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Excess Cash Holdings, Stock Returns, and Investment Organicity: Evidence from UK Investment Announcements

This paper examines whether the market reaction to investment announcements is conditional on company *excess cash holdings*. Cash may convey significant price-relevant information about the future cash flows and strategic direction of a company. Using a sample of 4,256 corporate investment announcements by firms listed on the London Stock Exchange over the period 2005–2019, we show that market reactions to new company investment announcements are higher for firms with excess cash holdings. Furthermore, we provide evidence on the relationship between excess cash holdings and market valuation of various investment classes. The results reveal that organic investments are valued more highly by the market than inorganic investments, and the positive impact of excess cash holdings is more pronounced for the set of organic investment decisions, particularly product launches and R&D. Lastly, we evaluate how the motive for holding cash affects the market perception of excess cash holdings. The market views excess cash holdings as positive when cash is held as a result of high exposure to risk, high debt capacity, and high bid–ask spread. Market perception of excess cash holdings reverses from negative before to positive after the global financial crisis.

Key words: Cash; Cash holdings; Motives for cash holdings; Corporate investment; Organic investment; Inorganic investment; Managerial entrenchment; R&D; Event study; Market perception.

The purpose of this paper is to determine the impact of excess cash holdings on valuation of investment decisions. We focus on the market valuation of investment announcements, which is a relatively neglected aspect of valuation studies due to the varied and inconsistent nature of investment information. Yet some studies attempt to determine how such information affects market values (see, e.g., Burton *et al.*, 1999; Jones *et al.*, 2004). Developments in information technology, improved listing and governance requirements, and greater media attention have enhanced the information environment for conducting such studies. In this study, we examine the market valuation of investment announcements and

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focus in particular on the role of excess cash holdings. Results are consistent with our view that excess cash holdings affect the market reaction to investment decisions and play a strategic role when new investment is announced. Our findings imply that cash held conveys significant information regarding the success of an investment.

Early work on the role of cash was postulated by Keynes (1937), who argues that cash is held to meet specific needs such as transactions, precautions against unexpected events, and speculation. At the firm level, Myers (1984) and Myers and Majluf (1984) argue that firms require some financial slack if they are to pursue all investment opportunities with positive net present values (NPV), especially if there are imperfections in financial markets. Market imperfections could be an impediment to corporate value creation since firms will be compelled to reject positive NPV projects if they believe the cost of financing does not reflect the true value of their securities. An alternative view is proposed by Jensen (1986) who suggests that excessive cash holdings could fuel the agency problem, as managers can use internal financing to avoid monitoring by capital markets. Hence, cash-rich firms are more likely to engage in suboptimal investments. Subsequent studies in the cash holdings literature were motivated mainly based on the arguments proposed by Myers and Majluf (1984) and Jensen (1986). Some studies model the determinants of cash holdings, others explore the relationship between cash holdings and corporate governance, corporate innovations, and mergers and acquisitions (M&A) (Harford, 1999; Opler *et al.*, 1999; Almeida *et al.*, 2004; Ozkan and Ozkan, 2004; Harford *et al.*, 2008; Chen and Chuang, 2009; Acharya *et al.*, 2012).

International studies on the role of cash have shown that differences in institutional settings between countries and regions can significantly affect the determinants and impacts of cash holdings. Employing a sample from 45 countries, Dittmar *et al.* (2003) document that weak investor protection leads to higher levels of cash holdings, to the detriment of shareholder interests. In contrast, Kalcheva and Lins (2007) show that firm value is negatively related to the level of cash holdings in countries with weak investor protection. In a UK study addressing the role of cash from a corporate governance perspective, Ozkan and Ozkan (2004) find that cash holdings are driven by managerial ownership. Farinha *et al.* (2018) provide evidence that firms listed on the London Stock Exchange reserve more cash when earnings quality is low. Earnings opaqueness encourages cash holdings as a means to avoid costly external financing. Lee and Powell (2011), using an Australian sample, find that the marginal value of increasing cash holdings declines, suggesting capital markets penalize excessive cash holdings. Similarly, Jones (2016) shows that a cash flow model (including cash holdings and short-term investment) outperforms various alternative models for predicting corporate bankruptcy in Australia.

One of the main premises of our study is that we differentiate the market reaction to organic and inorganic investment conditional on the level of cash holdings. The impact of cash holdings on inorganic investment such as acquisitions is well documented in the literature (see, e.g., Harford, 1999). However, relatively few studies focus on the differences between organic and inorganic investment. Our study seeks to fill this gap. First, we argue that investors may react differently

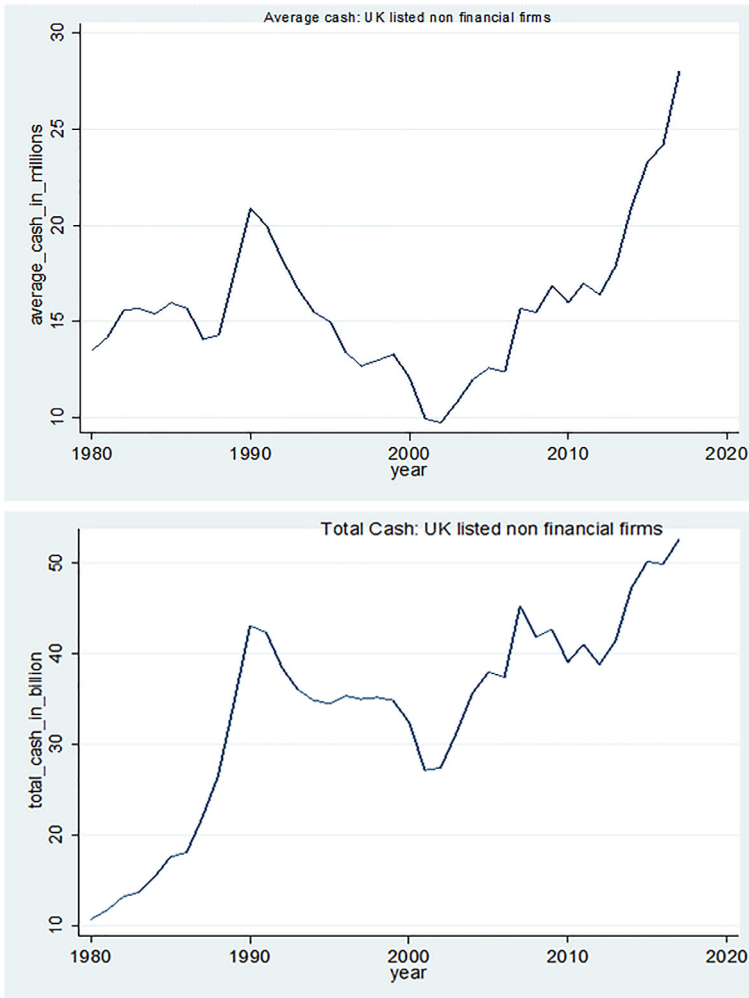
to organic and inorganic investment decisions. Contrary to inorganic (sometimes also referred to as non-organic) investment, organic investment focuses on internal growth, such as new product announcements and research and development (R&D). Internal growth strategies build an organization's long-term competitiveness based on improving the understanding of customer needs, which is fundamentally different from growth by acquisition (e.g., Lev, 1999, Kling *et al.*, 2009). Accordingly, Ahuja *et al.* (2017), using a sample of 550 US and European firms over a 15-year period, document higher shareholder return for companies that invest more in organic growth than using M&A. Secondly, we argue that cash holdings have distinctive advantages as a tool for comparing organic with inorganic investment. The level of cash holding can be used as a proxy for 'empire building' as a motive for acquisitive activity. Chen *et al.* (2020) report that poor internal controls are associated with increases in the level of abnormal cash holdings which in turn motivate value-destroying M&A activities. The level of cash holdings is also a proxy for 'value-creating' organic investment. Chay *et al.* (2015) show that organic investment is sensitive to cash holdings and indicate that cash flows from internal sources should be prioritized. Thus, the motive for companies with high cash holdings to choose organic or inorganic investment may be quite different. If cash holdings convey relevant information regarding the motivation behind investment behaviour, then the value implications and market reaction for each type of investment (organic and inorganic) will also be different.

Jensen (1986) and Myers and Majluf (1984) address the role of cash holdings in inducing overinvestment or underinvestment. In addition, the information content of investment announcements may extend to strategic significance, such as the value of growth opportunities or real options (Woolridge and Snow, 1990; Jones *et al.*, 2004). Building on these theoretical arguments and empirical observations, we provide new evidence on how firms' cash holding policies affect market reactions to new investment announcements. In particular, we examine how the valuation of investment announcements varies with investment classification as well as companies' motives for cash holdings. To the best of our knowledge, this study is the first to evaluate how the degree of cash held is perceived by the markets based on this categorization. Further, as discussed above, we explain the strategic reasons underpinning the valuation of organic and inorganic investment decisions.

To conduct our empirical tests, we use UK data. The UK provides an appropriate setting for this study since it is one of only a small number of countries that require firms to provide detailed information on investment decisions. It is also one in which the market has sufficient diverse ownership and liquidity to examine the issue at hand (Barca and Becht, 2002). In an article in the *Financial Times* (Times, 2013), cash held by FTSE 100 firms is reported to have risen from £12.2 billion to £73.9 billion between 2008 and 2013. The article indicates that shareholders advocate for a firm's excess cash position to be divested into dividend payments and investments. Figure 1 indicates a similar pattern of increasing average and total cash holdings by UK non-financial firms.

FIGURE 1

TRENDS IN CASH HOLDINGS BY UK LISTED NON-FINANCIAL FIRMS



Our study reveals that the market rewards firms that hold significant cash reserves when they make investment announcements.

Our main findings are as follows. Using a sample of 4,256 corporate investment announcements by UK companies in the FTSE ALL share index between 2005 and 2019, we find that excess cash holdings increase market valuation of corporate investment decisions. Our results suggest that there is a positive relationship between excess cash holdings and abnormal returns around corporate investment announcements. However, the positive relationship between excess cash holdings

and market valuation of corporate investment persists across our models for the set of organic investments, particularly new product announcements and R&D announcements. In contrast, in the case of inorganic investments, excess cash holdings are viewed unfavourably by the market.

The motive for holding cash also shapes the way the market reacts to corporate investment announcements. The market views excess cash holdings as positive when excess cash is held by firms with high debt capacity, high exposure to risk (i.e., high beta), high bid–ask spread, high board diversity, low free cash flow, and low market capitalization. Whereas excess cash holdings are perceived negatively for firms with low debt capacity, low risk exposure (beta), high market-to-book ratio, high net working capital, and low board diversity. These results suggest market participants infer information about agency costs, future cash flows, and the strategic direction of the firm from the firm's cash position when new investments are announced.

Lastly, we find that the markets' view of excess cash holdings reverses from negative in the period before the global financial crisis (GFC) to positive after the GFC.

HYPOTHESIS DEVELOPMENT

Cash Holdings and Market Valuation of Company Investment

Excess cash holdings can be a valuable tool for firms that wish to benefit from efficient financing of new investment projects (Myers and Majluf, 1984). Management have better information regarding firm value than potential investors (Myers and Majluf, 1984). As a consequence of asymmetry of information between managers and providers of external finance, funding of investment opportunities by means of external finance can be expensive during periods of firm undervaluation. Thus, when in need of finance, firms may prefer to finance internally if they perceive external finance to be overpriced. Accordingly, they are compelled to reject investment opportunities when they have no financial slack (i.e., cash). Firms that have sufficient financial slack are able to exercise investment opportunities without requiring external finance and at short notice.

The Myers and Majluf (1984) approach suggests that firms with high financial slack should seek out acquisition targets with good investment opportunities, limited financial slack of their own, and about which investors have limited information. Smith and Kim (1994) provide evidence that highlights the benefit of cash-rich firms acquiring targets with severe cash shortages. Correspondingly, Ascioğlu *et al.* (2008) reveal that information asymmetry reduces firm investment, implying that a firm's ability to exercise growth opportunities is constrained by high levels of information asymmetry. Similarly, companies with increased levels of information asymmetry may be forced to finance growth internally due to market undervaluation of the company and increased costs of external capital. Easley and O'Hara (2004) find an association between elevated levels

of information asymmetry and increased cost of equity. When information asymmetry is high, companies will be faced with higher external costs of finance or reliance on internal finance. In such cases, firm growth would be constrained by the availability of internal funds and underinvestment. Chen (2008) suggests that cash holdings are only valuable when firms have high investment opportunities. Without growth opportunities, firms with excess cash may be subject to overinvestment.

An alternative approach is advocated by Jensen (1986) who argues that there are agency costs associated with free cash flow. Free cash flows, the cash flows in excess of operating costs, are available to be used by managers for the expropriation of investors in the form of agency costs when corporate governance is imperfect. In this framework, corporate debt plays a central role in monitoring the activities of managers (Jensen, 1986). Debt lessens the agency problem by reducing the volume of cash available for discretionary spending. Furthermore, the monitoring role of debt is more important in corporations with limited growth opportunities but considerable cash flow. Managers with an excessive cash position are likely to invest in projects that may be suboptimal from a shareholder wealth perspective. Such expenditure may be motivated by private benefits of control rather than corporate value. Some subsequent studies have been conducted based on the free cash flow approach. For example, Lang *et al.* (1991) examine the free cash flow hypothesis in the context of takeovers and infer that high cash reserves induce rent-seeking behaviour and overinvestment. Harford (1999), Titman *et al.* (2004), and Harford *et al.* (2008) provide evidence that firms with large cash holdings are more likely to invest in value-destroying projects. Hence, we expect that the market reaction to new investment decisions will be modified by the level of cash holdings.

Hence, we hypothesize that:

H1: The level of cash holdings is associated with the market valuation of corporate investment announcements.

Managerial Entrenchment and Value Creation

Following the literature on the determinants of cash holdings (see, e.g., Opler *et al.*, 1999; Opler *et al.*, 2001; Pinkowitz and Williamson, 2001), we argue that cash is held for either survival, expansion, or managerial entrenchment. In support of the expansion argument, Opler *et al.* (1999), Ozkan and Ozkan (2004), and Chen and Chuang (2009) argue that firms with superior growth opportunities hold more cash than rivals with fewer growth opportunities within the same sector. Hence, to cater for the problem of underinvestment, such companies require some degree of flexibility (i.e., internal funds) to meet their investment needs. By holding cash, the company can exercise valuable growth opportunities without the need to raise capital and at short notice. Such decisions would be expected to create value as growth options should not be exercised unless they have positive NPV but, in

practice, markets may view the investment positively or negatively relative to expectations. Our argument is that these expectations are, at least in part, formed based on the motives of managers, and the level of cash holdings is indicative of the motives of managers.

One of the biggest risks for any financial organization is the risk of not meeting short-term financial obligations. Liquidity can threaten the going concern of a firm during downturns in the economic cycle or if adverse events affect an industry or sector (Opler *et al.*, 1999; Ozkan and Ozkan, 2004; Uyar and Kuzey, 2014). To mitigate the impact of such occurrences, firms are compelled to hold cash as a form of hedging against uncertainty. Similarly, firms that encounter difficulties in accessing finance from the capital market increase their cash reserves to meet financing shortfalls (Almeida *et al.*, 2004; Denis and Sibilkov, 2010). In addition, due to adverse exposure to fluctuation in interest rates, firms may be obliged to hedge with cash. Harford *et al.* (2014) explain how exposure to adverse movement in interest rates can prompt firms to increase cash reserves. Due to market conditions and investment requirements, some firms are forced to hold higher levels of cash.

In addition to expansion and survival as motives for holding cash, cash can act as a tool for insulating management from external scrutiny. When managers are less subject to monitoring, the resources of the company may be used by them to pursue personal objectives rather than those of the organization (Weisbach, 1988). Managerial entrenchment manifests when firms that have low investment opportunities, stable cash flows, low financing constraints, or low exposure to refinancing risk hold higher levels of cash (Florackis and Ozkan, 2009). Self-interested managers may undertake investment that increases their own personal significance to the organization. For example, managers may expand the structure of the company to include various departments or lines of production, such that the operations become complicated to manage or understand. As a result, managers acquire a high degree of artificial importance and the perception that they are indispensable to the company. Managerial power over boards allows CEOs with significant control over their boards to undertake investment opportunities even if the NPV of the investment is negative (Demsetz, 1983). More specifically, Ozkan and Ozkan (2004) and Anderson and Hamadi (2016) contend that firms with concentrated ownership tend to have higher levels of cash holdings. With cash at their disposal, managers can reduce monitoring and operate without constraints imposed by the need to raise external finance. In turn, managers can operate at lower levels of monitoring and value-destroying investments are more easily pursued.

The preceding arguments suggest that managers can use cash as a tool for either value creation or value destruction. Therefore, we hypothesize that cash holdings provide information about value creation or destruction associated with company investment decisions. The direction of the association between the market valuation of company investment announcements and the level of cash holdings depends on the motive for cash holdings. Our hypotheses are as follows:

- H2a: High cash holdings are positively associated with the market valuation of company investment announcements (value creation hypothesis).
- H2b: Stock market reaction to company investment announcements is higher for low excess cash holdings than high cash holdings (cash monitoring hypothesis).
- H2c: High cash holdings are negatively associated with the market valuation of company investment announcements (entrenchment hypothesis).

Organic and Inorganic Investment

Company investment is the commitment of financial, physical, and intellectual resources of a firm to the future generation of cash flow. In general, investment approaches employed by corporations can be organic or inorganic. Organic investment implies stimulating the development of a firm by focusing on internal development. This encompasses growing sales, customer base/clientele, and expansion or creation of a new product line based on an internal strategy (Bruner and Perella, 2004). Hence, organic investment includes capital investments such as the purchase of assets, product launch, and R&D, whilst inorganic growth focuses on business expansion by growing the scope of the business externally, including through M&A.

Compared to inorganic investment, organic investment is a slower and more painstaking growth strategy (Bruner and Perella, 2004). Inorganic investment is a more short-term strategy that offers quicker rewards (Trautwein, 1990). The short-term bias on investment can be somewhat relaxed in most classes of organic investment (Bruner and Perella, 2004). For instance, R&D announcements by firms with high growth opportunities are perceived positively (Doukas and Switzer, 1992). In addition, the free cash flow argument that applies to acquisitions does not apply to R&D investment announcements made by high growth firms (Szweczyk *et al.*, 1996). Correspondingly, Shah *et al.* (2008) argue that markets do not focus on short-term profitability but understand the implications of investments with long-term positive impacts such as R&D and other organic investments. They contend that the market takes a positive view of investments with a long-term impact. Thus, cash plays a more important role in organic than inorganic investment. Organic investments by financially constrained firms are more likely to cease as a result of illiquidity or funding shortages (Li, 2011). To this effect, Brown and Petersen (2011) demonstrate that financially constrained firms rely on cash for financing intangible investments. Therefore, the presence of large cash balances ensures the continuity and completion of such projects. Compared to acquisitions, where managers can take advantage of huge cash balances to propagate their self-interest (Harford, 1999), cash is required for organic investments because of their uncertain and long-term nature (Brown and Petersen, 2011).

Thus we hypothesize that:

H3a: For organic investments, the relationship between excess cash holdings and abnormal returns will be positive (long-term growth hypothesis).

H3b: For inorganic investments, the relationship between excess cash holdings and abnormal returns will be negative (entrenched investment hypothesis).

Data and Methodology

Company investment announcements were collected from the Financial Conduct Authority's (FCA) official national storage mechanism. We collected data for the period 2005–2019. Relevant categories of announcements were identified and an initial dataset of 14,425 announcements was reviewed for relevance according to the procedure outlined in Appendix A. To avoid the problem of contemporaneous price information release, we excluded contaminated announcements.¹ We categorized an announcement as contaminated if:

- during the event window, another event was announced that could alter price movement;
- the announcement was made in conjunction with another announcement that could alter price movement;
- the announcement was made by a firm in the financial services industry.

Among the final sample of 4,256 corporate investment announcements, 3,731 are announcements on corporate acquisition, 199 are acquisition of assets, 242 are R&D announcements, and 84 are new product announcements. Firm-level data were collected from DataStream. Further details on the sample cleaning process and distribution of the sample among years and industries are presented in Appendix B.

Empirical Model

Following the existing literature on cash holdings and corporate investment (see, e.g., Burton *et al.*, 1999; Opler *et al.*, 1999; Jones *et al.*, 2004). We estimate the following regression to evaluate the relationship between excess cash holdings and corporate investment announcement:

$$CAR_i = \alpha_o + \gamma_i \text{Excess Cash Holdings} + \gamma_j \text{Controls} + \gamma_k \text{Year} + \gamma_l \text{Industry} + \varepsilon \quad (1)$$

where the dependent variable *CAR* is the CARs over the period $t-1$ to $t+1$. We estimate market valuation of a corporate investment using an event study

¹ This approach mitigates against the possibility of a mixed-signal problem (Barraclough *et al.*, 2013) and to ensure the data provides for as clean a test of our hypotheses as possible.

approach. Abnormal returns for corporate investment announcements are estimated using the market-adjusted returns (MAR) method. The choice of MAR is motivated by the work of Brown and Warner (1980) who show that adjusting for firms' systematic risk and beta does not improve the performance of the return-generating mechanism. MAR are calculated by subtracting the expected returns surrounding the event announcement from the actual returns as follows:

$$AR_{it} = R_{it} - R_{mt} \quad (2)$$

where AR_{it} is the abnormal return for company i at time t , R_{it} is the return for company i at time t and R_{mt} is the return on the market at time t . Excess cash holdings is the difference between the firm cash holdings level and the average industry cash holdings for a year. *Controls* is a vector of variables that takes account of other factors that affect firm cumulative abnormal returns (CAR) around corporate investment announcements. The control variables employed in this study include size (i.e., natural logarithm of market capitalization), organic investment, free cash flow, market-to-book, leverage, run up (i.e., share price run-up), beta, market returns, dividend yield, capital expenditures, spread (i.e., bid-ask spread). The control variables follow Chen and Ho (1997), Datta *et al.* (2001), Jones *et al.* (2004), Barbopoulos and Sudarsanam (2012), and Andriosopoulos and Yang (2015).² ε is the error term. Year and Industry refer to year and industry fixed effects. Variable definitions are provided in Appendix C.

It can be problematic to differentiate between different sources of information using market reactions to new information.³ To circumvent this challenge, Barraclough *et al.* (2013) decompose the value of M&A into standalone value, market value of synergies, and allocation of the benefits of the combined entity between bidders and targets using call options. Their approach shows that share price information alone understates the true value created in corporate acquisitions. Similarly, Han *et al.* (2019) apply Barraclough *et al.*'s (2013) approach to capture the wealth effect of Australian firms to the 2011 announcement of the Australian Carbon Pricing Scheme, demonstrating a contrast between the news effect and the value effect. We are unable to use such an approach as we do not have the necessary exogenous shock, that is, the two required states or their probabilities. Furthermore, our focus is on whether organic investment is encouraged or discouraged by markets and what the role of excess cash holdings is in the valuation of such announcements. In our framework, the market reaction to any investment announcement is a combination of an announcement effect and the perceived increase in NPV, that is, the additional return over the expected return.

Identification of Motives for Holding Excess Cash

To examine the effect of firms' motives for holding excess cash on market responses to investment announcements (Hypotheses 2a to 2c), we identify the

² The control variable used in our regression analyses are continuous.

³ For instance, the value underpinning the market reaction to new acquisitions may be due to expected synergies or simply the standalone value of the entity being acquired (Bhagat *et al.*, 2005).

motives for cash holdings by categorizing firms in our sample based on whether they fall above or below the third quintile on several continuous variables regarded in the literature as being associated with the motives of survival, expansion, and entrenchment. We use various studies to guide our categorization as follows. For our value creation hypothesis (2a) we use leverage (Opler *et al.*, 1999; Pinkowitz *et al.*, 2001), market-to-book ratio (Opler *et al.*, 1999; Pinkowitz *et al.*, 2001; Ozkan and Ozkan, 2004), and board diversity (Bernile *et al.*, 2018). We use firm size (Ozkan and Ozkan, 2004), beta (Opler *et al.*, 1999), and bid–ask spread (Ascioglu *et al.*, 2008) to capture the cash monitoring motive (Hypothesis 2b). And for managerial entrenchment (Hypothesis 2c), we use leverage (again), free cash flow (Jensen, 1986), and net working capital (Opler *et al.*, 2001).

Firstly, consistent with the literature on the determinants of cash holdings, we split firms based on their leverage. Firms with high leverage may hold cash for expansion if they are financially constrained, which they might be expected to be, and not in danger of distress. However, if the prognosis for cash flows is a concern, highly leveraged firms may hold cash for survival (Opler *et al.*, 1999; Ozkan and Ozkan, 2004; Pinkowitz *et al.*, 2001). Whilst it is possible that such firms are subject to managerial entrenchment, the presence of debt monitoring and the potential for financial distress suggests that cash is held for other reasons. Conversely, firms with lower leverage (and hence possibly higher debt capacity) should be able to issue new debt for growth when required. If these firms are holding cash, then monitoring is weaker and cheaper debt could be raised as an alternative to theoretically more expensive equity. High cash holdings here imply managers are less subject to scrutiny. For our entrenchment hypothesis, we identify firms with leverage below the third quintile as firms with low leverage while firms above the third quintile are regarded as firms with high leverage. Firms with high leverage and high cash holdings might be considered to have a survival or expansion motive for holding cash which we argue would be perceived as a positive signal to markets and may result in a positive abnormal return as expressed in Hypothesis 2a. On the other hand, companies with lower leverage and potentially higher debt capacity have less need to hold cash. Extrapolating from Ozkan and Ozkan (2004) and Anderson and Hamadi (2016), we argue that holding cash when debt capacity is high indicates managerial entrenchment because managers with cash at their disposal are subject to less scrutiny. Without debt monitoring and with the potential to use cash opportunistically, managerial motives may be pursued and the signal to markets about the new investment may be a negative one.

Free cash flow refers to the operating cash flow that is above what managers can efficiently invest whilst yielding a positive return on investment (Jensen, 1986). In essence, the presence of high free cash flow may indicate rent-seeking tendencies (i.e., managerial entrenchment), since there are no profitable projects to be executed. For instance, managers of firms with high free cash flow may focus on empire-building even if this is not in the interest of shareholders. Managers of firms with low free cash flow are less exposed to this tendency. Motivated by Jensen's proposition, we split firms on the basis of their free cash flow. Firms

located above the third quintile of free cash flow are regarded as firms with high free cash flow since such firms are susceptible to the agency problem identified by Jensen (1986). Firms below the third quintile of free cash flow are firms with low free cash flow since they are less likely to dissipate liquid assets on unprofitable ventures.

Firms may build up cash reserves to ensure they exercise available growth opportunities (Opler *et al.*, 1999). Following this hypothesis, firms with high growth opportunities may be justified for their excess cash holdings whereas the high cash reserves of firms with fewer growth opportunities may be perceived as unwarranted. Therefore, firms with few growth opportunities and high cash holdings are more susceptible to the managerial entrenchment problem. In the spirit of Opler *et al.* (2001), we measure a firm's profitable growth opportunities using the market-to-book ratio. A high market-to-book ratio may also indicate a high probability of stock overvaluation. Firms with overpriced stocks are more likely to undertake acquisitions for reasons other than synergy (Gu and Lev, 2011). Accordingly, we split sample firms on the basis of their market-to-book ratio to identify firms holding cash to exercise growth opportunities. Firms located above the third quintile of market-to-book are identified as firms with high growth opportunities whilst firms below the third quintile of market-to-book are regarded as having low growth opportunities.

Large firms have better access to the capital market and are likely to have a good credit rating (Opler *et al.*, 1999). Hence, the size of a firm could mirror the degree of information asymmetry between the firm and the capital market (Ozkan and Ozkan, 2004). The degree of information symmetry varies inversely with the size of the firm (Opler *et al.*, 2001). Complementing this view, Easley and O'Hara (2004) argue that information asymmetry increases the cost of financing. Consequently, small firms may build up cash reserves to circumvent the high cost of financing (i.e., cash monitoring) whilst big firms may build up cash reserves for expropriation (i.e., managerial entrenchment). A higher level of information asymmetry may lead to a lower level of board monitoring (e.g., Cai *et al.*, 2015) and a higher level of management entrenchment (e.g., Lin *et al.*, 2019). As firm size is a common proxy for information asymmetry, we expect better monitoring and a lower level of managerial entrenchment for large firms. Following the literature on the determinants of cash holdings (see for example Opler *et al.*, 1999; Opler *et al.*, 2001; Pinkowitz *et al.*, 2006), we differentiate big firms from small firms based on their market capitalization. Consistent with our hypothesized motives for cash holdings, we identify firms above the third quintile of market capitalization as big and firms below the third quintile as small.

Managers may prioritize building up cash reserves if they are exposed to high risk because liquid assets reduce firm risk and increase managerial discretion (Opler *et al.*, 1999; Opler *et al.*, 2001; Harford *et al.*, 2014). Accordingly, we hypothesize that risky firms may build up cash reserves to mitigate their exposure to systematic risk. To measure firm exposure to market risk we estimate the beta of firms and identify firms above the third quintile as high-risk firms and their counterparts below the third quintile as low-risk firms.

Information asymmetry between managers and suppliers of finance increases the cost of financing (Ascioglu *et al.*, 2008). To mitigate the adverse selection problem in the capital market, firms with a high degree of information asymmetry between them and the capital market may build up cash reserves (Opler *et al.*, 2001). This justifies firms with high information asymmetry building up cash reserves; however, the case for firms with information symmetry holding excess cash is weak. To measure information asymmetry, we follow Biddle and Hilary (2006) and calculate the bid–ask spread. As information asymmetry is negatively related to the boards' monitoring role (e.g., Cai *et al.*, 2015) and positively related to managerial entrenchment (e.g., Lin *et al.*, 2019), we expect that firms with a large bid–ask spread may face lower monitoring, and greater managerial entrenchment. Firms above the third quintile of the bid–ask spread are identified as firms with high information asymmetry while firms below the third quintile of the bid–ask spread are regarded as firms with low information asymmetry.

Some companies may prioritize insuring themselves against the adverse selection bias in the capital market by holding liquid assets other than cash (Opler *et al.*, 2001). Therefore, it may appear counterproductive to hold excess cash and a high proportion of other liquid assets simultaneously since they are substitutes for cash. In the spirit of Opler *et al.* (1999), we measure the firm's cash substitutable asset by calculating its net working capital (i.e., working capital minus cash). Firms with net working capital above the third quintile of net working capital are identified as firms with high net working capital while those below the third quintile of net working capital are regarded as firms with low net working capital. High cash holdings by firms with high net working capital may indicate the potential for managerial expropriation.

Diverse boards perform better, adopt less risky financial policies, are more innovative, and pursue aggressive R&D policies (Bernile *et al.*, 2018). Given the inherent advantages and competency of diverse boards, they may be regarded as more trustworthy, and their financial policies and investment decisions should be perceived positively. Building on this proposition, we split firms based on their board diversity. Firms with board diversity scores above the third quintile are regarded as highly diverse firms whilst those below the third quintile are identified as firms with low board diversity.

EMPIRICAL RESULTS

Table 1 shows the descriptive statistics for the various investment categories. The summary data in Panels A and B suggest that companies in our set of organic and inorganic categories of investment do not differ in terms of leverage, capital expenditure, earnings per share, or market-to-book ratio.⁴

⁴ Compared to low cash-holding firms, excess cash-holding firms are on average significantly smaller, have a higher bid–ask spread, have more diverse boards, hold less free cash flow, and have higher market-to-book ratio. Similarly, on average, excess cash-holding firms have lower leverage, dividend yield, Capex, beta, DPS, EPS, and R&D expenditure when compared to low cash-holding firms.

TABLE 1
DESCRIPTIVE STATISTICS

	Panel A: Inorganic investment					Panel B: Organic investment					Difference in means
	Obs	Mean	SD	P25	P75	Obs	Mean	SD	P25	P75	
Cumulative Abnormal Returns	3,731	0.01	0.05	-0.01	0.03	525	0.02	0.18	-0.01	0.03	0.01**
Excess Cash Holdings	3,731	-0.02	0.10	-0.08	0.01	525	0.02	0.18	-0.09	0.10	0.05**
Cash Holdings Size	3,731	0.10	0.10	0.04	0.12	525	0.19	0.20	0.04	0.27	0.09**
Spread	3,731	13.90	2.12	12.52	15.19	525	13.47	2.86	11.51	15.58	-0.43**
Free Cash Flow	3,731	3.33	23.46	0.42	2.00	525	4.60	13.22	0.50	3.00	1.27
Relative Deal Size	3,731	0.11	0.12	0.08	0.16	525	0.02	0.24	0.01	0.13	-0.09**
Market-to-Book	3,731	0.00	0.03	0.00	0.00	525	1.36	1.02	0.62	1.64	0.05
Leverage	3,731	1.30	1.93	0.61	1.56	525	0.24	0.31	0.00	0.33	0
Dividend Yield	3,731	0.24	0.99	0.11	0.31	525	1.79	2.76	0.00	3.33	-2.04
Capex	3,731	3.83	32.14	1.38	3.48	525	0.04	0.08	0.01	0.05	0
Run Up	3,731	0.00	0.02	-0.01	0.01	525	0.00	0.03	-0.01	0.01	0
Beta	3,731	0.85	0.71	0.53	1.22	525	0.75	0.60	0.41	1.06	-0.10**
Market Returns	3,731	0.03	0.13	-0.02	0.13	525	20.66	50.32	0.00	10.57	4.50**
DPS	3,731	16.16	31.17	0.67	18.70	525	37.96	71.36	0.06	34.92	-2.37
EPS	3,731	40.33	65.64	5.13	45.63	525	1,038,466	2,183,224	8,462	182,575	793,582.80**
R&D	3,731	244,883	1,064,774	1,900	54,058	525	35	22	18	50	-1.63
Board Diversity	3,731	37	25	17	50	525	515,594.9	1,412,536	599.5	233,160	142,919.3
Number of Employees	3,731	372,676	2,900,821	4,700	99,900	525					

	Panel C: Asset acquisition					Panel D: New products					Panel E: R&D				
	Obs	Mean	SD	P25	P75	Obs	Mean	SD	P25	P75	Obs	Mean	SD	P25	P75
Cumulative Abnormal Returns	199	0.01	0.04	-0.01	0.03	84	0.00	0.05	-0.01	0.02	242	0.03	0.26	-0.01	0.05
Excess Cash Holdings	199	-0.03	0.09	-0.08	-0.01	84	-0.01	0.14	-0.10	0.04	242	0.08	0.22	-0.12	0.22
Cash Holdings Size	199	13.83	2.23	12.59	15.19	84	13.28	2.56	11.51	15.11	242	13.26	3.31	10.60	17.52
Free Cash Flow	199	2.06	3.96	0.30	1.99	84	8.73	22.59	0.50	4.47	242	5.19	13.36	1.00	3.25
Market-to-Book	199	0.09	0.15	0.06	0.15	84	0.02	0.28	0.03	0.13	242	-0.03	0.28	-0.08	0.12
Leverage	199	0.94	0.80	0.45	1.14	84	1.47	1.12	0.75	1.95	242	1.64	1.04	0.92	2.32
Dividend Yield	199	0.27	0.21	0.11	0.36	84	0.23	0.29	0.01	0.38	242	0.22	0.37	0.00	0.27
Capex	199	2.94	3.62	0.00	4.07	84	1.23	1.79	0.00	1.85	242	1.08	1.81	0.00	2.15
Run Up	199	0.06	0.12	0.02	0.07	84	0.03	0.04	0.01	0.04	242	0.02	0.02	0.00	0.02
Beta	199	0.00	0.02	-0.01	0.01	84	0.01	0.03	-0.01	0.02	242	0.00	0.03	-0.01	0.01
Market Returns	199	0.79	0.62	0.33	1.18	84	0.80	0.77	0.32	1.22	242	0.71	0.51	0.45	0.91
DPS	199	0.04	0.13	-0.02	0.13	84	0.06	0.13	-0.02	0.16	242	0.02	0.14	-0.05	0.10
EPS	199	12.11	19.98	0.00	14.00	84	3.46	8.83	0.00	5.08	242	32.51	68.12	0.00	2.85
R&D	199	33.68	45.23	1.12	43.40	84	13.21	21.79	0.52	19.77	242	48.93	92.62	0.00	78.65
Board Diversity	199	694,219	2,151,315	600	20,946	84	282,280	1,332,429	6,144	21,359	242	1,310,808	2,322,448	11,242	2,637,854
Number of Employees	199	550,392	1,779,580	14	50	84	45	35	17	78	242	33	15	25	44
				3,324	155,050	84	482,716	1,624,189	1,335	132,052	242	499,881	968,504	309	568,269

This table presents a descriptive summary of the variables used in this study. Panel A reports firm-level variables for the set of inorganic investments while Panel B reports firm-level variables for the set of organic investments. The *t* statistics report the difference in mean between the organic and inorganic observations. Panels C, D, and E report firm-level data for asset acquisition, new products, and R&D respectively.

According to our results, in terms of CARs, the market values organic investments more highly than inorganic investment announcements. A potential explanation for this is that such firms are young and are yet to exhaust their growth opportunities to the point of pursuing acquisitive growth (Bahadir *et al.*, 2009). Similarly, firms that favour organic investments appear to hold higher cash reserves and are significantly smaller when compared to their counterparts that favour inorganic investments. Cash holdings in this study are higher than reported by Ozkan and Ozkan (2004). However, the data for their study precede the global financial crisis, which may have encouraged higher cash holdings to mitigate short-term risks. The size difference between firms making organic and inorganic investment announcements supports the view expressed by Chan *et al.* (2001) that organic investment is better suited to smaller firms.⁵

Organic investment announcement firms have significantly lower betas, lower free cash flow, pay higher dividends, and spend more on R&D than inorganic investment firms. Among the group of organic investment announcements, R&D announcements are more highly valued than new product announcements and asset acquisitions. Product launches are associated with the lowest abnormal returns among organic investment announcements.

Prior studies in the UK examine similar classes of corporate investment to the present study. Burton *et al.* (1999) classify investment decisions based on how quickly investments yield cash flow. They report CARs of 1.2% for R&D and 0.35% for capital investment, whereas Jones *et al.* (2004) report average returns of 0.022%, 0.019%, and 0.003% for R&D, new product announcements, and asset expenditures respectively. The figures are broadly similar to previous studies (Burton *et al.*, 1999; Jones *et al.*, 2004). Our results indicate that the market reacts more favourably towards announcements of organic investment such as R&D and new product announcements than it does in response to corporate acquisitions. In this framework, the motivation for undertaking the investment decision drives the market reaction. Unlike acquisitions, which can be driven by motives such as managerial entrenchment and short-termism, organic investment has a longer horizon.

Excess Cash Holdings and Corporate Investment Valuation

Table 2 presents the results of the baseline regressions (i.e., model 1). The dependent variable is the three-day CAR ($t-1$ to $t+1$). We limit our CAR to the period $t-1$ to $t+1$ following results from the t -test on daily abnormal returns. The variable of interest is Excess Cash Holdings, measured as the ratio of cash to net assets adjusted by average industry cash holdings.⁶ The results in Table 2 (models 2 and 3) indicate that higher excess cash holdings are associated with higher stock

⁵ In the year prior to the corporate investment announcement, firms in our sample have significantly higher free cash flow and betas as well as less diverse boards and lower leverage.

⁶ We also use 'historically adjusted cash holdings' as an alternative proxy. The alternative proxy is the difference between a firm's cash holdings and this firm's average cash holdings in the previous five years. The results are very similar to those in Tables 2 and 3 and are reported in Appendix D.

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TABLE 2

EXCESS CASH HOLDINGS AND MARKET VALUATION OF CORPORATE INVESTMENT ANNOUNCEMENTS

	(1)	(2)	(3)	(4)	(5)
Excess Cash Holdings	0.0502*** (4.84)	0.0353*** (2.82)	0.0318*** (2.45)	0.0310*** (2.37)	0.0326*** (2.03)
Excess Cash Holdings Squared				-0.0001 (-0.14)	-0.0003 (-0.22)
Excess Cash Holdings Cubed					-0.0000 (-0.18)
Size		-0.0026*** (-3.97)	-0.0030*** (-4.17)	-0.0030*** (-4.13)	-0.0029*** (-4.12)
Organic		0.0070** (1.85)	0.0072** (1.67)	0.0079** (1.82)	0.0079** (1.83)
Free Cash Flow		-0.0392*** (-4.13)	-0.0400*** (-4.04)	-0.0416*** (-4.13)	-0.0415*** (-4.12)
Market-to-Book		0.0004 (0.58)	0.0006 (0.89)	0.0006 (0.87)	0.0006 (0.86)
Leverage		-0.0096 (-1.40)	-0.0105 (-1.50)	-0.0108 (-1.55)	-0.0107 (-1.53)
Run up		0.2463*** (4.25)	0.2477*** (4.25)	0.2454*** (4.20)	0.2454*** (4.20)
Beta		-0.0045*** (-2.47)	-0.0042*** (-2.13)	-0.0040*** (-2.04)	-0.0040*** (-2.05)
Market Returns		0.0069 (0.76)	-0.0212 (-0.32)	-0.0216 (-0.32)	-0.0207 (-0.31)
Dividend Yield		-0.0000 (-0.38)	-0.0000 (-0.44)	-0.0000 (-0.44)	-0.0000 (-0.43)
Capital Expenditure		-0.0098 (-0.40)	-0.0092 (-0.36)	-0.0086 (-0.34)	-0.0084 (-0.33)
Spread		-0.0000 (-0.52)	-0.0000 (-0.50)	-0.0000 (-0.50)	-0.0000 (-0.50)
Year dummy	No	No	Yes	Yes	Yes
Industry dummy	No	No	Yes	Yes	Yes
Intercept	0.0121*** (10.17)	0.0567*** (6.58)	0.0612*** (5.29)	0.0611*** (5.22)	0.0613*** (5.22)
Obs	4,256	4,256	4,256	4,256	4,256
Adjusted R-squared	0.005	0.026	0.025	0.025	0.025

This table presents the regression estimates of the effect of excess cash holdings on CARs of corporate investment announcements (organic and inorganic). Model 1 is the baseline model. Model 2 reports the relationship after including factors known to impact market valuation of corporate investment announcements. Model 3 reports the results after including year and industry dummies. Models 4 and 5 evaluate if heightened levels of excess cash holdings alter the relationship between excess cash holdings and market valuation of corporate investment announcements. ** and *** report significance below 10% and 5% respectively. *t*-statistics are reported in parentheses.

market valuation of investment announcements. One explanation for this finding is that high excess cash-holding firms undertake investments that are generally perceived as value-enhancing. Myers and Majluf (1984) argue that due to market imperfections and information asymmetry, managers are compelled to hold cash to meet shortages in finances, and to ensure they are able to exercise valuable investment opportunities, they require the flexibility provided by large cash

holdings. Further, our results complement the works of Easley and O'Hara (2004) and Ascioglu *et al.* (2008) who argue that information asymmetry increases the cost of financing. To compensate for these market imperfections, companies build up large cash reserves.

The findings in Table 2 (models 2 and 3) also indicate that the market responds positively to new announcements of organic investment. This is good news for firms who can thus pursue such investments without fear of a discount on the stock prices due to the less immediate nature of cash flows from organic investments (Burton *et al.*, 1999). Our evidence provides some support for the view that markets reward longer-term investments (Jones *et al.*, 2004).

The results in Table 2 (models 2 and 3) indicate that the size of a firm negatively affects the market valuation of investment announcements. This is consistent with the size effect identified in the cross-section of abnormal returns (Fama and French, 1993). Large firms are also more likely to engage in investments that are perceived as suboptimal, such as empire-building (Shin and Kim, 2002; Moeller *et al.*, 2004). Large firms with low investment opportunities engage in investments motivated by managerial motivation rather than shareholder value maximization (Shin and Kim, 2002). Similarly, free cash flow and firm beta negatively affect market responses to new corporate investment announcements. We also find that the share performance of firms in the build-up to corporate investment announcements significantly affects how investment announcements are priced. A positive share performance at announcement impacts the market valuation of corporate investment announcements favourably. The result validates the claim that momentum and investment optimism could positively influence the valuation of corporate investments (Antoniou *et al.*, 2008).

Investment Valuation and Levels of Cash Holdings

In Table 2 (models 4 and 5), we examine the non-linear relationship between cash and the market valuation of investment announcements. Models (4) and (5) include the squared and cubed values of excess cash holdings. These coefficients are not significant in our models, suggesting that assigning higher weightings to the higher values does not affect the results. This finding can be interpreted as inconsistent with the free cash flow perspective of Jensen (1986) as well as the views of Shin and Kim (2002) and Harford (1999), who argue that cash-rich firms undertake sub-optimal investment decisions. On the other hand, our result lends support to Myers and Majluf's (1984) argument that due to market imperfections firms need to build up cash reserves.

Excess Cash Holdings, Investment Classes, and Market Valuation of Investment

Table 3 presents the results of decomposing the sample into subcategories of investment. We classify investments as either organic or inorganic. Organic investment refers to investments excluding takeovers and acquisitions. This

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TABLE 3

EXCESS CASH HOLDINGS AND INVESTMENT CLASSES

	Inorganic investment	Organic investment	Asset acquisition	New products	R&D
Excess Cash Holdings	-0.0177*** (-1.99)	0.1459*** (2.21)	0.0078 (0.17)	0.1132** (1.74)	0.2011** (1.65)
Size	-0.0035*** (-7.69)	0.0036 (0.75)	-0.0026 (-1.22)	-0.0014 (-0.41)	-0.0011 (-0.06)
Spread	-0.0001*** (-2.31)	0.0011 (1.53)	0.0006 (0.73)	0.0008*** (2.81)	0.0013 (0.76)
Free Cash Flow	0.0254*** (3.55)	-0.1350*** (-2.71)	0.0318 (1.21)	0.0181 (0.57)	-0.2419*** (-2.16)
Relative Deal Size	0.0384 (1.04)				
Paid in Debt	-0.0009 (-0.06)				
Paid in Shares	0.0470 (1.20)				
Paid in Cash	-0.0007 (-0.07)				
Market-to-Book	0.0003 (0.81)	-0.0214** (-1.85)	0.0069 (1.38)	-0.0145*** (-2.18)	-0.0387 (-1.32)
Leverage	-0.0087** (-1.67)	-0.0268 (-0.93)	0.0012 (0.06)	-0.0716*** (-2.88)	-0.0636 (-1.11)
Run up	0.0954*** (2.56)	0.8425*** (2.72)	-0.1373 (-0.88)	0.2367 (1.21)	1.2534*** (2.21)
Beta	-0.0039*** (-3.38)	-0.0131 (-0.80)	0.0107 (1.64)	-0.0108 (-1.52)	0.0045 (0.10)
Market Returns	-0.0568 (-1.36)	0.0260 (0.06)	-0.6338*** (-3.34)	0.6666*** (2.32)	-0.7137 (-0.72)
Dividend Yield	-0.0000 (-0.86)	-0.0011 (-0.24)	-0.0036*** (-2.94)	0.0140*** (3.45)	0.0177 (0.73)
Capital Expenditure	-0.0342** (-1.93)	0.0292 (0.25)	0.0066 (0.23)	-0.2380** (-1.68)	0.9550 (0.93)
Year	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes
Intercept	0.0670*** (9.20)	0.0069 (0.09)	0.1239*** (3.66)	-0.0496 (-0.71)	-0.0342 (-0.15)
Observation	3,731	525	199	84	242
Adjusted R-squared	0.032	0.040	0.077	0.513	0.046

This table presents the results of the regression analysis of the impact of excess cash holdings on CARs for various types of corporate investment announcements. ** and *** report significance below 10% and 5% respectively. *t*-statistics are reported in parentheses.

category includes growth activities that focus on internal development such as increasing sales, growing clientele/customer base, and expansion/creation of a new product line. Table 3 also shows organic investments divided into the subcategories of asset acquisition, new products, and R&D. Inorganic investment refers to external growth strategies that include takeovers and acquisitions.

TABLE 4
MATCHING ORGANIC TO INORGANIC INVESTMENTS

	Organic investment		Asset acquisition		New products		R&D	
	Treated	Matched	Treated	Matched	Treated	Matched	Treated	Matched
Excess Cash Holdings	0.1459*** (2.20)	0.0131 (0.48)	0.0076 (0.16)	-0.0112 (-0.27)	0.1132** (1.74)	-0.3802*** (-3.80)	0.2011** (1.65)	0.0170 (0.39)
Size	0.0036 (0.75)	-0.0009 (-0.70)	-0.0026 (-1.22)	0.0011 (0.46)	-0.0014 (-0.41)	0.0101** (1.82)	-0.0011 (-0.06)	-0.0006 (-0.27)
Spread	0.0011 (1.52)	0.0001 (0.27)	0.0006 (0.73)	0.0007 (0.90)	0.0008*** (2.81)	0.0006 (0.78)	0.0013 (0.76)	0.0040*** (2.16)
Free Cash Flow	-0.1352*** (-2.71)	0.0634*** (4.09)	0.0319 (1.21)	0.0024 (0.06)	0.0181 (0.57)	-0.1075*** (-3.34)	-0.2419*** (-2.16)	0.0854*** (3.54)
Relative Deal Size		-0.0251 (-0.11)	0.0769 (0.07)	-0.7846 (-0.23)		-2.0120 (-0.07)		-0.1655 (-0.71)
Paid by Debt		0.0000 (0.00)		0.0000 (0.00)		0.0000 (0.00)		0.0000 (0.00)
Paid in Shares		0.0000 (0.00)		0.0000 (0.00)		0.0000 (0.00)		0.0000 (0.00)
Paid in Cash		0.0206 (0.89)		0.0190 (0.42)		0.0000 (0.00)		0.0000 (0.00)
Market-to-Book	-0.0214*** (-1.85)	-0.0023 (-0.81)	0.0070 (1.38)	0.0041 (0.75)	-0.0145*** (-2.18)	0.0252*** (3.19)	-0.0387 (-1.32)	0.0191*** (3.53)
Leverage	-0.0269 (-0.93)	0.0071 (0.50)	0.0013 (0.07)	0.0488*** (2.29)	-0.0716*** (-2.88)	-0.0084 (0.076)	-0.0636 (-1.11)	0.2392*** (5.51)
Dividend Yield	-0.0011 (-0.24)	0.0012 (1.16)	-0.0036*** (-2.92)	-0.0008 (-1.50)	0.0140*** (3.45)	0.0076 (1.556)	0.0177 (0.73)	-0.0055*** (-2.11)
Capex	0.0289 (2.25)	-0.0687*** (-2.13)	0.0066 (0.23)	-0.0469 (-1.35)	-0.2380** (-1.68)	0.1556 (0.35)	0.9550 (0.93)	-1.2880*** (-3.96)
Run Up	0.8426*** (2.72)	0.3204*** (4.51)	-0.1379 (-0.88)	0.2705*** (3.01)	0.2367 (1.21)	1.1180*** (2.84)	1.2534*** (2.21)	0.8204*** (4.65)
Beta	-0.0131 (-0.80)	-0.0127*** (-2.58)	0.0107 (1.64)	-0.0121 (-1.50)	-0.0108 (-1.52)	-0.0207 (-1.18)	0.0045 (0.10)	-0.0198*** (-2.49)
Market Returns	0.0261 (0.06)	0.4588*** (4.15)	-0.6333*** (-3.32)	0.2381 (1.17)	0.6666*** (2.32)	0.1710 (0.47)	-0.7137 (-0.72)	1.2332*** (7.02)

(Continues)

TABLE 4
CONTINUED

	Organic investment		Asset acquisition		New products		R&D	
	Treated	Matched	Treated	Matched	Treated	Matched	Treated	Matched
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Intercept	0.0067 (0.09)	-0.0291 (-1.30)	0.1238*** (3.64)	-0.0352 (-0.98)	-0.0496 (-0.71)	-0.1224** (-1.73)	-0.0342 (-0.15)	-0.0021 (-0.05)
Obs	526	526	208	208	85	85	242	242
Adjusted R-squared	0.038	0.287	0.071	0.279	0.513	0.305	0.046	0.582

This table presents the results of matching various classes of organic investment to inorganic investments. The columns labelled 'Treated' refer to the organic investment category while the columns labelled 'Matched' refer to inorganic investment announcements made by firms similar to companies in the treated category. Matching was done on a one-to-one basis for organic investment. Using the Mahalanobis algorithm, the set of organic investments are matched with the inorganic set of announcements based on market capitalization, total debt, and EBITDA. This approach ensures constituents of the matched and treated samples are similar in character. ** and *** report significance below 10% and 5% respectively. *t*-statistics are reported in parentheses.

The results indicate that excess cash holdings have a positive effect on the market value of organic investment decisions. This effect is most pronounced in the subcategories of new product announcements and R&D. Organic investments generally have a longer investment horizon, thus requiring a long time-span for future cash flow to be generated. Furthermore, working capital requirements and the outcome of these investments are inherently uncertain. The implication is that cash availability can provide the financial flexibility required to ensure the success and completion of such investments. We find a negative association between excess cash holdings and the CAR for inorganic investment. This suggests that excess cash holdings around the announcement of an acquisition may signal managerial myopia or other agency problems associated with acquisitions. The results confirm the position of Harford (1999), Titman *et al.* (2004), and Harford *et al.* (2008), who suggest that cash-rich firms are more likely to invest in value-destroying projects. In general, our results support the long-term growth hypothesis. In addition, it is interesting to compare our results in Table 3 to those in Table 2. The coefficient of organic investment exhibits weak significance in Table 2, suggesting some positivity towards organic investment. The effect of cash holdings on market reactions is clearly different between the organic and inorganic subsamples. Excess cash matters with respect to the market valuation of new information regarding the organicity of an investment.

In Table 4, we conduct an additional analysis in which we match the organic set of announcements with the inorganic set of announcements. We match firms in the organic category (i.e., the general category of organic investments as well as the asset acquisitions, product launch, and R&D subcategories) with similar firms in the inorganic category based on market capitalization, debt, and EBITDA using the Mahalanobis matching algorithm. This methodology ensures our sample of organic investment announcements are appropriately matched with similar cases in the inorganic investment group. The results from the additional analysis confirm that organic investment announcements by firms with excess cash holdings are viewed favourably by the market. Furthermore, the findings from the matching suggest that for new products (i.e., product launches) and R&D categories of investment announcements, the impact of excess cash holdings on the market valuation of corporate investment announcements remains positive.

Motives for Holding Cash and Market Valuation of Corporate Investment

Table 5 shows the results of dividing the sample into categories of variables that indicate the motivations for cash holding. The hypothesized motive for cash holdings for each variable is divided into either the value creation (survival or expansion) motive or the managerial entrenchment motive. We use eight variables to indicate the motive of the cash holdings—Leverage, Free Cash Flow, Market-to-Book ratio, Market Capitalization (Size), Beta, Bid-Ask Spread, Net Working Capital, and Board Diversity. For each variable, we use their quintile location to identify their potential motive for cash holdings. For instance, if a firm's leverage

TABLE 5
EXCESS CASH HOLDINGS, CORPORATE INVESTMENT VALUATION, AND FIRM CHARACTERISTICS

	Leverage		Free Cash Flow		Market-to-Book		Market Capitalization		Beta		Bid-Ask Spread		Net Working Capital		Board Diversity	
	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
Excess Cash Holdings	-0.0345***	0.0682***	-0.0105	0.1009***	-0.0346***	-0.0131	-0.0046	0.0661**	0.0892***	-0.0569**	0.1057***	-0.0077	-0.0313**	0.0191	0.0361***	-0.0412**
Organic	(-2.11)	(2.36)	(-0.95)	(3.09)	(-2.58)	(-0.68)	(-0.45)	(1.67)	(3.95)	(-1.90)	(2.76)	(-0.70)	(-1.90)	(1.31)	(2.29)	(-1.68)
Size	0.0085***	0.0130	0.0046	0.0081	0.0134***	0.0008	0.0030	0.0044	0.0057	0.0100	0.0025	-0.0014	-0.0014	0.0093**	0.0067	0.0081
Spread	(-2.41)	(-3.35)	(-1.85)	(-0.30)	(-5.09)	(-4.79)	(-3.34)	(-2.63)	(-1.75)	(-2.84)	(-1.32)	(-5.07)	(-7.64)	(-3.03)	(-3.52)	(-1.68)
Free Cash Flow	-0.0073	-0.0470***	0.0145	-0.0844***	0.0046	0.0105	0.0127	-0.0607***	-0.0298**	-0.0482***	-0.0971***	0.0266***	0.0381***	-0.0427***	-0.0409***	0.0113
Market to Book	0.0037***	0.0002	0.0003	-0.0107***	0.0007	(0.61)	(1.10)	(-2.35)	(-1.96)	(-1.99)	(-3.40)	(3.32)	(2.94)	(-2.88)	(-3.61)	(0.50)
Leverage	(2.15)	(1.15)	(0.84)	(-2.39)	(1.27)	(-0.19)	(0.53)	(-1.09)	(-0.67)	(1.01)	(-0.44)	(-0.26)	(0.75)	(1.34)	(0.71)	(-0.10)
Dividend Yield	-0.0178***	0.1527**	-0.0368***	0.0065	-0.0036	(-0.58)	(-3.29)	(-1.35)	(-1.04)	(-1.60)	(-0.16)	(-1.55)	(1.33)	(-2.78)	(-0.93)	(-1.60)
Capex	-0.0333**	0.0239	-0.0170	-0.0494	-0.0216	(-0.34)	(-1.76)	(0.14)	(-0.07)	(-0.37)	(0.32)	(-0.03)	(-2.78)	(-0.81)	(-0.39)	(-2.56)
Run Up	(-1.80)	(0.25)	(-0.73)	(-0.89)	(-1.35)	(-1.85)	(1.07)	(-0.22)	(0.09)	(-0.46)	(0.46)	(-0.63)	(-0.47)	(-1.44)	(-0.51)	(-0.17)
Beta	0.1217***	0.4550***	0.0795	0.3758***	0.1330***	0.0940	0.0854**	0.5292***	0.0836	0.5986***	0.4776***	0.0288	0.1274***	0.3791***	0.2663***	0.0572
Market Returns	0.0003	-0.0067**	-0.0036**	(2.86)	(2.04)	(1.54)	(1.83)	(3.24)	(0.85)	(4.86)	(2.88)	(0.62)	(0.0011)	(5.76)	(3.93)	(0.61)
Year	(0.14)	(-1.67)	(-1.79)	(-1.15)	(-0.01)	(-4.22)	(-0.63)	(-1.74)	(-1.62)	(-1.57)	(-0.30)	(-4.31)	(0.45)	(-3.75)	(-1.93)	(-1.10)
Industry Intercept	-0.0529	-0.0528	-0.0147	-0.0658	-0.1214	-0.0768	-0.1060***	0.0471	-0.0916	-0.0294	-0.0684	-0.0281	-0.0590	-0.0033	-0.0244	-0.2218***
	(-0.83)	(-0.30)	(-0.31)	(-0.33)	(-1.62)	(-1.01)	(-2.37)	(0.22)	(-0.79)	(-0.13)	(-0.37)	(-0.46)	(-0.92)	(-0.04)	(-0.31)	(-2.08)
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	0.0794***	0.0806***	0.0571***	0.0657***	0.0848***	0.0763***	0.0506***	0.2044***	0.0635***	0.0899***	0.0814**	0.0535***	0.0995***	0.0586***	0.0621***	0.0777***
	(6.04)	(2.50)	(5.58)	(2.17)	(5.21)	(6.34)	(4.33)	(3.04)	(2.76)	(3.08)	(1.78)	(5.97)	(8.32)	(3.48)	(4.43)	(3.23)

(Continues)

TABLE 5
CONTINUED

	Leverage		Free Cash Flow		Market-to-Book		Market Capitalization		Beta		Bid-Ask Spread		Net Working Capital		Board Diversity	
	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
Obs	1.842	1.358	1.895	1.388	1.789	1.469	2.400	911	2.049	971	1.055	2.594	1.876	2.043	3.409	554
Adjusted R-squared	0.036	0.026	0.042	0.034	0.029	0.038	0.019	0.038	0.035	0.033	0.052	0.024	0.035	0.049	0.024	0.025

This table presents the results of the regression analysis of the impact of excess cash holdings on CARs for various types of corporate investment announcements. CARs to company investment announcements are split based on Leverage, Free Cash Flow, Market to Book, Market Capitalization, Beta, Bid-Ask Spread, Net Working Capital, and Board Diversity. Observations are termed High or Low depending on their location comparative to the third quintile. For instance, firms with leverage above the third quintile of our leverage measure are regarded as highly leveraged firms whilst firms with leverage below the third quintile are identified as lowly leveraged firms. Only firms below and above the third quintile are included in this regression. Leverage is the ratio of debt to total assets. Free Cash Flow is operating income before depreciation, interest expenses, taxes, and capital expenditures scaled by the book value of total assets. The Market-to-Book ratio is the ratio of a firm's market capitalization to the book value of assets. Market Capitalization refers to the market value of a firm's outstanding shares of stock. It is simply the current market price of a firm multiplied by the outstanding shares. Beta is the coefficient of the relationship between a firm and the market. Bid-Ask spread is the difference between the ask price and the bid price of a share. Net Working Capital is working capital minus cash divided by total assets. Board Diversity is the percentage of board members that have a cultural background other than that of the location of the corporate headquarters. ** and *** report significance below 10% and 5% respectively. *t*-statistics are reported in parentheses.

is in the first quintile, we classify it as 'low leverage'. On the other hand, it will be classified as 'high leverage' if its leverage value is in the fifth quintile.

In Table 5, leverage has a significant influence on the impact of cash holdings on the market valuation of investments. Contrary to our expectations, excess cash holdings have a negative influence on abnormal returns to new investment announcements by high leverage companies. One potential explanation here is that markets prefer to see the cash used to retire debt. Whilst for firms with low leverage that might be more likely to be motivated by entrenchment, excess cash has a positive effect on the abnormal returns to investment announcements. We interpret that markets believe that excess cash is being used for value creation in these cases.

In the spirit of Jensen's free cash flow argument, we also split firms based on their free cash flow. Firms with free cash flow above the third quintile can be viewed as more susceptible to the agency problem supposed by Jensen (1986), and hence may build up cash for managerial entrenchment. Alternatively, firms with free cash flow below the third quintile of free cash flow may be perceived as building cash reserves for survival or expansion. The results presented in Table 5 indicate that excess cash holdings by firms with low free cash flow positively impact market valuations of corporate investment. However, the relationship is insignificant for high free cash flow firms.

Low growth opportunities are measured by identifying market-to-book ratio below the third quintile of market-to-book ratio; this captures cash held for entrenchment purposes whilst market-to-book ratio above the third quintile indicates cash held for the exercise of growth opportunities, that is, for expansion purposes. The results indicate that excess cash holdings by firms with high investment opportunities negatively affect the market valuation of their corporate investment announcements. This finding is contrary to the views of Opler *et al.* (1999) and Chen and Chuang (2009) who argue that some firms hold large cash reserves for the exercise of growth opportunities. A potential explanation for this finding is that firms with high growth opportunities may have high equity value, thus the market would favour raising finance through cheap equity issues or debt. Therefore, the market expectation is that excess cash should be used to finance all growth opportunities, thus generating returns rather than sitting idle in the bank. There is also no significant association between low growth opportunities and cash held.

The next test uses the same approach to examine firm size measured using market capitalization. In this design, small firms are companies with market capitalization below the third quintile of market capitalization whilst those above are classified as large firms. Small firms may build up excess cash reserves for survival while large firms may build up cash reserves for entrenchment. The coefficient for excess cash holdings is positive for small firms and insignificant for larger firms. Market valuations recognize the level of cash held when investments are announced for smaller firms. The implication of this finding is that small firms, which are more likely to be financially constrained, hold more cash for the survival motive. Such firms appear to be compensated for their excess cash holdings during market valuation of corporate investment announcements.

The next test examines the beta coefficient. Again, we split the beta coefficients above and below the third quintile. High beta firms are located above the third quintile of the beta measure while low beta firms are located below the third quintile. High beta firms may build up cash because of the high sensitivity of their revenue and profits to economic cycles. Low beta firms with high cash reserves may be more susceptible to the managerial entrenchment problem. The result demonstrates that the market welcomes excess cash holdings by high beta firms. However, excess cash holdings are perceived negatively for low beta firms.

Using the aforementioned approach, we divide firms based on their bid–ask spread. Paradoxically, excess cash holdings by firms with high bid–ask spread are associated with positive wealth effects. A high spread may reflect the quality of a firm's accounting information (Biddle *et al.*, 2006). Therefore, when firms with information asymmetry announce investment decisions, markets respond positively if such firms have excess cash holdings. A potential explanation for this perception could be that such firms are typically constrained (Easley and O'Hara, 2004). Hence, the presence of excess cash reinforces belief in the success and completion of such investments.

Net working capital is working capital minus cash. As it can perform the same liquidity function as cash (Opler *et al.*, 1999), it can be considered a substitute for cash. Thus, firms with high net working capital and high excess cash holdings may be perceived as holding cash for entrenchment purposes. Our results confirm the hypothesis that excess cash holding by firms with high net working capital negatively affects the market valuation of investment announcements. Firms with low net working capital experience insignificant abnormal returns.

Firms with diverse boards invest more in R&D and efficient innovation processes (Bernile *et al.*, 2018). Providing support for this view, Harjoto *et al.* (2018) argue that board diversity could spur optimal investment choices. We split firms based on their board diversity. The results indicate that excess cash holdings by firms with high board diversity are perceived positively during corporate investment announcements. For firms with low board diversity, the effect of excess cash holdings on the market valuation of corporate investment is negative. A potential explanation for this finding is that the level of board diversity could affect corporate attitudes towards investment in general (Harjoto *et al.*, 2018).

Excess Cash Holdings and Market Valuation of Corporate Investment Announcements Before and After the Global Financial Crisis

Periods of high economic uncertainty are accompanied by heavy reliance on internal finance (Campello *et al.*, 2011). Owing to credit shortages in periods of crisis, the value of cash rises (Im *et al.*, 2017). Motivated by this intertemporal shock in financial supply, we examine if this shaped or altered market perception of excess cash holdings. To test this, we split our investment announcements into periods before and after the GFC.

Panel A of Table 6 reports the mean comparison of a matched sample of firms that made investment announcements in the period before the GFC and in the period after the GFC. Firms that announced corporate investments after the GFC

TABLE 6
FIRM CHARACTERISTICS, INVESTMENT VALUATION, AND GFC

	Pre GFC				Post GFC				Mean differences
	Mean	SD	P25	P75	Mean	SD	P25	P75	
Cumulative Abnormal Returns	0.010	0.037	-0.007	0.026	0.012	0.090	-0.011	0.025	0.002***
Excess Cash Holdings	-0.023	0.108	-0.089	0.017	-0.017	0.114	-0.080	0.013	0.006***
Size	13.806	1.896	12.440	14.989	13.91	2.39	12.37	15.36	0.108***
Spread	3.895	13.680	0.500	3.000	2.470	6.933	0.400	2.000	-1.425***
Free Cash Flow	0.125	0.134	0.084	0.175	0.096	0.145	0.068	0.153	-0.029***
Market-to-Book	1.340	0.968	0.684	1.791	1.300	1.135	0.595	1.618	-0.040
Leverage	0.234	0.161	0.108	0.332	0.219	0.170	0.094	0.303	-0.014***
Dividend Yield	2.500	1.944	1.450	3.390	2.234	2.125	0.000	3.310	-0.267***
Capex	0.044	0.042	0.015	0.057	0.036	0.053	0.009	0.045	-0.008***
Run Up	0.001	0.017	-0.008	0.009	0.000	0.021	-0.007	0.008	-0.001
Beta	1.089	0.726	0.720	1.280	0.696	0.730	0.320	1.080	-0.393***
Market Returns	0.002	0.193	0.013	0.170	0.048	0.086	-0.017	0.096	0.0456***
DPS	12.937	24.320	1.030	14.850	15.48	34.24	0.00	16.69	2.543***
EPS	35.007	70.080	7.275	36.320	35.43	54.78	0.87	42.30	0.419***
R&D	302.292	818.667	2.064	58.700	499.316	1,612.928	2.700	73.800	197.024***
Board Diversity	29	18	14	36	38	26	18	50	9***
Number of Employees	147267	532008	4700	77000	463712	3159092	2651	120319	316,444***

Panel A reports the difference in characteristics of a matched sample of firms with announcements pre and post the GFC. Using the Mahalanobis matching algorithm, we match firms with announcements in the period after and before the GFC based on market capitalization, debt, and EBITDA. The differences in the mean between the period before and after the GFC are reported. *** denotes significant difference following results of a simple *t*-test.

Panel B: Excess cash holdings, corporate investment valuation, and GFC

	All Announcements		Organic		Inorganic		Asset acquisition		New products		R&D	
	Pre GFC	Post GFC	Pre GFC	Post GFC	Pre GFC	Post GFC	Pre GFC	Post GFC	Pre GFC	Post GFC	Pre GFC	Post GFC
Excess Cash Holdings	-0.0268**	0.0504***	-0.1045***	0.3623***	0.0076	-0.0235***	-0.1709	0.0346	0.0539	0.0512	-0.1542***	0.5733***
Size	(-1.84)	(2.87)	(-2.31)	(3.74)	(0.45)	(-2.26)	(-1.27)	(0.66)	(0.39)	(0.70)	(-2.19)	(3.04)
Organic	-0.0035***	-0.0022***	-0.0051	0.0121**	-0.0040***	-0.0035***	-0.0081	-0.0017	-0.0023	0.0029	-0.0211	0.0239
Relative Deal Size	(-3.92)	(-2.38)	(-1.13)	(1.84)	(-4.13)	(-6.73)	(-1.58)	(-0.65)	(-0.19)	(0.90)	(-1.06)	(1.13)
Paid by Debt	0.0025	0.0088										
Paid in Shares	(0.47)	(1.63)										
Paid in Cash					0.1965***	0.0150						
Free Cash Flow	-0.0079	-0.0579***	-0.0804**	-0.1623***	0.0708***	0.0259***	-0.1690	0.0244	-0.0203	0.1095	-0.0899	-0.1552
Market-to-Book	(-0.73)	(-4.41)	(-1.82)	(-2.35)	(2.89)	(3.21)	(-0.85)	(0.87)	(-0.31)	(1.57)	(-1.16)	(-0.93)
Leverage	0.0010	0.0008	-0.0118	-0.0214	-0.0071***	0.0007	0.0167	0.0024	-0.0217	0.0113	-0.0193	-0.0331
	(0.52)	(0.47)	(-1.03)	(-1.35)	(-3.20)	(0.71)	(1.09)	(0.42)	(-1.03)	(1.63)	(-0.92)	(-0.84)
	-0.0056	-0.0079	-0.0256	-0.0208	-0.0019	-0.0106**	0.0414	0.0091	-0.0787	0.0230	-0.0912***	0.0019
	(-0.71)	(-0.76)	(-1.05)	(-0.39)	(-0.20)	(-1.73)	(0.69)	(0.43)	(-1.60)	(0.59)	(-2.16)	(0.02)

(Continues)

TABLE 6
CONTINUED

	All Announcements		Organic		Inorganic		Asset acquisition		New products		R&D	
	Pre GFC	Post GFC	Pre GFC	Post GFC	Pre GFC	Post GFC	Pre GFC	Post GFC	Pre GFC	Post GFC	Pre GFC	Post GFC
Run Up	0.0910 (1.32)	0.2867*** (3.89)	-0.0785 (-0.35)	1.0113*** (2.42)	0.0281 (0.31)	0.1100*** (2.69)	-1.4184** (-1.95)	-0.0636 (-0.38)	0.0000 (0.00)	0.3466 (1.71)	-0.0051 (-0.02)	1.5818*** (2.02)
Beta	-0.0014 (-0.52)	-0.0038 (-1.60)	-0.0209*** (-2.06)	-0.0002 (-0.01)	0.0022 (0.77)	-0.0047*** (-3.60)	0.0076 (0.44)	-0.0003 (-0.04)	-0.0187 (-1.71)	0.0046 (0.38)	-0.0338 (-1.49)	-0.0412 (-0.59)
Market Returns	-0.0201*** (-1.99)	0.1075*** (2.51)	-0.0087 (-0.17)	0.5066*** (2.00)	-0.0310 (-1.23)	0.0001 (0.01)	-0.0147 (-0.29)	-0.2418*** (-2.07)	0.2141*** (2.64)	-0.1484 (-0.68)	-0.0866 (-0.76)	-0.0472 (-0.08)
Dividend Yield	-0.0014*** (-2.03)	-0.0011 (-1.17)	-0.0015 (-0.36)	-0.0003 (-0.05)	-0.0051*** (-4.20)	-0.0012*** (-2.58)	-0.0043 (-1.19)	-0.0043*** (-2.78)	0.0135 (1.19)	0.0198*** (5.25)	0.0158 (0.49)	0.0079 (0.29)
Capex	-0.0037 (-0.11)	-0.0136 (-0.42)	-0.0873 (-0.40)	0.0451 (0.34)	-0.0325 (-0.91)	-0.0353*** (-1.73)	-0.1531 (-0.82)	-0.0121 (-0.38)	-0.6631 (-1.23)	-0.2488 (-1.34)	1.6521*** (2.09)	0.9089 (0.71)
Spread	-0.0002** (-1.71)	0.0011*** (4.63)	0.0000 (0.05)	0.0096*** (5.48)	-0.0003*** (-3.38)	-0.0001 (-1.08)	-0.0028 (-0.60)	0.0003 (0.33)	0.0010 (1.65)	-0.0010 (-1.67)	-0.0003 (-0.46)	0.0236*** (4.59)
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Intercept	0.0700*** (4.79)	0.0437*** (3.17)	0.1968*** (2.47)	-0.1796*** (-2.00)	0.0802*** (5.46)	0.0667*** (8.65)	0.1357 (1.44)	0.1039*** (2.77)	0.0982 (0.74)	-0.0202 (-0.37)	0.2792 (1.10)	-0.3443 (-1.25)
Obs	1.130	3.126	151	374	702	3,029	40	159	32	52	79	163
Adjusted R-squared	0.030	0.037	0.016	0.144	0.078	0.036	0.105	0.080	0.504	0.781	0.095	0.243

Panel B presents the results of the regression analysis of the impact of excess cash holdings on CARs for various types of corporate investment announcements. CARs to investment announcements are split into categories of investment announcements and then into pre and post GFC. Pre GFC refers to the periods before 2008 while Post GFC refers to periods after 2008. ** and *** report significance below 10% and 5% respectively. t-statistics are reported in parentheses.

hold more excess cash, earn higher abnormal returns, and are significantly bigger than similar firms with investment announcements in the period before the GFC. Similarly, firms that announced investments after the GFC paid more dividends per share, declared higher earnings per share, have more diverse boards and employees, and invest more in R&D. Firms from the post-GFC era have lower leverage, lower capital expenditure, lower dividend yield, lesser free cash flow, and lesser bid–ask spread than firms from the pre-GFC era. A potential explanation for the differences in firm characteristics can be attributed to the negative impact of the crisis as well as corporate responses to future economic downturns.

In Panel B of Table 6, we report the regression analysis of the impact of the GFC on the market valuation of various categories of corporate investment announcements. Our analysis in Panel B indicates that the market perception of excess cash holdings during corporate investment announcements for the full sample and organic investments was significant and negative prior to the GFC but significant and positive afterwards. The relationship between excess cash holdings and the market valuations of investment announcements in the set of organic investments changed from negative before the GFC to positive after the GFC. Importantly, R&D appears to be the driver of this effect. Other organic investments experience insignificant returns both before and after the GFC. For the set of inorganic investments, the impact of excess cash holdings was insignificant before the GFC but became significant and negative after the GFC. A potential explanation is that in the period before the GFC, excess cash holdings signalled the potential for managerial entrenchment. Managers can use large cash reserves to evade capital market monitoring and pursue private benefits of control (Jensen, 1986). In contrast, the GFC demonstrated the value of cash reserves for firm growth and survival (Campello *et al.*, 2011). Our results show that the market prices excess cash holdings positively around the announcement of new corporate investment. Cash-rich firms can buffer short-term capital shocks that may affect the success of investment projects.

Robustness and Endogeneity Tests

It is highly implausible that abnormal returns during corporate investments cause firms to build up cash reserves. Therefore, the case for reverse causality is weak. Nonetheless, to affirm the robustness of our findings we conduct a variance inflation factor (VIF) test. The results of a VIF indicate that the predictive variables are not correlated and, as such, it is unlikely that the standard errors are inflated. In addition to this, despite clustering our standard errors at both industry and event date levels our results remain largely consistent.

The results may be driven by the selected event window. To address this possibility, we estimate the impact of cash holdings on CARs over the period t to $t+1$. The results of this additional analysis reported in Table 7 confirm our

TABLE 7

ADDITIONAL ANALYSIS

	(1)	(2)	(3)	(4)	(5)
Excess Cash Holdings	0.0419*** (4.79)	0.0286*** (2.73)	0.0288*** (2.64)	0.0285*** (2.60)	0.0345*** (2.57)
Excess Cash Holdings Square				-0.0002 (-0.53)	-0.0010 (-0.93)
Excess Cash Holdings Cube					-0.0002 (-0.78)
Size		-0.0021*** (-3.86)	-0.0023*** (-3.84)	-0.0023*** (-3.84)	-0.0023*** (-3.82)
Organic		0.0043 (1.37)	0.0040 (1.13)	0.0046 (1.27)	0.0048 (1.33)
Dividend Yield		0.0000 (0.20)	0.0000 (0.27)	0.0000 (0.27)	0.0000 (0.31)
CAPEX		-0.0113 (-0.55)	-0.0105 (-0.49)	-0.0097 (-0.45)	-0.0089 (-0.42)
Spread		0.0000 (0.48)	0.0000 (0.50)	0.0000 (0.48)	0.0000 (0.50)
Free Cash Flow		-0.0428*** (-5.38)	-0.0420*** (-5.07)	-0.0444*** (-5.26)	-0.0442*** (-5.23)
Market-to-Book		0.0004 (0.72)	0.0004 (0.75)	0.0004 (0.75)	0.0004 (0.71)
Leverage		-0.0029 (-0.51)	-0.0030 (-0.52)	-0.0033 (-0.56)	-0.0029 (-0.49)
Run Up		0.1193*** (2.46)	0.1184*** (2.43)	0.1165*** (2.38)	0.1165*** (2.38)
Beta		-0.0019 (-1.27)	-0.0014 (-0.88)	-0.0013 (-0.82)	-0.0014 (-0.84)
Market Returns		0.0163*** (2.15)	-0.0035 (-0.06)	-0.0026 (-0.05)	0.0009 (0.02)
Intercept	0.0087*** (8.66)	0.0429*** (5.95)	0.0444*** (4.58)	0.0449*** (4.58)	0.0456*** (4.63)
Year		No	Yes	Yes	Yes
Industry		No	Yes	Yes	Yes
Obs	4,256	4,256	4,256	4,256	4,256
Adjusted R-squared	0.005	0.025	0.024	0.024	0.024

The table presents the results of regressing excess cash holdings on the CARs calculated on the day of the announcement. The variable of interest is Excess Cash Holdings. Models 4 and 5 report the results of evaluating if the relationship between excess cash holdings and abnormal returns is non-linear. *** and ** report significance below 5% and 10% respectively. *t*-statistics are reported in parentheses.

hypothesis. To ensure our results are robust to alternative abnormal return-generating models, we estimate all models reported in our main findings using the market model and Fama and French's three-factor model but do not report them for brevity. The findings are consistent with our prior estimates.⁷

⁷ We conduct two further robustness tests. We estimate our models using an unadjusted measure of cash holdings (i.e., cash deflated by total assets) with robust results. We also test whether recent company performance, in terms of operating or stock performance over the previous year, influenced our results. All coefficients for these variables in our models are insignificant. Results can be provided on request.

CONCLUSION

In this paper, we examine the relationship between excess cash holdings and the market reaction to company investment announcements for UK listed firms. We provide several novel results. Firstly, our results reveal that excess cash holdings have a positive effect on the market valuation of corporate investment in general. When we split the sample on organicity, we find that cash has a negative effect on returns to inorganic investment, a finding which is notable after the GFC in particular. Asset acquisitions that may offer fewer longer-term growth prospects appear to receive an insignificant response from markets. Alternatively, cash holdings are positively associated with organic investments in general and in particular with R&D and new product announcements. Overall, the flexibility offered by cash holdings appears to reassure markets of the value and viability of organic investment decisions.

Our results indicate that managerial entrenchment is a potential motivation for cash holdings. Indicators of potential for managerial entrenchment in our study support the view that managers may hold cash for private benefits. In most cases where excess cash is held by firms with entrenchment tendencies, the market appears to price this negatively during corporate investment announcements. However, distinct from the results in previous studies, our results suggest that cash is held for survival and expansion purposes. When excess cash is held for survival (i.e., high leverage), the market appears to price it negatively during corporate investment announcements. For inorganic investments, we find that the market perception of excess cash holdings is negative. For organic investment, particularly new product announcements and R&D, excess cash holdings have a particularly positive effect on market reactions, suggesting the significance of cash in the financing hierarchy. We ascribe this finding to the long-term nature of these investments. Cash may not be generated for some time for many of these projects.

Our findings have implications for investors, managers, and regulators. For investors, the results indicate that beneficial signals about the value of the firm and its investments are embedded in cash holding levels. According to our results, market participants appear to have a sophisticated understanding of the motivations for cash holdings. Our interpretation is that cash holdings provide an effective tool for managers to convey strategic information to the market, enabling efficient pricing of companies and investment decisions. For regulators, we recommend that any major investment market should provide detailed investment information to assist efficient pricing and improve allocative efficiency. There may be costs but the benefits clearly outweigh the costs in the sample we examine both at company and market levels. In our empirical setting, the UK, we believe the current broad classification of investment can be improved upon. Detailed classification of investment announcements would improve the ability of investors to process new corporate investment information more quickly. We suggest categorizing investment announcements based on the growth strategy employed by the company (i.e., R&D, new products and services, real asset purchases, and stock acquisitions). Our study empirically demonstrates that investors price investment decisions based on this categorization.

REFERENCES

- Acharya, V., S. A. Davydenko, and I. A. Strebulaev (2012), 'Cash Holdings and Credit Risk', *The Review of Financial Studies*, Vol. 25, No. 12, pp. 3572–609.
- Acharya, V. V., H. Almeida, and M. Campello (2007), 'Is Cash Negative Debt? A Hedging Perspective on Corporate Financial Policies', *Journal of Financial Intermediation*, Vol. 16, No. 4, pp. 515–54.
- Ahuja, K., L. Segel, and J. Perrey (2017), 'Mastering Three Strategies of Organic Growth', *McKinsey & Company Quarterly*, pp. 1–8.
- Almeida, H., M. Campello, and M. S. Weisbach (2004), 'The Cash Flow Sensitivity of Cash', *The Journal of Finance*, Vol. 59, No. 4, pp. 1777–804.
- Anderson, R. W. and M. Hamadi (2016), 'Cash Holding and Control-oriented Finance', *Journal of Corporate Finance*, Vol. 41, pp. 410–25.
- Andriopoulos, D. and S. Yang (2015), 'The Impact of Institutional Investors on Mergers and Acquisitions in the United Kingdom', *Journal of Banking & Finance*, Vol. 50, pp. 547–61.
- Antoniou, A., J. Guo, and D. Petmezas (2008), 'Merger Momentum and Market Valuations: The UK Evidence', *Applied Financial Economics*, Vol. 18, No. 17, pp. 1411–23.
- Ascioglu, A., S. P. Hegde, and J. B. McDermott (2008), 'Information Asymmetry and Investment–Cash Flow Sensitivity', *Journal of Banking & Finance*, Vol. 32, No. 6, pp. 1036–48.
- Bahadir, S. C., S. Bharadwaj, and M. Parzen (2009), 'A Meta-analysis of the Determinants of Organic Sales Growth', *International Journal of Research in Marketing*, Vol. 26, No. 4, pp. 263–75.
- Barbopoulos, L. and S. Sudarsanam (2012), 'Determinants of Earnout as Acquisition Payment Currency and Bidder's Value Gains', *Journal of Banking & Finance*, Vol. 36, No. 3, pp. 678–94.
- Barca, F. and M. Becht (2002), *The Control of Corporate Europe*, Oxford University Press, Oxford.
- Barracough, K., D. T. Robinson, T. Smith, & R. E. Whaley (2013), 'Using Option Prices to Infer Overpayments and Synergies in M&A Transactions', *The Review of Financial Studies*, Vol. 26, No. 3, pp. 695–722.
- Bernile, G., V. Bhagwat, and S. Yonker (2018), 'Board Diversity, Firm Risk, and Corporate Policies', *Journal of Financial Economics*, Vol. 127, No. 3, pp. 588–612.
- Bhagat, S., M. Dong, D. Hirshleifer, and R. Noah (2005), 'Do Tender Offers Create Value? New Methods and Evidence', *Journal of Financial Economics*, Vol. 76, No. 1, pp. 3–60.
- Biddle, G. C. and G. Hilary (2006), 'Accounting Quality and Firm-level Capital Investment', *The Accounting Review*, Vol. 81, No. 5, pp. 963–82.
- Brown, S. J. and J. B. Warner (1980), 'Measuring Security Price Performance', *Journal of Financial Economics*, Vol. 8, No. 3, pp. 205–58.
- Brown, J. R. and B. C. Petersen (2011), 'Cash Holdings and R&D Smoothing', *Journal of Corporate Finance*, Vol. 17, No. 3, pp. 694–709.
- Bruner, R. F. and J. R. Perella (2004), *Applied Mergers and Acquisitions* (vol. 173), John Wiley & Sons, New York.
- Burton, B. M., A. A. Lonie, and D. M. Power (1999), 'The Stock Market Reaction to Investment Announcements: The Case of Individual Capital Expenditure Projects', *Journal of Business Finance & Accounting*, Vol. 26, Nos 5–6, pp. 681–708.
- Cai, J., Y. Liu, Y. Qian, and M. Yu (2015), 'Information Asymmetry and Corporate Governance', *Quarterly Journal of Finance*, Vol. 5, No. 3, 1550014.
- Campello, M., E. Giambona, J. R. Graham, and C. R. Harvey (2011), 'Liquidity Management and Corporate Investment During a Financial Crisis', *The Review of Financial Studies*, Vol. 24, No. 6, pp. 1944–79.
- Chan, L. K., J. Lakonishok, and T. Sougiannis (2001), 'The Stock Market Valuation of Research and Development Expenditures', *The Journal of Finance*, Vol. 56, No. 6, pp. 2431–56.
- Chay, J. B., S. H. Park, S. Kim, and J. Suh (2015), 'Financing Hierarchy: Evidence from Quantile Regression', *Journal of Corporate Finance*, Vol. 33, pp. 147–63.

- Chen, H., D. Yang, J. H. Zhang, and H. Zhou (2020), 'Internal Controls, Risk Management, and Cash Holdings', *Journal of Corporate Finance*, Vol. 64, 101695.
- Chen, S. S. and K. W. Ho (1997), 'Market Response to Product-strategy and Capital-expenditure Announcements in Singapore: Investment Opportunities and Free Cash Flow', *Financial Management*, Vol. 26, No. 3, pp. 82–8.
- Chen, Y. R. (2008), 'Corporate Governance and Cash Holdings: Listed New Economy versus Old Economy Firms', *Corporate Governance: An International Review*, Vol. 16, No. 5, pp. 430–42.
- Chen, Y. R. and W. T. Chuang (2009), 'Alignment or Entrenchment? Corporate Governance and Cash Holdings in Growing Firms', *Journal of Business Research*, Vol. 62, No. 11, pp. 1200–06.
- Datta, S., M. Iskandar-Datta, and K. Raman (2001), 'Executive Compensation and Corporate Acquisition Decisions', *The Journal of Finance*, Vol. 56, No. 6, pp. 2299–336.
- Demsetz, H. (1983), 'The Structure of Ownership and the Theory of the Firm', *The Journal of Law and Economics*, Vol. 26, No. 2, pp. 375–90.
- Denis, D. J. and V. Sibilkov (2010), 'Financial Constraints, Investment, and the Value of Cash Holdings', *The Review of Financial Studies*, Vol. 23, No. 1, pp. 247–69.
- Dittmar, A., J. Mahrt-Smith, and H. Servaes (2003), 'International Corporate Governance and Corporate Cash Holdings', *Journal of Financial and Quantitative Analysis*, pp. 111–33.
- Doukas, J. and L. Switzer (1992), 'The Stock Market's Valuation of R&D Spending and Market Concentration', *Journal of Economics and Business*, Vol. 44, No. 2, pp. 95–114.
- Easley, D. and M. O'Hara (2004), 'Information and the Cost of Capital', *The Journal of Finance*, Vol. 59, No. 4, pp. 1553–83.
- Fama, E. F. and K. R. French (1993), 'Common Risk Factors in the Returns on Stocks and Bonds', *Journal of Financial Economics*, Vol. 33, No. 1, pp. 3–56.
- Farinha, J., C. Mateus, and N. Soares (2018), 'Cash Holdings and Earnings Quality: Evidence from the Main and Alternative UK Markets', *International Review of Financial Analysis*, Vol. 56, pp. 238–52.
- Florackis, C. and A. Ozkan (2009), 'The Impact of Managerial Entrenchment on Agency Costs: An Empirical Investigation Using UK Panel Data', *European Financial Management*, Vol. 15, No. 3, pp. 497–528.
- Gu, F. and Lev, B. (2011), 'Overpriced Shares, Ill-Advised Acquisitions, and Goodwill Impairment', *The Accounting Review*, Vol. 86, No. 6, pp. 1995–2022.
- Han, J., M. Linnenluecke, Z. Pan, and T. Smith (2019), 'The Wealth Effects of the Announcement of the Australian Carbon Pricing Scheme', *Pacific-Basin Finance Journal*, Vol. 53, pp. 399–409.
- Harford, J. (1999), 'Corporate Cash Reserves and Acquisitions', *The Journal of Finance*, Vol. 54, No. 6, pp. 1969–97.
- Harford, J., S. Klasa, and W. F. Maxwell (2014), 'Refinancing Risk and Cash Holdings', *The Journal of Finance*, Vol. 69, No. 3, pp. 975–1012.
- Harford, J., S. A. Mansi, and W. F. Maxwell (2008), 'Corporate Governance and Firm Cash Holdings in the US', *Journal of Financial Economics*, Vol. 87, No. 3, pp. 535–55.
- Harjoto, M. A., I. Laksmana, and Y. W. Yang (2018), 'Board Diversity and Corporate Investment Oversight', *Journal of Business Research*, Vol. 90, pp. 40–7.
- Jensen, M. C. (1986), 'Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers', *The American Economic Review*, Vol. 76, No. 2, pp. 323–29.
- Jones, E., J. Danbolt, and I. Hirst (2004), 'Company Investment Announcements and the Market Value of the Firm', *The European Journal of Finance*, Vol. 10, No. 5, pp. 437–52.
- Jones, S. (2016), 'A Cash Flow Based Model of Corporate Bankruptcy in Australia', *Journal of Applied Management Accounting Research*, Vol. 14, No. 1, p. 23.
- Kalcheva, I. and K. V. Lins (2007), 'International Evidence on Cash Holdings and Expected Managerial Agency Problems', *The Review of Financial Studies*, Vol. 20, No. 4, pp. 1087–112.
- Keynes, J. M. (1937), 'The General Theory of Employment', *The Quarterly Journal of Economics*, Vol. 51, No. 2, pp. 209–23.

- Kling, G., A. Ghobadian, and N. O'Regan (2009), 'Organic Growth and Shareholder Value: A Case Study of the Insurance Industry', *International Journal of Research in Marketing*, Vol. 26, No. 4, pp. 276–83.
- Lang, L. H., R. Stulz, and R. A. Walking (1991), 'A Test of the Free Cash Flow Hypothesis: The Case of Bidder Returns', *Journal of Financial Economics*, Vol. 29, No. 2, pp. 315–35.
- Lee, E. and R. Powell (2011), 'Excess Cash Holdings and Shareholder Value', *Accounting & Finance*, Vol. 51, No. 2, pp. 549–74.
- Lev, B. (1999), 'R&D and Capital Markets', *Journal of Applied Corporate Finance*, Vol. 11, No. 4, pp. 21–35.
- Li, D. (2011), 'Financial Constraints, R&D Investment, and Stock Returns', *The Review of Financial Studies*, Vol. 24, No. 9, pp. 2974–3007.
- Lin, C., L. Wei, and W. Xie (2019), 'Managerial Entrenchment and Information Production', *Journal of Financial and Quantitative Analysis*, Vol. 55, No. 8, pp. 2500–29.
- Moeller, S. B., F. P. Schlingemann, and R. M. Stulz (2004), 'Firm Size and the Gains from Acquisitions', *Journal of Financial Economics*, Vol. 73, No. 2, pp. 201–28.
- Myers, S. C. (1984), 'The Capital Structure Puzzle', *The Journal of Finance*, Vol. 39, pp. 575–92.
- Myers, S. C. and N. S. Majluf (1984), 'Corporate Financing and Investment Decisions When Firms Have Information That Investors Do Not Have', *Journal of Financial Economics*, Vol. 13, No. 2, pp. 187–221.
- Opler, T., L. Pinkowitz, R. Stulz, and R. Williamson (1999), 'The Determinants and Implications of Corporate Cash Holdings', *Journal of Financial Economics*, Vol. 52, No. 1, pp. 3–46.
- (2001), 'Corporate Cash Holdings', *Journal of Applied Corporate Finance*, Vol. 14, No. 1, pp. 55–67.
- Ozkan, A. and N. Ozkan (2004), 'Corporate Cash Holdings: An Empirical Investigation of UK Companies', *Journal of Banking & Finance*, Vol. 28, No. 9, pp. 2103–34.
- Pinkowitz, L., R. Stulz, and R. Williamson (2006), 'Does the Contribution of Corporate Cash Holdings and Dividends to Firm Value Depend on Governance? A Cross-country Analysis', *The Journal of Finance*, Vol. 61, No. 6, pp. 2725–51.
- Pinkowitz, L. and R. Williamson (2001), 'Bank Power and Cash Holdings: Evidence from Japan', *The Review of Financial Studies*, Vol. 14, No. 4, pp. 1059–82.
- Shah, S. Z. A., A. W. Stark, and S. Akbar (2008), 'Firm Size, Sector, and Market Valuation of R&D Expenditures', *Applied Financial Economics Letters*, Vol. 4, No. 2, pp. 87–91.
- Shin, H. H. and Y. H. Kim (2002), 'Agency Costs and Efficiency of Business Capital Investment: Evidence from Quarterly Capital Expenditures', *Journal of Corporate Finance*, Vol. 8, No. 2, pp. 139–58.
- Smith, R. L. and J. H. Kim (1994), 'The Combined Effects of Free Cash Flow and Financial Slack on Bidder and Target Stock Returns', *The Journal of Business*, Vol. 67, No. 2, pp. 281–310.
- Szewczyk, S. H., G. P. Tsetsekos, and Z. Zantout (1996), 'The Valuation of Corporate R&D Expenditures: Evidence from Investment Opportunities and Free Cash Flow', *Financial Management*, Vol. 25, No. 1, pp. 105–10.
- Times, F. (2013). UK companies sit on giant piles of cash.
- Titman, S., K. J. Wei, and F. Xie (2004), 'Capital Investments and Stock Returns', *Journal of Financial and Quantitative Analysis*, Vol. 39, No. 4, pp. 677–700.
- Trautwein, F. (1990), 'Merger Motives and Merger Prescriptions', *Strategic Management Journal*, Vol. 11, No. 4, pp. 283–95.
- Uyar, A. and C. Kuzey (2014), 'Determinants of Corporate Cash Holdings: Evidence from the Emerging Market of Turkey', *Applied Economics*, Vol. 46, No. 9, pp. 1035–48.
- Weisbach, M. S. (1988), 'Outside Directors and CEO Turnover', *Journal of Financial Economics*, Vol. 20, pp. 431–60.
- Woolridge, J. R. and C. C. Snow (1990), 'Stock Market Reaction to Strategic Investment Decisions', *Strategic Management Journal*, Vol. 11, No. 5, pp. 353–63.

APPENDIX A: CLASSIFICATION OF CORPORATE INVESTMENT

We classify corporate investments based on the growth method adopted by the company. We label investments where a firm's growth is engineered by natural processes 'organic investment' and otherwise 'inorganic investment'. Natural processes (organic growth) refers to the expansion of a company that comes from within a company's existing business processes as opposed to inorganic growth that entails buying an existing business. We classify all investment announcements that exclude the purchase of an existing business as organic investment whilst the purchase of existing business processes is classified as inorganic investment. In organic investment, we include R&D announcements, purchase of asset announcements, and new product announcements.

The motivation behind this classification is identifying investment decisions that imply commitment of resources that could potentially lead to the generation of new cash flow (organic investment) and identifying investment decisions that entail committing resources for the purchase of existing cash flow (inorganic investment).

A.1. ORGANIC INVESTMENT

To identify organic investment, we noted company announcements that suggest organic growth strategy. Organic growth refers to corporate growth fuelled by the expansion or improvement of existing processes within an organization (Irvin *et al.*, 2003). Hence, any implicit or explicit commitment of resources for the improvement of existing processes such that it increases current and future cash flow or for the generation of new future cash flow from the existing process can be identified as organic investment. In this category, we group all investment announcements that do not involve the purchase of an existing cash-generating process.

Following this approach, based on the available data on Morningstar.co.uk, we identify the following announcements as organic: R&D, product launch, and purchase/acquisition of assets.

A.1.1. R&D Announcements

R&D announcements are investments that involve the commitment of resources, implicitly or explicitly to 'work directed towards the innovation, introduction, and improvement of products and processes' (Oxford Dictionary). Jones (1998) argues that R&D projects generally have a huge level of uncertainty embedded in them since where, when, and how returns will be generated is often unclear. Hence, a significant portion of the value of R&D is its option value.

Most of the announcements in this group were made by companies in the pharmaceutical industry. In selecting constituents of the group, it was not necessary for the amount invested to be stated. Company announcements within this group were drawn from the Morningstar.co.uk classification 'research and development'.

A.2. ASTRAZENECA ANNOUNCES POSITIVE RESULTS FROM BENRALIZUMAB PHASE III PROGRAMME IN SEVERE ASTHMA

Benralizumab first AstraZeneca respiratory biologic to complete Phase III 17 May 2016.

AstraZeneca today announced that benralizumab, a potential new medicine and anti-eosinophil monoclonal antibody, was well tolerated and achieved the primary endpoint in two pivotal Phase III registrational trials (SIROCCO and CALIMA), demonstrating significant reductions in the annual asthma exacerbation rate compared to placebo.

Sean Bohan, Executive Vice President, Global Medicines Development and Chief Medical Officer, said: "Severe asthma affects the health and quality of life of millions of people around the world, and exacerbations can be life threatening for these patients. We are pleased with the top-line results from these pivotal trials as they demonstrate the potential for benralizumab to improve outcomes for patients with severe asthma. Benralizumab is AstraZeneca's first respiratory biologic and its development underscores our commitment to transform the treatment of asthma and chronic respiratory disease with our next generation of respiratory medicines".

The trials evaluated the efficacy and safety of two dose regimens of benralizumab as an add-on therapy for severe uncontrolled asthma with eosinophilic inflammation in adults and adolescents 12 years of age and older.

In SIROCCO and CALIMA, the primary analysis population included patients on high-dose inhaled corticosteroids (ICS) plus long-acting β 2-agonist (LABA) with a baseline blood eosinophil count ≥ 300 cells/microliter. Patients were randomised to receive benralizumab 30mg every 4 weeks; 30mg every 4 weeks for the first three doses followed by 30mg every 8 weeks; or placebo. The safety and tolerability findings for benralizumab were generally consistent with those reported in previous trials.

Mark FitzGerald, MD, director of the Centre for Heart and Lung Health at the Vancouver Coastal Health Research Institute and Principal Investigator in the CALIMA trial, said: "We are learning more about different sub-types of asthma, and these trials investigate a potential new treatment to address the underlying driver for some patients. Within the appropriate patient population, the anti-eosinophil effect of benralizumab has the potential to deliver uniquely-targeted treatment for patients whose asthma is driven by eosinophilic inflammation".

Eosinophils are the biological effector cells that drive inflammation and airways hyper-responsiveness in approximately 50% of asthma patients, leading to frequent exacerbations, impaired lung function and reduced quality of life. Benralizumab is an anti-eosinophil monoclonal antibody that depletes eosinophils via antibody-dependent cell-mediated cytotoxicity (ADCC), the process by which natural killer cells are activated to target eosinophils. Benralizumab induces direct, rapid, and near complete depletion of eosinophils in the bone marrow, blood and target tissue. Benralizumab was developed by MedImmune, AstraZeneca's global biologics research and development arm.

Results from the SIROCCO and CALIMA trials will be presented at a future medical meeting. Regulatory submissions in the US and EU are anticipated in the second half of 2016.

A.2.1. New Product Announcement

A product launch announcement is an announcement of the introduction of new products or services. This refers to the debut of a product or service on the market. Announcements within this group were drawn from the Morningstar.co.uk announcement classification ‘product launch’.

9 June 2016

(Gfinity plc “Gfinity” or the “Company”)

Launch of the Gfinity Elite Series

Gfinity launches global professional eSports series

Gfinity Plc (AIM: GFIN), a leading eSports promoter, announces the launch of the Gfinity Elite Series (the “Series”), a dynamic new eSports league format, featuring some of the world’s most popular gaming titles.

Launching first in the UK, with a view to expanding across international markets in the near future, the Series will provide the eSports community with exciting new opportunities to watch or play in a fiercely competitive environment on www.gfinityelite.com.

Competition will start in January 2017, when gamers of any ability from anywhere around the world will be able to compete in the Gfinity Challenger Series to win Gfinity Elite Series ranking points. The competitors with the most points will qualify for the Gfinity Elite Draft, where professional teams will offer the best players a place in their Gfinity Elite Series franchises.

The Gfinity Elite Series itself will launch in April 2017 and will see Gfinity Elite Series Franchises compete for the title of Gfinity Elite Series Champion. The Gfinity Elite Series will be streamed live to a global audience from the home of UK eSports, the Gfinity Arena in London.

The Gfinity Elite Series is expected to attract an active audience of eSport enthusiasts to generate sponsorship and broadcasting rights for Gfinity and create a unique set of sponsorship, media and franchise opportunities for potential partners seeking access to the rapidly growing and valuable UK eSports population of 6.5 million, most of which fall into the male under 35 demographic.

Neville Upton, Chief Executive Officer, Gfinity Plc, said: “As the gamers’ champion, Gfinity is excited to be launching the Gfinity Elite Series. The UK has some of the best talent in eSports and Gfinity Elite Series gives them the opportunity to hone their skills and take on some of the best from around the world. This is what the UK eSports community has been waiting for and we can’t wait to take this truly global”.

A.2.2. Acquisition/Purchase of Asset Announcement

This refers to the commitment of resources for the acquisition of land, buildings, and machinery. They include expenditure on plants, equipment, and machinery

for the development and maintenance of existing processes (Jones, 1998). Constituents within this group were hand-collected from the general classification of announcements in ‘acquisitions’ on Morningstar.co.uk.

*Edita Food Industries Acquires New Land to Produce a Premix Formula
Cairo, 3 August 2016*

Edita Food Industries signed a contract to purchase a new plot of land to implement a new project that aims to enhance the efficiency and quality of the production process. The company signed the contract to acquire around 12,878 square meters of land in Sixth of October City’s Polaris Al-Zamil Industrial Park valued at approx. EGP 19.0 million (including utilities), to be paid on three installments over the 6 months period commencing on 3rd August 2016. The project aims to protect the recipe and knowhow confidentiality of the company’s products where a premix formula will be produced and supplied to all of Edita’s factories. Additionally, the project will enhance efficiency and quality through standardization of input blends.

A.3. INORGANIC INVESTMENT

This category comprises announcements of acquisitive growth/inorganic growth activity. This involves the commitment of resources to the growth of firms by acquiring already operating business processes. The emphasis in determining if an investment falls into this category is in answering the question, does the investment constitute a commitment of resources to the purchase of an existing business?

To identify announcements within this category, we first collected all announcements under the heading ‘acquisition’ within the Morningstar.co.uk website. Next, we selected company investment announcements with the heading ‘acquisition’. Thereafter, we included announcements of acquisition of shares in a company and acquisition of a subsidiary of the company. We excluded announcements of acquisition of land, properties, and building as well as announcements of takeovers. Acquisition announcements made by financial services companies were also excluded.

*Carr’s Group plc “Carr’s” or the “Group”
Acquisition of STABER GmbH 25 October 2016*

Carr’s, the Agriculture and Engineering Group, announces the acquisition and completion of STABER GmbH (“STABER” or the “Company”), for a total cash consideration of €7.85 million (£6.98 million), and after adjusting for estimated net cash within the Company at completion, a net consideration of €6.75 million (£6.00 million) (the “Acquisition”).

STABER, formally called Städtele GmbH, is a family owned engineering business located near the Group’s existing German operations in Markdorf.

STABER and Wälischmiller Engineering GmbH, a subsidiary of Carr’s Engineering Ltd, have been working together closely for over 50 years and STABER has most recently been a key supplier of parts for the remote handling

business. During 2014 and 2015 STABER was intrinsic in assisting Wälischmiller in the development of the Demo 2000 Telbot[®], a robotic system for vessel inspection and cleaning in the oil and gas market, and the first in the world to be certified for use in the most highly explosive of environments. STABER has designed and developed specialised intellectual property (“IP”) which will be strategically beneficial to Wälischmiller in both the near and long term. This IP will accelerate the ongoing strategic development work on the Telbot[®] and the Demo 2000 Telbot[®] by Wälischmiller.

STABER will be fully integrated into Wälischmiller over the next 18 months, enhancing efficiencies and providing technological growth opportunities across the remote handling business of the Group. To ensure the successful integration and transfer of the IP, €2.0 million of the total consideration will be deferred, until at the latest 31 June 2018.

Highlights and strategic rationale of the Acquisition. STABER is a long term strategic partner of Wälischmiller, having jointly developed multiple products over the past fifty years. The Acquisition will provide the Group with specialised IP relating to high quality, niche robotics and design technology. STABER’s IP will advance Wälischmiller’s ongoing product development in the global nuclear, oil & gas and defence industries. Combining STABER and Wälischmiller is expected to generate certain cost and operational synergies. STABER will provide the Group with access to new technologies and engineering design expertise. The Acquisition is in line with Carr’s strategy of being at the forefront of innovation and technology.

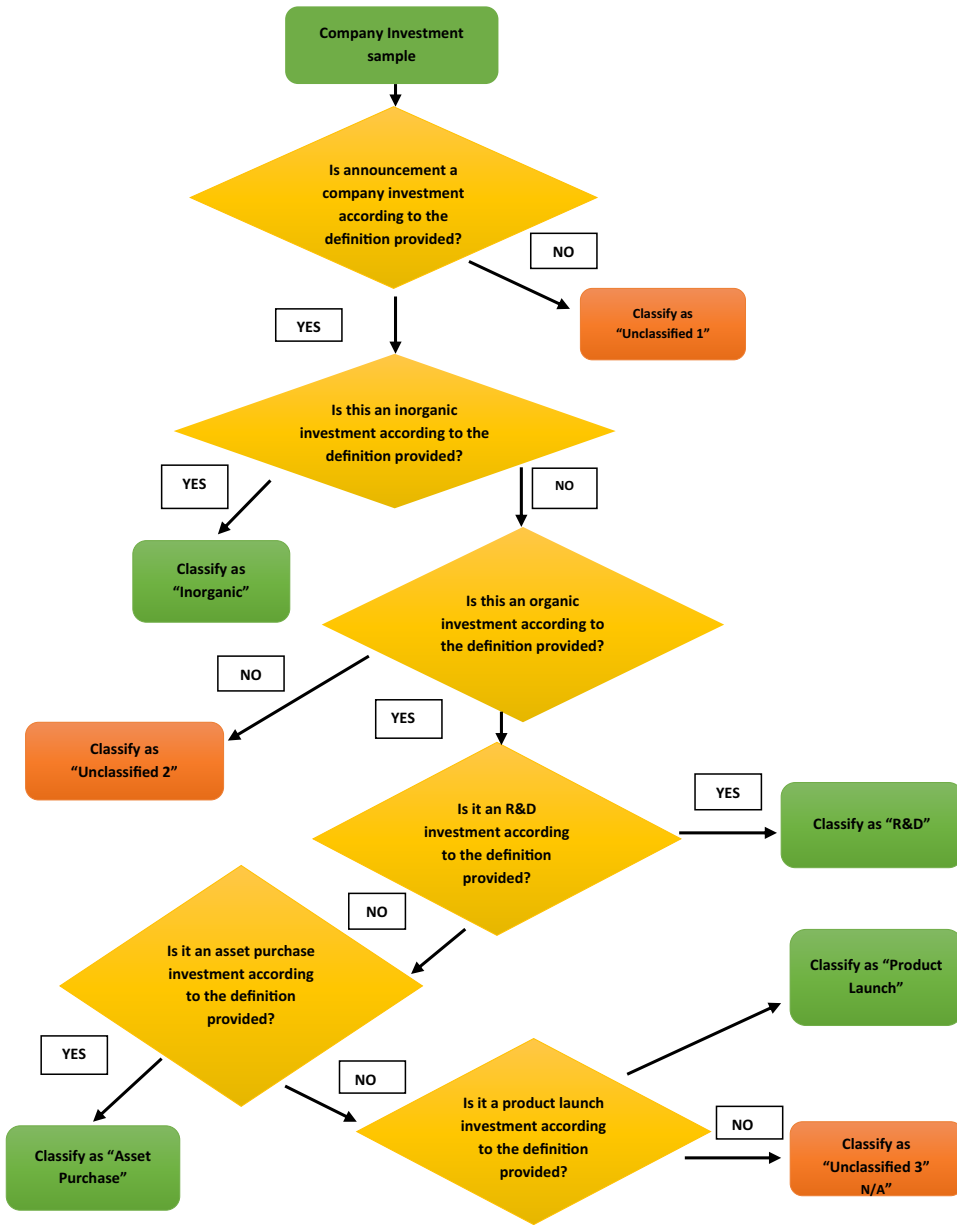
For the year ended 31 December 2015, STABER recorded adjusted EBITDA of €0.67 million and the adjusted gross assets of STABER as at 31 December 2015 were €1.76 million. The Acquisition is expected to be earnings neutral in the first year and enhancing thereafter.

The total consideration is being satisfied by the Group’s existing resources following the Group’s disposal of the Food division, announced on 5 September 2016. The Group expects this acquisition to enhance the capability of Wälischmiller and its long term operational performance.

A.4. CLASSIFICATION PROCEDURE

We followed the flow chart below in classifying investment announcements.

CASH AND INVESTMENT



APPENDIX B
DISTRIBUTION OF CORPORATE ANNOUNCEMENTS ACROSS YEARS AND INDUSTRY

Panel A: Announcement distribution across years and industry														
Acquisition	Asset acquisition						New products						R&D	
	Freq.	Percentage	Year	Freq.	Percentage	Year	Freq.	Percentage	Year	Freq.	Percentage	Year	Freq.	Percentage
2005	108	2.89	2005	8	4.02	2005	7	8.33	2005	8	3.31	2005	8	3.31
2006	279	7.47	2006	13	6.53	2006	9	10.71	2006	14	5.79	2006	14	5.79
2007	315	8.44	2007	4	2.01	2007	10	11.9	2007	24	9.92	2007	24	9.92
2008	277	7.42	2008	15	7.54	2008	6	7.14	2008	33	13.64	2008	33	13.64
2009	180	4.82	2009	15	7.54	2009	7	8.33	2009	16	6.61	2009	16	6.61
2010	263	7.05	2010	16	8.04	2010	11	13.1	2010	16	6.61	2010	16	6.61
2011	349	9.35	2011	22	11.06	2011	2	2.38	2011	7	2.89	2011	7	2.89
2012	294	7.88	2012	14	7.04	2012	4	4.76	2012	9	3.72	2012	9	3.72
2013	201	5.38	2013	8	4.02	2013	1	1.19	2013	5	2.07	2013	5	2.07
2014	229	6.13	2014	18	9.05	2014	3	3.57	2014	2	0.83	2014	2	0.83
2015	252	6.75	2015	14	7.04	2015	1	1.19	2015	4	1.65	2015	4	1.65
2016	218	5.84	2016	30	15.08	2016	3	3.57	2016	18	7.44	2016	18	7.44
2017	221	5.92	2017	7	3.52	2017	7	8.33	2017	21	8.68	2017	21	8.68
2018	284	7.61	2018	9	4.52	2018	11	13.1	2018	24	9.92	2018	24	9.92
2019	263	7.05	2019	6	3.02	2019	2	2.38	2019	41	16.94	2019	41	16.94
Total	3,733	100	Total	199	100	Total	84	100	Total	242	100	Total	242	100
Acquisition			Asset acquisition			New products			R&D					
Basic Materials	259	6.94	Basic Materials	27	13.57	Basic Materials	1	1.19	Basic Materials	6	2.48	Basic Materials	6	2.48
Consumer Discretion	885	23.71	Consumer Discretion	84	42.21	Consumer Discretion	10	11.9	Consumer Discretion	1	0.41	Consumer Discretion	1	0.41
Consumer Staples	153	4.1	Consumer Staples	7	3.52	Consumer Staples	3	3.57	Consumer Staples & F	2	0.82	Consumer Staples & F	2	0.82

(Continues)

Panel A: Announcement distribution across years and industry

Acquisition	Asset acquisition				New products				R&D	
	Energy & F	Health Care	Industrials	Total	Energy & F	Health Care	Industrials	Total	Health Care	Industrials
Energy & F	269	7.2	3	1.51	2	2.38	2	2.38	232	95.87
Health Care	223	5.97	10	5.03	30	35.71	1	35.71	1	0.41
Industrials	1,529	40.96	40	20.1	20	23.81	20	23.81	242	100
Real Estate	2	0.05	7	3.52	11	13.1	11	13.1		
Technology	239	6.4	21	10.55	6	7.14	6	7.14		
Telecommunications	80	2.14	199	100	1	1.19	1	1.19		
Utilities	94	2.52			84	100		100		
Total	3,733	100								

Panel B: Data cleaning procedure

Total announcements	14,425
Announcement by firms in the finance industry	(8,254)
Dirty announcements	(800)
Unclassified	(335)
Incomplete firm data on cash holdings	(495)
Incomplete data on other variables	(285)
Total clean announcements	4,256

APPENDIX C

VARIABLE DEFINITION TABLE

Variable	Definition
Abnormal Returns	Excess returns computed using the market index over the period $t-1$ to $t+1$
Excess Cash Holdings	Difference between a firm's cash holdings and the industry average cash holdings in a given year
Cash Holdings	Ratio of a firm's cash to total assets
Size	Natural logarithm of a firm's market capitalization
Spread	The difference between the ask price of a firm's stock and the bid price
Free Cash Flow	Operating income before depreciation, interest expenses, income taxes, and capital expenditures, scaled by book value of total assets
Relative Deal Size	Ratio of the announced cost of the acquisition to the firm's market capitalization
Market-to-Book	Ratio of a firm's market capitalization to the book value of assets
Leverage	Ratio of debt to total assets
Dividend Yield	Annual dividend per share to the share price of a company
CAPEX	Increases in plant, property, and equipment deflated by total assets
Run Up	Abnormal returns of a firm's shares 35 days before the announcement
Beta	Degree of sensitivity of a firm's share price to the market
Market Returns	Return from the market portfolio
DPS	Dividend per share
EPS	Earnings per share
R&D	R&D expenses for a given period
Board Diversity	Percentage of board members that have a cultural background different from the location of the corporate headquarters
Number of Employees	Number of staff employed by a company in a given year

APPENDIX D

HISTORICALLY ADJUSTED CASH HOLDINGS AND MARKET VALUATION OF INVESTMENT ANNOUNCEMENTS

	(1)	(2)	(3)	(4)
	Full sample	Full sample	Organic investment	Inorganic investment
Historically Adjusted Cash Holdings	0.0273*** (2.43)	0.0314*** (2.70)	0.1687*** (2.47)	0.0053 (0.74)
Size	-0.0028*** (-4.04)	-0.0029*** (-3.83)	0.0001 (0.02)	-0.0030*** (-6.32)
Organic	0.0067** (1.69)	0.0073 (1.64)		
Free Cash Flow	-0.0653*** (-5.85)	-0.0671*** (-5.75)	-0.1534*** (-2.62)	0.0162** (1.83)
Market-to-Book	0.0035*** (2.69)	0.0040*** (2.85)	-0.0178 (-1.40)	0.0010 (1.14)
Leverage	-0.0143** (-1.95)	-0.0160*** (-2.13)	-0.0728*** (-2.11)	-0.0091** (-1.67)
Run up	0.1407*** (2.27)	0.1362*** (2.18)	0.1882 (0.51)	0.1143*** (3.03)
Beta	-0.0027 (-1.44)	-0.0019 (-0.94)	0.0039 (0.22)	-0.0029*** (-2.52)
Market Returns	0.0034 (0.38)	-0.0598 (-0.73)	-0.4959 (-0.82)	-0.0394 (-0.83)
Dividend Yield	-0.0001 (-1.00)	-0.0002 (-1.05)	-0.0042 (-0.77)	-0.0002*** (-2.27)
Capital Expenditure	0.0203 (0.64)	0.0285 (0.84)	0.1629 (0.60)	-0.0180 (-0.90)
Spread	-0.0000 (-0.45)	-0.0000 (-0.36)	0.0014** (1.73)	-0.0001*** (-2.75)
Acquisition controls				Yes
Year dummy	No	Yes	Yes	Yes
Industry dummy	No	Yes	Yes	Yes
Intercept	0.0575*** (6.10)	0.0566*** (3.59)	0.0839 (0.71)	0.0539*** (5.80)
Obs	3,741	3,741	445	3,296
Adjusted R-squared	0.026	0.025	0.025	0.030

This table presents the regression estimates of the effect of historically adjusted cash holdings on CARs of corporate investment announcements (organic and inorganic). Historically adjusted cash holdings are the difference between a firm's cash holdings and this firm's average cash holdings in the previous five years. Models 1 and 2 are for the full sample. Model 3 is for the subsample of organic investment, while Model 4 is for inorganic investment. ** and *** report significance below 10% and 5% respectively. *t*-statistics are reported in parentheses.