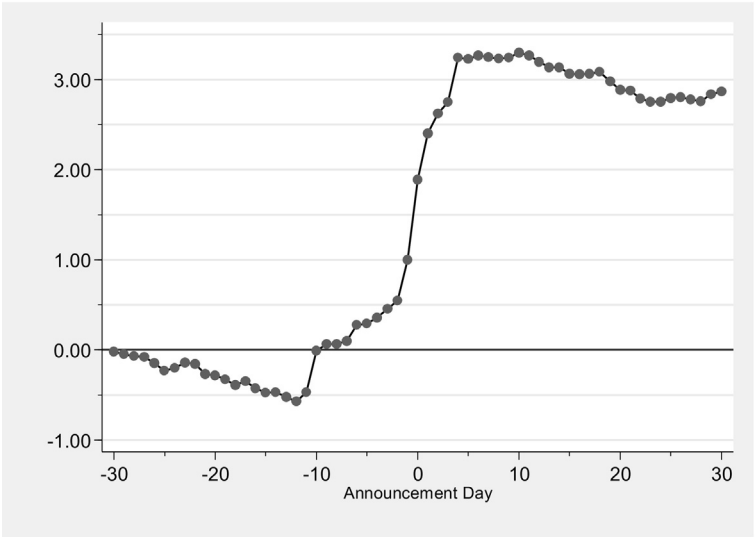

Fig. 1. Acquirers' cumulative average abnormal return (−30, +30). This figure shows the average cumulative abnormal return (*CAAR*) between January 1998 and December 2015, for the bidding firm in the (−30, +30) event window, where 0 denotes the announcement. The abnormal returns are calculated as the differences between the realized returns and the market model benchmark returns, with the parameters estimated over the period beginning 240 days and ending 41 days prior to the deal announcement.

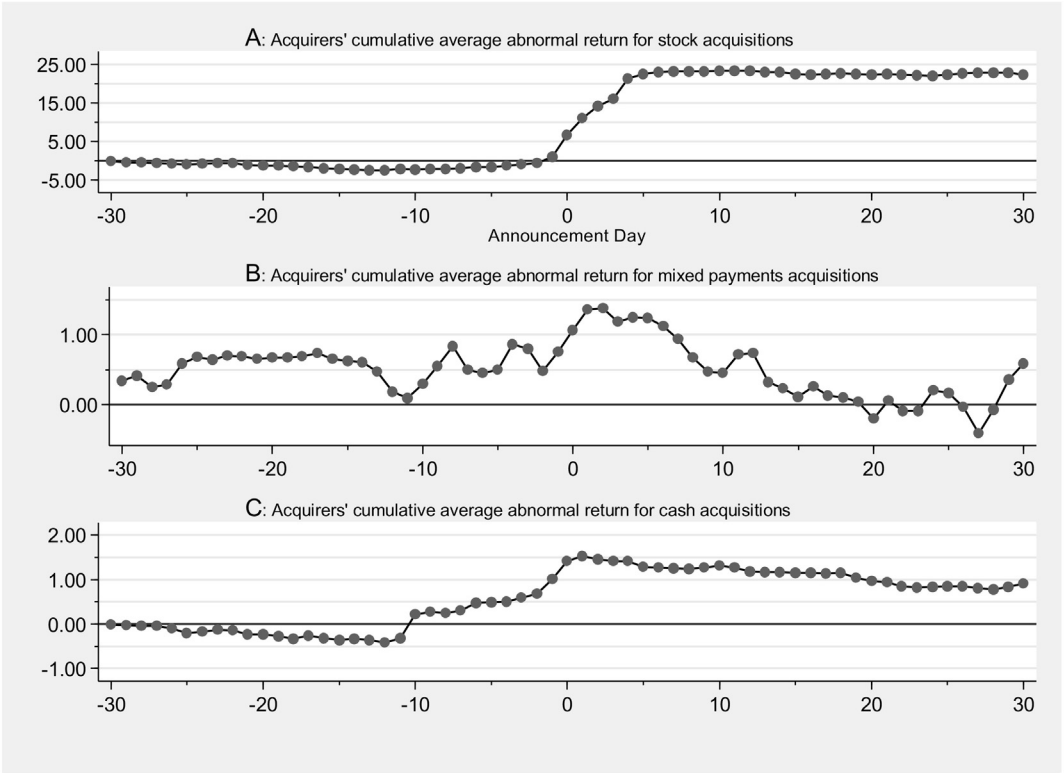

Fig. 2. Acquirers' cumulative average abnormal returns (−30, +30) differentiating across methods of payment. This figure shows the average cumulative abnormal returns (*CAARs*) between January 1998 and December 2015, for the bidding firm in the (−30, +30) event window, where 0 denotes the announcement, differentiating across methods of payment. The abnormal returns are calculated as the differences between the realized returns and the market model benchmark returns, with the parameters estimated over the period beginning 240 days and ending 41 days prior to the deal announcement. Panels A, B and C report the average acquirers' cumulative abnormal returns for all stock deals, mixed deals, and all cash deals, respectively.

Table 8
Determinants of the short-run cumulative abnormal returns of the bidders.

	(1)	(2)	(3)	(4)
	CAR5	*CAR3*	*CAR5*	*CAR3*
Payment_cash	−0.074***	−0.059***	−0.035***	−0.035***
	(0.008)	(0.006)	(0.011)	(0.008)
Tobin	0.006***	0.004**	0.017***	0.010***
	(0.002)	(0.001)	(0.003)	(0.002)
*Payment_cash *Tobin*			−0.016***	−0.010***
			(0.004)	(0.003)
Xcash	0.007	0.008	0.011	0.010
	(0.030)	(0.023)	(0.030)	(0.023)
CF	0.089**	0.076**	0.089**	0.076**
	(0.045)	(0.033)	(0.044)	(0.032)
Leverage	0.020	0.025**	0.019	0.024**
	(0.014)	(0.010)	(0.014)	(0.011)
Blockholders	0.010	0.008	0.009	0.008
	(0.014)	(0.011)	(0.014)	(0.011)
Shareholding_CEO	−0.003	−0.003	−0.003	−0.003
	(0.004)	(0.003)	(0.004)	(0.003)
SOEs	−0.009**	−0.007**	−0.008*	−0.006*
	(0.005)	(0.003)	(0.005)	(0.003)
Experienced	−0.008**	−0.005	−0.007*	−0.004
	(0.004)	(0.003)	(0.004)	(0.003)
Public_deals	0.010	0.005	0.011	0.005
	(0.019)	(0.014)	(0.019)	(0.014)
Size_ratio	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Unfriendly	0.000	−0.002	0.001	−0.002
	(0.004)	(0.003)	(0.004)	(0.003)
Diversifying	0.010***	0.005	0.010***	0.005*
	(0.004)	(0.003)	(0.004)	(0.003)
Completed	0.014***	0.010***	0.014***	0.010***
	(0.004)	(0.003)	(0.004)	(0.003)
Rumors	−0.053*	−0.030	−0.049	−0.028
	(0.029)	(0.020)	(0.033)	(0.022)
Competing	0.011*	0.007	0.010	0.006
	(0.006)	(0.005)	(0.006)	(0.005)
Financial Acquirer	−0.051**	−0.029*	−0.043**	−0.024
	(0.020)	(0.016)	(0.019)	(0.015)
Financial Sponsor	0.053***	0.032***	0.049***	0.030***
	(0.014)	(0.010)	(0.014)	(0.010)
Runup_stock	−0.036***	−0.026***	−0.034***	−0.024***
	(0.007)	(0.005)	(0.007)	(0.005)
Runup_market	0.017	0.013	0.014	0.011
	(0.011)	(0.008)	(0.010)	(0.008)
Sigma_stock	0.050	0.118	0.011	0.094
	(0.107)	(0.078)	(0.105)	(0.077)
Inverse Mills Ratio	0.016	0.014	0.019	0.016
	(0.013)	(0.010)	(0.013)	(0.010)
No. obs.	2304	2304	2304	2304
Adjusted R^2	0.19	0.18	0.21	0.19

Notes: this table presents results of the cross-sectional OLS regressions for the cumulative abnormal returns in the 3-day (columns 2 and 4) and 5-day event (columns 1 and 3) window, expressed in percentage terms. The dependent variable is cumulative abnormal returns, which are calculated using the market model with parameters estimated over the period beginning 240 days and ending 41 days prior to the deal announcement, for different day event windows around the announcement (day 0). All other variables are defined in Appendix 2. We use the Heckman's (1976, 1979) two-stage approach by introducing the *Inverse Mills Ratio* into each regression to take account of the selection bias. The *t*-statistics (in parentheses) are based on standard errors, which are asymptotically robust to heteroscedasticity. Time dummies and industry dummies were included in all specifications. *, **, *** indicate significance at the 10%, 5%, and 1% level, respectively.

suggests that the use of cash payments in acquisitions is associated with a 7.4 and 5.9 percentage-point lower *CAR5* and *CAR3*, respectively.

We also observe that the bidder's announcement returns (*CAR5* and *CAR3*) are significantly and positively associated with *Tobin's Q*. This suggests that the market reacts positively to increases in bidders' investment opportunities. In columns 3 and 4, we introduce in Eq. (3) an interaction term between *Tobin's Q* and *Payment_cash*. We observe that this additional term exhibits a negative coefficient. In column 3, the magnitude of the interaction term is −0.016, while the magnitude of the coefficient on *Tobin's Q* is 0.017. This suggests that when *Tobin's Q* rises by one standard deviation (1.5), the announcement returns (*CAR5*) will rise by 2.6 percentage points for non-cash bidders (0.017 ∗ 1.5), but only by around 0.15 percentage point [(0.017 − 0.016) ∗ 1.5] for cash bidders. This can be explained considering that cash bidders with valuable investment opportunities are likely to face a lower opportunity cost of

holding cash than the average cash bidder, as well as higher agency costs (e.g. tunneling). The negative coefficient associated with the interaction between *Tobin's Q* and *Payment_cash* also suggests that a higher *Tobin's Q* reinforces the negative association between *Payment_cash* and the *CAR*s. In other words, if bidders with valuable investment opportunities use cash to finance acquisitions, they suffer more from negative market reactions.

A thorough discussion of other determinants of bidders' *CAR*s is presented in Appendix 6. In summary, our results on abnormal announcement returns support Hypothesis III, according to which, in the Chinese context, stock bidders experience more positive reactions than cash bidders.

4.4.2. Long-run analysis

4.4.2.1. Time record of bidders' annual operating performance. In the previous section, we found that cash-paying bidders have lower abnormal announcement returns than stock-paying ones, suggesting that the market anticipates weaker future performance for the former. In order to provide greater insights into the relationship between a firm's participation in acquisitions and long-run performance, Table 9 presents the change in operating performance for bidders characterized by different methods of payment. First, following Healy et al. (1992), Harford (1999) and Linn and Switzer (2001), we use the return on assets (*ROA*) and cash flow (*CF*) to measure bidders' operating performance. According to Barber and Lyon (1996), in order to assess operating performance of corporations following major events or decisions, it is important to design a test which controls for firms with similar pre-merger performance.[26]

To this end, first, in Panels A and B of Table 9, we follow Heron and Lie (2002) and analyze bidders' operating performance relative to the median performance of firms in the same industry. Specifically, industry-adjusted operating performance (*industry-adjusted ROA*, and *industry-adjusted CF*) is constructed as the difference between a bidder's operating performance (*CF* or *ROA*) and that of the median firm in the same industry in a given year.

Second, in the spirit of Rau and Vermaelen (1998) and Harford (1999), in Panels C and D, we match sample firms to control for size and cash levels. Specifically, performance-adjusted operating performance (*performance-adjusted ROA*, and *performance-adjusted CF*) for a given bidder is constructed by subtracting the bidder's operating performance from the median performance of the firms in the same portfolio.[27] These performance-matched methods allow us to make a direct comparison between the operating performance of firms with a similar pre-event performance that engage in acquisitions and those that do not. This method therefore helps us to provide better inference about how merger deals impact bidders' operating performance.

In the columns labeled *All Bidders*, we report mean and median values of *adjusted-ROA* and *adjusted-CF* from year −2 to year +2 relative to the year of the acquisition announcement for the total sample. We observe that Chinese bidders generally experience a decrease in performance from year −1 to year +2, regardless of whether we use *adjusted-CF* or *adjusted-ROA* and regardless of whether we undertake industry or performance adjustment. *P*-values associated with both the *t*-test and the Wilcoxon rank-sum test show that, in general, these mean and median changes from year −1 to year +2 are statistically significant.

To check whether operating performance is affected by the method of payment, we next break the bidders down into three subsamples: *Stock only*, *Mixed Payment*, and *Cash only*. We find that the pre-acquisition operating performance is higher for bidders in cash-financed deals compared with those in stock-financed deals, regardless of whether we use *adjusted-ROA* or *adjusted-CF*. However, cash bidders underperform stock bidders in the post-acquisition periods.[28] It is interesting to note that only cash bidders show positive adjusted performance before acquisitions, while experiencing a decrease in adjusted performance between year −1 and year +2. For these deals, both the *t*-test and the Wilcoxon rank-sum test significantly reject the null hypothesis that the mean and median differences in adjusted performance before and after acquisitions equal zero at the 1% level. Based on the magnitude of the change in *adjusted-ROA* in Panel A, the decrease in bidders' adjusted performance between year −1 and year +2 is 0.7%, which is 7 times as high as the value of the *adjusted-ROA* in year 0 (0.1%). This figure is economically significant. These findings can be interpreted in two ways. First, good performance prior to the bid may allow bidders to accumulate substantial cash, which may enhance management discretion, as a result of which managers may then undertake low-return mergers for their private interests. Second, it is possible that due to a lack of investment opportunities, cash bidders with a better operating performance prior to the takeover face lower opportunity costs of cash holdings and tend to use M&As as a way of spending excess cash.

On the contrary, we find that there is a significant increase in bidders' adjusted performance from year −1 to year +2 for stock-financed deals. Based on the magnitude of the change in *adjusted-ROA* in Panel A, the increase in adjusted performance between year −1 and year +2 is 2.7%, which is about 1.5 times as high as the absolute value of the *adjusted-ROA* in year 0 (1.9%). This figure is also

[26] In an event study of operating performance, Barber and Lyon (1996) find that a test statistic is consistent and well specified only when sample firms are matched to appropriate benchmarks to control for abnormal firm performance prior to the event. For instance, if an industry has experienced abnormal growth in *CF* during a certain time period, it is highly likely that the sample firms in this industry experience a similar growth in *CF*. Assuming that a firm in this industry engages in an acquisition during the period, if we calculate the change of the firm's real performance due to the merger event without an appropriate benchmark (e.g. an industry benchmark), this firm would appear to have an inflated change of operating performance.

[27] Following Fama and French (1993), in each year, we partition firms into 25 portfolios on the basis of size (total assets) interacted with the cash ratio to control for abnormal firm characteristics prior to the event.

[28] The performance of mixed-payment acquisitions falls between the performance of cash and stock acquisitions: Mixed-payment bidders generally experience a decrease in performance before they take over other firms (i.e. from year −2 to year −1). This is then followed by an improvement in the post-acquisition period from year 0 to year +2.

Table 9
Changes in industry-adjusted operating performance.

Panel A: (*industry-adjusted ROA*, control group of firms based on industry)

Adjusted-ROA	*Stock Only*			*Mixed PYMT*			*Cash Only*			*All Bidders*		
Year	mean	median	No. obs.	mean	median	No. obs.	Mean	median	No. obs.	mean	median	No. obs.
Year (-2)	−0.025	−0.012	503	−0.028	−0.016	198	0.002	0.001	3092	−0.003	−0.001	3793
Year (-1)	−0.022	−0.012	500	−0.034	−0.014	201	0.002	0.001	3217	−0.003	−0.001	3918
Year (0)	−0.019	−0.008	508	−0.026	−0.011	203	0.001	0	3280	−0.003	−0.001	3991
Year (1)	−0.011	−0.003	391	−0.017	−0.007	187	−0.002	−0.001	2968	−0.004	−0.002	3546
Year (2)	0.005	−0.001	306	−0.009	−0.003	176	−0.005	−0.003	2687	−0.004	−0.003	3169
D(-1/2)	0.027	0.011		0.025	0.011		−0.007	−0.004		−0.001	−0.002	
t-test/signed-rank	0.00***	0.00***		0.00***	0.00***		0.00***	0.00***		0.05**	0.00***	

Panel B: (*industry-adjusted CF*, control group of firms based on industry)

Adjusted-CF	*Stock Only*			*Mixed PYMT*			*Cash Only*			*All Bidders*		
Year	mean	median	No. obs.	mean	median	No. obs.	Mean	median	No. obs.	mean	median	No. obs.
Year (-2)	−0.024	−0.013	500	−0.027	−0.02	197	0.002	0.002	3076	−0.003	−0.001	3773
Year (-1)	−0.021	−0.012	496	−0.033	−0.012	200	0.002	0.002	3201	−0.002	0	3897
Year (0)	−0.018	−0.01	506	−0.024	−0.011	203	0.001	0	3268	−0.003	−0.001	3977
Year(1)	−0.011	−0.003	389	−0.018	−0.011	185	−0.002	0	2962	−0.004	−0.001	3536
Year (2)	0.005	0.002	305	−0.011	−0.006	173	−0.004	−0.001	2679	−0.004	−0.001	3157
D(-1/2)	0.026	0.014		0.022	0.006		−0.006	−0.001		−0.002	−0.001	
t-test/signed-rank	0.00***	0.00***		0.00***	0.00***		0.00***	0.00***		0.03**	0.00***	

Panel C: (*performance-adjusted ROA*, control group of firms based on size and cash levels)

Adjusted-ROA	*Stock Only*			*Mixed PYMT*			*Cash Only*			*All Bidders*		
Year	mean	median	No. obs.	mean	median	No. obs.	Mean	median	No. obs.	mean	median	No. obs.
Year (-2)	−0.02	−0.008	503	−0.02	−0.009	198	0.003	0.002	3090	−0.001	0	3791
Year (-1)	−0.018	−0.009	500	−0.028	−0.01	201	0.003	0.001	3217	−0.001	0	3918
Year (0)	−0.015	−0.006	508	−0.019	−0.007	203	0.002	0	3280	−0.001	−0.001	3991
Year (1)	−0.007	−0.001	391	−0.012	−0.003	187	−0.001	0	2968	−0.002	−0.001	3546
Year (2)	0.01	0.004	306	−0.005	−0.004	176	−0.003	0	2687	−0.002	0	3169
D(-1/2)	0.019	0.013		0.023	0.006		−0.006	−0.001		−0.001	0	
t-test/signed-rank	0.00***	0.00***		0.00***	0.00***		0.00***	0.00***		0.09*	0.04**	

Panel D: (*performance-adjusted CF*, control group of firms based on size and cash levels)

Adjusted-CF	*Stock Only*			*Mixed PYMT*			*Cash Only*			*All Bidders*		
Year	mean	median	No. obs.	mean	median	No. obs.	Mean	median	No. obs.	mean	median	No. obs.
Year (-2)	−0.019	−0.01	500	−0.019	−0.013	197	0.004	0.001	3074	0	0	3771
Year (-1)	−0.017	−0.01	496	−0.027	−0.01	200	0.004	0.001	3201	−0.001	0	3897
Year (0)	−0.014	−0.009	506	−0.018	−0.007	203	0.002	0	3268	−0.001	−0.001	3977
Year (1)	−0.007	−0.001	389	−0.012	−0.005	185	−0.001	−0.001	2962	−0.002	−0.001	3536
Year (2)	0.01	0.009	305	−0.008	−0.005	173	−0.003	−0.001	2679	−0.002	−0.001	3157
D(-1/2)	0.018	0.010		0.019	0.005		−0.007	−0.002		−0.001	−0.001	
t-test/signed-rank	0.00***	0.00***		0.00***	0.00***		0.00***	0.00***		0.02**	0.00***	

Notes: this table presents annual mean and median values of adjusted return on assets (*adjusted-ROA*) in Panels A and C, and adjusted cash flow (*adjusted-CF*) in Panels B and D, from year −2 to year +2 relative to the year of acquisition. In Panels A and B, adjusted operating performance (*industry-adjusted ROA or CF*) is measured by the difference between a firm's *ROA* (*CF*) and that of the median firm in the industry in which that firm operates, in a given year. In Panels C and D, adjusted operating performance (*performance-adjusted ROA or CF*) is constructed by subtracting the benchmark performance (the median performance of the firms in the same portfolio) from the firm's operating performance in each year, where the benchmark performance is constructed as 25 portfolios on the basis of size (total assets) interacted with the cash ratio (Fama and French, 1993). D (−1/2) is the change of adjusted operating performance from year −1 to year +2. We provide the *t*-test and the Wilcoxon signed-rank test for differences in means and medians of adjusted operating performance from year −1 to year +2. *, **, *** indicate significance at the 10%, 5%, and 1% level, respectively.

economically significant. This suggests that stock acquisitions may improve bidders' operating performance. Better operating performance for stock acquisitions is in line with our previous finding of higher announcement returns.

Put together, our findings confirm the underperformance of cash deals compared with stock deals in terms of abnormal announcement returns documented in the previous section.[29]

[29] The under-performance of cash acquisitions contradicts the asymmetric information explanation proposed by most US and UK studies. According to this explanation, stock payments are preferred by overvalued bidders when purchasing target firms characterized by relative undervaluation. Furthermore, stock payments are widely interpreted as a negative signal as they shift part of the (possibly negative) future returns to the new shareholders. By contrast, when bidders have favorable private information about the high value of the target (potential synergies), they use cash to preempt potential competing bidders. Cash payments signal therefore positive information. Hence, on average, stock-financed mergers underperform cash-financed ones (Travlos, 1987; Fishman, 1989; Loughran and Anand, 1997; Andrade et al., 2001; Linn and Switzer, 2001; Abhyankar et al., 2005).

Table 10
Regressions of industry-adjusted operating performance.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Stock Only		*Mixed PYMT*		*Cash Only*		*All Bidders*	
Panel A: (*industry-adjusted ROA*, control group of firms based on industry)								
	ROA_1Y	ROA_2Y	ROA_1Y	ROA_2Y	ROA_1Y	ROA_2Y	ROA_1Y	ROA_2Y
Intercept	−0.006	0.009	−0.007	−0.002	−0.004***	−0.010***	−0.004***	−0.007***
	(0.004)	(0.007)	(0.005)	(0.008)	(0.001)	(0.002)	(0.001)	(0.002)
Pre-merger_ROA	0.238***	0.258***	0.326***	0.417***	0.382***	0.450***	0.349***	0.396***
	(0.091)	(0.093)	(0.102)	(0.083)	(0.036)	(0.032)	(0.031)	(0.029)
No. obs.	383	295	185	171	2901	2497	3469	2963
Adjusted R^2	0.05	0.09	0.12	0.18	0.13	0.17	0.12	0.15
F-value	6.93	7.67	10.26	24.98	113.44	194.70	124.99	192.83
Panel B: (*industry-adjusted CF*, control group of firms based on industry)								
	CF_1Y	CF_2Y	CF_1Y	CF_2Y	CF_1Y	CF_2Y	CF_1Y	CF_2Y
Intercept	−0.007	0.008	−0.008	−0.005	−0.003***	−0.010***	−0.004***	−0.007***
	(0.004)	(0.007)	(0.006)	(0.009)	(0.001)	(0.002)	(0.001)	(0.002)
Pre-merger_CF	0.240***	0.275***	0.325***	0.423***	0.409***	0.487***	0.371***	0.430***
	(0.091)	(0.093)	(0.103)	(0.088)	(0.036)	(0.031)	(0.031)	(0.028)
No. obs.	377	287	182	167	2881	2463	3440	2917
Adjusted R^2	0.06	0.10	0.11	0.18	0.15	0.21	0.13	0.18
F-value	6.95	8.83	9.93	23.17	131.88	247.00	144.33	239.00
Panel C: (*performance-adjusted ROA* control group of firms based on size and cash level)								
	ROA_1Y	ROA_2Y	ROA_1Y	ROA_2Y	ROA_1Y	ROA_2Y	ROA_1Y	ROA_2Y
Intercept	−0.004	0.014**	−0.004	−0.000	−0.002**	−0.007***	−0.002**	−0.004**
	(0.004)	(0.006)	(0.005)	(0.008)	(0.001)	(0.002)	(0.001)	(0.002)
Pre-merger_ROA	0.215**	0.238***	0.301***	0.376***	0.352***	0.422***	0.322***	0.373***
	(0.086)	(0.091)	(0.091)	(0.088)	(0.034)	(0.031)	(0.029)	(0.028)
No. obs.	383	295	185	171	2901	2495	3469	2961
Adjusted R^2	0.04	0.07	0.10	0.14	0.11	0.15	0.10	0.13
F-value	6.18	6.82	10.97	18.21	107.88	185.90	119.13	182.21
Panel D: (*performance-adjusted CF*, control group of firms based on size and cash level)								
	CF_1Y	CF_2Y	CF_1Y	CF_2Y	CF_1Y	CF_2Y	CF_1Y	CF_2Y
Intercept	−0.005	0.013*	−0.004	−0.003	−0.002**	−0.008***	−0.002**	−0.005***
	(0.004)	(0.007)	(0.005)	(0.009)	(0.001)	(0.002)	(0.001)	(0.002)
Pre-merger_CF	0.220**	0.246***	0.297***	0.383***	0.388***	0.461***	0.351***	0.409***
	(0.085)	(0.090)	(0.093)	(0.094)	(0.033)	(0.029)	(0.029)	(0.027)
No. obs.	377	287	182	167	2881	2461	3440	2915
Adjusted R^2	0.05	0.08	0.09	0.13	0.14	0.19	0.12	0.16
F-value	6.65	7.41	10.16	16.70	138.28	248.45	150.38	237.95

Notes: this table presents the results of an OLS regression of the effect of the pre-merger adjusted operating performance on post-merger adjusted operating performance. The dependent variable is the post-merger adjusted operating performance of the bidder in year +1 (*ROA_1Y* / *CF_1Y*) or from year +1 to year +2 (*ROA_2Y* / *CF_2Y*). Pre-merger performance is the adjusted operating performance of the bidder in year −1 (or from year −2 to year −1). In Panels A and B, adjusted operating performance (*industry-adjusted ROA or CF*) is measured by the difference between a firm's *ROA* (*CF*) and that of the median firm in the industry in which that firm operates in a given year. In Panels C and D, adjusted operating performance (*performance-adjusted ROA or CF*) is constructed by subtracting the benchmark performance (the median performance of the firms in the same portfolio) from the firm's operating performance in each year, where the benchmark performance is constructed as 25 portfolios on the basis of size (total assets) interacted with the cash ratio (Fama and French, 1993). The *t*-statistics (in parentheses) are based on standard errors, which are asymptotically robust to heteroscedasticity. *F*-value represents the *F*-test of overall significance. *, **, *** indicate significance at the 10%, 5%, and 1% level, respectively.

4.4.2.2. To what extent does bidders' industry-adjusted operating performance change from the pre- to the post-merger period?. To confirm our previous finding of a performance drop after a cash acquisition, in Table 10, we follow Harford (1999) and present estimates of OLS regressions aimed at seeing whether there is a change in operating performance of acquiring firms after mergers for deals financed in different ways. Our baseline regression model is as follows:

$$Post-merger\ Adj.ROA\ (CF) = b_0 + b_1 Pre-merger\ Adj.ROA\ (CF) + e_i \quad (4)$$

The dependent variable is the post-merger adjusted operating performance of the bidder in year +1 (columns 1, 3, 5, and 7), or from year +1 to year +2 (columns 2, 4, 6, and 8). Independent variables are the pre-merger operating performance of the bidder in year −1 (columns 1, 3, 5, and 7), or from year −2 to year −1 (columns 2, 4, 6, and 8). As in the previous section, we measure operating performance using industry-adjusted return on assets (*industry-adjusted ROA*) and industry-adjusted cash flow (*industry-adjusted CF*). The results are reported respectively in Panels A and B of Table 10. We then use performance-adjusted return on assets (*performance-adjusted ROA*) and performance-adjusted cash flow (*performance-adjusted CF*), and report the results respectively in Panels C and D. The coefficient b_1 captures the continuation of pre-merger operating performance for bidding firms.

The coefficient of interest is b_0, which captures any change in abnormal operating performance from the pre- to the post-merger period.

Focusing on all bidders, the results in columns 7 and 8 of Table 10 show that the b_0 coefficients in the regressions of both *adjusted-ROA* (Panel A) and *adjusted-CF* (Panel B), which measure the change in abnormal operating performance from the pre- to the post-merger period, are significantly negative at the 1% level. Specifically, focusing on column 8, we observe a b_0 coefficient of −0.7% in both panels, suggesting that on average, there is a significant drop in abnormal operating performance from the pre- to the post-merger period. Furthermore, when the regression is performed separately based on the methods of payment (columns 1 to 6), we observe that the coefficients b_0 are positive for stock-financed deals when post-merger adjusted operating performance is measured in a 2-years window, but still significantly negative for the cash deals regardless of how operating performance is measured.

These findings suggest that cash bidders tend to underperform in terms of operating performance from the pre- to the post-merger period. This is consistent with the opportunity cost of holding cash hypothesis, according to which bidders who use cash as a method of payment face a lower opportunity cost of holding cash, and are likely to spend their cash on value-decreasing deals.

Overall, the tests in this section support Hypothesis III, according to which cash acquirers perform significantly worse than stock acquirers both in terms of announcement returns and long-run operating performance. They also tell a consistent story that firms with more financial flexibility and lower investment opportunities are more likely to use cash payments for the acquisition and subsequently exhibit worse performance.

5. Conclusions

We investigate M&As in China during the period 1998–2015, focusing on the role of corporate liquidity. We develop a set of hypotheses to empirically test the links between firms' financial conditions and their acquisition behavior, as well as their performance following mergers. First, consistent with the free cash flow hypothesis (Jensen, 1986), we find that cash-rich firms are more likely to attempt acquisitions than their cash-poor counterparts. Acquisitions can therefore be seen as a way by which firms spend excess cash instead of paying it out to shareholders. Further, we observe that high-*Q* firms with greater operating performance (*ROA*) are less likely to attempt acquisitions, implying that good-operating firms with higher growth opportunities do not rely on external investment like M&As to spend their excess cash.

Second, we find that greater excess cash reserves lead firms that are subject to tunneling to engage in takeover activities. This suggests that Chinese firms are likely to use M&As as a channel to expropriate cash through tunneling. In other words, tunneling is likely to amplify free cash flow-driven takeovers.

Third, after controlling for all other determinants of the method of payment, we find that bidders with greater growth opportunities, reflected by higher stock valuation (Tobin's *Q*), are less likely to use cash as a method of payment. This effect is stronger for financially constrained firms. This finding is in line with the opportunity cost of holding cash hypothesis (Alshwer et al., 2011), according to which cash comes at a cost for constrained bidders, especially those with valuable growth opportunities. Hence, the higher their growth opportunities, the more reluctant are these bidders to use cash to finance acquisitions.

Finally, we observe that the low opportunity costs of cash holdings drive Chinese acquiring firms to make value-destroying cash-financed acquisitions, which leads to under-performance. Specifically, cash acquisitions underperform stock acquisitions: Cash bidders generate in fact worse announcement abnormal returns compared with stock bidders. Under-performance of cash acquisition also comes along with a significant post-merger drop in bidders' operating performance.

Our study is in line with the free cash flow motive of acquisitions, whereby managers tend to waste excess cash reserves on value-losing cash acquisitions. This effect is found to be particularly large for those firms subject to tunneling. Hence, we believe that tunneling can be a motivation behind acquisition activities in China, a country where the quality of corporate governance is weak (Allen et al., 2005). Given the relatively high financial capacity which characterizes some Chinese firms due to their high growth rates and ability to generate large amounts of internal funds (Guariglia et al., 2011), it is essential for these cash-rich firms never to rush into acquisitions (particularly cash acquisitions), but rather to find more efficient and sensible ways to use their liquid assets to pursue expansion opportunities.

Ongoing reforms should reduce the agency costs associated with acquisitions, improve corporate transparency in M&A transactions, and protect the interests of minority shareholders by increasing the intensity of monitoring by other blockholders or independent institutions, aligning the interests between managers and investors, and disclosing connected transactions (e.g. tunneling). Finally, given that cash is an important resource for firms operating in imperfect capital markets, a cautious approach on how to use it more efficiently should be promoted. A thorough evaluation of investment projects, as well as a sophisticated regulation and supervision of corporate profit distribution, and a more market-oriented allocation of resources would therefore benefit the Chinese economy.

Appendix 1. A case study about tunneling occurring through M&As

China Yangtze Power Co., Ltd. (stock code: 600900.SH) is the largest listed hydropower company in China, with main operations spanning hydropower generation and the sale of electricity. Yangtze Power is a state-owned enterprise. More than 60% of its shares in 2011 were held by its parent firm, the China Three Gorges Corporation.

On August 31st 2011, Yangtze Power announced the signing of an agreement with Three Gorges on the acquisition of the Underground Power Station (6 units with a capacity of 700 MW each). The takeover proceeded in two batches. On September 30th 2011, the company accomplished the takeover of the first batch of assets of the Underground Power Station, and on September 18th

2012, the company finished the takeover of the remaining assets, with a total payment of 11.368 billion yuan (7.636 billion and 3.732 billion RMB for the first and second purchase, respectively).

The book value of the assets of the Underground Power Station was only 7.147 billion RMB, i.e. around 62.9% of its purchasing price.[30] Moreover, based on data published by the National Audit Office on September 10th 2015, all six units of Underground Power Station had generated 4.255 billion kilowatt-hours of energy per year from its full operation in 2012 to 2014. This corresponds to a net profit of 218 million in total over the period, or to an average profit of 72.7 million per year, and even though production over those years was 21% in excess of the company's annual design generation capacity,[31] it contributed only to 0.114% of earnings per share.

In summary, due to the high purchase price (high premium) and relatively low profit generated by the acquired company, it is difficult to see how this acquisition could enhance the value of Yangtze Power. In other words, this related party deal was likely to be detrimental to minority shareholders, as it transferred benefits to the controlling shareholder (Three Gorges) through the high premium paid. For this reason, the acquisition of the Underground Power Station can be seen as an example of tunneling taking place through M&As.

Appendix 2. Definitions of the variables used

Table A1 provides definitions of the variables used in the paper.

Table A1: Variable definitions.

Variable	Definition
Blockholders	Percentage of shares owned by the largest shareholder.
CAR3, CAR5: cumulative abnormal returns	*CAR3* and *CAR5* are the cumulative abnormal returns in the 3-day $(-1, +1)$ and 5-day $(-2, +2)$ event windows, respectively, where 0 corresponds to the announcement. Cumulative abnormal returns are calculated using the market model with parameters estimated over the period beginning 240 days and ending 41 days prior to the deal announcement for different day event windows around the announcement (day 0).
Cash	Ratio of the sum of cash and cash equivalents to total assets.
Cash flow	Ratio of the sum of net profit and depreciation to total assets
Completed	Dummy variable equal to one if the transaction was completed, and zero otherwise.
Competing	Dummy variable equal to one if a third party launched an offer for the target while the original bid was pending, and zero otherwise.
DIF_Blockholders	Dummy variable equal to one if the firm's blockholder's controlling ownership exceeds its cash flow ownership in a given year, and zero otherwise.
Div_{Dum}	Dummy variable equal to one if the firm pays dividends, and zero otherwise.
Diversifying	Dummy variable equal to one if the bidder is not in the same industry as the target (measured using the bidder's and the target's first two digits of primary SIC code), and zero otherwise.
Employees	Number of employees.
Experienced	Dummy variable equal to one if the bidder has announced at least 3 takeover bids over the five-year period prior to the deal announcement, and 0 otherwise.
Financial Acquirer	Dummy variable equal to one if the bidder is buying a non-financial target company for financial reasons rather than for strategic reasons, and zero otherwise.
Financial Sponsor	Dummy variable equal to one if the deal has any buyout or financial sponsor involvement on either the buying side or the selling side, and zero otherwise.
KZ index	Following Lamont et al. (2001), the Kaplan and Zingales (*KZ*) index is a linear function of five variables. Specifically: $KZ_t = -1.002 * CF_t / K_{t-1} + 0.283 * Q_t + 3.139 * Debt_t / TK_t - 39.368 * (DIV_t / K_{t-1}) - 1.315 * Cash_t / K_{t-1}$ where t indexes time; CF_t is cash flow (net income + depreciation); Q_t is Tobin's Q; $Debt_t$ is the sum of short- and long-term debt; DIV_t is dividends; $Cash_t$ is cash and cash equivalents; K_t is capital; TK_t is total capital (sum of debt and equity). A firm with a higher value of the *KZ* index can be intended to be more financially constrained.
Leverage	Ratio of the sum of short- and long-term debt to total assets.
Market value of assets	Sum of the market value of tradable stocks, the book value of non-tradable stocks, and market value of net debt.
Method of payment: Cash Only, Mixed PYMT, Payment_cash, Stock Only	*Cash Only:* dummy variable equal to one if the payment is pure cash, and zero otherwise. *Mixed PYMT:* dummy variable equal to one if the payment is neither all-cash nor all-stock, and zero otherwise. *Payment_cash*: dummy variable equal to one if the payment is mainly cash (>50%), and zero otherwise. *Stock Only*: dummy variable equal to one if the payment is pure stock, and zero otherwise.
NWC	Ratio of net working capital (working capital minus cash holdings) to total assets.
OREC	Ratio of other receivables to total assets.
Payout	Dummy variable equal to one if the firm pays dividends in a given year, and zero otherwise.
Public_deals	Dummy variable equal to one if the target is a listed firm, and zero otherwise.
PE (price-to-earnings ratio)	Ratio of market value per share to earnings per share.
Return	Annual stock returns
Runup_stock	Cumulative daily stock price returns of the bidder over the period beginning 205 days and ending 6 days prior to the announcement date.
Runup_market	Cumulative daily Shanghai and Shenzhen value-weighted stock returns over the period beginning 205 days and ending

[30] The real value of the assets of the Underground Power Station is likely to be over-estimated. On September 30th 2011, the National Audit Office raised several issues highlighted on the audit report of the final accounts at the completion of the underground power station project. 337.9 million RMB remained unaccounted for and a large amount of construction contract projects (1.54 billion RMB) was involved in hidden accounting and corruption problems.

[31] The annual design generation capacity refers to the maximum electric output power stations can produce under specific conditions. The excess generation of 21% of the annual capacity may be due to the high runoff in the Yangtze River.

(continued)

Variable	Definition
	6 days prior to the deal announcement.
Return on assets (ROA)	Ratio of net income to total assets.
Rumors	Dummy variable equal to one if the transaction is currently (or originally began as) a rumor, and zero otherwise.
Sigma_stock	Standard deviation of the bidding firm's daily returns over the period beginning 205 days and ending 6 days prior to the announcement date.
Sales growth	Rate of growth of real sales.
Size	Natural logarithm of total assets.
Size_ratio	Ratio of transaction value divided by the bidder's market value 4 weeks prior to the announcement
Shareholding_CEO	Dummy variable equal to one if the firm's top executives (including the CEO) are holding shares in their own company, and zero otherwise.
SOEs	Dummy variable equal to one if the firm is state owned in a given year, and zero otherwise.
Tobin	Tobin's *Q:* sum of the market value of tradable stocks, the book value of non-tradable stocks, and the market value of net debt, divided by the book value of total assets.
Unfriendly	Dummy variable equal to one if the deal is not defined as friendly by Thomson Financial SDC, and zero otherwise.
Var_CF	Mean of the standard deviations of cash flow over total assets of firms in the same industry.
WW index	Derived from Whited and Wu (2006), the *WW* index is a linear function based on six financial variables. Specifically: $WW_t = -0.091 * CF_t / BA_{t-1} - 0.062 * Payout_t + 0.021 * TLTD_t / CA_{t-1} - 0.044 * LNBA_t - 0.035 * SGR_t + 0.102 * ISG_t$ where t indexes time; CF_t is cash flow (net income + depreciation); BA_t is book assets; $Payout_t$ is a dummy indicating positive dividends; $TLTD_t$ is long-term debt; CA_t is total current assets; Q_t is Tobin's *Q*; $LNBA_t$ is the natural log of the book value of assets; SGR_t is firm real sales growth; ISG_t is industry sales growth. A firm with a higher value of the *WW* index can be intended to be more financially constrained.

Notes: all variables (with the exception of dummy variables) are deflated using the GDP deflator, which is obtained from National Bureau of Statistics of China.

Appendix 3. Measure of excess cash

Excess cash (*Xcash*) is used to assess whether there is a relationship between cash-richness and acquisition decisions. Following Opler et al. (1999), excess cash is computed by subtracting the optimal level of cash holdings from the actual value of cash and cash equivalents (*Cash*). Specifically, in the OPSW model, cash holdings are assumed to be a function of *Tobin's Q* (defined as the firm's market-to-book ratio); *Firm size* (defined as the natural logarithm of the firm's total assets); *Cash flow* (defined as the ratio of the sum of net profit and depreciation to total assets); *NWC (*defined as the ratio of net working capital to total assets); *CAPEX* (defined as the ratio of capital expenditures to total assets); *Leverage* (defined as the ratio of short- and long-term debt to total assets); Div_{Dum} (a dividend payout dummy set to one if the firm pays dividends, and 0 otherwise); *Var_CF* (the mean of the standard deviations of cash flow over total assets of firms in the same industry). As ownership is likely to be important in the Chinese context, we also control for state ownership, by including a dummy variable (*SOEs*) that takes the value of 1 if the firm is state owned in a given year, and 0 otherwise. State-owned enterprises (*SOEs*) are less likely to face financial constraints. Therefore, according to the precautionary motive, one should expect *SOEs* to hold less cash than their non state-owned counterparts.

For firm i in year t and industry j, the model of cash holdings is therefore given by the following equation:

$$\begin{aligned} Cash^*_{i,t} = a + \sum\nolimits_k b_k X_{k,i,t} = a + b_1 Q_{i,t} + b_2 Size_{i,t} + b_3 CF_{i,t} + b_4 NWC_{i,t} + b_5 CAPEX_{i,t} \\ + b_6 Leverage_{i,t} + b_7 Div_{Dum_{i,t}} + b_8 Var_{CF_{j,t}} + b_9 SOEs_{i,t} + v_i + v_t + v_p + \varepsilon_{i,t} \end{aligned} \quad (5)$$

$X_{k,i,t}$ is the vector of k explanatory variables that affect the costs and benefits of cash holdings. Eq. (5) also incorporates time and provincial dummies, which account for year (v_t) and regional (v_p) fixed-effects associated with firms' cash holdings.

The regression is estimated using the fixed-effects estimator, which accounts for unobserved firm-specific heterogeneity (v_i).[32] It should be noted that because of collinearity, industry dummies cannot be included in the equations when the fixed-effects estimator is used. The fitted values of Eq. (5) can be interpreted as a proxy for the optimal level of cash holdings. We measure excess cash (*Xcash*) as the difference between the actual values of cash holdings and the fitted values derived from Eq. (5).

Appendix 4. Predicting the probability of being a bidder

In addition to the role played by excess cash holdings described in Section 4.1, the results in column 1 of Table 3 also show that the marginal effects associated with *Return*, *Tobin*, *ROA* and *Size*, have positive and significant signs, which suggests that larger firms with higher stock market returns (*Return*), higher investment opportunities (*Tobin*), and better operating performance (*ROA*) are more likely to make acquisitions. These findings are in line with Roll (1986) and Harford (1999), and support the hubris theory, according to which takeover deals can be promoted by firms' better performance and returns. Specifically, due to acquirer managers' hubris, excessive arrogance, and myopia, a higher firm profitability may lead managers with discretion to make self-interested and entrenched decisions on acquisitions, in order to diversify their personal portfolios and increase the scale and scope of operating assets in their hands (Moeller et al., 2004).

[32] The results are not reported for brevity but available upon request. We also estimated Eq. (5) separately in each year of the sample period, in order to allow the determinants of cash holdings to vary from year to year. The results remained substantially unchanged.

As for the ownership structure variables, our results provide evidence that *Shareholding_CEO* and *Blockholders* have a negative impact on the probability of being a bidder. This can be explained as follows. First, when the firm's CEO holds shares in his/her own company (*Shareholding_CEO*), this may reduce the agency costs faced by the firm since managerial ownership may help to align managers' interests with those of the firm's shareholders.[33] Thus, managers who hold shares in their own company may be less likely to make acquisitions due to personal interests. Second, a large ownership stake held by the blockholder (*Blockholders*) tends to lower the separation of voting rights and cash flow rights, which may lower the tendency of managers to engage in takeovers for tunneling reasons (Jiang et al., 2010). Moreover, a relatively large stake may give the primary owners a higher incentive to oversee or monitor the managers, alleviating therefore agency costs stemming from a conflict of interest between firm managers and shareholders (Jensen and Meckling, 1976; Ang et al., 2000). Alternatively, controlling owners with a relatively large stake might be reluctant to lose the control of their firms by engaging in acquisitions. Therefore, firms characterized by a high ownership stake of controlling shareholders may be more cautious in making investments through M&As (Amihud et al., 1990).

Appendix 5. Other determinants of the method of payment

Focusing on variables other than *Tobin's Q* and its interaction with the financing constraints dummies in Eq. (2), we observe that the marginal effect associated with the bidder's cash flow (*CF*) is positive and significant in all columns of Table 5. This is consistent with the free cash flow hypothesis (Jensen, 1986), according to which higher amounts of cash flow may increase the likelihood of cash payments in acquisitions. Next, we find significant and positive signs on the marginal effects associated with the variable (*Shareholding_CEO*) and our indicator of financial bidder (*Financial Acquirer*), suggesting that when the acquiring company's CEO holds shares in his/her own company or when the bidder is buying a non-financial target company for financial rather than for strategic reasons, cash payments are preferred. A possible explanation for the former is that the acquiring firm tends to spend cash to relieve the agency problems of free cash flow associated with CEO shareholding (Harford, 1999). Alternatively, it is possible that CEOs holding shares in their own company are unwilling to dilute their stake in the bidding firm. A possible explanation for the positive marginal effects associated with the *Financial Acquirer* variable is that the acquiring firm which engages in M&As for financial reasons is either a buyout firm, a merchant bank, a commercial bank or an investment bank. As such, they might hold more cash, which enables them, in turn, to produce the funds necessary to make a cash deal.

We also find that the probability of choosing cash payments is positively related to the dummy variable (*Experienced*), which implies that those bidders who have conducted multiple takeover deals prefer to use cash, probably due to the higher liquidity at their disposal.[34]

Turning to the deal's characteristics, consistent with Faccio and Lang (2002), Harford et al. (2009) and Karampatsas et al. (2014), we observe that the variable regarding the targets' listing status (*Public_deals*) has negative and significant marginal effects in all specifications, suggesting that in deals where unlisted targets are involved, a greater use of cash is made, while stock payments are more attractive for bidders of listed targets. This can be explained considering that private sellers should be more likely to accept cash as a method of payment due to their consumption and liquidity needs. In addition, stock acquisitions of unlisted targets with a concentrated ownership structure would dilute the dominant shareholders' stake in bidding firms, and potentially create a large rival blockholder, which could represent a corporate control threat for the bidder (Amihud et al., 1990).

The attitude indicator for the deals defined as unfriendly (*Unfriendly*) has a negative and significant marginal effect in all regression. This result is consistent with unfriendly bidder preference for cash financing to close the deal quickly, thus deterring other competing bidders and aggressive defenses against hostile takeovers (Linn and Switzer, 2001; Faccio and Masulis, 2005; Alshwer et al., 2011). Fishman (1989) documents that unlike the value of stock payments, which is contingent upon the profitability of the acquisition, a cash offer facilitates a more rapid deal completion. By contrast, stock payments will lower the speed of the takeover process due to security registration and the requirements of approval by the bidder's shareholders. Furthermore, using stock lowers the likelihood of acceptance since a stock offer is presumed to have a low value (Gilson and Black, 1986; Fishman, 1989).

Next, we find significant and negative signs on the marginal effects associated with the indicators of deal completion (*Completed*) and of competing bids (*Competing*), suggesting that completed acquisitions and the ones which involve competing bidders tend to use non-cash payments. A possible explanation may be that non-cash mergers are more likely to be associated with administrative transfers or connected transactions between one government agency and another. Under the command of the government, these non-cash deals may attract more bidders in M&A negotiations and are more likely to be completed.

We also find a negative marginal effect associated with the *Financial Sponsor* variable, which suggests that bidders with financial sponsor involvement (which include private equity- as well as venture capital-backed deals) prefer to use stocks as a method of payment. This can be explained in the light of the fact that private equity-owned companies have substantially high debt levels and therefore limited capacity to raise cash financing externally (Leslie and Oyer, 2008). Hence, they prefer to use stock as a method of payment.

[33] Alternatively, it may be the case that managers decide to forego M&As, as financing them by means of a stock swap would dilute their stake in the company by too large an extent.

[34] Due to hubris or entrenchment, multiple acquisitions may be used by management to spend excess liquidity, destroying firms' value (Billett and Qian, 2008; Black et al., 2015). The negative announcement effect for bidders who have conducted multiple takeover deals (shown in Section 4.4.1.2 and discussed in Appendix 6) confirms the hubris conjecture.

Appendix 6. Other determinants of bidders' CARs

Focusing on variables other than *Payment_Cash*, *Tobin's Q*, and their interaction in Eq. (3), Table 8 first shows a significantly positive coefficient on the bidder's cash flow (*CF*), which suggests that the market reacts more positively to mergers with high cash flow bidders.

Second, the coefficients on the dummy variables *SOEs* and *Experienced* are generally significantly negative, which suggests that state-owned acquiring firms and firms that make many acquisitions are more likely to undertake low-benefit M&A deals. The former can be explained considering that even though acquiring firms from the state sector might enjoy favorable financial and political support due to government intervention (Zhou et al., 2015), non-economic motivations (e.g. tunneling) may lead to misallocation of firms' resources. Consistent with Billett and Qian (2008) and Black et al. (2015), the latter can be explained by the fact that hubris and over-confidence developed from past acquisitions may lead to value-losing deals.

Third, the announcement returns increase with the higher relative size of the deal. This is consistent with findings reported for Chinese listed firms by Zhou et al. (2015) and Black et al. (2015), and for US firms by Asquith et al. (1983) and Moeller et al. (2004). It may be explained considering that the larger the size of the deal, the more significant the addition to the bidder's value (Asquith et al., 1983). Yet, the coefficients associated with *Size_ratio* are virtually 0.

Fourth, we find that the gain to acquirers is positively associated with diversifying deals (*Diversifying*). This is in line with recent research according to which diversification may be related to higher firm value (Campa and Kedia, 2002; Villalonga, 2004), as firms may choose to diversify to move away from industries with relatively low growth prospects.

Fifth, both the indicators of rumored deals (*Rumors*) and of financial bidder (*Financial Acquirer*) are negatively and significantly associated with abnormal returns.[35] The former is in line with recent findings according to which rumors may significantly impact merger outcomes and post-acquisition performance, among other things (Alperovych et al., 2016; Cumming et al., 2016). Given the fact that rumors can destroy the deal value (Alperovych et al., 2016), markets respond negatively to a takeover rumor. The latter suggests that financially motivated M&As might achieve fewer synergies than strategically motivated ones.

Sixth, the indicators of deal completion (*Completed*) and of competing bids (*Competing*) are positively and significantly associated with the bidder's returns.[36] The former suggests that failure to complete carries costs.[37] The latter might be due to the fact that the occurrence of competing bids conveys positive information and thus leads to positive abnormal announcement returns.

Seventh, we find that the *Financial Sponsor* dummy is positively related with bidders' announcement *CARs*. This can be explained considering that experienced financial sponsors are able to identify and structure deals so as to achieve greater synergies.

Lastly, in line with Rosen (2006) and Golubov et al. (2012), the stock price run-up of acquiring firms (*Runup_stock*) is negatively associated with abnormal returns. This may be due to hubris: Recent success may lead to incorrect business decision making, as managers affected by hubris may think they have better information about the target value than the market, and believe that the deal can create value in the long run. Therefore, these managers may tend to offer excessively high premiums for the targets. The market may perceive this situation, which may cause a reverse reaction to the pre-merger performance.

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[35] The coefficient associated with *Rumors* is only statistically significant in column 1, while that associated with *Financial Acquirer* is significant in all columns except the last.

[36] The coefficient associated with *Competing* is only statistically significant in column 1, while that associated with *Completed* is significant in all columns.

[37] This finding is consistent with the market-timing theory. In line with this finding, comparing abnormal returns between unsuccessful and successful stock bidders, Savor and Lu (2009) find that successful stock bidders significantly outperform unsuccessful ones. The authors explain that successful stock-financed mergers benefit long-term shareholders. By contrast, unsuccessful stock-financed mergers continue performing poorly even after the announcements of a bid termination, particularly for richly priced stock bidders. The difference in abnormal returns between unsuccessful and successful stock bidders captures the market-timing benefits between the market and fundamental value of their equity. It should be noted, however, that although our finding of a positive association between the *Completed* variable and the *CARs* supports the market-timing theory, most of the other evidence described in this paper does not support it.

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