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Bidder cash reserve effect under the precautionary motive: Evidence from UK

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Bidder Cash Reserve Effect under the Precautionary Motive: Evidence from UK

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Keywords

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JEL Classification

G34, D82

Abstract

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Cash-rich bidders in UK have better announcement abnormal returns than cash-poor ones during 1984–2007, contrasting findings in the US. The positive cash reserve effect is from bidders of high long-run growth and those with nontrivial institutional holdings. Cash-richer bidders also have better post-acquisition operating performance when their long-term growth is high and institutional holdings nontrivial. We argue that the precautionary motive drives UK bidders' announcement cash reserve effects. Specifically, cash reserves facilitate bidder post-acquisition growth and cushion adverse cash-flow shocks. Our results meanwhile suggest strong shareholder power is necessary to ensure cash reserved for shareholders' interests.

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Introduction

Previous literature documents that, in the US, bidders with high cash reserves (cash-rich) have lower announcement abnormal returns than those with low cash reserves (cash-poor) (Lang, Stulz, and Walkling, 1991; Harford, 1999; Schlingemann, 2004). Strong managerial power and potential agency cost of free cash flow (Jensen, 1986) lead the market to respond negatively to acquisitions announced by cash-rich bidders.

Nonetheless, economic theory does not always predict a negative bidder cash reserve effect. The precautionary motive of cash reserve suggests that cash-rich bidders have better announcement returns. According to the precautionary motive, cash reserve is valuable when external funds are more expensive than internal funds and internal funds are insufficient to finance all value-increasing investments. External funds are expensive either because there are agency costs (Myers, 1977; Jensen and Meckling, 1986), because market is uncertainty about the value of a company's asset in place (Myers and Majluf, 1984), or because there is great uncertainty in a company's future cash flow (Brusco, Lopomo, Robinson and Viswanathan, 2007; Rhodes-Kropf and Viswanathan, 2004). When external funds are expensive, a value-enhancing investment may appear to be value-destroying for old shareholders. This leads to underinvestment, reducing company value ex ante. Cash reserve provides financial slack and enables a company to take value-enhancing projects without relying on expensive external funds, which increases company value ex ante.¹ Cash reserve is most valuable when a company has high expected future growth (Kamien and Schwartz,

¹ Another type of financial slack is unused risk-free debt capacity (Myers and Majluf, 1984), which is difficult to measure. In this paper, our focus is on corporate cash reserve.

1978; Opler, Pinkowitz, Stulz, and Williamson, 1999; Almida, Compello, and Weisbach, 2004; Ozkan and Ozkan, 2004; Khurana, Martin, and Pereira, 2006) or high volatility of future cash flow (Opler et al., 1999; Han and Qiu, 2007; Bates, Kahle, and Stulz, 2009; Gryglewicz, 2011). Further, Opler et al. (1999) and Lins, Servaes, and Tufano (2010) maintain that cash reserve also add value by cushioning adverse cash flow shocks.

The precautionary motive is particularly relevant in acquisitions, where growth opportunities and cash flow uncertainties (including adverse cash flow shocks) arise from the combination of business. We argue that, under the precautionary motive, cash-rich bidders have better announcement returns for two reasons i) high cash reserves enable bidders to capture growth opportunities arising from acquisitions and cushion adverse cash flow shocks and ii) high cash reserves mean managers' perceive high future growth opportunities and, according to the Q theory, companies of high growth are more likely to make acquisitions that have better synergies (Lang, Stulz, and Walkling, 1989; Servaes, 1991; Martin, 1996; and Jovanovic and Rousseau, 2002; Dong, Hirshleifer, Richardson and Teoh, 2006).² In other words, bidder cash reserve should have a positive effect on bidder announcement returns under the precautionary motive. Previous studies almost exclusively focus on the US market which is characterised by strong managerial power, weak shareholder rights and passive institutional investors (Black and Coffee, 1994; Bebchuk and Fried, 2003; Babchuk, 2005). Where managerial power dominates shareholder rights, the agency theory (Jensen, 1986) predicts a negative cash reserve effect on bidder announcement returns. Nevertheless, we are aware of no study that examines bidder cash reserve effects where managerial power is weak

² The perception of managers may or may not be shared by the market. Therefore, cash reserve may contain information not yet incorporated into market price.

relative to shareholders rights. In such a context, we expect the precautionary motive to manifest itself through a positive relation between bidder cash reserve and bidder announcement returns.

The UK market offers a well balanced venue for us to study this issue and fill the gap in the literature. In the UK, managerial power is much weaker than that in the US. At the same time, since both markets have similar legal origin, level of financial market development and dispersed ownership, omitted factors are unlikely to affect the divergence in cash reserve effects. In section II.B, we describe the UK institutional and cultural backgrounds that give shareholders stronger power. Strong shareholder power in UK can be well illustrated in two important facts that are vastly different from those in the US. First, UK institutional investors are historically and contemporaneously more active in intervening in company decisions than their US counterparts. UK legislation and regulation impose much less restrictions on shareholders (both institutional and individual shareholders) to influence board decisions (Black and Coffee, 1994; Bebchuk, 2005). Importantly, shareholders are allowed to replace all managers with majority votes by calling for a special purpose meeting at any time of a year. But this is not true in the US. Further, UK institutional investors are closely located in the City of London, which allows them to take joint actions quickly, effectively, and at low costs (Black and Coffee, 1994; Crespi and Renneboog, 2010). The threat of joint actions enables institutional shareholders to influence company decisions even at low levels of shareholding. This is because bad information spread quickly among actual and potential institutional shareholders, and a board is reluctant to ignore this fact. Institutional shareholders also have incentive to monitor even at lower level of ownership, because

building the reputation of being a tough monitor is a cost-efficient way to deter self-dealing of management. The deterring effect is especially important for institutional shareholders whose attention is a scarce resource. Black and Coffee (1994) provides a comprehensive and in depth discussion of UK institutional shareholders' tradition of actively engaging companies. Bebchuk (2005) argues that, following the UK model, a substantial improvement in shareholder power is necessary for the US. Black and Coffee (1994) point out that most of the interventions by UK institutional shareholders are conducted privately. Becht, Franks, Mayer, and Rossi (2010) find that the UK Focus Fund of Hermes (Hermes is a fund manager owned by the British Telecom Pension Scheme) exercises its shareholder activism predominantly through private interventions. Therefore, previous studies that purely rely on public information do not always observe institutional interventions. Second, incumbent management has little power in takeover decisions. UK managers are under greater threat of hostile takeovers. Anti-takeover provisions like poison pills are prohibited and the management is not permitted to take any action blocking an offer without shareholders' consent (Armour and Skeel, 2007). The weak managerial power in takeover is highlighted by the recent takeover of Cadbury by Kraft. Cadbury, the British confectionary company, was taken over in 2009 by Kraft Foods in a \$16.7 billion hostile bid. An article in the New York Times commented "...If the takeover battle were happening in the United States, it would most likely be a fierce fight...The potential for a CEO or entrenched board to block a deal — or otherwise act in its own self-interest — is virtually nil. In other words, England is as close as any country gets to a true shareholder democracy. Any bid gets put to a vote, and all the board can do is offer an opinion — November 17, 2009, New York Times". In this study, we argue that strong shareholder power in UK ensures that cash can be reserved within the

company only when the management manages to convince shareholders that it is done in shareholders' interests (the precautionary motive).

In our empirical analysis, we follow previous literature and use excess cash reserve ratio to measure a company's cash richness. Of two companies with the same level of actual cash reserve ratio (i.e. the sum of cash and short-term investment divided by total assets), one can be cash-rich but the other cash-poor, depending on their respective cash demand. A company's required cash reserve ratio is estimated using a pooled time-series cross-sectional OLS regression with year dummies, following Opler et al. (1999). The difference between the actual cash reserve ratio and the required level is the excess cash reserve ratio.³

We document three sets of evidence consistent with the precautionary motive. Our first set of results show that bidder cumulative abnormal return (*CAR*) at deal announcement is higher for bidders of more excess cash reserve. A one-standard-deviation increase in an average bidder's excess cash reserve ratio relates to an increase of 0.832% in bidder announcement *CAR*. This positive cash reserve effect contrasts the negative effects documented in the US (Lang et al. 1991; Schlingemann, 2004; Harford 1999). It is consistent with the argument based on the precautionary motive that i) high cash reserves facilitate bidder growth post acquisition and cushion adverse cash-flow shocks and ii) high cash reserves means managers perceive high future growth and high-growth companies are more likely to make acquisitions with better synergies. One possible issue is that company characteristics drive both bidder cash reserve and bidder announcement returns (a self-selection problem). We then follow Heckman (1979) and control for the inverse mills ratio estimated from a Probit model of

³ Section III.A. provides a detailed description of the procedure. We also use alternative measures of excess cash reserve and our results broadly persist.

predicting bidders (based on panel data) in our regression analysis. The inverse mills ratio is not significant in any of our regressions, meaning there are no self-selection concerns. We further distinguish between the bidders anticipated by the market (predicted bidders) and those unanticipated (unpredicted bidders), and find that the positive cash reserve effect is mainly from unpredicted bidders. Because stock price movement only reflects unanticipated news, the positive cash reserve effects vanishes for predicted bidders.⁴ To further understand the association between growth and the positive cash reserve effect, we examine whether the positive cash reserve effect is indeed stronger for high-growth bidders. To measure growth, we decompose the market-to-book ratio of equity following Rhodes-Kropf, Robinson and Viswanathan (RKV) (2005). The market-to-book ratio per se is an ambiguous measure of growth because it also reflects misvaluation (Lee, Mayers and Swaminathan, 1999; Rhodes-Kropf and Viswanathan, 2004; Rhodes-Kropf et al. 2005; Dong et al. 2006). Decomposing allows us to isolate a component that is purely growth (the long-run growth component) from the other two parts that capture both growth and misvaluation (a transitory sector-specific component, and a transitory firm-specific component).⁵ The decomposition offers yet another benefit. Growth opportunities arise in various ways. Some opportunities are long-lasting, for example a good management team generates sustained returns that are higher than justified by risk, a patent guarantees a sustained firm-specific abnormal profit over a few decades, and a high sector entry requirement protects the abnormal returns of all companies in an industry. Other growth opportunities are short-lived. For example, a new product that can be easily mimicked by competitors provides a transitory firm-specific growth opportunity, and a

⁴ See Dasgupta, Gan, and Gao (2010) for a similar notion of price reaction to unanticipated news.

⁵ Section III.B. provides a more detailed description of the decompositions. This procedure per se is still imperfect in that it cannot entirely separate misvaluation from growth. However, we are not aware of a method that gives a better decomposition.

temporary cut of government spending on railroad provides a transitory growth opportunity for the automobile sector. It is therefore meaningful to understand what kind of growth opportunities underlies the positive cash reserve effect. Decomposing market-to-book ratios sheds lights on this question. We find that the positive cash reserve effect is mainly from bidders of high long-run growth. The positive effects of cash reserve do not change according to the level of the transitory firm-specific component or transitory sector-specific component.⁶

Our second set of results show that the presence of nontrivial (i.e. 3% or more) institutional shareholding substantially strengthens the positive cash reserve effect. When bidders' total institutional holding is no less than 3%, a one-standard-deviation increase in a bidder's excess cash reserve increases the announcement *CAR* by 2.885%. The result does not change when we define being nontrivial using 5%. Black and Coffee (1994) maintain that UK insurance companies are the most active institutional shareholders in terms of company intervention due to the long-term nature of their investments and substantial shareholding. Indeed, we find that the positive cash reserve effects is most prominent for bidders with nontrivial insurance-company shareholdings. A one-standard-deviation increase in an average bidder's excess cash reserve ratio increases announcement *CAR* by 4.471%, when insurance companies hold at least 3%.

Our last set of results is based on bidders' post-acquisition operating performance. In the first 3 years after acquisitions, when bidders have both high long-run growth and high excess

⁶ It is difficult to draw solid conclusions from the result that cash reserve effect is not different for bidders with high transitory firm-specific or high transitory sector-specific components. This is because the firm-specific and sector-specific component measure both growth and misevaluation. If a company is overvalued, higher cash reserve may lead to lower bidder announcement *CAR* due to revaluation (see Gao, 2011).

cash reserve, operating performance is 3.8% higher than otherwise. Moreover, when institutional investors (insurance companies) hold nontrivial (at least 3%) shares, a cash-rich bidder operationally outperforms other bidders by 4.2% (4.2%). Growth opportunities manifest themselves through operating performance in the long run post acquisitions. Our last findings further confirm that cash reserves enable bidders to capture growth opportunities arising from acquisitions. They also suggest that the presence of nontrivial institutional investors is important to ensure cash reserved in shareholders' interests.

Our study makes two contributions. First, we document evidence for the argument that the precautionary motive of cash reserve is a driving force underlying bidder cash reserve effects. We find cash reserve is positively related to bidder announcement returns, contrasting findings in the US. We argue that cash reserves enable bidders to capture growth opportunities and cushion adverse shocks that arise from acquisitions. Our findings strongly suggest that the agency theory cannot explain cash reserve effects in all scenarios of acquisitions. In fact, any study that intends to interpret cash reserve effects without considering the precautionary motive is incomplete. The precautionary motive of cash reserve has solid theoretical foundation. However, it has been ignored in previous studies examining bidder cash reserve effects. Our study fills this gap. Second, there is a substantial literature in legal studies that examine strong shareholder power in UK, which contrast sharply to the weak shareholder rights in the US (Black, 1990; Black and Coffee, 1984; Bebchuk, 2005; Armour and Skeel, 2007). However, little has been done to provide large-sample evidence that strong shareholder power indeed add value for UK shareholders. Our study is among the

first to provide systematic analysis on this edge. It offers useful background for those who advocate giving more power to shareholders.

The rest of our paper proceeds as follows. Section II reviews related literature and UK institutional and cultural background in order to provide more context and motivation for this study; Section III explains methodology; section IV describes sample and data; and section V reports empirical results. Section VI concludes.

II. Literature review

II.A. The precautionary motive and bidder cash reserve effects

The theoretical foundation of the precautionary motive for cash reserve can be traced back to early studies. According to Keynes (1936), a firm can reserve cash to hedge the risk of future cash shortfalls. Later studies show that adverse selection in the equity markets (Myers and Majluf, 1984) and the agency cost of debt (Myers, 1977; Jensen and Meckling, 1976) increase the cost of external capital and make companies financially constrained. Financially constrained companies bypass value-enhancing investment opportunities, reducing company value *ex ante*. Cash reserves enable companies to invest in value-enhancing projects that would be value-decreasing to incumbent shareholders under external financing. A high-growth company, therefore, prefers to reserve more cash than a low-growth one does (Kamien and Schwartz, 1978; Opler et al., 1999; Almaida et al., 2004; Ozkan and Ozkan, 2004; Khurana et al., 2006). Moreover, the value of high cash reserve increases with the risk of a company's cash flow (Opler et al., 1999; Han and Qiu, 2007; Bates et al., 2009;

Gryglewicz, 2011).⁷ Indeed, Opler et al. (1999) find that companies from industries that have higher cash flow volatility hold more cash, and Bates et al. (2009) find that cash ratios more than doubled from 1980 to 2006 because company cash flows became riskier. Finally, Opler et al. (1999) and Lins, Servaes, and Tufano (2010) maintain that cash reserve add value by cushioning adverse cash flow shocks.

Previous studies based on the US market, however, find bidder cash reserve has a negative effect on bidder announcement returns (Lang et al., 1991; Schlingemann, 2004; and Harford, 1999). Their results are reasonably interpreted in the framework of Jensen's (1986) agency costs of free cash flow.⁸ Specifically, when a company exhausts value-enhancing projects, self-serving managers prefer to invest cash in value-destroying investments. Related, Morck, Shleifer and Vishney (1990) find that acquisitions are driven by managerial motives. Maloney and Mitchell (1993) argue that debt mitigates agency costs of free cash flow by enforcing periodical cash distribution and they find bidders of higher leverage have better announcement abnormal returns.

In reality, the precautionary motive and the agency theory are not mutually exclusive. When managerial power is less constrained, the agency theory prevails. This is the case in the US. US managers have strong power in various aspects of corporate decisions including distribution to shareholders, changing corporate charters, merger and acquisitions, and setting their own compensation (Berle and Means, 1932; Bebchuk and Fried, 2003; Bebchuk, 2005). Shareholder power in the US is weak relative to managerial power, which leads Bebchuk

⁷ Here, cash flows are generated from both assets in place (Myers and Majluf, 1984) and future investments (Brusco et al., 2007; Rhodes-Kropf and Viswanathan, 2004).

⁸ Excess cash reserve can be treated as accumulated free cash flow.

(2005) to comment that US is the regime that stands out among developed countries in how far it goes to restrict shareholder initiating and intervening in corporate decisions. It is, therefore, not surprising that previous studies based on the US find evidences consistent with the agency theory.

On the contrary, we expect to find evidence for the precautionary motive in an environment where shareholders have strong power initiating and intervening in company decisions. The UK market offers a well balanced ground for our analysis. In the next subsection, we summarize the UK institutional and cultural background.

II.B. Shareholder power in the UK

Our description of the UK institutional background is summary. More detailed accounts of the differences in shareholder power between UK and the US can be found in Black and Coffee (1994), Bebchuk (2005) and Armour and Skeel (2007).

The statutory and regulatory institution of UK provides shareholders with more power than its US counterpart does. At the conceptual level, US corporations can be regarded as a “representative democracy” where the members of the polity can only act through their representatives.⁹ In UK, however, people do not view the corporation as “purely representative” (Bebchuk, 2005). Appendix I summarizes the main differences between UK and US company laws and regulations. First of all, UK shareholders can initiate the change of basic governance arrangement by initiating to change the company constitutional documents. In the US, however, only the management can initiate such change and shareholders only

⁹ For the US company act, we focus on the Delaware Code under which most US public companies are incorporated.

have veto power. In UK, shareholder(s) of 10% or more of the paid-up voting capital can requisition an Extraordinary General Meeting (EGM). The company's constitutional document cannot deprive shareholders of these rights. In the US however, company bylaws can deprive shareholders of such rights. UK shareholders also have more power making proposals in shareholder meetings than their US counter parts. Second, cumulative voting is the default arrangement in UK while plurality voting is the default for US corporations. Under cumulative voting, voters are allowed to concentrate their voting on fewer candidates than seats and a candidate is elected if she receives majority votes. Such arrangements allow small shareholders to elect director(s) representing their interests. Third, management tenure in UK is less secured than in the US. UK shareholders can always remove directors with majority votes in a special meeting called for such purposes. In the US, however, the removal of directors usually requires shareholders' unanimous consent. Although both sides allow staggered board, staggered boards in UK are essentially ineffective because shareholders can always remove directors by ordinary resolution. Fourth, managements have little power in takeover decisions in UK, contrasting the situation in the US. UK managers are under greater threat of hostile takeover because the UK Takeover Code prevents managers from blocking takeover bids without shareholder consent (no such restriction in the US). Embedded defences, such as poison pills and issuance of dual-class voting shares, are largely prevented in the UK (Armour and Skeel, 2007). Weak managerial power in takeover decisions is exemplified by the Kraft's takeover of Cadbury. In 2009, Cadbury, the British confectionary company, was taken over by Kraft Foods in a \$16.7 billion hostile bid. Despite the objection of management, the deal went through without much hassle. An article in the New York Times commented "...If the takeover battle were happening in the United States, it would

most likely be a fierce fight... The potential for a CEO or entrenched board to block a deal — or otherwise act in its own self-interest — is virtually nil. In other words, England is as close as any country gets to a true shareholder democracy. Any bid gets put to a vote, and all the board can do is offer an opinion — November 17, 2009, New York Times”. Last, in terms of distribution decisions (either in cash or in kinds), US corporate law treats it as part of the ordinary business to be delegated entirely to management. However, in the UK, such decision is subject to the directions given by special shareholders resolutions.

Apart from statutory and regulatory institutions, the expectation of oversight is embedded in British culture (Black and Coffee, 1994). UK managers thus may have never had the sustained opportunity to become entrenched.

Strong shareholder power in UK is well illustrated by institutional shareholders’ active intervention in company decisions. Black and Coffee (1994) maintain that UK institutions are significantly more active intervening than their US counterparts.¹⁰ Florence (1961) and Scott (1986) point out that shareholder intervention is more intensified in UK than in the US. Short and Keasey (1999) find UK management need to hold more shares to entrench themselves, suggesting UK institutional shareholders are more able to co-ordinate their intervention. Becht et al., (2010) find that Hermes, the fund manager owned by British Telecom Pension Scheme, actively engage with company managements targeted through its

¹⁰ Black and Coffee (1994) argue that UK insurers are the most active institutions, due to their substantial shareholding and long investment horizon. Some insurance companies hold regular review and consulting sessions with portfolio companies. For example, Prudential usually meet its portfolio companies twice a year. Another example is M&G, an asset management company acquired by Prudential in 1999. One of its core principles is that it focuses on investing in companies rather than chasing share prices. Given the importance of insurance companies, we, apart from examining the influence of entire institutional holding, also specifically examine the influence of insurance companies on cash reserve effect.

UK Focus Fund. They also find engagements are predominantly through private interventions, and the fund outperforms benchmarks.

Financial institutions are less regulated in UK than in the US (Black and Coffee, 1994; Roe, 1994; Armour and Skeel, 2007). For example, in the past, UK had no counterpart to the Glass-Steagall Act or to US restrictions on the size and power of banks. Nor does UK have the history of limiting stock ownership of insurance companies or regulating collective shareholder action (Black and Coffee, 1994). In fact, the UK regulatory authority encourages institutional intervention. For example, the Cadbury Report of 1992, which recommends arrangements of company boards to mitigate corporate governance risks, notes that “because of their collective stake, we look to the institutions in particular, with the backing of Institutional Shareholders’ Committee, to use their influence as owners to ensure that the companies in which they have invested comply with the Code” (section 6.16). Moreover, joint action is less costly and faster for UK institutional shareholders. Most financial institutions are based in the “City”, the one-square-mile district where London’s business community is located. Legal barriers for collective action are also considerably lower.

Overall, strong shareholder power urges UK managers to act in shareholders’ interests. The management usually take shareholder interests seriously, with the understanding that they are less insulated from internal (e.g. special resolution to remove managers) and external (e.g. takeover) discipline.¹¹ We expect strong shareholder power in the UK mitigates the problems of empire building and free cash flow. In other words,

¹¹ Previous studies find that stronger protection from takeover threats leads to managerial slack (Bertrand and Mullainathan, 1999; Garvey and Hanka, 1999), poor company performance (Gompers et al., 2003), more empire building (Gompers et al., 2003), and greater compensation and consumption of private benefits (Borokhovich et al., 1997; Bertrand and Mullainathan, 1998).

managers cannot reserve cash easily without convincing shareholders that it is in shareholders' interests.

III. Methodology

III.A. Measuring excess cash reserve

We follow previous literature and use excess cash reserve ratio to measure a company's cash richness. Of two companies having the same actual cash reserve ratio (i.e. the sum of cash and short-term investment divided by total assets), one can be cash-rich but the other cash-poor, depending on their respective cash demand. We estimate a firm's required level of cash reserve following Opler et al. (1999). In particular, we estimate the required cash reserve using a pooled time series cross-sectional OLS regression with year dummies (model 2 in table IV of Opler et al., 1999, p25). The sample used for estimation includes all Datastream firm-years from 1984 through 2007, subject to data availability. The regression specification is as follows:

$$\begin{aligned} \text{Cash Reserve Ratio}_{it} = & \beta_1 MTB_{it} + \beta_2 SIZE_{it} + \beta_3 CFAST_{it} + \beta_4 NWCAST_{it} \\ & + \beta_5 CAPEXAST_{it} + \beta_6 LEV_{it} + \beta_7 R \& D_{it} + \gamma YDUM_t + \varepsilon_{it} \end{aligned} \quad (1)$$

where i and t index firms and years respectively. *Cash reserve ratio* is cash and short-term investments over total assets. *MTB* is market-to-book ratio of assets. *SIZE* is the logarithm of total assets in millions of 1994 pound. *CFAST* is income before depreciation and amortization over book value of assets. *NWCAST* is net working capital over book value of assets. *CAPEXAST* is capital expenditure over book value of assets. *LEV* is total debt over total

assets. $R\&D$ is expenditure on research and development normalized by net sales. $YDUM$ are year dummies. The residual of Equation (1) is a measure of excess cash reserve ratio. We also estimate equation (1) by industry. Our results are qualitatively the same. According to Dittmar and Mahrt-Smith (2007) and Fresard and Salva (2010), market-to-book ratio can be affected by cash reserve. We therefore also use sale growth in the past three years as an instrument for market-to-book ratio and re-estimate equation (1). Past sales growth is clearly exogenous because it is hard to argue that current cash reserve affects past sales growth. We obtain broadly the same results using this alternative specification.

For robustness, we also construct excess cash reserve ratio using the approach of Deangelo, Deangelo, and Stulz (2010) (footnote 5 on page 287). Specifically, we first sort all non-financial firms that meet our sampling criteria in each year into three equal-sized groups based on total assets and three equal-sized groups based on market-to-book ratio of assets. In each year, a bidder is allocated to one of these nine groups based on its size and market-to-book ratio. Within each group, the required cash reserve ratio is the median ratio among all firms in the same 2-digit SIC industry. Our results are broadly the same using this alternative measure.

III.B. Decomposing Market-to-book ratio

Growth opportunities are of various natures, as is discussed in the introduction. Some opportunities are persistent, while others are transitory. Some are due to industrial factors and are available to all companies in an industry, while others are firm-specific. Therefore, it is meaningful to understand what kind of growth opportunities relates to the positive bidder cash reserve effect at deal announcement. Decomposing the market-to-book ratio has another

important benefit. In particular, the market-to-book ratio is an ambiguous measure of growth because it also reflects misvaluation (Lee et al., 1999; Rhodes-Kropf and Viswanathan, 2004; Rhodes-Kropf et al. 2005; Dong et al. 2006). Decomposing market-to-book ratio allows us to isolate a component that is purely growth (a long-run growth component) from other parts that also capture misvaluation (the transitory firm-specific component and the transitory sector-specific component).

In the spirit of Rhodes-Kropf et al. (2005), we decompose the market-to-book ratio of equity into three components: a long-run growth component, a (transitory) sector-specific component, and a (transitory) firm-specific component. These three components of market-to-book ratio are estimated for each firm i , in a sector j , at time t , using the following equation:

$$m_{it} - b_{it} = \underbrace{m_{it} - v(\theta_{it}; \alpha_{jt})}_{\text{transitory firm-specific component}} + \underbrace{v(\theta_{it}; \alpha_{jt}) - v(\theta_{it}; \alpha_j)}_{\text{transitory sector-specific component}} + \underbrace{v(\theta_{it}; \alpha_j) - b_{it}}_{\text{long-term growth component}} \quad (2)$$

,where m_{it} is the logarithm of market value of equity for firm i at time t and b_{it} is the logarithm of book value of equity for firm i at time t . θ_{it} is a vector of accounting variables for firm i at year t . α_j is a vector of multiples that are attached by investors to the set of accounting variables of sector j in the long-run. α_{jt} is a vector of multiples that are attached by investors to the set of accounting variables of sector j in year t . To estimate α_{jt} , we run

annual cross-sectional regressions (Equation 3) on firms grouped by 10 Fama-French industries (financial and utility firms are excluded from the estimation).¹²

$$m_{it} = \alpha_{0jt} + \alpha_{1jt}b_{it} + \alpha_{2jt}\text{Ln}(NI)_{it}^+ + \alpha_{3jt}\text{I}(<0)\text{Ln}(NI)_{it}^+ + \alpha_{4jt}LEV_{it} + \varepsilon_{it} \quad (3)$$

, where NI^+ is the absolute value of net income, $\text{I}(<0)$ is an indicator function for observations with negative net income, and LEV is the leverage ratio. The estimated value of $v(\theta_{it}; \alpha_{jt})$ for firm i in sector j at time t is given by the parameter estimates from Equation 3,

$$v(\theta_{it}; \alpha_{jt}) = \hat{\alpha}_{0jt} + \hat{\alpha}_{1jt}b_{it} + \hat{\alpha}_{2jt}\text{Ln}(NI)_{it}^+ + \hat{\alpha}_{3jt}\text{I}(<0)\text{Ln}(NI)_{it}^+ + \hat{\alpha}_{4jt}LEV_{it} + \varepsilon_{it} \quad (4)$$

$v(\theta_{it}; \alpha_j)$ is obtained by first averaging each coefficient in Equation (4) over time $\bar{\alpha}_{kj} = 1/T \sum \alpha_{kjt}$, $k = 0, 1, 2, 3, 4$, T is the number of years in the whole times series for a company, then calculating the following.

$$v(\theta_{it}; \alpha_j) = \bar{\alpha}_{0j} + \bar{\alpha}_{1j}b_{it} + \bar{\alpha}_{2j}\text{Ln}(NI)_{it}^+ + \bar{\alpha}_{3j}\text{I}(<0)\text{Ln}(NI)_{it}^+ + \bar{\alpha}_{4j}LEV_{it} + \varepsilon_{it} \quad (5)$$

The firm-specific component, $m_{it} - v(\theta_{it}; \alpha_{jt})$, captures transitory firm-specific growth opportunities. The sector-specific component, $v(\theta_{it}; \alpha_{jt}) - v(\theta_{it}; \alpha_j)$, captures transitory sector-specific growth opportunities. The long-run growth component, $v(\theta_{it}; \alpha_j) - b_{it}$, captures all long-run growth opportunities to a firm (firm-specific, sector-specific and market-wide). According to Rhodes-Kropf et al. (2005), the transitory firm-specific component and transitory sector-specific component also capture temporal misvaluation at

¹² Rhodes-Kropf et al. (2005) estimate three models, and equation (3) which we use here is the most sophisticated. Using the other two models does not alter our results.

firm and sector level.¹³ We bear this in mind and interpret with caution the results based on these two transitory components. The long-run growth component is not complicated by misvaluation.

III.C. Predicted and Unpredicted Bidders

Stock prices movements only reflect unanticipated news. We therefore expect that cash reserve effect on bidder announcement returns is stronger for unpredicted bidders. In our regression analysis of announcement returns, we distinguish between predicted and unpredicted bidders.

We follow a two-step procedure to categorize bidders. In the first step, we estimate a company's probability of being a bidder using a logistic model, based on 10713 nonfinancial firm-year observations that have required data. There are 282 bidder firm-years where a company announces one or more acquisitions. The sample period is from 1984 through 2007. Specifically,

$$Bidder_{i,t} = \alpha + \beta_1 Excash_{i,t-1} + \lambda Controls_{i,t-1} + \gamma YDUM_{i,t} + \delta INDDUM_{it} + \varepsilon_{i,t} \quad (6)$$

where i and t index companies and years respectively. *Bidder* is a dummy variable equal to 1 if a company announces at least one acquisition in a year and 0 otherwise. *Excash* is $\log(1 + \text{excess cash reserve ratio})$. *YDUM* is a vector of year dummy variables for years from 1984 to 2007. *INDDUM* is a vector of industry dummy variables for Fama-French 10 industries (excluding financial and utility companies). *Controls* is a vector of control variables. The

¹³ We assume that there is no permanent misvaluation.

control variables include logarithm of total assets, leverage defined as the ratio of book value of debt to total assets, logarithm of market-to-book ratio of equity, return on assets (defined as the ratio of operating income to total assets), mean abnormal returns over the past 3 years, standard deviations of daily stock returns over the past 3 years, non-cash working capital — defined as net working capital (current assets – current liabilities) minus cash and marketable securities then divided by total asset.¹⁴ The overall fit of the model is determined by likelihood ratio test and pseudo R-squared.

In the second step, for each firm-year, we estimate the fitted probabilities of being a bidder and the fitted probabilities of not being a bidder respectively. We then plot the distributions of these two sets of fitted probabilities for our bidder sample and find the crossover point of the two probability distributions. A bidder that falls to the right (left) of the crossover point is predicted (unpredicted). This method is similar to that used by Harford (1999). Figure 1 shows the two distributions cross at 0.15.

III.D. Announcement effects

We use the following two baseline models to estimate bidder announcement returns,

$$CAR_i = \alpha + \beta_1 Excash_i + \lambda Controls_i + \gamma YDUM_i + \delta INDDUM_i + \varepsilon_i \quad (7)$$

$$CAR_i = \alpha + \beta_2 Excash_i \times Predicted-bidder Dummy_i + \beta_3 Excash_i \times Unpredicted-bidder Dummy_i + \eta Unpredicted-bidder Dummy_i + \lambda Controls_i + \gamma YDUM_i + \delta INDDUM_i + \varepsilon_i \quad (8)$$

where i indexes acquisitions. CAR is bidder cumulative abnormal return over a 5-day period from 2 trading days before to 2 trading days after the announcement day (day 0), estimated

¹⁴ The mean abnormal returns are computed as daily abnormal returns averaged over 3 years prior to the announcement. Abnormal returns are estimated using a market model approach over rolling windows.

using a market model. If the announcement day is a public holiday, we use the first subsequent trading day as day 0. The estimation period is a 250-day window ending 15 trading days before the announcement day (we require at least 30 non-missing daily stock returns in the estimation window). The 5-day test period is chosen to accommodate the concern that the announcement date recorded by SDC is inaccurate. *Unpredicted-bidder Dummy* is 1 for an unpredicted bidder and 0 otherwise. *Predicted-bidder Dummy* is 1 for a predicted bidder and 0 otherwise (see section III.C. for a more detailed explanation of predicted and unpredicted bidders). *Controls* is a vector of control variables, it includes size, asset tangibility, returns on asset, logarithm of average sales growth, logarithm of market-to-book ratio, leverage and relative deal value.

To examine how growth opportunities impact the cash reserve effect, we include interaction terms between cash reserve and dummy variables of the three market-to-book components. Specifically, we estimate the following model,

$$\begin{aligned}
CAR_i = & \alpha + \\
& \beta_2 Excash_i \times Predicted-bidder Dummy_i + \\
& \beta_3 Excash_i \times Unpredicted-bidder Dummy_i \\
& \beta_4 Excash_i \times Unpredicted-bidder Dummy_i \times High Component Dummy_i + \\
& \eta Unpredicted-bidder Dummy_i + \gamma YDUM_i + \delta INDDUM_i + \varepsilon_i
\end{aligned} \tag{9}$$

, where *High component Dummy* is 1 if the long-run growth component (or the transitory sector-specific component, or the transitory firm-specific component) is above the sample median and 0 otherwise.

To examine how institutional holdings impact the cash reserve effect, we add an interaction term between cash reserve and a nontrivial institutional holdings dummy variable. The

nontrivial institutional holding dummy is based on holdings by all institutions or holdings by insurance companies. It is 1 if institutional holdings are no less than 3% of total shares outstanding. Using 5% does not change our results. As we mentioned in the introduction, the threat of joint actions enables institutional shareholders to influence company decisions even at low levels of shareholding. Specifically, we estimate equation (10).

$$CAR_i = \alpha + \beta_1 Excash + \beta_5 Excash_i \times Nontrivial\ Institutional\ Holdings\ Dummy_i + \gamma YDUM_i + \delta INDDUM_i + \varepsilon_i \quad (10)$$

$$CAR_i = \alpha + \beta_2 Excash_i \times Predicted-bidder\ Dummy_i + \beta_3 Excash_i \times Unpredicted-bidder\ Dummy_i + \beta_6 Excash_i \times Unpredicted-bidder\ Dummy_i \times Nontrivial\ Institutional\ Holdings\ Dummy_i + \eta Unpredicted-bidder\ Dummy_i + \gamma YDUM_i + \delta INDDUM_i + \varepsilon_i \quad (11)$$

, where *Nontrivial Institutional Holdings Dummy* is based either on holdings by all institutional shareholders or by insurance companies only.

III.E. Operating performance

An analysis of post-acquisition operating performance provides further insights into acquisition synergies. We measure operating performance using operating cash flow less change in working capital then divided by total assets. Operating performance is then adjusted by the median performance of other firms in the same industry, size decile and operating-performance decile.¹⁵ This approach is similar to the method of Powell and Stark (2005). We estimate the regression of post-acquisition operating performance on pre-acquisition operating performance, using the sample of completed offers. Post-acquisition

¹⁵ Similar method is used by Healy, Palepu, and Ruback (1992), Harford (1999) and Gao (2011).

operating performance is calculated for the combined firm, averaged over 3 years after the acquisitions. In each year before acquisition, the target and bidder performances are combined into one figure, weighted by market values. The combined performance is then averaged over 3 years prior to announcement. The regression specification is,

$$Post\text{-}Acquisition\text{ }OPF_i = \alpha + \beta_1 Pre\text{-}Acquisition\text{ }OPF_i + \varepsilon_i \quad (12)$$

where i indexes deals. OPF is adjusted operating performance; β_1 measures the continuation of pre-acquisition performance. α measures the change in operating performance in post-acquisition years attributable to the acquisition. A significantly positive α suggests that a takeover is value-enhancing, while a significantly negative α means that a takeover is value-decreasing.

We also add nontrivial institutional holdings dummy, high long-run growth component dummy, high cash reserve dummy, and their interaction terms to equation 12. This allows us to examine how synergies vary according to bidder cash reserve, bidder growth, and institutional holdings.

IV. Sample and Data

Our initial acquisition sample is gathered from the SDC M&A database covering 1984 – 2007. We impose several selection criteria. First, following previous studies (Harford, 1999; Schlingemann, 2004; Gao, 2011), we focus on mergers, acquisition of majority interests,

acquisition of remaining interests and acquisition of partial interests.¹⁶ Second, both the bidder and the target must be public companies listed on the London Stock Exchange (LSE). We exclude private targets because the underlying dynamics of bidder announcement returns is undecided in the literature (Chang, 1998; Fuller et al., 2002). By focusing on acquisitions of public companies, we preclude the possible complications from issues such as loss of control to potential block shareholders and targets' demand for liquidity. Third, means of payment (i.e. percentages of stock, cash or mixed payments) must be available from SDC. To mitigate the distortion of recording error made by SDC, we require the sum of means of payment is between 95% and 105%. Fourth, deal value must be available and no less than £10 million. Fifth, deal announcement date must be available from SDC. These requirements give us an interim sample of 921 deals. We then exclude financial bidders (SIC 6000-6999) and intensively regulated utility bidders (SIC 4900–4999). There are 639 unique transactions left. To compute bidder cumulative abnormal returns (*CAR*), we require at least 30 daily returns to be available during the estimation period in order to get reliable estimates of market-model parameters. As a result, we drop 262 deals. The sample reduces to 377 deals. We further require that data from DataStream and Thomson One Banker to be available for us to calculate excess cash reserve ratio and predicted and unpredicted bidders. This requirement further drops 12 deals. We also require other variables used in regressions to be available, namely, market-to-book ratio, leverage, asset tangibility, research and development (*R&D*), return on asset (*ROA*), relative deal value, and average sales growth in the past two

¹⁶ These are definitions by SDC and are commonly used in the M&A literature. In a merger, all shares outstanding of a company is acquired by another. In an acquisition of majority interests, the acquirer holds less than 50% of the target before the transaction, but holds more than 50% after the transaction. In an acquisition of minority interests, the acquirer has less than 50% of the target before the transaction, and still owns less than 50% after the transaction. In an acquisition of remaining interests, the acquirer holds more than 50% of the target before the transaction, and owns the entire target after the transaction.

years before the announcement.¹⁷ All variables are measured in real term 1994 value. Finally, we have 210 transactions with the full range of data.¹⁸ Given our sample selection criteria, our sample size is in proportion to other studies for UK (Antoniou et al. 2007; Bi and Gregory, 2011). Since our sample is not especially large, in our regression analysis, we use robust regressions (corrected for heteroskedasticity) to correct for the bias of outliers and changing residuals.

Table I, Panel A reports summary statistics for our final sample. Variables are winsorized at 1% and 99% except for *CAR*. Bidder announcement *CAR* has a mean of -0.5% and a median of -0.3%, neither is statistically different from zero. The mean excess cash reserve is -6.3% (median is -3.6%). On average, our sample bidders are short of cash, which suggests there is scope for companies to increase value by reserving cash. It also suggests that, under strong shareholder power, it is more difficult for management to reserve cash. Any cash reserved should be justified by shareholders' interests. Cash paid to target from reserve is the product of deal value and percentage paid in cash minus change in long-term debt over one year prior to deal announcement, then deflated by total assets. Cash payment to target can be funded from cash reserve or from borrowed funds. We used it in our regressions to control for the possible effect that, if cash reserve is spent on the current takeover, a bidder's ability to capture future growth or cushion adverse shocks weakens. After careful investigation, Schlingemann (2004) conclude that it is impossible to establish a precise correspondence

¹⁷ All bidder characteristics are measured at the fiscal-year end prior to deal announcement unless otherwise mentioned. For about 30 percent of our final sample, Datastream codes are available for the bidding firms, but accounting information are missing from Datastream. We manually collected accounting data from annual report available from Thomson one Banker.

¹⁸ For several specifications, the sample size reduces further when required data is not available. For instance, including market-to-book decompositions reduces the final sample to 158 transactions (see table III). It is because variables used to estimate the components are missing for 52 bidders.

between a dollar raised in time t and a dollar spent on a takeover in time $t + s$, $s \geq 0$. We, therefore, rely on one-year change in long-term debt prior to announcement to infer the amount of borrowing.¹⁹ The mean value of cash paid to target from reserve is 0.4% and the median is zero. It shows that the primary source of funds for cash offers is borrowed money. We also form a growth-and-cash combination dummy variable which is used to capture a particular synergy pointed out by Mayers and Majluf (1984) and Smith and Kim (1994). Specifically, the underinvestment problem can be mitigated when a cash-rich company is combined with a cash-poor company that have growth opportunities. Our Growth-and-Cash combination dummy is 1 if a bidder (target) has high growth (i.e. long-run growth component is above sample median) but is cash-poor (i.e. excess cash reserve below sample median) and the target (bidder) is cash-rich (i.e. excess cash reserve ratio above sample median) and 0 otherwise. There are 86 acquisitions whose Growth-and-Cash combination dummy is 1.

Panel A also reports that an average bidder has total assets of £186.450 million and leverage of 0.145. Market-to-book ratio of assets has a mean (median) of 2.911 (1.147), while return on asset has a mean (median) of 6.3% (7.8%). Bidders have a mean (median) asset tangibility of 52.4% (50.4%). The average sales growth is 37.8% and median is 12.9%. On average, a bidder has a long-run growth component of 1.082, a transitory sector-specific component of 0.249, and a transitory firm-specific component of 0.264. Average relative deal value is 12% of a bidder's market capitalization. Panel B compares median values for cash-rich and cash-poor bidders. The left section of panel B shows that cash-rich and cash-poor bidders have similar announcement *CAR* (-0.003), and neither is statistically significant.

¹⁹ The one-year change in long-term debt prior to announcement, is not a perfect measure of debt issued for acquisition. However, we cannot think of a better proxy for it. Dropping this variable or replacing it with total cash payment to target scaled by bidder's total assets does not change our results.

Compared to cash-poor bidders, cash-rich bidders are larger companies, are less leveraged, make smaller acquisitions, and have higher market-to-book ratio and higher transitory sector-specific component. However, their transitory firm-specific component and long-run growth component is indistinguishable from those of cash-poor bidders. For predicted bidders (the middle panel), cash-rich and cash-poor bidders have statistically indistinguishable announcement *CAR* and other similar characteristics except for the excess cash reserve itself. For unpredicted bidders, cash-rich and cash-poor bidders have similar announcement *CAR*, return on assets, asset tangibility, past sales growth and transitory firm-specific component. Compared to cash-poor bidders, cash-rich bidders are larger companies, have lower leverage, and make smaller acquisitions relative to their market value of equity. Moreover, cash-rich bidders have higher market-to-book ratio, higher long-run growth component, and higher sector-specific component, which suggests higher cash reserve relate to high growth for unpredicted bidders.

[TABLE I]

V. Empirical results

V.A. Positive cash reserve effects on bidder announcement returns

Table II reports our regression results based on equation (7) and (8). Model 1 shows that $\log(1+\text{excess cash reserve ratio})$ has a positive and significant (at 5%) coefficient of 0.020. It means that a one-standard-deviation increase in the excess cash reserve ratio for an average bidder increases the *CAR* by 0.832%. This result contrasts the US finding that cash reserve has a negative announcement effect (Lang et al. 1989; Schlingemann, 2004; Harford 1999; Gao, 2011). It is consistent with our arguments based on the precautionary motive that i) high

cash reserve enables bidders to capture growth opportunities arising from acquisitions and cushion adverse cash-flow shocks, and ii) high cash reserve reflects managers' perception of high future growth, and high-growth companies are more likely to make acquisitions of high synergies (the Q theory). Further, it is important to note that, in the UK, strong shareholder power demands that any cash reserved within the company has to be justified by shareholder interests.

In model 2, we use the predicted bidder dummy and the unpredicted bidder dummy to form interaction terms with excess cash reserve. The positive cash reserve effect is mainly from unpredicted bidders. The coefficient of the interaction term between excess cash reserve and unpredicted bidder dummy is 0.033 and statistically significant at 1%. The coefficient of the interaction term formed using predicted bidder dummy is economically weaker (-0.018) and statistically insignificant (p-value 0.469). In model 3, we add two three-item interactions formed using excess cash reserve, the unpredicted bidder dummy, and a all-stock offer dummy (or a all-cash offer dummy). The all-stock (all-cash) offer dummy is 1 if the deal is entirely funded by stock (cash) and 0 otherwise. We find that the coefficient on the two-item interaction formed using excess cash reserve and the unpredicted bidder dummy is qualitatively unchanged. The coefficient of the three-item interaction term formed using all-stock offer dummy is significantly (at 1%) negative at -0.047. A Wald test fails to reject the null hypothesis that the sum of the coefficient of the two-item interaction term and that of the three-item interaction is significantly different from zero. The coefficient of the three-item interaction term formed using the all-cash offer dummy is -0.008 and statistically insignificant (p-value 0.645). The positive effect of cash reserve therefore is only present for

all-cash and mixed offers. Misvaluation complicates the cash reserve effects for stock offers (e.g., Travlos, 1987; Franks, Harris and Mayer, 1988; Asquith, Bruner and Mullins, 1987; Wansley, Lane and Yang, 1987; Servaes, 1991; Martin, 1996). Gao (2011) argues that adverse selection explains the negative cash reserve effect for all-stock offers. Therefore, the negative cash reserve effects due to adverse selection offsets the positive cash reserve effects due to the precautionary motive. In all three models, we control for cash paid to target from reserve. Its coefficient is insignificant in all three models. The significant positive effect of cash reserve is not affected after controlling for this variable. We also control for the growth-and-cash combination dummy in all three models, however in none of the specification it has a coefficient significantly different from zero.

[TABLE II]

Table III reports the results based on equation (9). We form interaction terms using excess cash reserve and dummy variables for high market-to-book components. In models 1, 2, and 3, we add to equation (8) the dummies for high long-run growth component, high sector-specific component, and the firm-specific component respectively. The purpose is to examine how the market-to-book components affect bidder announcement returns. Model 1 shows that the long-run growth component has a significantly (at 5%) positive effect on bidder *CAR*, consistent with the notion that higher-growth bidders make acquisitions of better synergies. In Model 2, the sector-specific component has a significantly (at 10%) negative effect on bidder *CAR*. This suggests that the sector-specific component reflects more transitory sector-specific misvaluation than transitory sector-specific growth. In Model 3, the firm-specific

component has no significant effect on bidder *CAR*, suggesting that the firm-specific component captures both transitory growth and transitory misvaluation at the firm level. Model 4 estimates equation (9) where the high market-to-book component dummy is based on the long-run growth component. The coefficient of the three-item interaction is significantly positive (5%) at 0.062. The coefficient of the two-item interaction between the unpredicted bidder dummy and excess cash reserve becomes insignificant in model 4. The sum of the two coefficients above is 0.077 and statistically significant at 5%. This means, for bidders with high long-run growth, a one-standard-deviation increase in excess cash reserve increases bidder *CAR* by 2.885%. This evidence suggests that the positive cash reserve effect on bidder *CAR* is mainly from the bidders with high long-run growth. Model 5 estimates equation (9) where the three-item interaction term is formed using the dummy for high sector-specific component. The coefficient of the three-item interaction is insignificant (p-value 0.102). A possible interpretation is that, for bidders of high sector-specific component, stronger positive cash reserve effect due to growth and the stronger negative effect due to misvaluation offset each other. Similarly, the cash reserve effect does not change when a bidder's firm-specific component is higher (model 6).

[TABLE III]

V.B. Institutional holdings and cash reserve effects on bidder announcement returns

Strong shareholder power in the UK is well represented by institutional shareholders' active intervention in company decisions. In the city of London, institutional investors are located closely to one another, which allows them to coordinate efficient and effective joint

actions (Black and Coffee, 1984; Armour and Skeel, 2007). The management understands that negative opinions circulate fast among actual and potential institutional shareholders. Consequently, company managers are usually careful not to ignore the opinion of institutional shareholders even when the actual institutional holdings are moderate. Moreover, since shareholders can replace management at any time, the overhanging threat of intervention induces managers to act in shareholders' interests, in the absence of actual intervention. Therefore, we hypothesize that, when institutional holdings is nontrivial, cash reserve effect is more favourable for shareholders. We also investigate insurance company holdings separately, because Black and Coffee (1984) maintain that insurance companies are particularly active intervening in company decisions.

[TABLE IV]

Table IV, panel A reports summary statics for institutional holdings. On average, 38% of a bidder's shares outstanding are held by institutional shareholders. The highest institutional holdings are 69.87%. On average, insurance companies hold around 12% of a company's shares outstanding. The highest insurance company holdings are 54.23%. We use 3% as the cut-off point to generate dummy variables for nontrivial institutional holdings (1 for at least 3% and 0 otherwise). We also use 5% as the cut-off point and our results do not change. There are 58 (40) bidders in our sample that have a grand total institutional holdings (insurance company holdings) no less than 3%.²⁰

Panel B reports regression results based on equation (10). In model 1, the coefficient of the interaction term between excess cash reserve and nontrivial grand total institutional

²⁰ Institutional holdings below 3% are not required for disclosure in the UK. We set undisclosed holdings to zero. Therefore, the median values understate the actual institutional holdings.

holding dummy is 0.072 (significant at 1%). The coefficient of excess cash reserve is 0.020 and remains significant at 5%. The sum of these two coefficients is 0.092 and significant at 1%. It means, for an average company with nontrivial institutional holdings, a one-standard-deviation increase in excess cash reserve increases bidder announcement *CAR* by 4.241%. The positive cash reserve effect is economically much stronger for bidders with nontrivial institutional holdings than for bidders with zero or trivial institutional holdings. Model 2 examines the bidders having nontrivial insurance company holdings. The coefficient of the interaction term between excess cash reserve and nontrivial insurance company holdings dummy is 0.77 and statistically significant at 1%.²¹ The coefficient of excess cash reserve is 0.020 and remains significant at 5%. The sum of these two coefficients is 0.097 and significant at 1%. It suggests that when insurance company holdings are nontrivial, a one-standard-deviation increase in excess cash reserve increases bidder announcement *CAR* by 4.664%.

Panel C reports regression results based on equation (11). Model 1 shows that the coefficient on the three-item interaction between unpredicted bidder dummy, excess cash reserve and nontrivial grand total institutional holdings dummy is 0.075 (significant at 1%). Model 2 shows that the coefficient on the three-item interaction between unpredicted bidder dummy, excess cash reserve and nontrivial insurance company holdings dummy is 0.076 and significant at 5%.

²¹ We also estimate regressions, adding interaction terms between excess cash reserve and nontrivial holdings dummies for other types of institutions (pension funds, mutual funds, commercial banks). The coefficients on those interaction terms are all insignificant except for that between excess cash reserve and nontrivial merchant bank holdings dummy which is 0.073 and statistically significant at 10%. These results are consistent with Black and Coffee's (1994) argument that insurance companies are the most active group of institutional shareholders that intervene.

Overall, the above results show that the presence of nontrivial institutional shareholders is important to ensure cash reserved in shareholders' interests rather than in managerial benefits.

V.C. Operating performance

Table 6 reports the results for post-acquisition operating performance. We regress post-acquisition adjusted operating performance on pre-acquisition adjusted operating performance according to equation (12). Model 1 shows that, in the 3 years immediately following acquisitions, the abnormal operating performance due to acquisition is significantly negative at -3.4% per year. It is not entirely surprising because business judgement plays an important part in acquisitions and management may make bad judgements. In model 2, we add bidder announcement *CAR*. The coefficient of *CAR* is 0.260 and significant at 1%. It confirms that bidder announcement returns correctly predicts deal synergies that manifest themselves through operating performance in post-acquisition years. In model 3, we add the high excess cash reserve dummy. Its coefficient is positive (0.009) but statistically insignificant at the conventional level. In model 4, we add an interaction term between high excess cash reserve dummy and high long-run growth component dummy. We find this interaction term has a significantly (at 5%) positive coefficient of 0.038. It means that when a high-growth bidder is cash-rich, its post-acquisition annual operating performance is higher than other bidders' by 3.8%. In model 5, we add an interaction term between high excess cash reserve dummy and nontrivial grand total institutional holdings dummy. We find that the interaction term has a significantly (at 1%) positive coefficient of 0.042. It means that if a cash-rich bidder has nontrivial institutional holdings, it outperforms other bidders by 4.2% a

year in terms of operating performance. In model (6), we replace nontrivial grand total institutional holdings dummy using high insurance company total holdings dummy to form an interaction term. The coefficient of the interaction term is 0.042 (significant at 5%). Cash-rich bidders that have nontrivial insurance company holdings outperform other companies by 4.2% a year. All the above results suggest that cash reserve facilitates growth companies to capture investment opportunities, and nontrivial institutional holdings are important to ensure cash to be reserved for shareholders' interests.

[TABLE V]

VI. Conclusion

We find that bidder excess cash reserve is positively related to bidder announcement abnormal returns. The positive cash reserve effects are mainly from bidders of nontrivial institutional holdings and bidders with high long-run growth. Cash-rich bidders also produce better post-acquisition operating performance than other bidders when their long-run growth is high or their institutional holdings are nontrivial. Our evidence can be explained using the precautionary motive of cash reserve. Specifically, i) cash reserve allows bidders to capture growth opportunities that arise from acquisitions and cushion negative shocks, and ii) high cash reserve reflects managers perception of high future growth, and high-growth companies are more likely to make acquisitions that have better synergies.

We argue that cash reserve effects in acquisitions are more complicated than what we thought. The agency theory can explain some of the evidence but not all. The precautionary motive has solid theoretical background, but is ignored in the previous literature on cash reserve effects in acquisitions. We fill in this gap by studying bidder cash reserve effects in

the UK. The unique pro-shareholder environment of the UK offers an ideal setting for us to test the predictions of precautionary motive. Strong shareholder power in the UK ensures cash is reserved within a company for shareholders' interests rather than for managers' benefits.

Moreover, we add to the debate whether more power should be given to shareholders. An established literature in legal studies (Black and Coffee, 1984; Bebchuk, 2005) advocates that US companies should give more power to shareholders. Our findings support this argument.

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Figure 1
Probability distribution of being a bidder and not being a bidder (for the bidder sample)

The PDFs of the probabilities of being a bidder and not being a bidder are plotted for all our sample bidders. They cross at 0.15, which is the cut off point used for determining whether a bidder is predicted or not. To generate the distributions, we first estimate a logistic model on all company-years (Equation 6) to predict bidders and estimate the fitted probabilities of being a bidder and not being a bidder respectively. We then plot the distributions of these two sets of fitted probabilities for all our sample bidders. Finally, we find the crossover point for the two probability distributions. A bidder whose probability of being a bidder falls to the right (left) of the crossover point is predicted (unpredicted). This method is similar to that used by Harford (1999).

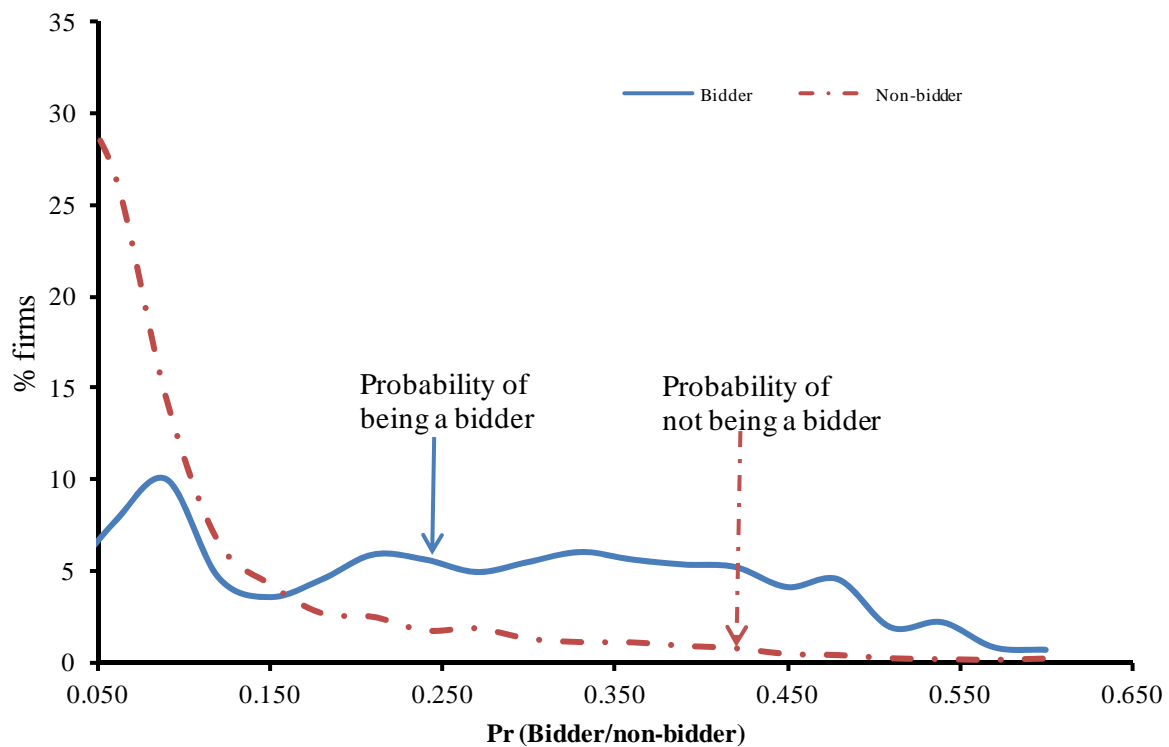


Table I: Descriptive statistics

This table reports the descriptive statistics for our acquisition sample from 1984 through 2007. Panel A shows mean, median and standard deviations of the variables. Panel B compares median values for high and low excess cash reserve bidders, within all bidders, predicted bidders and unpredicted bidders respectively. *CAR* (-2,+2) is bidder cumulative abnormal returns (-2,+2), calculated as the sum of market-model adjusted abnormal returns from 2 days prior to the announcement to 2 days after the announcement. Excess cash reserve ratio is the actual cash reserve ratio minus the required level estimated using a pooled time-series cross-sectional OLS regression with year dummies, following Opler et al. (1999). Actual cash reserve ratio is cash and marketable securities over total assets. Size is measured as total assets in millions of pounds. Leverage is the ratio of book value of debt to total assets. Market to book (M/B) is the ratio of market value of equity plus book value of long-term liability divided by book value of equity plus book value of long term liability. Return on asset is the ratio of operating income to total assets. Asset tangibility is the ratio of tangible asset to total assets. Average sales growth is growth in sales over 2 years prior to year 0 (i.e. year of announcement). Relative deal value is deal value divided by bidder market value of equity. Cash paid to target from reserve is measured as a product of deal value and percentage of cash payments minus change in long-term debt in year prior to announcement, then deflated by total assets. Sector-specific component, firm-specific component and long-run growth component are the components of market-to-book ratio of equity, decomposed according to RKV (2005) approach. Sector-specific component is the deviation of the value implied by sector-specific multiples from the value implied by long-run multiples. Firm-specific component is the deviation of market value from the value implied by sector-specific multiples. Long-run growth component is the deviation of the value implied by long-run multiples from the current book value. Growth-and-Cash combination dummy is a dummy variable taking a value of 1 if a bidder (target) is high-growth (i.e. long-run value to book above sample median) but cash-poor (i.e. excess cash reserve below sample median) and the target (bidder) is cash-rich (i.e. excess cash reserve ratio above sample median), and 0 otherwise. Friendly deal dummy is a dummy variable equal to 1 for friendly deals and 0 otherwise. Tender offer dummy is a dummy variable equal to 1 for tender offers and 0 otherwise. Diversifying deal dummy is a dummy variable equal to 1 if the target and the bidder are in different 2-digit SIC code industry and 0 otherwise. Z-test is based on Wilcoxon rank sum test for median differences. All variables are measured at the end of the fiscal year prior to deal announcement.

| Panel A | Full sample | | | |
|-----------------------------------|-------------|---------|---------|-------|
| | <i>N</i> | Mean | Median | STD |
| <i>CAR</i> (-2,+2) | 210 | -0.005 | -0.003 | 0.060 |
| Excess cash reserve ratio | 210 | -0.063 | -0.036 | 0.483 |
| Total assets | 210 | 186.450 | 132.370 | 9.764 |
| Leverage | 210 | 0.145 | 0.070 | 0.275 |
| Market to book | 210 | 2.911 | 1.147 | 6.436 |
| Return on assets | 210 | 0.063 | 0.078 | 0.140 |
| Asset tangibility | 210 | 0.524 | 0.504 | 0.273 |
| Average sales growth | 210 | 0.378 | 0.129 | 0.636 |
| Relative deal value | 210 | 0.120 | 0.027 | 0.390 |
| Cash paid to target from reserve | 210 | 0.004 | 0.000 | 0.025 |
| Sector-specific component | 210 | 0.249 | 0.059 | 1.965 |
| Firm-specific component | 210 | 0.264 | 0.051 | 0.990 |
| Long-run growth component | 210 | 1.082 | 0.966 | 1.682 |
| | | Yes | No | |
| Friendly deal | 210 | 101 | 109 | |
| Tender offer | 210 | 75 | 135 | |
| Diversifying deal | 210 | 47 | 163 | |
| Growth-and-Cash combination dummy | 210 | 86 | 124 | |

| Panel B | All bidders | | | Predicted bidders | | | Unpredicted bidders | | |
|----------------------------------|-------------|-------------|-------------|-------------------|-------------|-------------|---------------------|-------------|-------------|
| | High | Low | Z-statistic | High | Low | Z-statistic | High | Low | Z-statistic |
| | Excess cash | Excess cash | | Excess cash | Excess cash | | Excess cash | Excess cash | |
| | Median | Median | Diff. | Median | Median | Diff. | Median | Median | Diff. |
| <i>CAR</i> (-2,+2) | -0.003 | -0.003 | 0.575 | -0.009 | 0.004 | -1.245 | -0.002 | -0.003 | -1.126 |
| Excess cash reserve ratio | 0.070 | -0.127 | 14.180*** | 0.020 | -0.094 | 5.129*** | 0.079 | -0.130 | 13.224*** |
| Total assets | 259.520 | 96.029 | 3.106*** | 795.447 | 306.612 | 1.285 | 130.632 | 83.721 | 2.17** |
| Leverage | 0.061 | 0.092 | -2.813*** | 0.086 | 0.920 | -0.395 | 0.035 | 0.092 | -2.484 |
| Market to book | 1.607 | 1.318 | 2.566*** | 1.699 | 1.578 | 1.031 | 1.531 | 1.298 | 2.058** |
| Return on asset | 0.083 | 0.074 | 1.331 | 0.098 | 0.091 | 0.067 | 0.080 | 0.072 | 0.994 |
| Asset intangibility | 0.467 | 0.516 | -0.751 | 0.465 | 0.444 | 0.415 | 0.488 | 0.524 | -0.487 |
| Average sales growth | 0.133 | 0.120 | 1.083 | 0.093 | 0.091 | 0.475 | 0.169 | 0.128 | 1.691* |
| Relative deal value | 0.019 | 0.041 | -3.132*** | 0.007 | 0.015 | -1.046 | 0.023 | 0.047 | -2.467** |
| Cash paid to target from reserve | 0.0006 | 0.0001 | 0.592 | 0.0014 | 0.0043 | 1.006 | 0.0005 | 0.0001 | 1.030 |
| Sector-specific component | 0.201 | -0.013 | 3.676*** | 0.334 | 0.067 | 1.384 | 0.127 | -0.013 | 2.785*** |
| Firm-specific component | 0.038 | 0.075 | -0.172 | 0.411 | 0.244 | 0.079 | -0.033 | 0.024 | -0.411 |
| Long-run growth component | 1.104 | 0.948 | 1.153 | 0.747 | 1.248 | -1.049 | 1.151 | 0.933 | 1.829* |
| <i>No of obs</i> | 105 | 105 | | 39 | 26 | | 62 | 83 | |

Table II: Effects of excess cash reserve on bidder announcement returns

This table reports the robust regression estimates of the effects of excess cash reserve on bidder announcement returns, corrected for heteroskedasticity. The dependent variable is bidder *CAR* (-2,+2). Pure stock offer dummy (pure cash stock offer dummy) is a dummy variable taking a value of 1 for pure stock (pure cash offers) and 0 otherwise. Predicted bidder dummy is a dummy variable taking a value of 1 for predicted bidders and 0 otherwise. Unpredicted bidder dummy is a dummy variable taking a value of 1 for unpredicted bidder and 0 otherwise. All other variables are defined in table I. The values in parenthesis are p-values. *, **, *** indicate significance at 10%, 5% and 1% respectively.

| | Full sample 1984–2007 | | |
|---|-----------------------|----------------------|----------------------|
| | Model 1 | Model 2 | Model 3 |
| Log (1+ excess cash reserve ratio) | 0.020** (0.050) | | |
| Predicted bidder dummy x log(1+ excess cash reserve ratio) | | -0.018 (0.469) | -0.004 (0.863) |
| Unpredicted bidder dummy x log(1+excess cash reserve ratio) | | 0.033*** (0.003) | 0.062*** (0.000) |
| Unpredicted bidder dummy x pure stock deal dummy x log(1+excess cash reserve ratio) | | | -0.047** (0.035) |
| Unpredicted bidder dummy x pure cash deal dummy x log(1+ excess cash reserve ratio) | | | -0.008 (0.645) |
| Unpredicted bidder dummy | | 0.003 (0.739) | -0.001 (0.938) |
| Log (1+total assets) | 0.001 (0.753) | 0.001 (0.809) | 0.001 (0.845) |
| Asset tangibility | -0.002 (0.258) | -0.004* (0.087) | -0.003 (0.165) |
| Return on assets | 0.020** (0.041) | 0.023** (0.021) | 0.013 (0.195) |
| Log (1+average sales growth) | 0.007 (0.112) | 0.008* (0.064) | 0.009** (0.034) |
| Log (1+M/B) | -0.009* (0.072) | -0.014*** (0.003) | -0.016*** (0.000) |
| Leverage | 0.006 (0.810) | -0.015 (0.547) | -0.021 (0.363) |
| Relative deal value | -0.023** (0.012) | -0.023** (0.011) | -0.019** (0.024) |
| Growth-and-Cash combination dummy | 0.002 (0.793) | -0.004 (0.556) | 0.001 (0.894) |
| Cash paid to target from reserve | 0.399 (0.744) | -0.59 (0.633) | -0.634 (0.581) |
| Tender offer dummy | -0.020*** (0.003) | -0.021*** (0.002) | -0.016** (0.014) |
| Diversifying deal dummy | 0.007 (0.312) | 0.008 (0.216) | 0.000 (0.990) |
| Friendly deal dummy | 0.008 (0.327) | 0.012 (0.154) | 0.006 (0.429) |
| Pure cash offer dummy | | | 0.008 (0.354) |
| Pure stock offer dummy | | | 0.001 (0.931) |
| Constant | 0.007 (0.832) | 0.012 (0.737) | 0.014 (0.682) |
| No of obs | 210 | 210 | 210 |
| Prob>F | 0.00*** | 0.00*** | 0.00*** |
| Pseudo R-squared | 0.446 | 0.481 | 0.559 |

Table III: Decompositions of market to book ratio and the effects of excess cash reserve on bidder announcement returns

This table reports the robust regression estimates of how the effects of excess cash reserve on bidder announcement returns change with the level of different components of market-to-book, corrected for heteroskedasticity. The dependent variable is bidder *CAR* (-2,+2). Sector-specific component, firm-specific component and long-run growth component are the components of market-to-book ratio decomposed according to RKV (2005) . We construct a dummy variable for each of them which is 1 if it is above sample median and 0 otherwise. All other variables are defined in table I. The values in parenthesis are p-values. *,**,*** indicate significance at 10%, 5% and 1% respectively.

| | Full sample 1984–2007 | | | | | |
|--|-----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 |
| Predicted bidder dummy x log(1+ excess cash reserve ratio) | -0.016 (0.578) | -0.013 (0.660) | -0.019 (0.547) | -0.027 (0.406) | -0.052* (0.098) | 0.002 (0.942) |
| Unpredicted bidder dummy x log(1+excess cash reserve ratio) | 0.048** (0.028) | 0.048** (0.033) | 0.044* (0.055) | 0.015 (0.644) | 0.102*** (0.000) | 0.052* (0.053) |
| Unpredicted bidder dummy x high long-run growth component dummy x log(1 + excess cash reserve ratio) | | | | 0.062** (0.045) | | |
| Unpredicted bidder dummy x high sector-specific component dummy x log(1 + excess cash reserve ratio) | | | | | -0.107 (0.102) | |
| Unpredicted bidder dummy x high firm-specific component dummy x log(1 + excess cash reserve ratio) | | | | | | -0.023 (0.677) |
| High long-run growth component dummy | 0.004** (0.044) | | | | | |
| High sector-specific component dummy | | -0.005* (0.055) | | | | |
| High firm-specific component dummy | | | -0.003 (0.492) | | | |
| Unpredicted bidder dummy | 0.008 (0.423) | 0.007 (0.505) | 0.011 (0.267) | 0.009 (0.371) | 0.010 (0.301) | 0.009 (0.360) |
| Log (1+ total assets) | 0.001 (0.663) | 0.002 (0.512) | 0.001 (0.927) | 0.001 (0.762) | 0.002 (0.434) | -0.001 (0.820) |
| Asset tangibility | 0.028* (0.075) | 0.029* (0.079) | 0.032* (0.059) | -0.005** (0.040) | 0.029* (0.096) | -0.005* (0.051) |
| Return on assets | 0.021 (0.134) | 0.022 (0.137) | 0.023 (0.132) | 0.018 (0.256) | 0.046*** (0.004) | 0.021 (0.229) |
| Log (1+average sales growth) | 0.013 (0.217) | 0.015 (0.174) | 0.014 (0.218) | 0.01 (0.400) | 0.01 (0.345) | 0.011 (0.305) |
| Log (1+M/B) | -0.007** (0.013) | -0.005** (0.027) | -0.002 (0.412) | -0.003 (0.153) | -0.003 (0.168) | -0.003 (0.149) |
| Leverage | 0.016 (0.617) | 0.015 (0.642) | 0.01 (0.759) | -0.013 (0.709) | 0.005 (0.873) | -0.003 (0.923) |
| Relative Deal Value | -0.036*** (0.004) | -0.035*** (0.006) | -0.037*** (0.005) | -0.039*** (0.004) | -0.031** (0.017) | -0.041*** (0.003) |
| Growth-and-Cash combination dummy | 0.001 (0.891) | 0.001 (0.903) | -0.002 (0.797) | 0.001 (0.901) | -0.003 (0.668) | 0.002 (0.846) |
| Cash paid to target from reserve | -0.720*** (0.000) | -0.711*** (0.000) | -0.734*** (0.000) | -0.717*** (0.000) | -0.706*** (0.000) | -0.723*** (0.000) |
| Tender offer dummy | -0.020*** (0.005) | -0.019** (0.013) | -0.021*** (0.008) | -0.018** (0.027) | -0.019** (0.015) | -0.017** (0.030) |
| Diversifying deal dummy | 0.025*** (0.001) | 0.025*** (0.002) | 0.024*** (0.003) | 0.022*** (0.008) | 0.022*** (0.005) | 0.024*** (0.004) |
| Friendly deal dummy | 0.009 (0.311) | 0.013 (0.186) | 0.011 (0.275) | 0.009 (0.338) | 0.016* (0.097) | 0.007 (0.450) |
| Constant | -0.031 (0.482) | -0.048 (0.292) | -0.033 (0.490) | -0.019 (0.657) | -0.058 (0.217) | 0.004 (0.931) |
| No of obs | 158 | 158 | 158 | 159 | 159 | 158 |
| Prob>F | 0.00*** | 0.00*** | 0.00*** | 0.00*** | 0.00*** | 0.00*** |
| Pseudo R-squared | 0.647 | 0.628 | 0.615 | 0.607 | 0.758 | 0.608 |

Table IV: Institutional holdings and the effects of excess cash reserve on bidder announcement returns

This table reports the robust regression estimates of how the effects of excess cash reserve on bidder announcement returns change with the level of institutional holdings, corrected for heteroskedasticity. Panel A reports the summary statistics of institutional holdings. Grand total institutional holdings are the percentage holdings in a company by all types of institutional investors. Insurance company holdings are the percentage holdings in a company by insurance companies. Dummy variables are generated for nontrivial holdings depending on whether holdings are no less than 3% (take value of 1) or not (take value of 0). Regressions in Panel B does not distinguish between predicted and unpredicted bidders, but those in Panel C do. The dependent variable is bidder *CAR* (-2,+2). All other variables are defined in table I. The values in parenthesis are p-values. *, **, *** indicate significance at 10%, 5% and 1% respectively.

| Panel A | Mean | Median | STD | Min | Max |
|--|--------|--------|--------|-----|-------|
| Grand total institutional holdings (%) | 38.156 | 0.000 | 15.712 | 0 | 69.87 |
| Insurance company holdings (%) | 12.356 | 0.000 | 6.759 | 0 | 54.23 |
| | D= 1 | D=0 | | | |
| Nontrivial grand total institutional holdings dummy (above 3%) | 58 | 152 | | | |
| Nontrivial insurance company holdings dummy (above 3%) | 40 | 170 | | | |
| No of obs | 210 | | | | |

| Panel B | Full sample 1984–2007 | |
|--|-----------------------|----------------------|
| | Model 1 | Model 2 |
| Log (1+ excess cash reserve ratio) | 0.020** (0.044) | 0.020** (0.042) |
| Log (1+ excess cash reserve ratio) x Nontrivial grand total institutinal holdings dummy | 0.072*** (0.000) | |
| Nontrivial grand total institutional holdings dummy | 0.012 (0.125) | |
| Log (1+ excess cash reserve ratio) x nontrivial insurance company holdings dummy | | 0.077*** (0.003) |
| Nontrivial insurance company holdings dummy | | 0.010 (0.214) |
| Log (1 + total assets) | 0.003* (0.051) | 0.003** (0.045) |
| Asset tangibility | -0.004** (0.038) | -0.004** (0.045) |
| Return on assets | 0.003 (0.714) | 0.002 (0.807) |
| Log (1+average sale growth) | 0.012*** (0.002) | 0.011*** (0.004) |
| Log (1+M/B) | -0.017*** (0.000) | -0.016*** (0.000) |
| Leverage | -0.026 (0.197) | -0.024 (0.239) |
| Relative deal value | -0.023*** (0.003) | -0.023*** (0.004) |
| Growth-and-Cash combination dummy | 0.001 (0.949) | 0.001 (0.992) |
| Cash paid to target from reserve | -0.926 (0.367) | -0.77 (0.459) |
| Tender offer dummy | -0.020*** (0.001) | -0.020*** (0.001) |
| Diversifying deal dummy | 0.001 (0.797) | 0 (0.983) |
| Friendly deal dummy | 0.008 (0.250) | 0.007 (0.355) |
| Constant | -0.019 (0.488) | -0.018 (0.521) |
| No of obs | 210 | 210 |
| Prob>F | 0.00*** | 0.00*** |
| Pseudo R-squared | 0.611 | 0.588 |

| Panel C | Full sample 1984–2007 | |
|--|-----------------------|----------------------|
| | Model 1 | Model 2 |
| Predicted bidder dummy \times log(1+ excess cash reserve ratio) | -0.019 (0.433) | -0.018 (0.462) |
| Unpredicted bidder dummy \times log(1+ excess cash reserve ratio) | 0.022* (0.075) | 0.024** (0.043) |
| Unpredicted bidder dummy \times Nontrivial grand total institutional holdings dummy \times log(1+excess cash reserve ratio) | 0.075*** (0.001) | |
| Nontrivial grand total institutional holdings dummy | 0.004 (0.669) | |
| Unpredicted bidder dummy \times Nontrivial insurance company holdings dummy \times log(1+excess cash reserve ratio) | | 0.076** (0.012) |
| Nontrivial insurance company holdings dummy | | 0.003 (0.718) |
| Unpredicted bidder dummy | 0.002 (0.778) | 0.003 (0.723) |
| Log (1 + total assets) | 0.001 (0.676) | 0.001 (0.556) |
| Asset tangibility | -0.004* (0.078) | -0.004* (0.065) |
| Return on assets | 0.007 (0.513) | 0.006 (0.551) |
| Log (1+average sales growth) | 0.012*** (0.006) | 0.011*** (0.010) |
| Log (1+M/B) | -0.017*** (0.000) | -0.016*** (0.001) |
| Leverage | -0.021 (0.363) | -0.025 (0.292) |
| Relative deal value | -0.027*** (0.003) | -0.027*** (0.003) |
| Growth-and-Cash combination dummy | -0.004 (0.514) | -0.004 (0.536) |
| Cash paid to target from reserve | -0.881 (0.460) | -0.892 (0.456) |
| Tender offer dummy | -0.018*** (0.008) | -0.018*** (0.006) |
| Diversifying deal dummy | 0.006 (0.333) | 0.006 (0.376) |
| Friendly deal dummy | 0.009 (0.301) | 0.008 (0.312) |
| Constant | 0.012 (0.732) | 0.008 (0.817) |
| No of obs | 210 | 210 |
| Pseudo R-squared | 0.533 | 0.513 |

Table V: The effects of excess cash reserve on post-acquisition bidder operating performance

This table reports robust regression estimates of bidders' post-acquisition abnormal operating performance, corrected for heteroskedasticity. Only completed deals are examined. In each year, operating cash flow performance is measured as operating cash flow less change in working capital over total assets, then adjusted by the median performance of those firms in the same industry, size decile and operating performance decile, an approach similar to Powell and Stark (2005). The dependent variable is adjusted operating performance of the combined firm averaged over 3 years after deal completion. For each pre-acquisition year, the target and bidder adjusted operating performances are combined into one figure, weighted by their respective market value. Pre-acquisition operating performance is the average combined adjusted operating performance over the three years prior to deal announcement. High excess cash reserve dummy is 1 if a bidder's excess cash reserve is above sample median and 0 otherwise. All other variables are defined in table I or table IV. The constant term captures any abnormal performance after the deal completion attributable to the deal. The coefficient of pre-acquisition operating performance captures the continuation of operational performance after the acquisition. The values in parenthesis are p-values. *, **, *** indicate significance at 10%, 5% and 1% respectively.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|--|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Pre-acquisition operating performance | 0.106*** (0.000) | 0.091*** (0.000) | 0.087*** (0.000) | 0.106*** (0.000) | 0.089*** (0.000) | 0.089*** (0.000) |
| CAR (-2,+2) | | 0.260*** (0.000) | 0.257*** (0.000) | 0.116 (0.405) | 0.287*** (0.000) | 0.287*** (0.000) |
| High excess cash reserve dummy | | | 0.009 (0.295) | | | |
| High excess cash reserve dummy × High long-run growth component dummy | | | | 0.038** (0.041) | | |
| High excess cash reserve dummy × Nontrivial grand total institutional holdings dummy | | | | | 0.042*** (0.001) | |
| High excess cash reserve dummy × Nontrivial insurance company holdings dummy | | | | | | 0.042** (0.041) |
| Constant | -0.034*** (0.000) | -0.037*** (0.000) | -0.043*** (0.000) | -0.031*** (0.000) | -0.041*** (0.000) | -0.041*** (0.000) |
| No of obs | 185 | 185 | 185 | 169 | 185 | 185 |
| Pseudo R-square | 0.192 | 0.181 | 0.181 | 0.112 | 0.224 | 0.19 |

Appendix I: Institutional environment for shareholder power in the UK and the US

| Shareholder power | United Kingdom | United States |
|--|--|--|
| Changing basic governance arrangements | Shareholders can initiate changes to company memorandum and the articles of association (i.e. the constitutional documents of UK firms). Changes can be made by a "special resolution" that requires a supermajority approval of 75% of casted votes at shareholder meeting (Companies Act, 1985, c. 6, section 9(1), 378(2)). | Only the board can initiate changes to corporate charters and the state of incorporation. Shareholders only have veto power (Delaware Code Annotated, Title 8, section 141(a) ; Model Business Corporation Act section 8.01(b)). |
| Extraordinary general meeting (EGM) | Shareholder(s) of 10% or more of the paid-up voting capital can requisition an EGM. The company's articles cannot deprive shareholders of these rights (Companies Act, 1985, c. 6, section 368). | Shareholders cannot call these meetings, unless stated otherwise in the certificate of incorporate or bylaws (Delaware Code Annotated, Title 8, section 211(d)). In principle, company bylaws can deprive shareholders of the right to call special meetings. |
| Shareholder proposal | At ordinary annual meetings, shareholder(s) holding no less than 5% of the voting rights or at least 100 shareholders (each has paid no less than £100 of paid-up capital) can compel the company to put a resolution to the meeting, and to circulate a statement less than 1000 words before the meeting (Companies Act, 1985, c. 6, section 376). | Shareholder can request the board to add proposals (not related to election) to the proxy document (SEC Rule 14a-8). In principle, the board is not bound by the proposal even when the proposal receives a majority of votes. Related costs belongs to the company. Shareholders can also make proposals via a full proxy solicitation (SEC Rule 14a). Shareholders bear related costs. |
| Appointing/removing directors via election | There must be a separate resolution for each director (Companies Act, 1985, c.6, section 292). Cumulative majority votings applies. A director can always be removed by a special meeting called for such purposes (Companies Act, 1985, c.6, section 303). | State laws and company bylaws apply. Under Delaware Law, plurality voting is the default practice, i.e. candidates that receive the highest votes (not necessarily a majority votes) win (Delaware Code Annotated, Title 8, section 216). |
| Appointing/removing directors by other procedures | | Shareholders can appoint/remove directors by written unanimous consent; If the consent is not unanimous, such action can only be taken when all the directorship is vacant and all such vacancies are to be filled by such consent (Delaware Code Annotated, Title 8, section 211(b)). |
| Staggered board | Usually, director terms are determined by the company articles. But shareholders can always remove a director (see above). | The terms of directors can be staggered, ensuring only one-third can be elected each year(Delaware Code Annotated, Title 8, section 141(d)). |
| Restricting voting power concentration | Shareholder rights plans (poison pills) are largely absent. | Delaware courts upholds shareholder rights plans which limit the ability of shareholders' concentrating voting power beyond certain thresholds (usually 10-15%). |
| Restrictions on management frustrating takeover bids | The Takeover Code prevents managers from blocking takeover bids and thus provides shareholders with the power to decide whether to accept such bids (Takeover Code, Rule 21). | No such restrictions. |
| Embedded takeove defences | Embedded takeove defenses are largely prevented because of various aspects of the UK corporate governance environment, which restricts directors' ability to entrench themselves (Armour and Skeel, 2007; also see above on staggered board and poison pills). | Various types of "enbeded takeover defenses" exists (Armour and Skeel, 2007). |
| Distribution to shareholders | Under the default of UK law, the board is subject to "any directions given by special resolution" of the shareholders(Companies Act appendix, Table A, provision 70). | Under state corporate law, the authority to determine distribution (in cash or in kinds) rests fully with the board (Model Business Corporation Act, section 6.40). |

Appendix II: Correlation matrix of variables

This table reports the correlation matrix of the variables in the analysis. Variables are defined in table I.

| | CAR (-2,+2) | Excess cash reserve ratio | Total Assets | Tangi- bility | ROA | Sales- growth | Market to book | Leverage | Relative deal value | Long-run growth component | Sector- specific component | Firm- specific component | Growth-and- Cash combination | Cash paid to target from reserve | Unpredicted bidder dummy | Tender offer dummy | Diversifying deal dummy | Friendly deal dummy |
|-----------------------------------|----------------|---------------------------------|-----------------|------------------|--------|------------------|-------------------|----------|---------------------------|---------------------------------|----------------------------------|--------------------------------|------------------------------------|--|--------------------------------|--------------------------|----------------------------|---------------------------|
| CAR (-2,+2) | 1 | | | | | | | | | | | | | | | | | |
| Excess cash reserve ratio | 0.195 | 1 | | | | | | | | | | | | | | | | |
| Total assets | 0.047 | -0.004 | 1 | | | | | | | | | | | | | | | |
| Tangibility | -0.008 | 0.021 | 0.117 | 1 | | | | | | | | | | | | | | |
| Return On Assets (ROA) | 0.183 | 0.323 | -0.041 | 0.049 | 1 | | | | | | | | | | | | | |
| Average sales growth | -0.078 | 0.097 | -0.049 | 0.173 | 0.036 | 1 | | | | | | | | | | | | |
| Market to book | -0.053 | -0.049 | -0.109 | 0.028 | -0.020 | 0.261 | 1 | | | | | | | | | | | |
| Leverage | 0.054 | 0.064 | 0.059 | -0.120 | 0.321 | 0.031 | -0.222 | 1 | | | | | | | | | | |
| Relative deal value | -0.164 | -0.040 | -0.237 | 0.006 | -0.025 | 0.062 | -0.013 | -0.150 | 1 | | | | | | | | | |
| Long-run growth component | -0.046 | 0.028 | 0.020 | -0.015 | 0.061 | 0.101 | 0.153 | 0.063 | -0.029 | 1 | | | | | | | | |
| Sector-specific components | -0.001 | 0.019 | 0.061 | 0.007 | -0.010 | -0.031 | -0.119 | 0.013 | 0.002 | -0.758 | 1 | | | | | | | |
| Firm-specific components | -0.031 | 0.000 | 0.395 | -0.021 | 0.125 | -0.001 | 0.021 | 0.147 | 0.047 | -0.068 | 0.117 | 1 | | | | | | |
| Growth-and-Cash combination dummy | -0.045 | 0.058 | 0.009 | 0.067 | 0.114 | 0.024 | 0.078 | 0.018 | -0.067 | 0.281 | -0.075 | 0.115 | 1 | | | | | |
| Cash paid to target from reserve | -0.218 | 0.021 | -0.072 | -0.008 | -0.009 | 0.171 | 0.040 | -0.082 | 0.116 | -0.028 | 0.021 | 0.024 | 0.094 | 1 | | | | |
| Unpredicted bidder dummy | -0.039 | -0.005 | -0.478 | 0.062 | 0.071 | 0.217 | 0.068 | 0.044 | 0.129 | 0.041 | -0.131 | -0.243 | -0.067 | 0.039 | 1 | | | |
| Tender offer dummy | -0.223 | -0.049 | -0.204 | -0.090 | -0.091 | 0.048 | 0.057 | -0.105 | 0.085 | -0.059 | 0.011 | -0.083 | -0.147 | 0.083 | 0.013 | 1 | | |
| Diversifying deal dummy | 0.081 | -0.033 | 0.103 | 0.092 | -0.085 | -0.120 | -0.163 | -0.030 | 0.043 | -0.132 | 0.175 | 0.051 | -0.062 | -0.069 | -0.190 | -0.173 | 1 | |
| Friendly deal dummy | 0.054 | -0.101 | -0.006 | 0.028 | 0.035 | -0.019 | 0.060 | -0.120 | -0.116 | 0.124 | -0.152 | -0.099 | 0.156 | -0.107 | 0.103 | 0.116 | 0.067 | 1 |