

Essays on insider trading and financial reporting discretion

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Acknowledgments

“Always keep Ithaca in your mind.
To arrive there is your ultimate goal.
But do not hurry the voyage at all.
It is better to let it last for many years;
and to anchor at the island when you are old,
rich with all you have gained on the way,
not expecting that Ithaca will offer you riches.
Ithaca has given you the beautiful voyage.
Without her you would have never set out on the road.
She has nothing more to give you.”

C. P. Cavafy

Undertaking the PhD has been a long journey, but what stays is the knowledge, the experience, the friendships you make. Despite the difficult times you may face during the journey, the ultimate goal is after all achieved.

The past few years have been an amazing journey and I would like to express my sincerest gratitude to a number of people who made this enjoyable journey successful. Foremost among them is my first supervisor Dr Christina Dargenidou whose I am grateful for her guidance, patience and suggestions. Her support helped me undertake the research presented in this thesis. I also wish to thank for my second supervisor Prof. Ian Tonks for all his support, guidance, ideas and comments. I am very thankful to both of them for their contribution to this thesis.

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This thesis is dedicated to my partner, Sofia and our little one who soon will be exploring this world and to my parents, Dr Nikolaos Tsoligkas and Eleni Tsoligka, who have always supported me throughout my studies and for motivating me to pursue a PhD. I also want to show my thanks to my brother, Dr Andreas Tsoligkas, and his family.

Abstract

This thesis presents three empirical studies investigating the capital market effects of the interplay between financial reporting discretion and insider trading. The empirical studies contribute to the emerging accounting literature which considers managers' private signal conveyed by means of their trading on their own firm's shares.

The first study examines whether the disclosure of directors trading improves market efficiency and contributes to the long standing controversy in the literature with regards to the informational efficiency of insider trading. The findings indicate that insider trading assist market participants to assess the implications of current for future earnings during an earnings announcement and consequently lead to more efficient prices. However, the information in insider trading subsumes the information in financial reporting discretion in this setting.

The second empirical chapter investigates the interplay between financial reporting discretion and insider trading focusing on the setting of acquisitions financed with equity whereby managers have incentives to manipulate earnings and the opportunity to conceal the consequences from doing so. In this particular setting, it is shown that a combination of financial reporting discretion aiming to inflate earnings and insider purchases denoting overconfident managers is associated with acquirers' long term underperformance.

The third empirical chapter employs a setting characterised by an exogenous constraint over financial reporting discretion over the capitalisation of R&D expenditures. It is shown that constraining financial reporting discretion comes at the expense of a loss of information about future earnings. Moreover, constraining

financial reporting discretion reduces also the usefulness of the insider purchases disclosure as a means for assessing the motivation for capitalisation.

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1 Introduction

The trading by corporate insiders' in their own firm's share, commonly known as insider trading, has been a major controversy in the literature. On the one hand, trading by insiders who are better informed than other investors can be detrimental to market efficiency in the sense that it may discourage information acquisition and trading by outsiders (Ausubel, 1990; Fishman and Hagerty, 1992). On the other hand, trading by informed investors disseminates their private information, and consequently leads to more efficient prices (Manne, 1966; Carlton and Fischel, 1983b; Leland, 1992).

Corporate insiders are in a unique position because they are aware of the future prospects of the firm. Given their position, insiders could employ their information advantage when trading on their own firm's shares. In line with insiders' information advantage, prior research shows that directors' trading on their own firm's share predicts subsequent share price changes and performance (e.g. Gregory *et al.*, 1997; Lakonishok and Lee, 2001; Fidrmuc *et al.*, 2006). Specifically, purchases are shown to be followed by positive abnormal returns and sales by negative abnormal returns. Consequently, the disclosure of their trades is a significant source of information for market participants to unravel managers' expectation about the future performance of the firm.

Corporate insiders are, also, in charge of corporate decision-making and the information in financial statements. Investors would employ the information in financial statements in order to assess a firm's future prospects and future cash flows and consequently, the value of a firm. Accounting standards allow managers to exercise their discretion so that the information in the financial statements

reflects the underlying economics, given their intimate knowledge of the firm. For instance, considerable discretion has been allowed to managers in estimating accruals. The primary role of accruals is to address timing and matching problems inherent in cash flows so that earnings reflect more closely the firm's performance and enable the prediction of future earnings and cash flows. Another type of discretion examined here is the capitalisation of R&D expenditures which conveys information about the future prospects of R&D projects. The underlying idea for allowing financial reporting discretion is to allow managers to communicate their private information and decrease the information asymmetry between insiders and outsiders. Whilst prior literature shows on average, that financial reporting discretion provides relevant information to capital markets (e.g. Subramanyam, 1996), it also shows that discretion may also arise out of opportunistic motivations (e.g. Healy and Wahlen, 1999; Walker, 2013 for reviews of the literature). Although signalling and opportunistic choices can be identified ex-post, such identification by market participants can be often very difficult in real time. This type of noise in the information in financial reporting discretion compromises the quality of financial reporting and exacerbates the information asymmetry between insiders and outsiders (e.g. Bhattacharya *et al.*, 2013). Moreover, the noise in financial reporting information can also arise when the discretion allowed to managers does not enable them to communicate efficiently their private information.

Investors then, would rely on additional disclosure to interpret the information in financial statements (e.g. Francis *et al.*, 2007) in order to infer managers' private information. Prior research has employed a number of proxies for additional disclosure. Here, we employ insider trading as a direct signal of managers' private information. Insider purchases signal managers' increased expectations about the

firm's future performance while insider sales would signal decreased managerial expectation of future performance. Insider trading and more specifically insider purchases are costly and thus credible signal of commitment about the future value of the firm. Not only insiders invest their own wealth in the firm's shares but also, they take on more idiosyncratic risk as they under-diversify their portfolio (e.g. Fidrmuc *et al.*, 2006; Veenman *et al.*, 2011) Therefore, the disclosure of these transactions would be relevant information for investors. Consistently, prior literature (e.g. Beneish and Vargus, 2002) shows that market participants can employ insider trading in order to assess the likelihood of opportunistic earnings management. Recent literature also revives the interest in directors trading to interpret the information in financial reporting. Veenman (2012) shows that insider trading and more specifically insider purchases increase the precision of information in financial statements. In addition, Badertscher *et al.* (2011) show that the market use this disclosure to price accounting restatements. This finding indicates that the market employs directors' signal when they are concerned about the quality of financial reporting.

This thesis presents three empirical chapters (Chapters 3-5) that examine the capital market effects of the interplay between insider trading and financial reporting discretion. The thesis contributes to the insider trading literature by addressing questions that prior research has yet to address. Specifically, the empirical chapters presented in this thesis answer an array of questions: Does insider trading enable the dissemination of managers' private information conveyed by financial reporting discretion? Or, does insider trading deter market participants from extracting information from financial reporting discretion? What can we learn about the managers' motivations for engaging with financial reporting discretion by

looking at their insider trades? Under which circumstances can insider trading assist market participants to interpret financial reporting discretion?

The empirical chapters presented in this thesis focus on legal insider trading in the UK that has been reported as required by the law. Chapter 2 discusses in further detail the regulation surrounding insider trading and defines legal and illegal insider trading. The thesis employs the terms “insiders”, “directors” and “managers” interchangeably to refer to corporate insiders who are assumed to have private information about their company and can influence financial reporting. In line with prior research in the UK, the insider trading examined here consists of trades by executive and non-executive directors on their own firm’s share.

Chapter 2 discusses the definition and regulation of insider trading in the UK. Next, it discusses the insider trading literature focusing on the information role of directors’ trades and the relation between insider trading and financial reporting discretion as well as the evidence that we have so far on the capital market effects of this relation. The chapter concludes by identifying the settings that are employed here to investigate the capital market effects of the interplay between insider trading and financial reporting discretion and outlines the contribution of the research presented.

Chapter 3 investigates whether the disclosure of directors insider trading enables the dissemination of managers’ private information conveyed by financial reporting discretion or deters market participants from extracting information from financial reporting discretion. In order to address this question, this chapter investigates whether the disclosure of insider trading results in more efficient prices in a setting of a pervasive market inefficiency, namely the post earnings announcement drift

(PEAD). Our findings confirm that the disclosure of informative insider trading mitigates the anomaly implying that informative insider trading conveys information, which assists market participants to unravel financial reporting discretion. However, these results do not extend to any other form of insider trading. It is shown that the disclosure of any other form of insider trading deters the efforts of market participants from using the information in financial reporting discretion to interpret the earnings surprise. This chapter contributes to the long lasting debate in the literature with respect to insider trading. On the one hand, insider trading is beneficial because of its informational role (Manne 1966; Lelenad, 1992; Carlton and Fischel; 1983), while on the other hand, insider trading harms investors' confidence and adversely affect the market participants' information acquisition efforts, trading and liquidity (Manove, 1989; Ausubel, 1990; Fishman and Hagerty, 1992; Chung and Charoenwong, 1998). The empirical literature (e.g. Gregory *et al.*, 1997; Lakonishok and Lee, 2001; Fidrmuc *et al.*, 2006; Veenman, 2012) shows that the disclosure of insider trading is associated with significant market reactions, implying that it provides relevant information, consistent with the information role of insider trading. Our evidence provides only partial support for the argument that capital markets benefit from insider trading. This chapter also contributes to the literature examining whether insider trading provides relevant information for the valuation of the earning (e.g. Udpa, 1996; Roulstone, 2008; Veenman, 2012). The approach taken in those studies, however, cannot inform the extent to which insider trading has implication for market efficiency. This chapter contributes to this line of research by investigating the role of insider trading for market efficiency.

Chapter 4 investigates what we can learn about the managers' motivations for engaging with financial reporting discretion by looking at their insider trades when

managers have incentives to engage in opportunistic earnings management, and more importantly, have the opportunities to conceal its consequences. To address this, the chapter employs the setting of corporate acquisitions given that the post-acquisition environment offers opportunities to conceal aggressive reporting. Furthermore, acquisitions financed with stock create the incentives to engage with opportunistic earnings management since the cost of the acquisition is inversely related to acquirers' share price. While insider purchases are typically considered as credible signal indicating the absence of earnings management (e.g. Beneish and Vargus, 2002), the literature on acquisition (Malmendier and Tate, 2005; Doukas and Petmezas, 2007) considers them as a signal of managers' overconfidence. The results presented in this chapter show that the long term underperformance of stock financed acquisitions is driven by firms exhibiting the combination between earnings management and insider purchases that are claimed here to be attributable to overconfident managers. This chapter contributes to the stream of literature that employs directors' trading as a measure of overconfidence by identifying its role in explaining the post-acquisition underperformance. Specifically, we show that its presence reinforces with high precision the optimism inherent into earnings management. This chapter also contributes to the stream of literature that attributes the long-term performance of stock acquisitions to earnings management (e.g. Louis, 2004). Our findings show that the underperformance due to earnings management is driven by those acquisitions, which exhibit evidence of managerial overconfidence.

Chapter 5 examines the circumstances under which insider trading can assist market participants to interpret financial reporting discretion. Prior research (e.g. Beneish and Vargus, 2002) suggests that the market could employ the disclosure

of directors' trading to assess whether managers' underlying motivation for earnings management is opportunistic or signalling. However, this stream of research has yet to investigate its role when discretion is exogenously constrained. Chapter 4 addresses this by focusing on the capitalisation of R&D and employs the transition from a discretionary capitalisation (SSAP 13) to a mandatory capitalisation (IAS 38) regime in the UK. Similarly to the evidence reported in prior research, we find that that insider purchases assist market participants to learn about the signalling motivation for engaging with capitalisation. However, this finding holds only under the discretionary capitalisation regime and not under the mandatory capitalisation. The results also show that constraining managerial discretion over the capitalisation of R&D results in significant loss of information with respect to future earnings. This chapter contributes to the stream of research investigating the interrelation by showing that the role of insider purchases to denote that earnings management is employed for signalling exists only when discretion is allowed. In addition, this chapter contributes empirical evidence supporting the concerns raised in prior research (e.g. Wyatt, 2008; Stark, 2008) with respect to the adoption of the standard in the UK.

Finally, chapter 6 summarises the empirical findings presented in chapters 3 to 5 and discusses the conclusion drawn from this thesis.

2 Review of the insider trading literature

2.1 The regulation of insider trading in the UK and the definition of inside information

In the UK, inside information as defined by the Financial Conduct Authority (FCA)¹ and adopted from the European Market Abuse Directive (2003, enacted in 2005) is information of a “precise nature which is not generally available, relates, directly or indirectly, to one or more issuers of the qualifying investments or to one or more of the qualifying investments, and would, if generally available, be likely to have a significant effect on the price of the qualifying investments or on the price of related investments.”² However, information from research or analysis is deemed to be generally available, and therefore it is not considered as ‘inside information’.

FCA, which regulates insider trading, defines insiders those individuals who have access to ‘inside information’³:

- as a result of their membership of the administrative, management or supervisory body of an issuer of qualifying investments;
- as a result of holding capital of an issuer of prescribed investments;
- as a result of having access to the information through their employment, profession or duties;
- as a result of criminal activities; or
- which they have obtained by other means, e.g. a tip-off from a friend, and which they know, or could be reasonably expected to know, is inside information.

Insider trading and in particular the trades by directors are regulated by The Companies Act 1985, The Criminal Justice Act (CJA) 1993, The Financial Services

¹ Previously known as Financial Services Authority.

² Section 118C of the Financial Services and Markets Act (2000)

³ Section 118B of the Financial Services and Markets Act (2000)

and Markets Act (FSMA) 2000, Listing Rules and Disclosure Rules administered by the Financial Conduct Authority. While it is not illegal for a director to trade on the company's share, it becomes illegal if these trades are incurred with price sensitive information. FCA has the power, under Section 123 of Financial Services and Markets Act (2000), to impose penalties such fine or imprisonment to insiders found guilty of trading on inside information. Furthermore, the Financial Services and Markets Act (FSMA) 2000 introduced the wider offence on market abuse which supplements the criminal offences of insider trading. It is worth noting that FCA won its first successful criminal prosecution for insider trading in 2009.⁴

The Disclosure Rule 3.1 administered by the Financial Conduct Authority states that any person discharging managerial responsibilities in the UK must notify the company about the occurrence of any transaction within four business days of the day which the transaction occurred. Then, the company should notify the London Stock Exchange (LSE) no later than the following day, when the information about the trade is disseminated to the market. Therefore, directors' trades should be announced to the market approximately six days after a directors' trade. However, directors must receive a clearance to trade from the chairman in order to trade according to the London Stock Exchange Model Code (1977), currently part of the Listing Rules.⁵ Considering that insiders typically notify the board of directors prior to the insider trading, the timeliness for the disclosure of directors trading is

⁴ The "Updated Measurement of Market Cleanliness" (www.fsa.gov.uk/pubs/occpapers/op25.pdf) report published in 2007 by the Financial Service Authority (FSA) identifies the presence of informed trading prior to acquisitions in the UK. In 2012 Brooke Masters reported in Financial Times that informed trading by insiders prior to acquisition has decreased significantly following the successful convictions of insider trading 2009. Overall, the above evidence indicates poor enforcement prior to 2009 and thus, greater informed trading by insiders.

⁵ Listing Rule 9.2 and 15.

improved. Consistently, Fidrmuc *et al.* (2006) note that 85% of the directors trades are announced to the market the same day they occur or the following.

In addition, the London Stock Exchange Model Code (1977) prohibits insiders from trading up to two months preceding an annual earnings announcement and one month prior to an interim earnings announcement. In addition, directors are allowed to trade as early as the earnings announcement. Hillier and Marshall (1998) show that the Model Code is well enforced since directors' trading prior to an earnings announcement is virtually non-existent. Furthermore, Hillier and Marshall (2002a) show that directors' trading is concentrated in the period immediately before the start of the ban and in the period following the earnings announcement, with the incidence of trading being higher in the period following an earnings announcement.

2.2 The role of insider trading in capital markets

The concept of trading by managers on their own firm's share has been a major controversy in the literature. The debate in this stream of research focuses on the implications of insider trading on the informational efficiency of the market.

On the one hand, Manne (1966a, 1966b) suggests that insider trading results in more efficient prices because managers' trading decisions are a means of conveying private information to the markets. The dissemination of managers' private information results in prices reflecting more information about the future relatively to the information that is available to market participants when insiders abstain from trading (Leland, 1992; Chau and Vayanos, 2008). Consequently, investors could employ this signal to confirm or contradict their own information and trade accordingly (Clacher *et al.*, 2009). In addition, Carlton and Fischel (1983a)

argue that investors would have demanded stricter regulation, had they believed that insider trading decreases firm value.

On the other hand, permitting insiders to trade on their firm's shares profitably on their asymmetric information is unfair and harms investors' confidence and compromises market efficiency (Ausubel, 1990; Fishman and Hagerty, 1992). This occurs because insider trading deters other traders from acquiring information and trading, and therefore it affects the distribution of information among investors. In addition, Manove (1989) argues that insider trading may discourage corporate investments since insiders could appropriate some part of the returns generated by corporate investments. Specifically, he analytically shows that when investments are riskier, insider trading would induce underinvestment, while under circumstance of less risky investment, insider trading would induce overinvestment. In addition, Chung and Charoenwong (1998) show that firms with greater extent of insider trading activity are associated with larger bid ask spreads. Overall, this stream of research suggests that permitting insider trading impairs market efficiency.

However, despite those objections, insider trading is a pervasive feature of capital markets. In reality, those transactions are subject to regulations that appear to protect, at least to some extent, outside investors' interests while allowing insider trading to enrich the information set available to market participants. Fernandes and Ferreira (2009) show that the first enforcement of insider trading regulation results in prices reflecting more information about the future performance of the firm. Similarly, Brochet (2010) show that regulation that accelerates the disclosure of insider trading results in greater market reactions at their announcement.

The above literature suggests that insider trading has a favourable information effect while it may significantly affect market's confidence and consequently impair market efficiency. The work presented in this thesis attempts to shed further light in the controversy from the perspective of examining financial reporting discretion.

2.3 Do insiders possess private information?

Corporate insiders are in a unique position because they are in charge of corporate decision-making and are aware of the future prospects of the firm. Consequently, the disclosure of their trading decision is likely to communicate to the market their beliefs about the prospects of the firm. The seminal microstructure paper by Kyle (1985) and the subsequent analytical literature (e.g. Huddart *et al.*, 2001), show how insiders' information is transmitted into prices. This stream of research suggests that trading by insiders possessing private information would result in unanticipated trading volumes which would convey their information to the market. Then, market makers would set prices in response to these unanticipated trading volumes. Prices would drop following an insider sale and prices would jump following an insider buy. In other words, insider trading reveals new information to the market which results in the revisions in investors' expectations and hence, share price movements. Consistently, in order to investigate whether insiders employ their inside information when trading, prior research observes return patterns around insider trading and around corporate events and other disclosures. The following sections discuss briefly the ample empirical evidence on the share price responses to insider trading.

2.3.1 *Abnormal returns around insider trading*

One of the earliest studies examining the market reaction associated with insiders' trades in the US is Jaffe (1974). He finds significant abnormal returns up to eight months following a directors' trade. This finding implies that insiders can predict future share price changes and supports the idea that insiders exploit their inside information to trade. Finnerty (1976) examines whether these abnormal returns differ for insider purchases and insider sales. He finds that both insider purchases and sales are followed by significant abnormal returns during the month following the trade. However, he shows that the magnitude of abnormal returns following insider sales is lower compared to purchases. Subsequent studies in the US (e.g. Bettis *et al.*, 1997; Lakonishok and Lee, 2001; Jeng *et al.*, 2003) find similar results; insider purchases are followed by positive abnormal returns and insider sales are followed by negative and lower in magnitude abnormal returns. These results suggest that prices may not fully reflect the information content of insiders' trades. In other words, the market underestimates the use of inside information since the abnormal returns continue after the announcement of these trades to the market.

Early evidence from the UK by King and Roell (1988) confirms the evidence in the US suggesting that significant abnormal returns follow the announcement of insider trading. More specifically, they find that insiders' purchases are associated with positive abnormal returns which are significant up to one year after the announcement of the trade. With regards to sales, they find that they are associated with positive but insignificant abnormal returns. The authors conclude that the market underestimates the use of inside information with respect to the future performance of the firm. This implies that directors' trading contains information which is not fully absorbed by the market. Using a bigger sample of

trades, Gregory et al. (1994) re-examine the abnormal returns followed by insider trading. Their findings are consistent with the announcement effect of insiders' buys that King and Roell (1988) find. More specifically, they find that purchases yield positive and significant abnormal returns whereas sales yield smaller and negative abnormal returns following the date of their announcement to the market. Subsequent studies in the UK report similar findings for the abnormal returns following the months of the insider trades (e.g. Gregory *et al.*, 1997) or the days following the announcement of the trades (e.g. Friederich *et al.*, 2002; Fidrmuc *et al.*, 2006; Gregory *et al.*, 2009). The evidence in Fidrmuc *et al.* (2006) also show that insider trading is more informative in the UK triggering greater market reaction in the UK compared to the US, attributing this difference to the more timely disclosure in the UK compared to the US. Prior to the introduction of Sarbanes-Oxley Act of 2002 directors should report their trades by the tenth day of the following month that the trades occurred, while after SOX insiders should report their trades within two business days (Brochet, 2010). In contrast to the UK, managers in the US do not have to receive the clearance to trade. These practises in the UK explain why insider trading in the UK triggers greater market reaction compared to the US.

This stream of research aims to identify whether insiders trade based on their private information by observing the market reactions associated with these trades, since the actual private information that insiders trade upon is almost impossible to be identified (Tonks, 2010). Fidrmuc *et al.* (2006) observe that the empirical evidence on insider trading is sought by testing for significant abnormal returns either over a period of time after the trade such as 6, 12 or more months or on the day of the insider trades' announcement. The evidence supports the notion that the

announcement of insider trading announcement triggers significant market reactions. This implies that the disclosure of insider' trading could be useful for investors to observe managers' private information. Furthermore, insider purchases trigger greater reactions than sales. This is because directors' purchases are costly and thus, a credible signal of commitment about the future value of the firm. Not only insiders invest their own wealth in the firm's shares but also, they take on more idiosyncatic risk as they under-diversify their portfolio (e.g. Fildmuc *et al.*, 2006; Veenman *et al.*, 2011). On the other hand, sales are motivated for a number of reasons such as liquidity or portfolio diversification purposes (e.g. Lakonishok and Lee, 2001) which may be unrelated to insiders' own private information, thus leading to lower information content compared to purchases. Consistently, Veenman *et al.* (2011) show that insider purchases are related to favourable future performance whilst sales are not. Overall, the empirical results reported in this stream of research suggest that insider purchases are followed by significant upward returns while sales by downward returns of lower magnitude or significance compared to purchases. In other words, insiders appear to buy before price increases and sell prior to price declines. Generally, insiders appear to trade on their foreknowledge of price changes and consistently with their private information about the future performance of the firm. In order to investigate whether insiders trade on inside information, prior research has also examined insider trading patterns prior to earnings announcements, corporate events and other news announcements. The next sections discuss the evidence from this stream of literature.

2.3.2 *Insider trading around earnings announcements*

In order to investigate whether managers possess private information, prior research also investigates the interaction between insider trading and earnings announcements. An insider who expects favourable future earnings would take advantage of this information by purchasing shares prior to the earnings announcement in order to buy the shares at a lower price, and vice versa for adverse news. Consistently, Elliot et al. (1984) shows that insiders tend to increase purchases and decrease sales of shares twelve months prior to the announcement of extreme earnings increases. Similarly, Lustgarten and Mande (1995) show that insiders tend to purchase shares prior to the announcement of good earnings news and vice versa for bad news. More recently, Piotroski and Roulstone (2007) show this relationship is not linear and is attenuated for extreme earnings surprises. However, insiders may face litigation when they sell shares prior to the announcement of adverse earnings news. In line with this argument, Ke *et al.* (2003) show that insiders in the U.S. tend to increase their net sales three to nine quarters prior to a break of earnings increases. This evidence implies that managers not only employ their inside information about future earnings when trading, but also time their trades to avoid litigation.

Udpa (1996) shows that insider trading prior to an earnings announcement mitigates the market reaction to the subsequent earnings announcement. In a similar vein, Roulstone (2008) shows that insider purchases and sales result in lower market reaction during the earnings announcement. These results suggest that the information in directors' trading allows the market to develop inferences about future earnings. However, this stream of research has yet to identify which trades assist investors to develop inferences about future earnings and

consequently, lead to more efficient prices. For instance, trades that anticipate the earnings surprise are more likely to reveal managers' private information about the forthcoming earnings, compared to those trades, which do not anticipate the earnings surprise. Chapter 3 investigates further this argument by identifying which trades are more likely to be informative and the extent to which they result in more efficient prices.

Insiders may also delay their trades until the impact of the earnings information has been observed, and consequently trade after the earnings announcement. In other words, an insider who plans to buy (sell) and expects unfavourable (favourable) earnings news will postpone the trade until after the earnings announcement. In line with this argument, Sivakumar and Waymire (1994) find that insiders tend to buy (sell) more shares following adverse (favourable) unexpected earnings. Lustgarten and Mande (1995) also find similar evidence that insiders delay the purchase (sale) of shares until after bad (good) earnings news is announced. Similar evidence presented for the UK by Hillier and Marshall (2002a) shows that insiders tend to buy after bad earnings news and sell after good earnings news. This literature builds upon Seyhun (1998) to argue that an insider who anticipates a negative earnings surprise can refrain from trading until after the bad news is announced in order to buy shares at a lower price. Conversely, an insider who anticipates a positive earnings surprise can postpone trading until after the public news announcement to sell at a higher price, and similarly for insider sales following good news. Seyhun (1998) argues that the direction in these trades reveals that prices have completely incorporated the information in earnings.⁶ On

⁶ Specifically, Seyhun (1998) argues: "Following their sales, insiders do not necessarily expect negative future performance. They only know that past expectation of good performance is completed and the stock price fully reflects insiders' expectations." (page 51)

the other hand, buys after the announcement of good news signal that past performance has yet to be completed and that prices do not completely incorporate insiders' information. In line with this argument, Kolasinski and Li (2010) show that trades occurring in the same direction with the earnings surprise are followed by significant returns up to six months after the earnings announcement. More recently, Veenman (2012) shows that purchases occurring after an earnings announcement are more informative when they confirm the initial earnings surprise and concludes that their disclosure is a useful signal for market participants to value past earnings. However, this stream of literature has yet to examine the capital market consequences of those delayed informed trades on price efficiency. Chapter 3 attempts to fill this gap in the literature.

2.3.3 *Insider trading around corporate events and decisions*

Among the first studies to investigate whether insiders exploit this type of private information is Givoly and Palmon (1985) who examine whether insiders trade prior to news announcements. They find that the returns they earn from trading are irrelevant to the disclosure of the news and that insider trading is rather rare prior to news announcements. More recently, Korczak *et al.* (2010) employ a sample of UK firms and report that only a small portion of news are followed by insider trading.⁷ However, their results are not so surprising for at least three reasons. Firstly, insiders may trade well before the announcement of the event due to litigation concerns. Secondly, they may not trade based upon all the information. Lastly, the events considered in the above studies would differ in magnitude. Consequently, only a fraction of the events employed would generate profitable strategies for insiders to exploit. Therefore, insiders may use their long term

⁷ They find evidence of insider trading in 5,345 out of the 78,251 news.

information advantage to trade as oppose to short term information. Thus, it is important to examine insider trading around specific corporate events and announcements where insiders are more likely to have an information advantage which may employ when trading. One of the most material information events for investors to assess the future performance of the firm is the announcement of earnings. Given that insiders would have superior knowledge of future earnings and performance, they may trade upon this information. The following section reviews the literature on directors' trading around corporate events such as capital expenditures, dividend changes, acquisitions, voluntary disclosure and seasonal equity offerings. The literature with regards to insider trading around earnings announcements is examined separately.

It is well established in prior literature that changes in the levels of dividends causes significant share price reactions, as it signals information about the future performance of the firm. For instance, Smith (1986) shows that the initiation of dividends cause significant favourable market reactions which are higher in magnitude than dividends increases or the issuance of special dividends. In other words, initiation of dividends would trigger positive market reactions signalling the good future prospects of the firms. Consequently, managers could purchase shares at lower prices in anticipation of future price increases. Then, insider purchases may reinforce the favourable news about dividend increases by enhancing the credibility of this disclosure about the future prospects of the firm. Consistently, John and Lang (1991) show that dividend increases accompanied by insider purchases are associated with greater favourable market reactions.

Similar evidence has also been presented for other corporate events and decisions. For instance, John and Mishra (1990) show analytically that increases

in capital expenditure accompanied by insider purchases communicate managers' private information with regards to their beliefs about the net present value of the investment. In addition, Gu and Li (2007) show that voluntary disclosure about the innovation strategy of high tech firms is more credible when it is accompanied by insider purchases. However, insiders could time their trades relative to the disclosure of news in order to avoid appearing trading upon inside information. For instance, Cheng and Lo (2006) show that insiders tend to purchase more shares following the announcement of bad news. Similarly, Noe (1999) show that insiders tend to trade in opposite direction of the management earnings forecast following its announcement. More importantly, he finds that insiders earn significant returns when they trade after the disclosure. In other words, insider trading following the disclosure signals the future performance of the firm.

The joint signalling literature has also investigated the interaction between the announcement of seasonal equity offerings (SEOs) and insider trading. The literature on the performance of SEOs shows robust evidence that its announcement results in significant underperformance for the issuer (e.g. Loughran and Ritter, 1995; Clarke *et al.*, 2001). Therefore, managers have strong incentives to sell shares at a higher price prior to the announcement of a SEO. Consistently, Karpoff and Lee (1991) shows that insiders tend to sell shares prior to the announcement of the SEO. Johnson *et al.* (1996) show that the market reaction to a SEO is less adverse when accompanied by insider purchases as opposed to insider selling or the absence of insider trading.

Another stream of the joint signalling literature focuses on corporate acquisitions or mergers. For instance, Elliot *et al.* (1984) show that insiders tend to purchase shares prior to the announcement of a merger. In a similar vein, Seyhun (1990)

show that insiders are more likely to purchase shares when the announcement of the takeover is likely to trigger favourable market reactions. In other words, insider purchases appear to signal the favourable prospects of the takeover. However, more recent literature suggests that insider purchases may stem out of managers' over-confidence or self-attribution bias and over-estimate the future performance of the firm. Consistently, this research (Doukas and Petmezas, 2007; Kolasinski and Li, 2012) shows that insider purchases prior to the announcement of an acquisition reveals managers' over-confidence denoted by the adverse market reaction to the magnitude and presence of insider purchases. Chapter 4 draws upon this literature to investigate the interaction between insider trading and financial reporting discretion in the context of acquisitions.

2.3.4 Insider trading and financial reporting discretion

Managers can exercise significant discretion in financial reporting with the intention to inform or mislead investors. Those mixed attributes may hamper the interpretation of earnings and increase the information asymmetry between insiders and outsiders. Financial statement analysis may not fully reveal managers' private information. Consequently, investors would rely on additional disclosure to interpret earnings (e.g. Francis *et al.*, 2007), in order to infer managers' private information and thus, address this information asymmetry. Considering managers' intimate knowledge about financial reporting and its components, the disclosure of managers' trading on their own firm's shares may assist market participants to price earnings.

Noise in earnings could result from the accrual component of earnings, among other factors.⁸ Sloan (1996) shows that the accrual component of earnings has lower persistence than the cash flow component and concludes that prices fail to fully reflect the information contained in the accruals components. Xie (2001) shows that the findings in Sloan (1996) are attributable to the discretionary component of accruals. In other words, those findings imply that prices fail to fully reflect the implication of discretion that managers induced to accruals for future earnings. This finding may not be so surprising considering that accounting standards allow managers to exercise significant discretion when estimating these accruals in order to best communicate the underlying economics of the firm. Managers could opportunistically employ their discretion in order to achieve various objectives and earnings targets (e.g. Healy and Wahlen, 1999; Walker, 2013). Thus, discretionary accruals could arise from managers' intention to inform or mislead. Francis *et al.* (2005) show that this factor causes significant information asymmetry, and managers could exploit it by trading on their own firm's shares profitably (e.g. Aboody *et al.*, 2005). In other words, managers' trading decision may be related to the discretion they exercise in accruals. Sawicki and Shrestha (2008) and Sawicki and Shrestha (2014) establish an inverse relation between earnings management and net insider trading. In a similar vein, Core *et al.* (2006) show that insiders tend to purchase more shares in firms with low accruals and sell more shares in firms which report high accruals. The results in this stream of research suggest that managers are well informed about the persistence of

⁸ For instance, the aggregated accounting information in financial reporting could potential hide part of the information required by investors to fully interpret earnings and the private information managers hold. Supplementary disclosure may address this information gap, but full disclosure comes at the expense of revealing proprietary information which may hurt the firm and its competitive advantage and position.

accruals and sophisticated enough to observe potential mispricing (Core *et al.*, 2006). Consequently, investors could rely on managers' trading decisions in order to resolve the uncertainty with regards to the implications of discretionary accruals for future earnings. Consistently, Beneish and Vargus (2002) find that the persistence of the discretionary component of accruals in earnings is greater when those are accompanied by directors' purchases and less persistent when accompanied by sales. Chapter 4 focuses on a context where managers have incentives to manipulate earnings in order to investigate the implications of discretionary accruals accompanied with insider purchases for future earnings.

Recent literature, also, recognises behavioural factors which may affect financial reporting. For instance, Schrand and Zechman (2012) show that managers' optimistic expectations about the future performance of the firm may lead to restatements arising from managers' overconfidence that future earnings will absorb the reversal of accruals. Given the significant loss of market value during a restatement (e.g. Hribar and Jenkins, 2004; Palmrose *et al.*, 2004), insiders have strong incentives to sell their stock prior to its announcement. Summers and Sweeney (1998) show that insider trading could be a useful determinant to assess the likelihood of restatement. Furthermore, Li and Zhang (2006) show that insider sales decrease before the restatement announcement, probably due to litigation concerns. More importantly, they find that managers tend to purchase shares following the announcement, while Agrawal and Cooper (2008) show that insiders generate significant profits in this setting. More recently, Badertscher *et al.* (2011) show that the insider trading significantly affects the market reaction to the announcement of the restatement. Specifically, they show that insider sales intensify the adverse reaction to the announcement, while purchases moderate the

adverse reaction. Those findings suggest that the market employs directors' signal when they are concerned about the quality of financial reporting. Managers could also induce noise in the cash flow component of earnings by manipulating real activities. Roychowdhury (2006) shows that managers reduce discretionary expenses such as R&D and advertising, increase production to report lower cost of goods sold or accelerate the timing of sales through increased price discounts in order to meet various earnings benchmarks. In contrast to manipulating accruals, real activities manipulation affects the underlying operating activities of the firm (Gunny (2010). In other words, real earnings management has an adverse effect on the firm's operations. Consequently, the benefits from insider trading may not offset the costs associated with real earnings management. Consistently, Sawicki and Shrestha (2014) do not establish any relation between insider trading and real earnings management. Their findings further reinforce the motivation to investigate the relation between insider trading and discretion induced in accruals or alternative mechanisms by which earnings can be manipulated. One such mechanism that is investigated here is the discretion upon the capitalisation of R&D expenditures. Prior research has shown that this type of financial reporting discretion has been either employed to signal the good prospects of the firm's R&D projects or abused as a means to inflate and smooth volatile earnings. The investigation undertaken in the thesis explores whether the insider trading disclosure, and more particularly, purchases have been employed by firms to discern the purpose of capitalisation. More importantly, the setting that is employed here allows us also to observe the extent to which market participants continue to rely on insider trading disclosure when financial reporting discretion is constrained.

2.4 Concluding remarks and contribution of the thesis

This chapter summarises the literature which investigates the information role of insider trading. Insider trading has been a major controversy in the literature, and early research attempts to address the implications of insider trading on the informational efficiency of the market. On the one hand, insider trading is beneficial because of its informational role (Manne 1966; Lelenad, 1992; Carlton and Fischel; 1983), while on the other hand, insider trading harms investors' confidence and adversely affect the market participants' information acquisition efforts, trading and liquidity. The first empirical chapter contributes to this stream of research by investigating the impact of insider trading on market efficiency. Specifically, this chapter investigates whether its disclosure results to more efficient prices by employing a setting where the market is known to be inefficient, namely the post earnings announcement drift. This is the first study to employ this setting to examine the consequences of insider trading for market efficiency.

The post earnings announcement drift (PEAD) or a return continuation along the sign of the earnings surprise occurs as the market exhibits a delayed response to the information received during the earnings announcement. Following prior research, the research design in this chapter employs the timing together with the direction of insider trading to identify transactions that are informative about the managers' private information for future earnings. Our initial findings confirm that the disclosure of informative insider trading mitigates the drift implying that insider trading conveys information about the implications of the earnings surprise for future earnings. However, the results do not support that the disclosure of insider trading assists market participants to unravel financial reporting discretion. Instead, it is shown that the disclosure of insider trading deters the efforts of market

participants from using the information in financial reporting discretion to interpret the earnings surprise.

The second empirical chapter investigates the market's assessment of financial reporting discretion when managers have the incentives to engage in opportunistic earnings management, and more importantly, have the opportunities to conceal its consequences. The opportunity to investigate such a setting is offered here by the case of stock acquisition announcements. Acquisitions financed with stock are associated with incentives to engage with opportunistic earnings management since the cost of the acquisition is inversely related to acquirers' share price. Moreover, the post-acquisition environment offers opportunities to conceal the consequences of aggressive financial reporting discretion. The results of the empirical investigation in this chapter demonstrate that insider trading, and more particularly insider purchases that take place before the acquisition announcement and after the latest earnings announcement characterise financial reporting discretion that stems out of managers' overconfidence. More particularly, the combination between this type of insider trading and earnings management denote optimistic managers who are also overly confident about their ability to control the consequences of aggressive accounting in the post-acquisition environment. The findings in this chapter suggest that the market is able to see through earnings management at the acquisition announcements. Nevertheless, the long term acquirers' underperformance is driven by the firms exhibiting the combination between earnings management and insider purchases that are claimed here to be attributable to overconfident managers. While prior literature in acquisitions employs directors' purchases as a proxy for overconfidence, we contribute to this literature by showing that its presence reinforces with high precision the optimism

inherent into earnings management. Our findings are in line with recent research by Ben-David *et al.* (2013) which indicates that the two distinctive aspects of overconfidence are managerial optimism and precision.

Finally, the stream of research which investigates the relation between insider trading and earnings management suggests that the market could employ the disclosure of directors' trading to assess whether managers' underlying motivation for earnings management is opportunistic or signalling. Consequently, investors may face additional costs in order to process the information in earnings in an attempt to infer managers' private information. An obvious reaction would be to constrain managers' discretion up to a level that curbs the scope for opportunistic financial reporting practices while preserving the signalling content of the information provided. Chapter 5 focuses on the capitalisation of R&D and employs the transition from a discretionary capitalisation (SSAP 13) to a mandatory capitalisation (IAS 38) regime in the UK as a natural experiment to investigate the implications of constraining financial reporting discretion. The findings suggest a significant loss of information with respect to future earnings when managers' discretion is constrained. Moreover, the evidence reported in this chapter demonstrates also a role for the disclosure of insider trading and more particularly, insider purchases for assisting market participants to learn about the motivation for engaging with capitalisation. The reported findings suggest also that such role for insider purchases exists only when significant discretion is allowed.

The thesis concludes by a discussion of limitations in the research reported here as well as the opportunities for further research.

3 Informative insider trading and price discovery: Evidence from the post earnings announcement drift anomaly

3.1 Introduction

It has been argued that insider trading is a mechanism that allows relevant information held by insiders to be incorporated into stock market prices (Manne, 1966; Carlton and Fischel, 1983b; Leland, 1992).⁹ However, others have pointed out that allowing insiders to trade upon their private information reduces investor confidence and deters other market participants from acquiring information and trading (Ausubel, 1990; Fishman and Hagerty, 1992). More recent research (Udpa, 1996; Roulstone, 2008; Veenman, 2012) demonstrates that the disclosure of insider trading accelerates the rate at which earnings information is incorporated into prices. We contribute to this research by examining whether insider trading enhances or reduces stock market efficiency within a pervasive market inefficiency setting, namely the post earnings announcement drift (PEAD) phenomenon. The PEAD is a return continuation along the sign of the earnings surprise, and represents a delayed response to an earnings surprise. We distinguish between informative and non-informative insider trading signals around an earnings announcement, and we report that informative insider trading mitigates the PEAD by providing information about the interpretation of the earnings surprise for future earnings. Hence, our results suggest that these trades are a mechanism for ensuring more efficient stock market prices. In contrast, we find non-informative

⁹ We use the terms “insiders” and “directors” interchangeably to refer to corporate insiders with private information about their company

trades carry no information about future earnings, and appear to be responsible for exacerbating the PEAD anomaly.

To the best of our knowledge, this is the first study to employ the PEAD setting for examining the capital market consequences of insider trading. The UK stock market provides an appropriate setting to address these questions, since the regulatory framework and common practice in the UK allow us to identify informative insider trading transactions that are disclosed in a timely manner. We take advantage of two features of the London Stock Exchange regulations. First, there is a clearly-defined trading ban prescribed by the London Stock Exchange Model Code (1977) forbidding insiders, normally interpreted to be executive and non-executive directors of the company, from trading for two months prior to the earnings announcement, and we use this trading ban to define informative trades.¹⁰ In contrast, companies in the US often have voluntary self-imposed restrictions to insiders trading around the earnings announcement, which may differ across firms (Bettis, Coles, Lemmon, 2000). Second, the disclosure rules for corporate insider trades on the London Stock Exchange allow for the timely disclosure of insider trading.¹¹ Following Garfinkel (1997), Seyhun (1998) and Hillier and Marshall (2002a), we distinguish between two types of insider trading, depending on their timing relative to the earnings announcement and the trading ban two months prior to the earnings announcement: active trades, which occur prior to the earnings announcement and passive trades which occur after the earnings

¹⁰ The Model Code is part of the listing rules of the London Stock Exchange (see <http://fshandbook.info/FS/html/handbook/LR/9/Annex1>)

¹¹ Financial Conduct Authority (FCA) summarises the disclosure rules of the persons discharging managerial responsibilities for firms listed in the UK (see <http://fshandbook.info/FS/html/handbook/DTR/3/1>).

announcement.¹² Further, we classify trades as informative and non-informative taking into account the direction of the trade in relation to the earnings surprise. “Active informative trades” are those trades by insiders that occur in the window immediately preceding the trading ban (so more than two months before the earnings announcement) and anticipate the earnings surprise component, that is being in the same direction as the earnings surprise. This is the most natural definition of how insiders exploit their private information, and because these trades occur sometime before the earnings announcement, are unlikely to fall foul of any insider trading regulations. “Passive informative trades” in contrast, are those insider trades that take place after the earnings surprise has been revealed and occur in the opposite direction to the earnings surprise, reflecting insiders’ beliefs that the stock market response to the announcement has been completed.¹³ By opposite direction we mean that insiders act in a contrarian fashion: buying after bad news or selling after good news. All other trades by insiders i.e. before the earnings announcement in the opposite direction to the earnings surprise, and after the earnings announcement in the same direction as the earnings announcement are classified as “non-informative insider trades”. We examine the effects of active and passive informative trading on the PEAD anomaly by calculating average abnormal returns in the six months after the earnings announcement (measured for six months from day +6 to day +137) and conditioning the sample on those

¹² Investigating insider trading occurring after the earnings announcement is important because insiders in the UK are allowed to trade as early as the earnings announcement day itself, which coincides with the end of the two months trading ban.

¹³ For instance, Seyhun (1998) notes that an insider who plans to buy but has private information on the future release of bad news will refrain from buying until after the negative news is announced; conversely, an insider who plans to sell and has private information on the release of good news will postpone the trade until after the public news announcement. In the former case, the insider avoids having a capital loss from buying at a high price and in the later, the insider exploits the opportunity to sell at a higher price.

observations where there has been active informed trading, passive informed trading and non-informative trading.

We report that the PEAD anomaly is alive and well for our sample of UK firms, based on 5,392 annual earnings announcements over the period 1990-2009, with the unconditional spread returns to a winner-loser hedge portfolio in the six months window after the earnings announcement, averaging a significant 4.54 percentage points. However, our results confirm that the disclosure of active and passive informative trades mitigates the PEAD anomaly. We find that if we condition on active informative trades the spread portfolio is reduced to an insignificant 1.41 percentage points, and for passive informative trades the spread portfolio is reduced to an insignificant 1.84 percentage points. These results hold when we treat active and passive informative trades separately and when we aggregate active and passive informative trades together. We find that for aggregated informative trades the spread portfolio is an insignificant 1.92 percentage points. These results are robust to the inclusion of size, momentum and the book-to-market factors.

The evidence is consistent with our hypothesis that informative insider trading conveys information about the implications of the earnings surprise for future earnings earlier than would otherwise be the case and consequently reduces the PEAD anomaly. In contrast, the disclosure of non-informative insider transactions in those windows, elicit a subsequent drift which suggests that these trades appear to generate uncertainty among market participants. We further show that our results hold after controlling for information acquisition costs using the magnitude of discretionary accruals. Prior research shows that information acquisition costs and the ensuing information uncertainty prevent arbitrageurs to eliminate the PEAD

until more information is received. Nevertheless, the findings here suggest also that the disclosure of insider trading is a sub-optimal mechanism for promoting market efficiency as it deters market participants from engaging with a fundamental-based information acquisition process.

This chapter contributes to the body of research that has investigated the influence of informative trading on the PEAD anomaly. Bartov *et al.* (2002) considers the effect of the presence of skilled investors while, Vega (2006) analyses an aggregate measure of information-based trading (PIN). However, Richardson *et al.* (2010) argues that the quality of these proxies may be questionable, especially for measures based on trade size, because of informed strategies that split orders. We measure information based trading by focusing on the trades of corporate insiders who are likely to have superior information due to their position in the company. Given the concerns in Richardson *et al.* (2010), the quality our measure of information based trading is unlikely to be questionable, in contrast to the proxies prior literature employed. While adding to the literature on PEAD, we also contribute to the research which investigates how the disclosure of insider trading accelerates the incorporation of earnings information into price (Udpa, 1996; Roulstone, 2008; Veenman, 2012). More specifically, Udpa (1996) and Roulstone (2008) show that insider trading prior to an earnings announcement reduce subsequent earnings surprises while Veenman (2012) shows that directors' purchases help investors price past earnings. The approach taken in those studies, however, cannot inform the extent to which insider trading has implication for market efficiency. This chapter contributes to this line of research by investigating the role of insider trading for market efficiency. The present study is also related to Kolasinski and Li (2010) who show that insiders purchase (sell) shares following

the announcement of good news (bad news) when the market underreacts to earnings news in an attempt to exploit the under reaction. In contrast to Kolasinski and Li (2010), we focus on insider purchases following the announcement of bad news and insider sales following the announcement of good news. When we employ the insider trading in the same direction with the earnings surprise our results are similar to Kolasinski and Li (2010). In addition, we consider trades that also occur prior to the earnings announcement as well trades after the earnings announcement. Furthermore, their study examines the pre-SOX period where insider trades could take up to one month to be disclosed to the market.¹⁴ In contrast, we focus on the UK setting where insider trading transactions have been disclosed in a timely manner. Furthermore, the most common policy in the US prevents managers from trading in the days following the earnings announcement (Bettis *et al.*, 2000). In contrast, in the UK directors may trade as early as the earnings announcement day itself (Hillier and Marshall, 2002a); hence insiders in the UK are better able to exploit any under-reaction to the earnings announcement news.

The timeliness of insider trading transactions is also a critical feature of the process during which the market learns from insiders' private information. Huddart *et al.* (2001) demonstrate analytically that timely disclosure of insider trades accelerates price discovery. Moreover, recent empirical evidence documents a positive relation between the timeliness of insider trading disclosure and its information content (Brochet, 2010). This is a pertinent issue, especially with regard to the disclosure of transactions immediately after the earnings announcement. We can reasonably

¹⁴ Prior to the adoption of the Sarbanes Oxley Act, the public disclosure of insider trades could be reported as late as the tenth day of the following calendar month.

assume that the UK regulatory environment combined with directors' practices ensure that the disclosure of those trades is sufficiently timely. The Model Code requires directors to report their trades to the company no later than the fourth day after the transaction occurred. In turn, the company has to notify the London Stock Exchange (LSE) no later than the following day, when the information about the trade is disseminated to the market. Therefore, directors' trades should be announced to the market no more than six days after a director's trade. However, Fidrmuc *et al.* (2006) note that 85% of the directors trades in the UK are announced to the market the same day they occur or the following day, since insiders, following the Model Code guidelines typically notify the board of directors prior to the insider trading (Hillier and Marshall, 2002b). Our data confirm Fidrmuc *et al.*'s (2006) findings. Specifically, 84.56% of shares of the shares traded in the period following an earnings announcement are disclosed in the same or the following day, while 62.96% of the shares traded prior to the start of the trading ban are announced in the same or the following day.

The remainder of the chapter is structured as follows: Section 2 reviews the relevant literature and develops our hypotheses on the role of informative insider trading in addressing the PEAD anomaly. Section 3 explains the methodology that we employ to provide evidence on our research questions. Section 4 describes the data and the construction of our variables. Section 5 discusses our findings and section 6 presents the conclusions of the study.

3.2 Hypothesis development

In an efficient market, investors would promptly appreciate the full implications of earnings information. However, the post earnings announcement literature

provides significant evidence that defies the market efficiency axiom as market participants appear to be consistently sluggish in appreciating the implications of an earnings surprise for future earnings. The examination of the post earnings announcement drift anomaly began with the seminal work of Ball and Brown (1968) who were the first to report that firms with good earnings experience an upward drift in their share price while firms announcing bad earnings experience a downward drift, and thereby producing a return continuation, or drift. This regularity has generated a large literature that attempts to explain why prices do not reflect all of the information contained in current earnings changes in a timely manner.¹⁵

In this study, we provide evidence to that body of research on PEAD that has suggested that the PEAD is dissipated in the presence of informative insider trading. This literature has argued that the market improves its inferences of earnings surprises for future earnings by observing the trades of individuals who have superior information. Bartov *et al.* (2002) employs institutional investors as a proxy for sophisticated investors and finds that their holdings are negatively correlated with PEAD. More recently, Vega (2006) finds that shares of firms associated with high PIN, a measure of the probability of private information-based trading based on abnormal order flows (excess buying or selling), experience low or insignificant drift. While Bartov *et al.* (2002) considers the presence of skilful investors and Vega (2006) looks at an aggregate measure of information-based trading (PIN), Richardson *et al.* (2010) questions the quality of these proxies,

¹⁵ A comprehensive literature review of the PEAD literature can be found in Richardson *et al.* (2010) and Kothari (2001). In summary, the PEAD has been attributed to a risk explanation (Kim and Kim, 2003), limits to arbitrage (Mendenhall, 2004; Ng *et al.*, 2008), cognitive biases (Liang, 2003; Dellavigna and Pollet, 2009; Hirshleifer *et al.*, 2009), investors' lack of sophistication (Bartov *et al.*, 2000; Shanthikumar, 2004; Battalio and Mendenhall, 2005) and investors' "rational structural uncertainty" (Chordia and Shivakumar, 2005; Vega, 2006; Francis *et al.*, 2007).

especially for measures based on trade size. The strategy of stealth trading (Barclay and Warner, 1993) and the increased use of algorithmic trading by institutional investors results in trades being smaller in size. Consequently, it becomes difficult to attribute small trades to less informed individuals. Instead, we identify information-based trading as being transacted by individuals who are privy to inside information: corporate insiders. In contrast to institutional investors, these insiders are likely to be in a better position to compute the firm's intrinsic value than other sophisticated investors, and are able to trade and take advantage of this knowledge, provided they are not violating any legal or regulatory rules (i.e., outside of the trading ban period in the UK). We draw upon the insider trading literature to define the specific transactions that are likely to be information-based in the context of earnings announcements. Seyhun (1998), Garfinkel (1997) and Hillier and Marshall (2002a) consider two types of insider transactions that are designed to exploit their private information and whose disclosure is likely to be informative. The first type are those transactions that anticipate the subsequent earnings surprise component and are referred to as active informative trades; and a second type of contrarian transactions, referred to as passive informative trades that occur after the earnings announcement in the opposite direction to the earnings surprise. In line with the Kyle (1985) insider trading model, the trading activity by an informed trader will partially reveal her information to the market. Since insiders are uniquely informed, their trades will disseminate information to the market, so their decision to trade will have valuation implications.¹⁶ Insider trading taking place prior to an event is likely to assist market participants in pricing the event. Consequently, when

¹⁶ There is an extensive literature documenting that the announcement of insider trades results in significant market reaction (Seyhun, 1986; Lakonishok and Lee, 2004; Brochet 2010 for the US, and in the Gregory *et al.*, 1997; Fidrmuc *et al.*, 2006)

insiders' trades are revealed to the market, share prices become more efficient and less sensitive to the forthcoming event itself. In line with this reasoning, Udpa (1996) and Roulstone (2008) show that insider trading prior to an earnings announcement (active insider trading) allows the market to make inferences about future earnings. We extend this stream of research and identify those trades that are likely to be informative with regards to the upcoming earnings announcement. Following Hillier and Marshall (2002a), Garfinkel (1997) and Seyhun (1998), we focus specifically on insiders' trades that anticipate the surprise component of earnings announcement. A positive (negative) surprise following insider purchases (sales) is likely to be surrounded by less uncertainty when the disclosure of directors' trades has pre-empted the news in the earnings surprise. Therefore, our first hypothesis suggests that the price discovery process is accelerated when the disclosure of insider trading is in line with the direction of the forthcoming earnings announcement surprise:

H1: Active informative insider trades that anticipate the earnings surprise attenuate the Post Earnings Announcement Drift anomaly.

Seyhun (1998) suggests a second type of informed trading which he refers to as passive informed trading, which is when insiders delay their trades until the impact of an announcement has been observed and trade after this announcement. He argues that such trading occurs when insiders who want to buy (sell) trade after the release of short-term bad (good) news. These trades may reveal insiders' information about the likely long-run performance of the firm. For instance, Veenman (2012) shows that directors' purchases assist investors in pricing past earnings. Drawing upon Seyhun (1998), we argue that insider trading that occurs after the earnings announcement in the opposite direction to the surprise

announcement (buy trade following negative surprise, or sell trade following positive earnings surprise) accelerates price discovery by conveying insiders' private information that past performance in reported earnings has been completed. To the extent that those trades are delayed transactions motivated by the insiders' anticipation of the direction of the surprise, their disclosure conveys the insiders' private information that prices fully reflect the information in the surprise. In the case of positive (negative) surprise, insiders' sales (purchases) communicate that share prices have fully absorbed the good (bad) news given the insiders' information set. Our second hypothesis is as follows:

H2: Passive informative insider trades that occur after the earnings announcement in the opposite direction to the surprise announcement attenuate the Post Earnings Announcement Drift anomaly.

Our first two hypotheses test separately whether either of the two types of informative insider trading, active and passive, attenuate or exacerbate the PEAD anomaly. Both of these hypotheses relate to the extent to which insider trading provides information to the market about future earnings earlier than would otherwise be the case. We also test the proposition that informative insider trading, irrespectively of their timing, contributes to price discovery. We test this hypothesis by aggregating active and passive informative trades to allow for a more precise inference about the consequences of the earnings surprise for future earnings.

H3: Both active and passive informative insider trades jointly (aggregated informative insider trades) attenuate the Post Earnings Announcement Drift anomaly.

We now go on to explain the research methodology that we will adopt to test these three hypotheses.

3.3 Research design

In common with the extant literature on the PEAD, we investigate the association between the earnings surprise component and subsequent returns as follows:

$$BHAR_{i,t} = \alpha_0 + \alpha_4 UE_{i,t} + Controls_{i,t} + \varepsilon_{i,t} \quad (3.1)$$

where, *BHAR* denotes size adjusted buy and hold abnormal returns measured from six days after the earnings announcement to six months later, where a month is defined in terms of 21 trading days; *UE* is the quintile rank of the earnings surprise, where the cut-off points are determined by the distribution of the earnings surprise in the previous year.¹⁷ We define unexpected earnings as the difference between the actual earnings per-share (EPS) and the forecasted EPS by the timeliest analysts prior to the earnings announcement (e.g. Bartov *et al.*, 2002; Ayers *et al.*, 2011). As with prior research, we control for the effect of size, momentum and book-to-market (e.g. Core *et al.*, 2006; Hirshleifer *et al.*, 2008; Louis and Sun, 2011) by means of the quintile rank of the corresponding variable. We also control for the cross-sectional and time-series correlation by clustering standard errors by firm and year (Petersen, 2009). Following the evidence presented on PEAD for the UK (Hew *et al.*, 1996; Liu *et al.*, 2003) and the US (e.g. Ball and Brown, 1968; Ayers *et al.*, 2011), we predict that the market under-reacts to the earnings surprise. In model (1), this will be represented by a positive and statistically significant coefficient α_1 denoting an abnormal returns drift along with

¹⁷ This restriction is necessary since not all companies announce their earnings at the same time. This is a pertinent issue for UK companies since only a small percentage of firms have a fiscal year end at the end of December.

the sign of the earnings surprise UE . In our subsequent analysis, we follow Mendenhall (2004) and Affleck-Graves and Mendenhall (1992) to re-define UE as RUE , a variable taking the value “-0.5” if an observation belongs to the bottom quintile rank of earnings surprise and “0.5” if an observation belongs to the top quintile rank of earnings surprise. Following this treatment, the difference between the extreme portfolios amounts to one and therefore, α_1 represents the difference in the average abnormal returns between observations in the highest and the lowest unexpected earnings portfolios. Alternatively, α_1 corresponds to the returns to a zero investment strategy going long in the highest and short in the lowest unexpected earnings portfolios. With regard to the intermediate portfolios, we follow Core *et al.* (2006) and set RUE to be equal to zero.

In order to test our first two hypotheses, we adjust model (3.1) by partitioning the response to the earnings surprise conditional on the presence of active informative trading ($Ainf$) and passive informative trading ($Pinf$).¹⁸ More specifically, we modify (1) as:

$$BHAR_{i,t} = b_0 + b_1Ainf_RUE_{i,t} + b_2Pinf_RUE_{i,t} + b_3NAPinf_RUE_{i,t} + b_4Ainf_{i,t} + b_5Pinf_{i,t} + Controls_{i,t} + \varepsilon_{i,t} \quad (3.2)$$

where $Ainf_RUE$ equals to RUE when directors trades anticipate the earnings surprise, and zero otherwise; $Pinf_RUE$ equals to RUE when directors trade after the earnings announcement in the opposite direction to the earnings surprise, and

¹⁸A similar approach to splitting (truncating) independent variables is undertaken in Beneish and Vargus (2002) and Skaife *et al.* (2013). We prefer splitting unexpected earnings based on the presence of informative insider trading, as opposed to including interaction terms, since the coefficient of the regressions corresponds to the difference in the average abnormal returns between observations in the highest and the lowest unexpected earnings portfolios. In other words, the coefficients in the regressions correspond to the zero investment strategies presented in Table 3.3 after controlling for the effects of size, momentum and book-to-market which explain abnormal returns and consequently the drift following the earnings announcement.

zero otherwise; and *NAPinf_RUE* equals to RUE in any remaining case, including observations without any insider trading. From hypotheses H1 and H2 we expect the coefficients b_1 and b_2 will be insignificant, indicating that either types of informative insider trading attenuate the drift.¹⁹ We also include the main effect variables *Ainf* and *Pinf* in order to control for possible effects of informative insider trading on the subsequent abnormal returns.

In order to test our hypothesis (H3) that both types of informative trading, irrespectively of their timing, attenuates investors' under-reaction to earnings announcement, we aggregate the two types of informative trading into a single variable (*Inf*) and adjust model (3.2) as follows:

$$BHAR_{i,t} = b_0 + b_1 inf_RUE_{i,t} + b_2 NAPinf_RUE_{i,t} + b_3 Inf_{i,t} + Controls_{i,t} + \varepsilon_{i,t} \quad (3.3)$$

So far, our research design relies on the assumption that it is only the specific informative insider trades that attenuate the PEAD. It is still an open empirical question whether the disclosure of any other type of insider trading within the windows that we employ here, have a similar effect on the market's inferences about the information contained in these trades. Therefore, we want to examine whether the remaining transactions aggregated within the *NAPinf_RUE* variable in (3.2) or (3.3) have a similar effect in mitigating the PEAD. We refer to these remaining transactions as non-informative. If we do not find any evidence that these

¹⁹ We eliminate cases where insiders engage in both types of informative insider trading in order to avoid confounding the response coefficient to either *Ainf_RUE* or *Pinf_RUE*. Although we acknowledge that insiders reversing their initial positions are an interesting category by itself, the limited number of observations prevents us from drawing conclusive evidence in this respect.

transactions have a mitigating impact on PEAD, this will corroborate the evidence on the role of informative trading as hypothesized above.

In order to investigate this concern, we modify (3.2) by disaggregating the $NAPinf_RUE$ to cases where directors' trades do not anticipate the earnings surprise ($NAinf_RUE$), cases where directors trade in the same direction as the earnings surprise ($NPinf_RUE$) and cases where directors abstain from trading during the windows surrounding the trading ban period, as follows:

$$BHAR_{i,t} = b_0 + b_1Ainf_RUE_{i,t} + b_2Pinf_RUE_{i,t} + b_3NT_RUE_{i,t} + b_4NAinf_RUE_{i,t} + b_5NPinf_RUE_{i,t} + b_6Ainf_{i,t} + b_7Pinf_{i,t} + b_8NAinf_{i,t} + b_9NPinf_{i,t} + Controls_{i,t} + \varepsilon_{i,t} \quad (3.4)$$

where, NT_RUE is equal to RUE when directors abstain from trading during the windows surrounding the trading ban period, and zero otherwise; $NAinf_RUE$ is set equal to RUE when directors trades do not anticipate the earnings surprise, and zero otherwise; $NPinf_RUE$ is equal to RUE when directors trade in the same direction as the earnings surprise, and zero otherwise.

Extending our hypothesis H1, insider trades that occur in the window before the earnings announcement and do not anticipate the earnings surprise provide contradictory information which may confuse market participants at the date of the earnings announcement. Consequently, such trades reinforces market uncertainty in the interpretation of the surprise and results to the formation of the PEAD. Therefore, we predict a positive and significant coefficient for $NAinf_RUE$. Extending our hypothesis H2, we also predict a similar finding with respect to the coefficient of $NPinf_RUE$. More specifically, insider trades after the earnings

announcement that follow the direction of the surprise represent insiders' beliefs based on their private information that share prices have yet to reflect fully the news in the earnings announcement. In other words, insiders purchases (sales) following good (bad) news convey the message that insiders conduct those transactions because they anticipate share prices to further increase (decrease). We believe that this also creates uncertainty among market participants about the implications of the surprise for future earnings and contributes to a subsequent drift. In line with this argument, Kolasinski and Li (2010) show that insiders purchases (sales) following the announcement of good (bad) leads to higher subsequent returns in the same direction with the surprise. Evidence consistent with the above predictions, will provide corroborative evidence to support further H1 and H2 that only those trades which we define as active or passive informative mitigate the anomaly. Finally, we expect that in the absence of any insiders' trades, returns will exhibit a drift that is consistent with the overall evidence on PEAD and therefore, we predict a positive and significant coefficient for NT_RUE . Note also that, similar to (3.2), we add the main effect variables $NAinf$ and $NPinf$ to control for possible effects of non-informative insider trading on subsequent abnormal returns.

We inform our H3 hypothesis by testing the impact of the disclosure of informative trading on the PEAD as opposed to disclosure of non-informative trading. We modify (3.3) by disaggregating $NAPinf_RUE$ to cases with non-informative (active or passive) insider trading ($Ninf_RUE$) and cases where directors abstain from trading (NT_RUE), as follows:

$$BHAR_{i,t} = b_0 + b_1inf_RUE_{i,t} + b_2NT_RUE_{i,t} + b_3Ninf_RUE_{i,t} + b_4inf_{i,t} + b_5Ninf_{i,t} + Controls_{i,t} + \varepsilon_{i,t} \quad (3.5)$$

From the preceding discussion, we predict that the disclosure of non-informative insider trading is not likely to mitigate the drift. Consequently, we expect that the coefficient of *Ninf_RUE* will be positive and significant.. Empirical evidence supporting this prediction will provide corroborative evidence in support of H3 that only those trades which we define as informative mitigate the anomaly. In line with H3, we expect the coefficient of *inf_RUE* to be insignificant denoting that the presence of informative insider trading attenuates the drift and assists in price discovery.

3.4 Data and empirical proxies

3.4.1 Data

Our initial sample includes 19,205 annual earnings announcements from 1990 to 2009 available in Bloomberg and I/B/E/S of non-financial companies.²⁰ We obtain analysts' forecasts from the detailed file from I/B/E/S and we define earnings surprise similarly to prior research (e.g. Bartov *et al.*, 2002; Ayers *et al.*, 2011), as follows:

$$UE = (Actual_EPS_{i,t} - Forecasted_EPS_{i,t}) / P_{i,t-1}$$

where, *Actual_EPS* is the actual earnings per share reported in I/B/E/S for year *t*; *Forecasted_EPS* is the single most recent forecast made by the timeliest analysts prior to the earnings announcement;²¹ and $P_{i,t-1}$ is the stock price at the previous

²⁰ We further exclude earnings announcement taking place after 200 days from the fiscal year end.

²¹ Following Bartov *et al.* (2002), we only consider the latest forecast preceding the earnings announcement by at least three days. We acknowledge that using the latest forecast is quite common (e.g. Bartov *et al.*, 2002; Brown and Caylor, 2005; Ayers *et al.*, 2011) and is known to be more closely related to the market reaction at the earnings announcement (Brown and Kim, 1991). We further exclude forecasts preceding the earnings announcement by more than 200 days to prevent stale forecasts being included in the analysis. Bartov *et al.* (2002) also follow a similar approach.

fiscal year end. Consistent with prior studies, $UE_{i,t}$ is converted into quintiles of earnings surprise based on the magnitude of the surprise. We acknowledge that not all companies announce earnings at the same time and the distribution of earnings surprise might not be known prior to the portfolio formation date. Therefore, we define the quintiles of the earnings surprise based on the distribution of the preceding year's surprises. These procedures reduce our sample by 11,275 observations.²² We further eliminate 1,213 observations due to missing market data from Datastream. Following the calculation of discretionary accruals the sample is further reduced by 961 observations.²³ In order to limit the influence of extreme observations we trim market data and all the variables used to estimate the discretionary accruals variable at the 1st and 99th percentiles of their distributions.²⁴ Finally, we exclude further 174 firm-year observations which exhibit insider trading in both the periods surrounding the trading ban or show insider trading violating the trading ban; the insufficient number of observations within the extreme quantiles of earnings surprise do not allow us to consider them as a separate category. This process yields a final sample of 5,392 observations corresponding to 979 firms. Table 3.1 summarises the sample selection procedure.

²² The significant drop of our sample due to the requirement of analyst forecast available in IBES is not so surprising and is in line with prior research in the UK employing analysts' forecasts from IBES. For instance, instance Liu *et al.*, (2003) employ a sample of 835 firms from 1988 to 1998, while Athanasakou *et al.* (2011) employ a sample of 1,061 firms from 1994 to 2004.

²³ Companies with accounting reporting period of less than 340 and more than 380 days are also excluded from the sample (similarly to García Lara *et al.*, 2005).

²⁴ Given the use of quintile ranks for all the variables, apart from the buy-and-hold abnormal returns measuring the drift, there should be no further influence of outliers, consistently with the extent research on the PEAD anomaly.

Table 3.1: Sample selection

Annual earnings announcements	19,205
Missing analysts data	11,275
Missing market data	1,213
Missing accounting data	961
Outliers	190
Other exclusions	174
Final Sample	5,392 (979 firms)

3.4.2 Abnormal returns

We calculate the post earnings announcement returns as the buy and hold size-adjusted returns beginning from +6 day and ending 6 months later, relative to the earnings announcement.²⁵ We estimate the benchmark returns on both an equal and a value-weighted basis. Our calculations of abnormal returns follow closely the procedure described in prior research in the UK (e.g. Gregory *et al.*, 2010). To construct the size control portfolios, each year, all UK firms are ranked in decile portfolios according to their market capitalisation at the beginning of the year. The return for each size control portfolio is then tracked from January of year t , with the returns being value-weighted according to their initial market capitalisations. A further problem that we confront is that Datastream would report missing returns if firms in the sample are de-listed. This has the potential to create an upward bias in the estimated BHAR returns, since some of these de-listings are bankruptcies. In computing BHAR returns, de-listed firms were treated on the basis of the following rule. If a de-listed firm has preserved its value (such as a merger or an acquisition), we replace the return of that firm by the return of the benchmark. If the delisting is

²⁵ In order to alleviate the concerns expressed in prior research (Ince and Porter, 2006) with regards to returns estimated from the Return Index (RI) data-item from Datastream, we calculate returns using prices and dividends from Datastream and screen daily returns in the same way. Specifically, we replace returns equal to missing if the return on any given day is above 300% or $(1 + R_t)(1 + R_{t-1}) - 1$ is less than 50%.

due to a total loss of value (bankruptcy), we replace the return by -1 . In making this distinction, we use the LSPD G10 description. The most important codes are 7, 16, 20 and 21 which are the types of delisting most likely to be firms that are either worthless or a long way from giving shareholders any terminal value, and so we treat these cases as if investors lost all their investment. By contrast, the remaining types of de-listing would seem to be value preserving.

Finally, the UK market is characterised by the high frequency of missing returns due to thin trading. In order to address thin trading, we calculate both trade-to-trade returns and lumped returns (Maynes and Rumsey, 1993; Campbell *et al.*, 2010).²⁶ More specifically, trade to trade returns are calculated returns from non-missing price days. For a stock with a missing price, the corresponding portfolio return is added to the next non-missing price day's portfolio return for a trade to trade abnormal return calculation. On the other hand, lumped returns consist of trade to trade returns on non-missing price days and zero on missing price days with no adjustment to the portfolio return when returns are missing, given that procedure does not allow for missing returns.²⁷

3.4.3 *Insider trading*

We obtain information on directors' trading from the Hemmington Scott Directors' Trading Dataset for the period from 1996-2008 and before that year, from Directus Ltd. In line with prior research in the UK (e.g. Pope *et al.*, 1990; Gregory *et al.*, 1994; Hillier and Marshall, 2002b; Fidrmuc *et al.*, 2006), we define insider transactions as purchases or sales by both executive and non-executive

²⁶ We report the results for trade to trade returns. However, using lumped returns yields qualitative the same results.

²⁷ In addition, to avoid abnormal returns being influenced by thin trading we also require at least 50 trading days within the period where we measure PEAD.

directors.²⁸ Motivated by prior literature (Beneish and Vargus, 2002; Core *et al.*, 2006; Sawicki and Shrestha, 2008; Beneish *et al.*, 2012), we use a firm-specific net measure of insider trading aggregating all directors' trading activity. Following prior research (e.g. John and Lang, 1991; Beneish, 1999), we calculate the net purchases ratio (NPR) defined as follows:

$$NPR = [PURCHASES - SALES] / [PURCHASES + SALES]$$

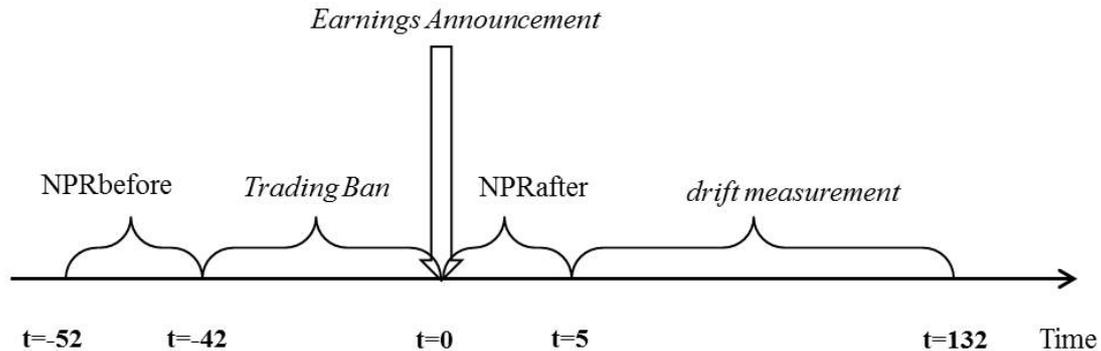
where *PURCHASES* is the number of shares purchased by directors and *SALES* is the number of shares sold. A positive *NPR* could be the result of directors purchasing more shares or selling fewer shares and *vice versa* for a negative *NPR*. A positive *NPR* indicates net insider buying, whereas a negative *NPR* indicates net insider selling.²⁹ In order to ensure that we capture insiders' private information, *NPR* is estimated by using only open market purchases and sales of common shares. The need to focus on open market transactions is also confirmed by the findings in Veenman *et al.* (2011) who show that only open market purchases are associated with positive future news as opposed to stock options conversions. The main interest of the present study is insider trading transactions that take place and are disclosed in the period prior to the start of the trading ban (*NPRbefore*) as well as the period following an earnings announcement (*NPRafter*). Following Hillier and Marshall (2002a), we calculate *NPRbefore* within the 10 days prior the start of the trading ban. Moreover, we calculate the *NPRafter* ratio within the first five days from the earnings announcement. The five days window is employed here in order to capture the disclosure of early trades which are more likely to be motivated by

²⁸ We do not examine illegal insider trading; rather, we focus on legal insider trading by directors.

²⁹ We have also used the value of shares purchased and sold and the results are qualitative the same.

the insiders' information advantage. Figure 3.1 shows the periods which we measure director's trading as well as the period which we measure abnormal returns.

Figure 3.1: Timeline for insider trading and drift measurement relative to earnings announcement



Notes:

Figure 1 depicts the period of directors trading measurement as well as drift measurement relative to the earnings announcement.

3.4.4 Discretionary accruals

We use the Modified Jones (1991) model to estimate discretionary accruals which predicts the level of “non-discretionary” accruals as a function of the growth in revenues and gross property, plant and equipment. We estimate discretionary accruals in a two-stage procedure. In the first stage, a total accruals variable for firm i , year t and sector j (two-digit ICB industry classification³⁰) is regressed upon the change in revenues and gross property, plant and equipment where all variables are scaled by the beginning total assets for each year.³¹ The second

³⁰ The two digit ICB provides 15 industry classifications whereas the equivalent SIC leads to 66 industries classifications, excluding missing and financial observations. We require at least 6 observations for each industry-year sub-sample (similarly to García Lara *et al.*, 2005).

³¹ The accounting data are sourced from Worldscope for all the UK domicile companies. The total accruals are estimated as Income Before Extra Items (WC04001) – Total Funds From Operations (WC04201) - Other Funds From Operations (WC04831). Other accounting data employed here are:

stage predicts the non-discretionary component of accruals using the estimated coefficients from the first stage. Note that in second stage, the influence of the cash sales is also taken into account by introducing the change in receivables, similarly to Dechow *et al.* (1995).³² The “non-discretionary” part of the accruals then represents an estimate of the expected level of accruals and the remaining component is presumed to include managements’ discretion on accruals. Moreover, since performance might also be a determinant of the level of accruals, the estimated discretionary accruals here are also “performance adjusted” in the manner advocated by Kothari *et al.* (2005) by adding return on assets (ROA) as an additional explanatory variable in both stages.

Since firms do not announce their earnings at the same time, the variables used to calculate discretionary accruals are not available for all firms in the same industry-year portfolio. Therefore, the entire distribution of discretionary accruals is typically unknown to the investors at the earnings announcement and, as a result, the hedge portfolio strategies that underlie our investigation cannot be implemented. Similarly to Louis and Sun (2011), we address this issue by estimating the accrual model one year prior to the portfolio formation and then apply the estimated coefficients to the second stage of the estimation process. Furthermore, similarly to the

change in sales (WC01001), total assets (WC02999) and change in receivables (WC02051). In order to mitigate the influence of outliers, extreme values of the distribution to the 1st and 99th percentiles of the above variables are excluded from the analysis. The use of the Worldscope database is motivated by the wish to ensure comparability with previous research as well as for data availability reasons. Notably, Worldscope data can be downloaded by either Datastream or Thomson One Banker. In order to ensure the maximum coverage available, both sources have been employed and subsequently, the two datasets are merged based their SEDOL or their ISIN number.

³² The change in receivables is included in order to control for managers’ attempts to manipulate earnings through discretionary revenues. For instance, managers may use their discretion to recognise revenues for which cash has yet to be received or have yet to be earned. This situation would result in reporting increased sales and accruals through increased receivables (Dechow *et al.*, 1995).

treatment of *UE*, discretionary accruals are then converted to tercile ranks based on their (absolute) magnitude with the cut-off points determined at the year before.

3.5 Analysis

3.5.1 *Descriptive statistics*

Table 3.2 shows the descriptive statistics of net purchase ratio before and after the earnings announcement, earnings surprise (*UE*) and post earnings announcement equally and value weighted abnormal returns (*BHAR-EW* and *BHAR-VW* respectively) by quintile of earnings surprise. The descriptive statistics of the net purchases ratio reveal insiders appear to refrain from trading prior to the earnings announcement and they tend to trade more after the earnings announcement, possibly due to the anticipation of reputation or litigation concerns. In line with prior evidence in the UK (e.g. Gregory *et al.*, 2011), we also we find that insiders purchase more shares in both periods we employ. This finding may not be so surprising given that during the points in time where we capture insider trading, we expect to see a lot of information based trading rather the usual trading for liquidity purposes and therefore sales in big blocks. Firms on the top quintile of earnings surprise outperform firms in the bottom quintile of earnings surprise by 4.54% based on equally weighted returns (4.68% value weighted) and are statistically significant. In other words, a strategy going long on firms belonging to the top quintile of earnings surprise and short on firms belonging to the bottom quintile would yield a 4.54% (4.68%) return. The returns pattern among the quintiles of earnings surprise as well as the spread between the top and bottom portfolios are evidence indicating the presence of the PEAD anomaly and are consistent with the

findings reported in prior research in the UK (Hew *et al.*, 1996; Liu *et al.*, 2003) and for the US (e.g. Ball and Brown, 1968; Ayers *et al.*, 2011).

Table 3.2: Descriptive statistics

Portfolio Quintile	1	2	3	4	5	(5-1)
NPRafter						
N	128	171	163	167	111	
Mean	0.6094	0.6175	0.5897	0.4691	0.5609	
Median	1.0000	1.0000	1.0000	1.0000	1.0000	
NPRbefore						
N	77	183	167	137	70	
Mean	0.4547	0.5145	0.5969	0.5105	0.5389	
Median	1.0000	1.0000	1.0000	1.0000	1.0000	
N	1126	1172	1000	1115	979	
UE						
Mean	-0.3851	-0.0013	0.0007	0.0039	0.1245	
Median	-0.0154	-0.0003	0.0006	0.0033	0.0216	
DAC						
Mean	0.0680	0.0646	0.0564	0.0644	0.0683	
Median	0.0521	0.0500	0.0428	0.0533	0.0520	
BHAR-EW						
Mean	-0.0004	0.0071	0.0136**	0.0196***	0.0449***	0.0454***
<i>p-values</i>	<i>0.4792</i>	<i>0.1312</i>	<i>0.0268</i>	<i>0.0019</i>	<i>0.0000</i>	<i>0.0001</i>
Median	-0.0030	0.0141	0.0088	0.0148**	0.0444***	0.0474***
<i>p-values</i>	<i>0.7874</i>	<i>0.1289</i>	<i>0.1304</i>	<i>0.0151</i>	<i>0.0000</i>	<i>0.0001</i>
BHAR-VW						
Mean	-0.0003	0.0054	0.0119**	0.0208***	0.0464***	0.0468***
<i>p-values</i>	<i>0.4829</i>	<i>0.2006</i>	<i>0.0490</i>	<i>0.0011</i>	<i>0.0000</i>	<i>0.0000</i>
Median	-0.0005	0.0105	0.0037	0.0136***	0.0459***	0.0464***
<i>p-values</i>	<i>0.7752</i>	<i>0.2266</i>	<i>0.2212</i>	<i>0.0093</i>	<i>0.0000</i>	<i>0.0001</i>

Notes:

NPRafter is the net purchase ratio calculated within the first five days from the earnings announcement; NPRbefore is the net purchase ratio calculated within the ten days prior to the start of the ban; UE is the earnings surprise calculated as the difference between the I/B/E/S actual reported earnings and the single most recent forecast deflated by the stock price; |DAC| is the tercile rank of the magnitude of the total discretionary accruals; BHAR-EW is the equally weighted buy and hold abnormal return where with size defined as the market capitalisation at the beginning of the year; BHAR-VW is the value weighted buy and hold abnormal return where with size defined as the market capitalisation at the beginning of the year.

*, ** and *** denote significance at the 10%, 5% and 1% respectively.

Table 3.3 shows the abnormal returns of the extreme portfolios of earnings surprise as well as the corresponding spread for the sub-samples of observations formed based on the definitions of informative trading employed here. More specifically, Panel A shows the abnormal returns for the “active” informative trading sub-sample, Panel B for the “passive” informative trading sub-sample and Panel C aggregates the two-types of informative insider trading into a single aggregated “informative” trading sub-sample. The hedging strategies yield spreads that are insignificant across all three sub-samples. Consistent with hypotheses H1, H2, and H3, the results of those univariate tests suggest that the presence of informative trading accelerates the incorporation of earnings information into prices.

Table 3.3: Hedging returns of informative insider trading

Portfolio Quintile	1	5	Spread (5-1)
Panel A: Active informative trading			
N	20	53	
BHAR-EW			
Mean	0.0154	0.0295	0.0141
p-values	0.3609	0.2624	0.5699
Median	0.0214	0.0097	-0.0117
p-values	0.4553	0.5680	0.9408
BHAR-VW			
Mean	0.0132	0.0319	0.0187
p-values	0.3812	0.2451	0.5926
Median	0.0255	0.0115	-0.0140
p-values	0.3905	0.5210	0.9408
Panel B: Passive informative trading			
N	103	24	
BHAR-EW			
Mean	0.0081	0.0265	0.0184
p-values	0.3777	0.2916	0.6229
Median	0.0487	0.0435	-0.0052
p-values	0.7873	0.5872	0.9754
BHAR-VW			
Mean	0.0060	0.0268	0.0208
p-values	0.4082	0.2885	0.6391
Median	0.0450	0.0387	-0.0063
p-values	0.8642	0.6071	0.9411
Panel C: Informative trading			
N	123	77	
BHAR-EW			
Mean	0.0093	0.0285	0.0192
p-values	0.3419	0.2074	0.6852
Median	0.0331	0.0398	0.0067
p-values	0.6297	0.4756	0.8793
BHAR-VW			
Mean	0.0072	0.0303	0.0231
p-values	0.3760	0.1926	0.7197
Median	0.0343	0.0382	0.0039
p-values	0.7069	0.4357	0.8125

Notes:

BHAR-EW is the equally weighted buy and hold abnormal return where with size defined as the market capitalisation at the beginning of the year; BHAR-VW is the value weighted buy and hold abnormal return where with size defined as the market capitalisation at the beginning of the year.

*, ** and *** denote significance at the 10%, 5% and 1% respectively.

3.5.2 Discussion of findings

Table 3.4 presents our evidence on the PEAD in the UK drawing upon multivariate tests where we control for the effects of size, momentum and the book-to-market ratio (e.g. Core *et al.*, 2006; Hirshleifer *et al.*, 2008; Louis and Sun, 2011) by means of the quintile rank of the corresponding variable. It can be seen that the evidence on PEAD is robust after the inclusion of those control variables out of which, momentum and book-to-market appear to exert a significant influence on the abnormal return after the announcement. While we establish statistical significant evidence by means of UE, we also understand that the drift is also economically significant. More specifically, the coefficient of RUE denotes that a zero investment strategy going long in the highest and short in the lowest unexpected earnings portfolio yields a significant equally weighted abnormal return of 3.33% (3.48%, if returns are value weighted) after controlling for known determinants.

Table 3.4: The impact of earnings surprise on the post earnings announcement returns

$$BHAR_i = a_0 + a_1UE_{i,t} + Controls_{i,t} + \varepsilon_{i,t}$$

$$BHAR_i = b_0 + b_1RUE_{i,t} + Controls_{i,t} + \varepsilon_{i,t}$$

	Equally weighted	Value weighted	Equally weighted	Value weighted
UE	0.0073* (0.0820)	0.0080* (0.0589)		
RUE			0.0333* (0.0731)	0.0348* (0.0603)
QMM	0.0205*** (0.0031)	0.0199*** (0.0045)	0.0205*** (0.0033)	0.0200*** (0.0047)
QBM	0.0145** (0.0113)	0.0145** (0.0116)	0.0145** (0.0114)	0.0144** (0.0116)
QMV	-0.0021 (0.4235)	-0.0023 (0.5205)	-0.0026 (0.3237)	-0.0028 (0.4226)
Constant	-0.1041*** (0.0000)	-0.1037*** (0.0000)	-0.0806*** (0.0007)	-0.0783*** (0.0008)
Observations	5,392	5,392	5,392	5,392
Adjusted R-squared	0.0217	0.0213	0.0218	0.0212
F	28.49	27.78	28.25	27.39
p-value	0.0000	0.0000	0.0000	0.0000

Notes:

BHAR is the buy and hold abnormal return; UE is the earnings surprise calculated as the difference between the I/B/E/S actual reported earnings and the single most recent forecast deflated by the stock price; RUE equals -0.5 if the firms belongs to the lowest quintile of earnings surprise and 0.5 if a firm belongs to top quintile of earnings surprise; QMM is the quintile rank of momentum measured as the buy and hold market adjusted returns over the 6 months up to the earnings announcement; QBM is the quintile rank of the book to market ratio; QMV is the quintile rank of the market value of the company measured at the fiscal year end for each company.

p-values in brackets; *, ** and *** denote significance at the 10%, 5% and 1% respectively.

The findings from testing hypotheses H1 and H2 by means of the model outlined in (3.2) are reported in Table 3.5. Consistently with our univariate tests, we have no evidence of PEAD in the presence of active or passive informative trade as denoted by the corresponding low coefficients of *Ainf_RUE* and *Pinf_RUE*. In those cases, abnormal returns appear to be not significantly different from zero which is in contrast with the coefficient of *NAPinf* which demonstrates evidence of a significant drift (equally weighted abnormal returns: 3.64%; value weighted: 3.77%, significant at 10%). However, before we jump to the conclusion that either form of informative trading accelerates the incorporation of information in returns, we wish to rule out that other forms of insider trading may also have a similar effect. This investigation is undertaken in Table 3.6 which presents our findings from estimating model (3.4). In Table 3.6 it becomes obvious that trading along the earnings surprise conveys that insiders have private information that the past expectation arisen from the surprise is not yet complete. Insiders purchases (sales) in this case, anticipate that share prices will further increase (decrease) and our findings confirm that this anticipation incites uncertainty among market participants about the implications of the earnings surprise. Such uncertainty could explain the significant drift that we observe in the presence of non-informative passive insider trading disclosures (*NPinf_RUE*), *i.e.*, value weighted abnormal returns at 11.79% (11.64% equally weighted), significant at 5%.

Table 3.5: Active-*Ainf* and Passive-*Pinf* and Aggregated informative trading

$$BHAR_{i,t} = b_0 + b_1 Ainf_RUE_{i,t} + b_2 Pinf_RUE_{i,t} + b_3 NAPinf_RUE_{i,t} + b_4 Ainf_{i,t} + b_5 Pinf_{i,t} + Controls_{i,t} + \varepsilon_{i,t}$$

	Active		Passive		Active and Passive informative	
	Equally weighted	Value weighted	Equally weighted	Value weighted	Equally weighted	Value weighted
<i>Ainf</i>_RUE	0.0083 (0.8789)	0.0127 (0.8157)			0.0084 (0.8774)	0.0128 (0.8146)
<i>Pinf</i>_RUE			0.0065 (0.9168)	0.0095 (0.8779)	0.0065 (0.9163)	0.0095 (0.8775)
<i>NAPinf</i>_RUE	0.0345* (0.0658)	0.0360* (0.0553)	0.0350* (0.0656)	0.0365* (0.0556)	0.0364* (0.0590)	0.0377* (0.0512)
<i>Ainf</i>	-0.0109 (0.7390)	-0.0105 (0.7478)			-0.0107 (0.7445)	-0.0102 (0.7523)
<i>Pinf</i>			0.0016 (0.9655)	0.0005 (0.9890)	0.0012 (0.9729)	0.0002 (0.9959)
Q5MM						
Q5BM	0.0205*** (0.0034)	0.0200*** (0.0048)	0.0205*** (0.0033)	0.0200*** (0.0047)	0.0206*** (0.0034)	0.0201*** (0.0048)
Q5MV	0.0146** (0.0108)	0.0145** (0.0110)	0.0145** (0.0115)	0.0144** (0.0117)	0.0145** (0.0109)	0.0145** (0.0112)
Constant	-0.0027 (0.2974)	-0.0029 (0.4007)	-0.0024 (0.3426)	-0.0027 (0.4419)	-0.0025 (0.3152)	-0.0028 (0.4199)
Observations	5,392	5,392	5,392	5,392	5,392	5,392
Adjusted R-squared	0.0215	0.0209	0.0215	0.0209	0.0212	0.0206
F test	19.08	18.49	18.97	18.37	14.41	13.95
P value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Notes:

BHAR is the buy and hold abnormal return; *Ainf_RUE* equals to RUE when directors trades anticipate the earnings surprise, and zero otherwise; *Pinf_RUE* equals to RUE when directors trade in a contrarian fashion, and zero otherwise; and *NAPinf_RUE* equals to RUE in any remaining case, including observations without any insider trading; Q5MM is the quintile rank of momentum measured as the buy and hold market adjusted returns over the 6 months up to the earnings announcement; QBM is the quintile rank of the book to market ratio; QMV is the quintile rank of the market value of the company measured at the fiscal year end for each company. p-values in brackets; *, ** and *** denote significance at the 10%, 5% and 1% respectively.

Table 3.6: Disclosure of informative (active-*Ainf* and passive- *Pinf*) and non-informative (active-*NAinf* and passive- *NPinf*) insider trading.

$$BHAR_{i,t} = b_0 + b_1Ainf_RUE_{i,t} + b_2Pinf_RUE_{i,t} + b_3NT_RUE_{i,t} + b_4NAinf_RUE_{i,t} + b_5NPinf_RUE_{i,t} + b_6Ainf_{i,t} + b_7Pinf_{i,t} + b_8NAinf_{i,t} + b_9NPinf_{i,t} + Controls_{i,t} + \varepsilon_{i,t}$$

	Non-informative - Active		Non-informative - Passive		Active informative, Passive informative Non-informative - Active, Non-informative - Passive	
	Equally weighted	Value weighted	Equally weighted	Value weighted	Equally weighted	Value weighted
<i>Ainf_RUE</i>					0.0087 (0.8733)	0.0131 (0.8106)
<i>Pinf_RUE</i>					0.0062 (0.9201)	0.0092 (0.8813)
<i>NT_RUE</i>	0.0323* (0.0861)	0.0340* (0.0704)	0.0289 (0.1449)	0.0306 (0.1229)	0.0308 (0.1502)	0.0323 (0.1320)
<i>NAinf_RUE</i>	0.0896 (0.2319)	0.0882 (0.2525)			0.0893 (0.2336)	0.0879 (0.2543)
<i>NPinf_RUE</i>			0.1178** (0.0140)	0.1164** (0.0148)	0.1179** (0.0140)	0.1164** (0.0147)
<i>NAinf</i>	0.0270 (0.4346)	0.0272 (0.4362)			0.0275 (0.4274)	0.0277 (0.4296)
<i>NPinf</i>			-0.0097 (0.6563)	-0.0088 (0.6806)	-0.0095 (0.6665)	-0.0087 (0.6910)
<i>Ainf</i>					-0.0100 (0.7611)	-0.0096 (0.7694)
<i>Pinf</i>					0.0020 (0.9555)	0.0010 (0.9781)
Constant	-0.0806*** (0.0007)	-0.0783*** (0.0008)	-0.0819*** (0.0005)	-0.0796*** (0.0006)	-0.0822*** (0.0005)	-0.0799*** (0.0006)
Controls	YES	YES	YES	YES	YES	YES
Observations	5,392	5,392	5,392	5,392	5,392	5,392
Adjusted R-squared	0.0216	0.0210	0.0219	0.0213	0.0212	0.0205
F test	18.99	18.41	19.62	19.03	10.06	9.740
P-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Notes:

BHAR is the buy and hold abnormal return; *Ainf_RUE* equals to RUE when directors trades anticipate the earnings surprise, and zero otherwise; *Pinf_RUE* equals to RUE when directors trade in a contrarian fashion, and zero otherwise; *NAinf_RUE* equals to RUE when directors trades do not anticipate the earnings surprise, and zero otherwise; *NPinf_RUE* equals to RUE when directors trade in the same direction with the earnings surprise after the earnings announcement, and zero otherwise; *NT_RUE* equals to RUE when directors abstain from trading; Controls include: momentum, book to market ratio and the market value of the company.

p-values in brackets; *, ** and *** denote significance at the 10%, 5% and 1% respectively.

On the other hand, we have rather mixed evidence with respect to the non-informative active trading disclosures (*i.e.*, not anticipating the earnings surprise). Despite the lack of statistical significance of the drift associated with the type of trading, we note that the magnitude of the corresponding coefficient NA_{inf_RUE} is quite large (equally weighted abnormal returns: 8.93%; value weighted abnormal returns: 8.79%). Such large magnitude (note the comparison with the magnitude of drift in the presence of active informative trading disclosures) may still denote that the prior disclosure of such trades provides contradicting information which, to some extent, confuses market participants at the earnings announcement.

Those results, lead us to confirm that the presence of informative trading disclosure as defined by prior research accelerates the incorporation of information around earnings announcements and prevents the drift formation. Interestingly, the PEAD appears to arise only in the presence of “passive” non-informative insider trading. The results reported in Table 3.7 summarise this conclusion. Disclosure of directors’ trades which we define as non-informative is associated with a strong evidence of PEAD (equally weighted abnormal returns: 8.64%; value weighted: 8.53%, significant at 1%). This finding is in line with the evidence presented in Kolasinski and Li (2010) who show that the drift is stronger when insiders trade in the same direction with the earnings surprise. Furthermore, we can’t find any evidence of drift in the presence of informative trades. Given also the lack of statistical evidence of drift in the case where directors abstain from trading, it could be said that PEAD could be attributed to a large extent to disclosure of directors’ trades that increase the investors’ uncertainty.

Table 3.7: Disclosure of informative and non-informative insider trading.

$$BHAR_{i,t} = b_0 + b_1 inf_RUE_{i,t} + b_2 NT_RUE_{i,t} + b_3 Ninf_RUE_{i,t} + b_4 inf_{i,t} + b_5 Ninf_{i,t} + Controls_{i,t} + \varepsilon_{i,t}$$

	Informative		Non-informative		Informative & Non-informative	
	Equally weighted	Value weighted	Equally weighted	Value weighted	Equally weighted	Value weighted
<i>Inf_RUE</i>	0.0011 (0.9800)	0.0055 (0.9007)			0.0011 (0.9811)	0.0054 (0.9018)
<i>NT_RUE</i>	0.0364* (0.0588)	0.0377* (0.0509)	0.0279 (0.1664)	0.0297 (0.1401)	0.0308 (0.1487)	0.0323 (0.1306)
<i>Ninf_RUE</i>			0.0864*** (0.0038)	0.0853*** (0.0053)	0.0864*** (0.0038)	0.0853*** (0.0053)
<i>Inf</i>	-0.0036 (0.8788)	-0.0038 (0.8676)			-0.0028 (0.9058)	-0.0030 (0.8957)
<i>Ninf</i>			0.0098 (0.4913)	0.0104 (0.4739)	0.0098 (0.4992)	0.0103 (0.4833)
<i>Q5MM</i>	0.0205*** (0.0032)	0.0200*** (0.0045)	0.0205*** (0.0032)	0.0201*** (0.0046)	0.0206*** (0.0031)	0.0201*** (0.0044)
<i>Q5BM</i>	0.0145** (0.0111)	0.0144** (0.0114)	0.0145** (0.0119)	0.0144** (0.0122)	0.0145** (0.0117)	0.0144** (0.0120)
<i>Q5MV</i>	-0.0026 (0.3137)	-0.0028 (0.4190)	-0.0023 (0.3947)	-0.0025 (0.4789)	-0.0023 (0.3849)	-0.0025 (0.4750)
Constant	-0.0808*** (0.0007)	-0.0785*** (0.0008)	-0.0820*** (0.0004)	-0.0797*** (0.0005)	-0.0821*** (0.0004)	-0.0798*** (0.0005)
Observations	5,392	5,392	5,392	5,392	5,392	5,392
Adjusted R-squared	0.0216	0.0210	0.0220	0.0213	0.0217	0.0210
F test	19.06	18.46	19.70	19.09	14.90	14.42
P value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Notes:

BHAR is the buy and hold abnormal return; *inf_RUE* equals to RUE when directors trades anticipate the earnings surprise and directors trade in a contrarian fashion to the earnings surprise after the earnings announcement, and zero otherwise; *Ninf_RUE* equals to RUE when directors trades do not anticipate the earnings surprise and directors trade in the same direction with the earnings surprise after the earnings announcement, and zero otherwise; *NT_RUE* equals to RUE when directors abstain from trading; Controls include: momentum, book to market ratio and the market value of the company.

p-values in brackets; *, ** and *** denote significance at the 10%, 5% and 1% respectively.

3.5.3 Additional evidence

Our predictions and results so far, suggest that a positive effect of insider trading supporting the arguments of the proponents for allowing insider trading (Manne, 1966; Carlton and Fischel, 1983b; Leland, 1992) is confined only to informative trading. We think that we could shed further light on the controversy around the consequences of insider trading by also questioning whether insider trading deters market participants from the information acquisition process (e.g. Fishman and Hagerty, 1992). To this end, we draw upon the findings of recent research (Francis *et al.*, 2007) which documents a significant association between the presence of PEAD and the magnitude of abnormal accruals.³³ Francis *et al.* (2007) use discretionary accruals as a measure of imprecision of the earnings signal which prevents arbitrageurs to eliminate the PEAD. Here, we consider that discretionary accruals can be employed by managers to either signal or manipulate. Those mixed attributes hamper the interpretation of earnings surprise and increase information acquisition costs in this respect. Prior research on the interaction between earnings management and insider trading (Aboody *et al.*, 2005) uses the magnitude of discretionary accruals as a proxy for information available to insiders, but not to outside investors. We argue then, that in order to address the uncertainty surrounding an imprecise earnings signal and the information asymmetry suggested in Aboody *et al.* (2005), outsiders need to invest in private information search activities. Additionally, the poorer the quality of earnings and the earnings imprecision, the more costly is the process of information gathering and

³³ Those findings refer specifically to the use of modified Jones performance adjusted abnormal accruals (Francis *et al.*, 2007, p.427). We note that the main tests in Francis *et al.* (2007) are based on the Dechow and Dichev (2002) methodology. Given that first, Francis *et al.* (2007) report similar findings by using both methodologies and second as the Dechow and Dichev (2002) methodology induces a bias towards larger and more stable firms due to its data demands, we refrain from using the latter here and we opt for the modified Jones performance adjusted abnormal accruals model.

processing. Therefore, we employ the variation in the magnitude of discretionary accruals as a means to introduce the concept of information acquisition costs in our research design. Consequently, it is important to consider the impact of the magnitude of discretionary accruals since in our test so far we observe an aggregate effect of earnings on future returns. Motivated by the findings reported in Francis *et al.* (2007), we expect that the information acquisition process will be more costly and thus, will take longer, in the presence of increased discretionary accruals.³⁴ In order to test this argument, we extend (3.5) to accommodate the effect of informative insider trading conditionally upon the magnitude of discretionary accruals ($|DAC|$), as follows:

$$\begin{aligned}
 BHAR_{i,t} = & b_0 + b_1 inf_RUE_{i,t} + b_2 NT_RUE_{i,t} + b_3 Ninf_RUE_{i,t} + b_4 |DAC|_{i,t} * \\
 & inf_RUE_{i,t} + b_5 |DAC|_{i,t} * NT_RUE_{i,t} + b_6 |DAC|_{i,t} * Ninf_{RUE_{i,t}} + b_7 inf_{i,t} + b_8 Ninf_{i,t} + \\
 & b_9 |DAC|_{i,t} + Controls_{i,t} + \varepsilon_{i,t} \quad (3.6)
 \end{aligned}$$

To the extent that insider trading deters the information acquisition process, we would expect that the magnitude of accruals will not affect our initial evidence of the magnitude of drift in the presence of insider trading. Moreover, following Francis *et al.* (2007), we expect the coefficient of interaction between the earnings surprise when insiders abstain from trading and discretionary accruals to be positive and significant.

We report the empirical application of (3.6) in Table 3.8. With respect to the cases where directors abstain from trading, we confirm the evidence in Francis *et al.*

³⁴ Investors who typically occur such private information acquisition costs are sophisticated investors. Balsam *et al.* (2002) document that sophisticated investors are typically faster in identifying and assessing earnings management than unsophisticated investors. The relation between PEAD and sophisticated investors established by Bartov *et al.* (2002) concurs with this argument.

(2007) on the relation between PEAD and discretionary accruals. The insignificant coefficient of NT_RUE denotes that in the absence of insider trading, market participants rely on their private information to unravel the implications of the earnings surprise. Here, given the low information acquisition costs, such endeavour is affordable and results to the resolution of uncertainty as implied by the lack of evidence about a subsequent drift. However, the incremental effect of the magnitude of discretionary accruals as denoted by the coefficient of $|DAC|*NT_RUE$ is positive and significant. Given the mixed attributes of discretionary accruals, this finding suggests that their presence in the earnings surprise involves substantial information acquisitions costs which impede and delay the price discovery.³⁵

³⁵ In order to alleviate any concerns that our results may be driven by the lack of statistical power, we also adjust this model and include interaction terms instead of introducing truncated variables and our results are qualitatively similar. As we discuss in footnote 7, we report the results when we split unexpected earnings since the coefficients we observe correspond the drift following the earnings announcement

Table 3.8: Informative and non-informative trading and the post earnings announcement drift: The impact of information acquisition costs

$$\begin{aligned}
 BHAR_{i,t} = & b_0 + b_1 inf_RUE_{i,t} + b_2 NT_RUE_{i,t} + b_3 Ninf_RUE_{i,t} \\
 & + b_4 |DAC|_{i,t} * inf_RUE_{i,t} + b_5 |DAC|_{i,t} * NT_RUE_{i,t} + \\
 & b_6 |DAC|_{i,t} * Ninf_RUE_{i,t} + b_7 inf_{i,t} + b_8 Ninf_{i,t} + b_9 |DAC|_{i,t} + Controls_{i,t} + \varepsilon_{i,t}
 \end{aligned}$$

	Informative		Non-informative		Informative & Non-informative	
	Equally weighted	Value weighted	Equally weighted	Value weighted	Equally weighted	Value weighted
<i>Inf_RUE</i>	0.0112 (0.8498)	0.0133 (0.8203)			0.0110 (0.8525)	0.0131 (0.8229)
<i>NT_RUE</i>	-0.0028 (0.9097)	-0.0011 (0.9651)	-0.0075 (0.7477)	-0.0057 (0.8062)	-0.0099 (0.7235)	-0.0082 (0.7700)
<i>Ninf_RUE</i>			0.0606** (0.0126)	0.0617** (0.0107)	0.0605** (0.0124)	0.0616** (0.0104)
<i> DAC * Inf_RUE</i>	-0.0228 (0.7911)	-0.0178 (0.8395)			-0.0225 (0.7940)	-0.0174 (0.8425)
<i> DAC * NT_RUE</i>	0.0783** (0.0228)	0.0774** (0.0220)	0.0716** (0.0254)	0.0715** (0.0239)	0.0813** (0.0262)	0.0807** (0.0246)
<i> DAC * Ninf_RUE</i>			0.0517 (0.4039)	0.0473 (0.4443)	0.0518 (0.4024)	0.0474 (0.4428)
<i>Inf</i>	-0.0033 (0.8901)	-0.0035 (0.8796)			-0.0024 (0.9182)	-0.0026 (0.9090)
<i>Ninf</i>			0.0099 (0.4917)	0.0105 (0.4733)	0.0099 (0.4992)	0.0105 (0.4822)
<i> DAC </i>	0.0086 (0.2687)	0.0078 (0.3017)	0.0090 (0.2471)	0.0083 (0.2747)	0.0087 (0.2689)	0.0080 (0.2989)
Constant	-0.0864*** (0.0003)	-0.0836*** (0.0003)	-0.0877*** (0.0002)	-0.0850*** (0.0002)	-0.0878*** (0.0002)	-0.0851*** (0.0002)
Controls	YES	YES	YES	YES	YES	YES
Observations	5,392	5,392	5,392	5,392	5,392	5,392
Adjusted R-squared	0.0228	0.0221	0.0230	0.0223	0.0228	0.0220
F test	13.29	12.87	13.80	13.37	10.40	10.06
P value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Notes:

BHAR is the buy and hold abnormal return; *inf_RUE* equals to RUE when directors trades anticipate the earnings surprise and directors trade in a contrarian fashion to the earnings surprise after the earnings announcement, and zero otherwise; *Ninf_RUE* equals to RUE when directors trades do not anticipate the earnings surprise and directors trade in the same direction with the earnings surprise taking after the earnings announcement, and zero otherwise; *NT_RUE* equals to RUE when directors abstain from trading; *|DAC|* is the tercile rank of the magnitude of the total discretionary accruals; Controls include: momentum, book to market ratio and the market value of the company.

p-values in brackets; *, ** and *** denote significance at the 10%, 5% and 1% respectively.

In our previous tests, we have significant evidence that informative trading leads to more efficient prices. Nevertheless, the findings reported in this test reveal that this is a sub-optimal mechanism as it subsumes information acquisition. This conclusion is supported mainly by our findings that the disclosure of informative trading exerts such a pervasive influence that no drift ensues, irrespectively of the level of information acquisition costs. We also entertain the possibility the disclosure of this type of insider trading is a useful source of information about the attributes of the discretionary accruals. If that happens, then, we should consider first, that the insignificant coefficient of $inf_RUE_{i,t}$ is guided by the low information acquisition costs as in our baseline case of the absence of insider trading; second, the insignificant incremental effect of discretionary accruals denotes that investors use the information in this disclosure to decode the implications of discretion for future earnings. However, our findings on the influence of the disclosure of non-informative insider trades reinforce the idea that insider trading discourages information acquisition efforts through an investigation of the firm's fundamentals. We find that the disclosure of this type of trading is associated with a subsequent drift irrespectively of the level of discretionary accruals. More particularly, the coefficient of $Ninf_RUE_{i,t}$, denoting the drift in the presence of disclosure of non-informative insider trades under conditions of low information acquisition costs, is statistically significant (equally weighted abnormal returns: 6.05%; value weighted: 6.16%, significant at 5%). This result can be interpreted as market participants disregarding their own information acquisition efforts that otherwise, e.g. in the absence of any insider trading, would lead them to price discovery. Instead, market participants' interpretations are led by the disclosure of non-informative insider trades which incite uncertainty. Moreover, the incremental effect of the magnitude

of discretionary accruals appears to be not significant denoting a pervasive and adverse effect of the disclosure of non-informative trades, irrespectively of the information acquisition costs involved. Given the combined evidence on the influence of the disclosure of insider trading, we conclude that insider trading deters information acquisition efforts.

3.6 Conclusions

The present study contributes to a long-standing debate on the capital market effects of insider trading. It is argued that directors' dealings convey information that make share prices to move toward the level they would command if the inside information were publicly available and thus, contribute to market efficiency. On the other hand, others have argued that insider trading compromises investor confidence and deters market participants from the information acquisition process. We shed further light by employing the setting of a pervasive market anomaly, namely the PEAD within the UK context which is characterised by specific practices and regulation that enable our investigation. Following prior research's definitions of informative insider trading, we find that their disclosure conveys information about the implications of the earnings surprise for future earnings earlier than would otherwise be the case and consequently attenuates the PEAD anomaly. The evidence is reinforced by our findings that this effect does not extend to disclosures of non-informative trades which appear instead, to elicit a subsequent drift. Therefore, we provide only partial support for the argument that capital markets benefit from insider trading. Moreover, our findings provide support for the arguments against insider trading as we document a pervasive and sometimes, insidious, influence of the insider trades disclosure on the price discovery process. Based on tests where we introduce the concept of information acquisition costs,

we show that the disclosure of informative insider trading subsumes the efforts of market participants to use financial reporting information to interpret the earnings surprise. While this implies a sub-optimal mechanism of price discovery in the case of informative trades, this becomes insidious in the case of non-informative trades.

While we believe that our findings contribute both to the debate on insider trading and the literature on the explanations of PEAD, we recognise that those maybe subject to the specific practices and guidelines on insider trading in the UK. We have yet to see a similar study in the US context as its insider trading regulation could make this exercise very challenging. More particularly, in the US, the regulation of insider trading is based on the principle of the “Disclose or Abstain” Rule. However, there are no guidelines for a clearly defined trading ban period but instead, companies adopt their own blackout policies whose duration and timing as well as observance may vary across firms (Bettis *et al.*, 2000). We hope that future research may wish to undertake this challenge and confirm our findings in this setting.

4 Assessing the impact of earnings management on stock acquisitions: The role of insider purchases

4.1 Introduction

The present study builds upon prior research which identifies the market's mispricing of the acquirer's fundamentals (Erickson *et al.*, 2012) and most specifically, discretionary accruals as a driver of acquisitions underperformance (Louis, 2004). We revisit the earnings management mispricing hypothesis in Louis (2004) with respect to stock acquisitions. According to this hypothesis, the use of earnings management prior to stock acquisitions is attributable to managers' incentives to firstly, enhance the share exchange ratio in order to reduce the cost of the acquisition and secondly, to protect current shareholders' interest dilution (Erickson and Wang, 1999). Louis (2004) argues that investors are initially misled by inflated earnings and subsequently, revise their expectations downwards when pre-acquisition earnings management reverses or managers guide them to do so. Moreover, he supports the earnings management mispricing hypothesis by refuting the alternative hypothesis that earnings management may reflect managers' overconfidence or, over-optimistic expectations. To this end, he draws upon evidence that indicators of the firm's operations are not consistent with managers' favourable views of the firm's prospects (e.g. he finds no evidence of strong demand anticipation by means of inventory build-up preceding a stock acquisition as opposed to a cash acquisition). However, this approach for establishing managers' overconfidence before an acquisition may be flawed. Managers' overconfidence with respect to an acquisition is more likely to occur in relation to

the future performance of the combined entity and it is not necessarily obvious in their expectations with respect to the continuing operations of the acquiring firm.

In the present study, we take into account developments in the finance literature on acquisitions that have established a relation between managers' overconfidence and acquisitions' underperformance (Doukas and Petmezas, 2007; Billett and Qian, 2008; Kolasinski and Li, 2012). This stream of research develops the ideas of managerial hubris presented by Roll (1986). In summary, overconfident managers issue bids founded on mistaken estimates of target firm and more particularly, on over-optimistic estimations of the merger synergies. As a result, they are more likely to undertake value destroying projects than rational managers (Malmendier and Tate, 2008). We extend this literature by adopting a recent definition of overconfidence presented by Ben-David *et al.* (2013) who show that overconfident managers are optimistic managers who overestimate the mean of firm's cash flows (optimism) and under-estimate the volatility of their firms' future cash flows (precision). We apply this framework in our context by capturing managers' optimism in terms of earnings management and precision in terms of their purchases of the acquiring firms' shares.

First, overconfident managers overestimate the magnitude of the combined entity's future earnings. We capture managers' optimism with respect to future earnings by means of their discretion upon accruals. The issue is especially pertinent for stock acquisitions where the acquirer has the incentives to manage earnings in order to boost the exchange ratio. We identify managers' optimism in their beliefs that the combined acquirer's and target's fundamentals will be able to absorb the consequences of the acquirer's aggressive accounting reversal. This argument builds upon prior research which points out that acquisitions provide managers with

opportunities to increase earnings and thus avoid the near term unwinding of earnings management (Fairfield *et al.*, 2007). Moreover, recent research points out that managers can take advantage of the differences in accounting policies and assumptions and use their integration as a “black box” to camouflage the consequences of pre-acquisition aggressive accounting (Erickson *et al.*, 2012).

Second, overconfident managers underestimate the volatility in future earnings that may arise during the integration period. Difficulties and unforeseen problems in the integration of the target into the acquirer may have adverse implications for the earnings persistence. Such circumstances may also compromise the managers’ ability to contain the consequences of the pre-acquisition earnings management reversal. Recent research shows that the post-acquisition integration period is likely to be characterised by significant information uncertainty that contributes to acquirers’ wealth losses (Erickson *et al.*, 2012). That allows us to identify overconfident managers as those who first, engage with earnings management to deliver an optimistic measure of performance and second, convey a costly signal that those optimistic estimates are very precise. To this end, we operationalize the second feature of overconfident managers, *i.e.* managers’ precision, by looking at insider net purchases. We argue that managers’ commitment of personal wealth in the presence of earnings management is an indication of their own beliefs about the combined entities’ superior performance, which will not be affected by integration difficulties or the earnings management reversal. More specifically, here we focus on net insider purchases taking place in the period after the latest earnings announcement and before the acquisition.³⁶ This particular timing is

³⁶ In our tests, we introduce also the net insider purchases that take place before the latest earnings announcement in the model for completeness.

motivated by Veenman (2012). He demonstrates that this timing of insider purchases conveys the precision of insiders' private information in reported earnings with respect to future earnings.

Our initial findings using a sample of UK acquisitions confirm the inverse relationship between discretionary accruals and both short term³⁷ and long term market reactions in the case of stock acquisitions, also documented for U.S.A. firms in Louis (2004).³⁸ We also present evidence that discretionary accruals affect adversely the combined firm's operating performance within two years after the acquisition. However, the long-term post-acquisition underperformance is confined only to acquirer firms whose managers exhibit both the features that we define here as overconfidence indicators.

Our findings contribute to the research investigating the long-run post-acquisition underperformance. In a recent study, Erickson *et al.* (2012) attribute the acquirer's long-term underperformance to increases in information uncertainty arising from the prolonged integration process of M&As and complicated financial reporting with unpredictable outcomes. Based on our results, the information uncertainty effect pertains to the uncertainty with regard to the ability of overconfident managers to

³⁷ Louis (2004) fails to find a statistically significant relationship between discretionary accruals and abnormal returns over the three days around the merger announcements; he attributes this to the market anticipating the acquisition announcement. Thus, he obtains his results by extending the return measurement window over the period from 21 days before to one day after the merger announcement. On the contrary, our results suggest that the market does not anticipate the acquisition announcement and we document a significant relationship between discretionary accruals and abnormal returns over the three days around the merger announcements that is also significant even after controlling for the run-up effect.

³⁸ A possibly intriguing result is a positive, albeit no significant, reaction to discretionary accruals when managers are net purchasers prior to the earnings announcement. It seems that the market perceives those specific transactions as having already credibly signalled the absence of opportunism in those discretionary accruals at the earnings announcement. This result is also in line with Beneish and Vargus (2002). Consistently with this interpretation, our further tests do not establish any evidence of earnings management reversal during the post-acquisition period examined here.

contain the consequences of the pre-acquisition earnings management during the integration period. Notably, in cases of simple optimism, whereby managers engage with earnings management but not insider purchases, we don't have any statistically strong evidence of under-performance. That reinforces our claim that acquirers' underperformance is led by a market reaction to overconfidence rather than mispricing. Our findings allow also to clarify that insider purchases alone do not consist an indication of overconfidence in acquisitions. Instead, a well-designed measure should take into account the circumstances under which those purchases have taken place (e.g. the presence of earnings management and their timing of execution relative to the earnings announcement). Our findings then, contribute also to the finance literature (Malmendier and Tate, 2005; Doukas and Petmezas, 2007) which uses various measures of insiders' holdings and transactions in their firms' shares as a measure of overconfidence.

The remainder of the chapter is organized as follows. The next section develops the hypothesis concerning the joint signals of discretionary accruals and directors' trading on the market reaction to a takeover announcement. Section 3 presents the research design employed in the chapter. Section 4 describes the data and the sample. Section 5 discusses the empirical results and section 6 presents the conclusions of the study.

4.2 Hypothesis development

4.2.1 *Earnings management prior to acquisitions*

The primary role of accruals is to address timing and matching problems inherent in cash flows so that earnings reflect more closely the firm's performance. To this end, considerable discretion has been allowed to managers in estimating accruals

with the purpose of enabling them to communicate their private information and mitigate information asymmetry between managers and shareholders. Subramanyam (1996) finds that on average, the market attaches value to discretionary accruals, probably because the discretionary component increases the ability of earnings to reflect fundamental value. However, a significant body of research on earnings management has documented that such discretion over the level and the timing of accruals has been employed opportunistically by managers in order to achieve various objectives. In the cases where earnings management is deployed in relation to an upcoming event, announcement of the event reveals managers' incentives to distort the level and timing of accruals causing investors to revise their beliefs about future performance. For instance, accrual manipulation preceding events such as seasonal equity offerings (Shivakumar, 2000) and stock acquisitions (Louis, 2004) seems to determine the market reaction around the event.

In the case of stock acquisitions, the number of shares offered by the acquirer to gain control of the target is determined by a negotiated exchange ratio which is computed based on the acquiring firm's share price. Given the inverse relation between the exchange rate and the share prices, the managers of the acquiring firm have incentives to manage earnings in an attempt to increase share prices and hence, reduce acquisitions costs. The lower cost of the acquisition would also minimize the likelihood of both earnings and voting power dilution of the existing shareholders (Erickson and Wang, 1999).³⁹ Consistently prior research (Erickson

³⁹ Target shareholders would have incentives to detect earnings management. Louis (2004) notes a number of reasons why target shareholders may agree upon the exchange ratio. That could be for reasons of retirement or illiquid stock ownership (Shleifer and Vishny, 2003). The acquirer can also buy their agreement through the acceleration in the exercise of stock options, by granting them

and Wang (1999) and Louis (2004) in the US; Botsari and Meeks (2008) in the UK) documents a statistically significant occurrence of earnings management preceding stock acquisitions.

Recent accounting research has noted the reversal of earnings management as a key feature of the accrual accounting process (Dechow *et al.*, 2012; Allen *et al.*, 2013). In the present setting, we acknowledge that the reversal of accruals takes place within the combined entities' fundamentals, following a significant shock into the firm's business model arising from the acquisition. Consequently, the effect of the reversal of pre-acquisition accrual distortions in the post-acquisition period is more likely to differ from the reversal of the acquiring firm's accruals alone. When referring to the time series properties of accruals, Owens *et al.* (2013) point out that acquisitions are "non-articulation" events associated with significant business shocks that violate stationarity. In a related vein, Collins and Kim (2012) point out that M&A activities can severely distort firms' growth measures as well as the lead-lag relation between accruals and cash flows from operations. Furthermore, the integration of the target would result in combining two separate streams of fundamentals that are subject to different accounting policies and factual assumptions (Erickson *et al.*, 2012).

Research on earnings management prior to acquisitions has mainly focused on the underlying incentives. We argue that a better understanding of this empirical regularity and its capital market effects requires also the consideration of its reversal and the opportunities that open up for the concealment of its

generous severance pay, or by keeping them in top positions. In addition, the target's managers can simply be duped into accepting the acquirer's inflated stocks.

consequences in the post-acquisition environment. Those opportunities may arise from synergies developing out of merging two streams of fundamentals subject to different accounting policies (e.g., for inventory, depreciation, or revenue recognition) and factual assumptions (e.g., rates used in various pension computations, salvage values, useful lives, necessity of valuation allowances, etc.) as Erickson et al.(2012) point out. They may also arise out of the substantial transitory growth components showing up after the acquisition as discussed by Collins and Kim (2012).

Here, we argue that during a stock acquisition announcement, investors realise the incentives and the opportunities for earnings management and adjust prices accordingly. Similar to the hypothesis and empirical evidence in Louis (2004), our first hypothesis follows:

H1: The market reaction during the announcement of stock acquisitions is negatively associated with the extent of earnings management.

Nevertheless, it has to be noted that the post-acquisition environment is fraught with complicated financial reporting issues, difficulties in integration of the target and other unforeseen problems (Erickson *et al.*, 2012). In other words, even insiders cannot fully anticipate for certain whether and when the pre-acquisition earnings management will affect future performance. Considering this framework, it could be inferred that pre-acquisition earnings management may also be related to the managers' overconfidence that its reversal could be addressed through financial reporting synergies among the merged streams of fundamentals.

The concept of managerial overconfidence in acquisitions has been widely discussed in the finance literature. Therefore, we draw upon this literature in order to further develop our hypotheses.

4.2.2 Managerial overconfidence and the impact of earnings management on the performance of acquisitions

4.2.2.1 Managerial overconfidence in the finance literature

A significant stream of research on acquisitions' underperformance attributes it to managerial overconfidence. This stream of research has been developed upon the seminal chapter of Roll (1986) and the concept of "hubris" hypothesis. According to the hubris hypothesis, overconfident managers have a strong conviction that their valuations are right and that the market does not reflect the full economic value of the combined firm. The emphasis in the hubris hypothesis is on managerial optimism and the managers' overbearing presumptions that their valuations are correct. Furthermore, an important feature of the Roll's (1986) hubris hypothesis is that management intentions may be fully consistent with honourable stewardship of corporate assets, but actions need not always turn out to be right. The lack of agency problems in Roll's perspective comes at a contrast with the mainstream explanations of acquirers' underperformance (e.g. the Jensen (1986)'s free cash flow hypothesis; the managerial "perks" hypothesis, e.g., Harford and Li (2007); the overvaluation hypothesis, e.g. Schleifer and Vishny (2003) and even the mispricing of earnings management hypothesis by Louis (2004)). Elaborating upon the hubris hypothesis, Malmendier and Tate (2008) point out that since overconfident managers overestimate merger synergies, they misperceive some merger opportunities with negative synergies to be value-creating. Thus, overconfident managers are more likely to undertake value destroying projects than rational

managers would forgo. The emphasis in this interpretation of overconfidence is on managers' over-optimistic cash flow expectations and their tendency to undertake value destroying projects. In a similar vein, Doukas and Petmezas (2007) and Billett and Qian (2008) show that the inverse relation between acquirers' underperformance and the occurrence of high order acquisitions can be also attributed to overconfidence.

Overall, this literature focuses on overconfident managers' bad choice of acquisitions as a result of their over-optimistic expectations. Although implied, this research does not elaborate on the other aspect of hubris as Roll (1986) has defined it, *i.e.*, the managers' "overbearing presumptions". The two features are inextricably tied to each other. Heaton (2002) points out that people are more optimistic about outcomes that they believe they can control and to which they are highly committed. In more recent research, Ben-David *et al.* (2013) define overconfident managers as optimistic managers who overestimate the mean of firm's cash flows (optimism) and in the same time underestimate the volatility of their firms' future cash flows (precision).

4.2.2.2 The market response to earnings management during and after acquisitions: mispricing or managerial overconfidence?

In our context, an overconfident manager would engage in aggressive accounting prior to a stock acquisition under the assumption that the combined acquirer's and target's accruals and cash flows will be able to absorb the reversal of pre-acquisition earnings management. Prior research also points out that acquisitions provide managers with opportunities to increase earnings and thus avoid the near term unwinding of earnings management (Fairfield *et al.*, 2007). Managers can take advantage of the differences in accounting policies and factual assumptions as a

“black box” to camouflage the consequences of prior aggressive accounting. Furthermore, Erickson *et al.* (2012) points out that the process of combining two separate streams of fundamentals that are subject to different accounting policies and factual assumptions aggravates information uncertainty among investors. Information uncertainty may be further compounded by difficulties in the integration of the target into the acquirer and other unforeseen problems. Therefore, manipulating earnings prior to a stock acquisition denotes optimistic managers who believe that they can obfuscate the adverse consequences of aggressive accounting. Most important, it also denotes managers who have the “overbearing presumption” that they are able to deliver this outcome despite complex accounting issues that can’t be anticipated.

Based on prior research (Malmendier and Tate, 2005; Doukas and Petmezas, 2007), we draw evidence about the managers’ precision of optimistic expectations out of insider purchases. However, the literature on directors’ trading in corporate finance typically considers purchases as a credible and costly signal of commitment about the future value of the firm given that managers put their own wealth at stake while they hold an under-diversified portfolio (Fidrmuc *et al.*, 2006; Veenman *et al.*, 2011). Consistently, John and Mishra (1990) shows that an increase in insider holdings lends credibility to investment announcements such as capital expenditures. Furthermore, prior empirical research shows that insider purchases preceding corporate announcements and other voluntary disclosures assist the market to better assess the future performance of the firm (John and Lang, 1991; Gu and Li, 2007; Badertscher *et al.*, 2011).

Here, we rely in particular on Veenman (2012) who argues that the presence of insider purchases taking place after the earnings announcement enhances the

precision of information in reported earnings about future earnings. This particular feature can also inform our hypothesis here and explain why insider purchases have been employed by the finance literature as an indicator of overconfidence. While earnings management captures the first component of managers' overconfidence, *i.e.*, optimism, insider purchases, being a costly signal, reinforce the optimism inherent into earnings management with high precision, or, the second component of overconfidence.

Louis (2004) attributes the long-term post-acquisition market response to earnings management to investors that are unable to fully undo the influence of earnings management at the acquisition announcement. In contrast, we argue that investors learn gradually about the managers' ability to contain the earnings management reversal by observing their reports over the integration period. Initially, and given the increased uncertainty of the post-acquisition environment, investors have no means to assess the managers' ability to mitigate the reversal of past earnings management during the integration process until further information becomes available. However, during the post-acquisition announcement period, the market observes the deviation between the initial precision of managers' optimistic projections and the information uncertainty in the post-acquisition period which could not be fully anticipated earlier. This deviation would motivate doubts when managers have been overly precise about their judgement and ability during the acquisition announcement. This relationship is likely to vary with the extent of their initial optimism. That leads us to the second hypothesis:

H2a: The short term market reaction to earnings management is not affected by managers' overconfidence and more particularly, the over-precision of their projections as conveyed by insider purchases.

H2b: The long term market reaction to earnings management after an acquisition is driven by a reaction to managers' overconfidence and more particularly, the over-precision of their projections as conveyed by insider purchases.

4.3 Research design

4.3.1 *The interpretation of pre-acquisition discretionary accruals during acquisition announcements*

Our first set of tests revisit the mispricing of earnings management hypothesis. This set consists of the baseline tests for the tests we conduct here to investigate our hypothesis empirically.

We use a similar model to that employed in Louis (2004) in order to inform the relationship between acquirer's returns (*ABRET*) and discretionary accruals (*DACC*), for stock and cash acquisitions, as follows:

$$ABRET_{i,t} = \sum_{s=0}^1 (\alpha_{0,s} + \alpha_{1,s}DACC_{i,t} + Controls_{i,t}) + \varepsilon_{i,t} \quad (4.1)$$

where, $ABRET_i$ is the value weighted size adjusted abnormal returns; *DACC* is the discretionary accruals. We measure acquisition announcement returns from two days before to two days after the acquisition announcement.⁴⁰ We also examine long term returns for over one, two and three years from the month of the

⁴⁰ The results are similar when using equally weighted size adjusted returns, with size defined as the market capitalisation at the beginning of the year. In order to alleviate the concerns expressed in Ince and Porter (2006) with regards to returns estimated from the Return Index (RI) data-item from Datastream, we calculate returns using prices and dividends from Datastream and screen daily returns in the same way. Specifically, we replace returns equal to missing if the return on any given day is above 300% or $(1 + R_t)(1 + R_{t-1}) - 1$ is less than 50%.

acquisition announcement. Following Louis (2004), the research design identifies the effects of discretionary accruals for stock and cash acquisitions separately. Although our hypotheses are developed with stock acquisitions in mind, we also test the corresponding coefficients for cash acquisitions. Since the incentives for earnings management are not evident in this case, we don't have any predictions for those cases. Moreover, evidence of insignificant coefficients in the case of cash acquisition will reinforce that our hypotheses for stock acquisition are in the correct direction. We denote the method of payment by the subscript s , taking the value of one for stock acquisitions and zero otherwise. Consistently with hypothesis H1, we expect the coefficient $\alpha_{1,s}$ to be negative and significant, indicating that the announcement returns of stock acquisitions are driven by the market's discount upon share prices for earnings management.

All the models employed in this study include a number of control variables. We include a size variable measured as natural logarithm of market value (Ln_MV) (Louis, 2004; Moeller *et al.*, 2005; Masulis *et al.*, 2007); the book to market ratio capturing growth expectations (BM); and leverage as a proxy for financial distress risk (LEVERAGE) (Masulis *et al.*, 2007; Gregory and Wang, 2011). Furthermore, as is common in the literature we control for acquisition specific parameters such as:⁴¹ private versus public status of the target firm (LISTED) (Fuller *et al.*, 2002; Moeller *et al.*, 2004); internationalization aspects of the acquisition (CROSS-BORDER) (Schoenberg, 2000; Pantzalis *et al.*, 2008); intra-industry acquisitions (INTRA-INDUSTRY) (Prahalad and Bettis, 1986; King *et al.*, 2004; Martynova and Renneboog, 2006); value of the underlying deal (DEALVALUE) (Bayazitova *et al.*,

⁴¹ Reviews of this literature include Martynova and Renneboog (2008), Agrawal *et al.* (1992) and King *et al.* (2004).

2012); and bidder's prior performance which captures the rumour phase of the acquisition (RUNUP) (Louis, 2004; Martynova and Renneboog, 2011). We also add earnings announcement returns (EACAR) in order to control for the initial valuation of discretionary accruals at the time of the earnings announcement and thus, to ensure that the coefficients of discretionary accruals in our model capture the re-assessment of this information.

4.3.2 *The influence of insider purchases on the market interpretation of earnings management during acquisition announcements*

Following our discussion, we disaggregate the relationship between returns and discretionary accruals based on the presence and timing of insider purchases relative to the latest earnings announcement preceding the acquisition announcement.

$$\begin{aligned}
 ABRET_{i,t} = & \sum_{s=0}^1 \alpha_{0,s} + b_{1,s}NBDACC_{i,t} + b_{2,s}BUYbeforeEA_DACC_{i,t} \\
 & + b_{3,s}BUYafterEA_DACC_{i,t} + b_{4,s}BUYbefore\&afterEA_DACC_{i,t} \\
 & + b_{5,s}BUYbeforeEA_{i,t} + b_{6,s}BUYafterEA_{i,t} \\
 & + b_{7,s}BUYbefore\&afterEA_{i,t} + Controls_{i,t} + \varepsilon_{i,t}
 \end{aligned}
 \tag{4.2}$$

where, *NBDACC* stands for discretionary accruals when directors abstain from purchasing shares during the financial year preceding the acquisition and up to the acquisition announcement, and zero otherwise; *BUYbeforeEA_DACC* stands for discretionary accruals when directors engage with insider purchases during the financial year preceding the acquisition, and zero otherwise; *BUYafterEA_DACC* stands for discretionary accruals when directors engage with purchasing shares

after the latest earnings announcement and up to the acquisition announcement, and zero otherwise; *BUYbefore&afterEA_DACC* stands for discretionary accruals when directors engage with purchasing shares during the financial year preceding the acquisition and up to the acquisition announcement, and zero otherwise. Those four variables correspond to the discretionary accruals variable in equation (4.1), albeit disaggregated according to the timing and the presence of insider purchases. Equation (4.2) includes the corresponding main effects as binary variables taking the value of one depending on the timing of insider purchases and zero otherwise.

Following the baseline tests described in (4.1), we run the regression presented in equation (4.2) in relation to short term and long term market reactions. With regards to the short term market responses (hypothesis H2a), our prediction is that coefficients $b_{1,1}$, $b_{3,1}$ and $b_{4,1}$ should be negative and significant. The coefficient $b_{2,1}$ is of particular interest here. As insider purchases taking place before the latest earnings announcement and probably long before the acquisition, their information may not be related to the acquisition event. In this case, we follow Beneish and Vargus (2002) to argue that those transactions are associated with a higher persistence of earnings, or smaller extent of earnings management reversal. If this holds, then insider purchases before the earnings announcement may be a credible signal for the absence of earnings management and thus, our prediction is that the coefficient $b_{2,1}$ is not negative.

According to the hypothesis H2b, the long term market reaction to earnings management after a stock acquisition is driven by managers' overconfidence and more particularly, the precision of insiders' optimistic expectations. Therefore, we expect that only the combination of earnings management and insider purchases after the earnings announcement, purported to capture overconfidence, will be

negatively associated with returns. However, the inverse association between discretionary accruals and long term returns could be attributable to a delayed response to earnings management. As long as a delayed response explains this association, the coefficient of $b_{1,1}$ would also be negative and significant. On the other hand, an insignificant coefficient would reinforce our hypothesis that such penalty does not occur when optimistic expectations are not conveyed with similar precision. This finding would also imply that investors have the ability to fully undo earnings management during the acquisition announcement. We also don't expect to find any evidence of significant response to earnings management in any other remaining case.

4.4 Data and empirical proxies

4.4.1 *Mergers and acquisitions data*

The sample employed here draws upon the data available in the Securities Data Company (SDC) database and consists of completed mergers and acquisitions of UK listed companies that were announced between 1st January 1994 and 31st December 2008.⁴² Consistently with prior research on acquisitions completed by UK firms (Botsari and Meeks, 2008), we apply no restrictions on the listing status or the location of the target company in order to secure a broad a range of acquisition activity. A transaction is included in the sample if it satisfies the following criteria:

- (i) The bidder acquires a majority interest in the target company;

⁴² Martynova and Renneboog (2009) and Gregory and Wang (2011) suggest that the SDC coverage of acquisitions prior to 1994 is not very reliable.

- (ii) The transaction consideration is either pure share-exchange (100% stock) or a hybrid case which includes both a cash and a separately identifiable share element or wholly in cash (100% cash);⁴³
- (iii) The deal value is above £1 million;⁴⁴
- (iv) The bidder is a non-financial company (*i.e.*, firms under the ICB Industry Codes 8000-8999 are excluded);⁴⁵
- (v) Accounting and market data are available in Worldscope and Datastream;⁴⁶
- (vi) The acquisition event date can be clearly identified in relation to the bidder's preceding earnings announcement date;
- (vii) We introduce a "clear period" for companies performing multiple acquisitions of three consecutive earnings announcements, as illustrated in Fig.1. in order to avoid capturing discretionary accruals which are subject to the influence of the reversal of accruals associated with prior acquisitions.

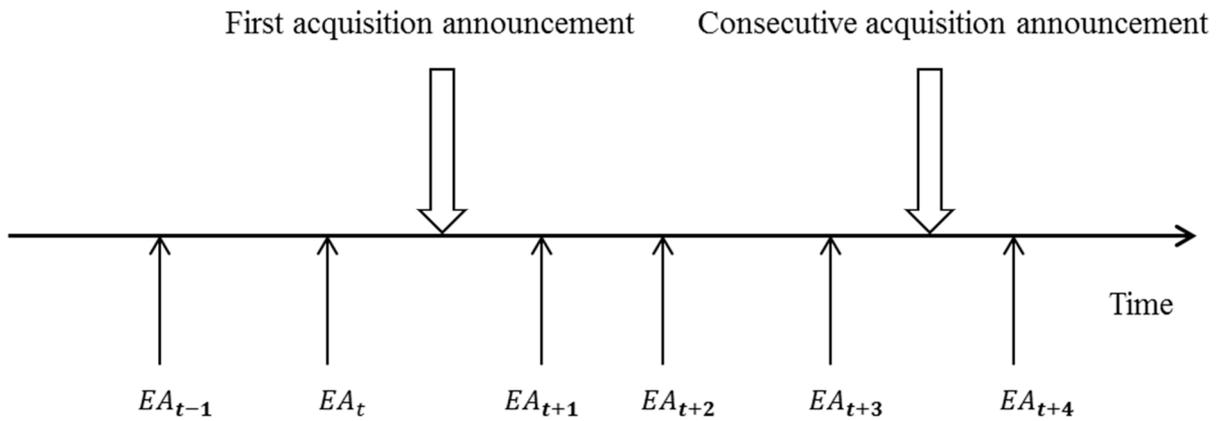
⁴³ Botsari and Meeks (2008) note that the guidelines concerning the conduct of acquisitions in the UK require that there should be a cash alternative consideration in an otherwise all share offer (Rule 9 and 11 of 'The City Code on Takeovers and Mergers'). Therefore, acquisitions financed with shares and cash (hybrid) are in essence stock acquisitions.

⁴⁴ A similar sample selection choice has also been applied elsewhere (Fuller *et al.*, 2002; Moeller *et al.*, 2004; Doukas and Petmezas, 2007) in order to avoid the results being driven by very small deals.

⁴⁵ The industry classification employed by SDC is based on the SIC codes. Adopting an alternative classification such as the ICB is deemed necessary in order to ensure a better match between the SDC and Worldscope/Datastream databases.

⁴⁶ We also require companies to have an accounting reporting period of less than 380 and more than 340 days (similarly to García Lara *et al.*, 2005).

Figure 4.1: Timeline for consecutive acquisition announcements



Notes:

Figure 4.1 depicts the “clean period” of three consecutive earnings announcements for multiple acquisitions performed by the same acquirer. This choice is driven by the intention to avoid capturing the market reactions that are attributed to the consequences of the reversal of financial reporting discretion relating to a prior acquisition. EA is the earnings announcement relative to the acquisition announcement.

The initial sample includes 11,795 completed acquisitions announced by UK firms over the sample period between 1994-2008. We exclude 7,406 acquisitions that are not classified as acquisitions of majority interest while 591 acquisitions are excluded because they have a deal value below £1 million. The sample is reduced by 1,446 acquisitions which do not meet the criteria for the method of payment. We follow Botsari and Meeks (2006) and classify firms as stock acquisitions if the consideration offered is 100% stock or the consideration includes both a cash and a separately identifiable share element or wholly in cash,⁴⁷ while any remaining acquisition is classified as cash. The sample is further reduced by 673 acquisitions for which we cannot identify the earnings announcements date either in I/B/E/S or Bloomberg and 777 acquisitions which cannot be matched with accounting data in Worldscope. Our sample is further reduced by 527 acquisitions due to our filter for multiple acquisitions. Finally, we exclude 18 acquisitions because they relate to reverse takeovers and 12 observations due to missing returns from Datastream. The final sample consists of 345 acquisitions announced by 304 acquirers, split between 169 stock acquisitions and 176 cash acquisitions. This sample size is comparable to prior literature in the UK. For instance, Botsari and Meeks (2006) use a sample of 48 stock acquirers announced between 1997 and 2001, Gao and Mohamed (2012) employ a sample of 210 cash acquisitions announced from 1984 to 2007, Gregory (2005) uses a sample of 217 acquisitions announced between 1984 and 1992 and (Gregory and Wang, 2011) employ a sample of 152 cash acquisitions announced from 1984 to 2002.⁴⁸ Moreover, the smaller number of

⁴⁷ Consistently with Botsari and Meeks (2006), when acquiring companies intend to use stock as method of payment, they also have an incentive to manage earnings upwards.

⁴⁸ We note, however, that our sample appears smaller compared to the sample employed in Doukas and Petmezas (2007). We speculate that the difference in the sample size is explained by different selection criteria. More specifically, Doukas and Petmezas (2007) employ a sample of acquisitions announced between 1980 and 2004, whereas our sample covers the period between 1994 and

acquisitions classified as stock relative to acquisitions classified as cash is also consistent with prior research in the UK which employs private target as well (e.g. Faccio and Masulis, 2005; Doukas and Petmezas, 2007; Botsari and Meeks, 2008).^{49,50} Table 4.1 summarises the data selection procedure.

Table 4.1: Table of observations

UK acquirers	11,795
Less:	
Transactions not classified as acquisitions of majority interest	7,406
Deal value is less £1m	591
Transactions not classified as share or cash exchange and hybrid	1,446
Missing earnings announcements	673
Missing accounting data or financial acquirer	777
Multiple acquisitions	527 ⁵¹
Reverse takeovers	18
Missing returns	12
Final sample	345 (304 firms)

4.4.2 Insider purchases

We focus on directors' purchases in the acquiring firm and obtain information on directors' trading from the Hemmington Scott Directors' Trading Dataset for period from 1996-2007 and before that from Directus Ltd. In line with prior research in the UK (e.g. Pope *et al.*, 1990; Gregory *et al.*, 1994; Hillier and Marshall, 2002b; Fidrmuc *et al.*, 2006), we define insider transactions as purchases by both

2007. In addition, Doukas and Petmezas define "single acquirers" bidders engaging in less than five acquisitions within a three-year period, whereas we define "single acquirers" acquisitions announced after at least three earnings announcements (criterion *vii* of the sample selection criteria).

⁴⁹ More specifically, Faccio and Masulis (2005) notes that UK companies acquiring a public target are more likely to use stock financed deals. Given that we apply no restrictions on the listing status of the target our results are not surprising.

⁵⁰ We acknowledge that the evidence reported for the UK contrast the evidence in the US. For instance, Andrade *et al.* (2001) report a higher percentage of stock financed acquisition in the US.

⁵¹ It includes 191 deals which were announced in the same year.

executive and non-executive directors.⁵² Motivated by prior literature (Beneish and Vargus, 2002; Core *et al.*, 2006; Sawicki and Shrestha, 2008; Beneish *et al.*, 2012), we use a firm-specific net measure of inside purchases aggregating all directors' trading activity. Following this stream of literature, we calculate the net purchases ratio (NPR) defined as follows:

$$\text{NPR} = [\text{PURCHASES} - \text{SALES}] / [\text{PURCHASES} + \text{SALES}]$$

where, PURCHASES are the number of shares purchased by directors and SALES are the number of shares sold. A positive NPR could be the result of directors purchasing more shares or selling fewer shares and *vice versa* for a negative NPR. A positive NPR indicates net insider buying, whereas a negative NPR indicates net insider selling.⁵³ In order to ensure that the trades that are observed are associated with insiders' private information, the insider trading measure is estimated by using only open market purchases and sales of common shares, since those trades are more likely to be informative about the future prospects of the firm. The need to focus on open market transactions is also confirmed by the findings in Veenman *et al.* (2011) who show that only open market purchases are associated with positive future news as opposed to stock options conversions.

⁵² We do not examine illegal insider trading; rather, we focus on legal insider trading by directors. In the US insiders are defined as officers, directors, key employees and shareholders holding more than 10% of any equity class. The majority of insider trading literature in the US focuses only on officers and directors (Lakonishok and Lee, 2001). Officers are referred as executives in the UK, whereas directors are referred as non-executives in the UK (Fidrmuc *et al.*, 2006). Fidrmuc *et al.* (2006) provide a detailed discussion of the regulatory differences between the UK and the US with respect to the definition of insiders and (illegal) insider trading, the frequency of information releases and trading bans, the length of the period within which insiders must report their trades and the level of the enforcement of the regulation.

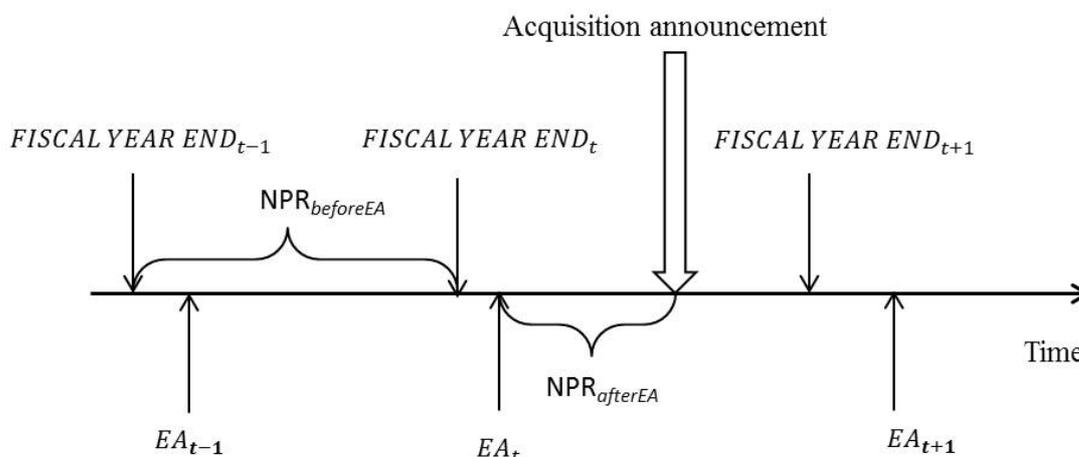
⁵³ Following Sivakumar and Waymire (1994), when the number of shares purchased equal the number of shares bought and the direction of trading cannot be determined, we classify those cases as observations with no insider trading.

As already discussed, we observe the influence of insider trading transactions across two different windows. Drawing from the findings in Veenman (2012) we aggregate insider trading transactions taking place after an earnings announcement but before the acquisition announcement. Following Beneish and Vargus (2002) and Sawicki and Shrestha (2008), our second measure of insider trading aggregates transactions that take place during the fiscal year preceding the acquisition announcement. Figure 4.2 illustrates these two periods which we use to measure directors trading relative to the acquisition announcement. We establish that insider trading transactions take place in 282 out of 345 acquisitions. More specifically, we observe directors trading in 131 stock acquisitions and 151 cash acquisitions. Furthermore, we find that directors are net purchasers in 71 stock acquisitions and 100 cash acquisitions.^{54, 55}

⁵⁴ The high percentage of acquisitions with insider purchases does not surprise us since it is well established that corporate insider purchases occur more frequently than insider sales (Lakonishok and Lee, 2001 in the US; and Friederich et al., 2002; Fidrmuc et al., 2006 in the UK). However, sales by value are much bigger than buys as they occur in bigger blocks, with the result that insiders in aggregate are net sellers over the time. However, in the context of acquisitions insiders may have constraints to sell their shares due to adverse signalling and reputations concerns (Akbulut, 2012) and therefore, abstain from selling prior to the announcement of the acquisition.

⁵⁵ We also note that directors purchases occur *before* 53 (71) stock (cash) acquisitions and *after* the earnings announcement in 33 (69) stock (cash) acquisitions.

Figure 4.2: Timeline for insider trading relative to the acquisition announcement



Notes:

Figure 4.2 depicts the period of directors trading measurement relative to the acquisition announcement.

4.4.3 Earnings management prior to acquisition announcements

We use the modified Jones model to estimate discretionary accruals (DACC) which predicts the level of “non-discretionary” working capital accruals as a function of the growth in revenues.⁵⁶ We follow Hribar and Collins (2002) and Meeks and Botsari (2008)⁵⁷ who suggest that the accruals measure should be estimated from cash flow statement figures rather than from balance sheet numbers, as the difference between income before extra-ordinary items reported in the cash flow statement and cash flows from operations, adjusted for the depreciation depletion

⁵⁶ Beneish (1998) and Young (1999) justify a focus on modelling working capital accruals instead of total accruals by pointing out that changes in depreciation policy cannot be made very frequently without attracting adverse attention and that modelling other long-term accruals such as environmental liabilities and pension obligations is far too complex. For similar reasons, Louis (2004) also focuses on current accruals.

⁵⁷ Collins and Hribar (2002) attribute the inconsistency between the “balance sheet” versus the “cash flow” approach for measuring accruals to non-articulation events such as reclassifications, acquisitions, divestitures, accounting changes, and foreign currency translations. The estimation procedure here is deliberately more prudent and thus, is drawing data out of the cash flow statement.

and amortization expense. We estimate discretionary accruals in a two-stage procedure. In the first stage, a working capital accruals variable for firm i , year t and sector j , scaled by the beginning total assets, is regressed upon the change in revenues scaled by the beginning total assets for each year and all available firm observations under the same two-digit ICB industry classification j and year t .^{58,59} The second stage regression predicts the non-discretionary level of working capital accruals using the estimated coefficients from the first stage. Note that in second stage, the influence of the cash sales is also taken into account by introducing the change in receivables, similarly to Dechow *et al.* (1995).⁶⁰

An important feature of the research question in this study is financial reporting discretion that is specifically related to the acquisition. To this end, the first stage of regression estimating the “non-discretionary” part of accruals is estimated on a sample that excludes firm-year observations associated with an acquisition announcement. Based on recent research (Collins and Kim, 2012; Owens *et al.*, 2013), acquisitions are “non-articulation” events, often associated with significant business shocks whereby the lead-lag relation between financial statement items

⁵⁸ Two digit ICB provides 15 industry classification whereas the equivalent SIC leads to 66 industries classifications, excluding missing and financial observations. We require at least 6 observations for each industry-year sub-sample (similarly to García Lara *et al.*, 2005).

⁵⁹ The accounting data are sourced from Worldscope for all the UK domicile companies. The working capital accruals are estimated as Income Before Extra Items (WC04001) – Total Funds From Operations (WC04201) - Other Funds From Operations (WC04831) + Depreciation, Amortisation & Depletion (WC04051). Other accounting data employed here are: change in sales (WC01001), total assets (WC02999) and change in receivables (WC02051). In order to mitigate the influence of outliers, extreme values of the distribution to the 1st and 99th percentiles of the above variable are excluded from the analysis. We then winsorise all the remaining variables we employ at the top and bottom 1%. The use of the Worldscope database is motivated by the wish to ensure comparability with previous research as well as for data availability reasons. Notably, Worldscope data can be downloaded by either Datastream or Thomson One Banker. In order to ensure the maximum coverage available, both sources have been employed and subsequently, the two datasets are merged based their SEDOL or their ISIN number.

⁶⁰ The change in receivables is included in order to control for managers' attempts to manipulate earnings through discretionary revenues. For instance, managers may use their discretion to recognise revenues for which cash has not yet received and have yet to be earned. This situation would result in reporting increased sales and working capital accruals through increased receivables (Dechow *et al.*, 1995).

is distorted. Hence, introducing such observations in the first stage may lead to inconsistent discretionary accruals estimates. This is a point that may have escaped prior research and affected its inference, e.g. Louis (2004).

The non-discretionary level of accruals prediction procedure in the second stage applies the coefficients estimated in the first stage to the particular sample in the present study comprising of firms which engage with an acquisition. The “non-discretionary” part of the accruals in our sample then represents an estimate of the expected level of accruals had the firm not been involved in an acquisition. Finally, since performance might be also a determinant of the level of accruals, the estimated discretionary accruals here are also “performance adjusted” in the manner advocated by Kothari *et al.* (2005) and implemented in Botsari and Meeks (2008), by adjusting the level of discretionary accruals with the median level of discretionary accruals of matched firms for the respective industry-year and quartile of ROA.

4.4.4 *Measuring long term abnormal returns*

The post-acquisition performance is estimated as the size adjusted buy and hold abnormal return (BHAR) over one, two and three years following the announcement of the acquisition, similar to Louis (2004). Our approach to measure long term abnormal returns follow closely the procedure described in prior research in the UK (e.g. Gregory *et al.*, 2010). We construct the size control portfolios for each year using all UK firms. Then, we rank these firms in decile portfolios according to their market capitalisation at the beginning of the year. The return for each size control portfolio is then tracked from January of year t , with the returns being value-weighted according to their initial market capitalisations. We calculate buy and hold returns for all companies with available returns data in Datastream.

However, our results are similar when we replace missing returns. We follow the procedure discussed in Gregory *et al.* (2010) given that Datastream reports missing returns if firms in the sample are de-listed. This has the potential to create an upward bias in the estimated BHAR returns, since some of these de-listings relate to bankruptcies. If a de-listed firm has preserved its value (such as a merger or an acquisition), we replace the return of that firm by the return of the benchmark. If the delisting is due to a total loss of value (bankruptcy), we replace the return by -1 . We source bankruptcies from LSPD using G10 description and more specifically codes 7, 16, 20 and 21. These codes are most likely to be firms that are either worthless or a long way from giving shareholders any terminal value, and so we treat these cases as if investors lost all their investment. By contrast, the remaining types of de-listing would seem to be value preserving.

4.5 Analysis

4.5.1 *Descriptive statistics*

Descriptive statistics on the composition of the sample by industrial sector and by year of announcement are presented in Table 4.2. Panel A shows that bids in the “technology” and “industrial goods & services” sector dominate the sample (21.74% and 48.99% respectively) and this is consistent across both stock-financed acquisitions (26.63% and 41.42%) and cash-financed (17.05% and 56.25%). The time-series phenomenon of mergers waves can be clearly seen in Panel B, with a notable concentration of both cash-financed (57.40%) and stock-financed (59.09%) acquisition deals during the 1994-2001 (5th) wave (Martynova and Renneboog, 2008). Similarly, we note the impact of the 2003-2006 (6th) merger wave (Martynova and Renneboog, 2008) in our sample.

Table 4.2

Panel A: Composition of the sample by industry classification

ICB	ICB Name	Full sample			Stock exchange			Cash exchange		
		Freq.	Percent	Cum.	Freq.	Percent	Cum.	Freq.	Percent	Cum.
23	Construction & Material	14	4.06	4.06	2	1.18	1.18	12	6.82	6.82
27	Industrial Goods & Services	169	48.99	53.04	70	41.42	42.6	99	56.25	63.07
35	Food & Beverages	5	1.45	54.49	1	0.59	43.2	4	2.27	65.34
37	Personal & Household Goods	16	4.64	59.13	9	5.33	48.52	7	3.98	69.32
45	Health Care	17	4.93	64.06	9	5.33	53.85	8	4.55	73.86
53	Retail	5	1.45	65.51	5	2.96	56.8	0	0	73.86
55	Media	39	11.3	76.81	23	13.61	70.41	16	9.09	82.95
57	Travel & Leisure	5	1.45	78.26	5	2.96	73.37	0	0	82.95
95	Technology	75	21.74	100	45	26.63	100	30	17.05	100
Total		345	100		169	100		176	100	

Table 4.2
Panel B: Composition of the sample by year

Year	Full sample			Share exchange			Cash financed		
	Freq.	Percent	Cum.	Freq.	Percent	Cum.	Freq.	Percent	Cum.
1994	25	7.25	7.25	16	9.47	9.47	9	5.11	5.11
1995	35	10.14	17.39	14	8.28	17.75	21	11.93	17.05
1996	27	7.83	25.22	17	10.06	27.81	10	5.68	22.73
1997	9	2.61	27.83	4	2.37	30.18	5	2.84	25.57
1998	21	6.09	33.91	10	5.92	36.09	11	6.25	31.82
1999	32	9.28	43.19	10	5.92	42.01	22	12.5	44.32
2000	33	9.57	52.75	19	11.24	53.25	14	7.95	52.27
2001	19	5.51	58.26	7	4.14	57.40	12	6.82	59.09
2002	7	2.03	60.29	3	1.78	59.17	4	2.27	61.36
2003	7	2.03	62.32	4	2.37	61.54	3	1.70	63.07
2004	24	6.96	69.28	13	7.69	69.23	11	6.25	69.32
2005	19	5.51	74.78	12	7.10	76.33	7	3.98	73.30
2006	32	9.28	84.06	15	8.88	85.21	17	9.66	82.95
2007	38	11.01	95.07	20	11.83	97.04	18	10.23	93.18
2008	17	4.93	100	5	2.96	100	12	6.82	100
Total	345	100		169	100		176	100	

Table 4.3 reports the differences between the characteristics of firms who conduct cash and stock acquisitions. Consistent with prior research (Erickson and Wang, 1999; Louis, 2004; Botsari and Meeks, 2008), firms that embark on stock-financed deals exhibit significant earnings management in terms of discretionary accruals (mean: 0.0164, p -value<5%). In contrast, there is no evidence of management for firms who conduct cash-financed deals (mean 0.0075, p -value>10%). Financial reporting in stock acquisitions appears to be driven by incentives to boost share prices with the aim firstly to improve the share-exchange ratio during the acquisition and therefore to reduce the cost of acquisition, and secondly, to protect current shareholders' interest dilution (Erickson and Wang, 1999). The descriptive statistics also confirm prior evidence documenting a more positive market reaction among cash than stock acquisitions (Moeller *et al.*, 2004 for the US; and Draper and Paudyal, 2006 for the UK). Specifically, there is evidence of significant positive returns exhibited by cash acquisitions (mean 0.0093, p -value<0.01) as opposed to stock acquisitions (mean 0.0054, p -value>0.10) where returns are not significantly different from zero. In line with Louis (2004) we find that the median one, two and three returns are significantly negative for stock acquisitions. Firms that engage with stock acquisitions appear to underperform significantly compared to cash acquisitions. The descriptive statistics also confirm the evidence documented by Akbulut (2012) that directors' purchases occur more often than directors' sales prior to an acquisition.

Table 4.3: Descriptive statistics for cash and stock acquirers

	Full sample	Stock	Cash	Stock-Cash
DACC				
Mean	0.0118**	0.0164**	0.0075	0.0089
<i>p-value</i>	0.0124	0.0231	0.1323	0.1988
Median	0.0080***	0.0105*	0.0049	0.0056
<i>p-value</i>	0.0322	0.0659	0.2390	0.5454
ABRET				
Mean	0.0074***	0.0054	0.0093***	-0.0040
<i>p-value</i>	0.0088	0.1623	0.0016	0.2617
Median	0.0039***	0.0014	0.0064***	-0.0050
<i>p-value</i>	0.0046	0.3642	0.0009	0.2127
ABRET1Y				
Mean	-0.0189	-0.0665**	0.0267	-0.0933**
<i>p-value</i>	0.2057	0.0297	0.1852	0.0214
Median	-0.0464	-0.0644**	-0.0221	-0.0423**
<i>p-value</i>	0.1355	0.0108	0.6480	0.0264
	(n=345)	(n=169)	(n=176)	
ABRET2Y				
Mean	-0.0548*	-0.0969**	-0.0145	-0.0824
<i>p-value</i>	0.0516	0.0235	0.3780	0.1101
Median	-0.1456***	-0.2458***	-0.0933**	-0.1524*
<i>p-value</i>	0.0000	0.0003	0.0295	0.0778
	(n=343)	(n=168)	(n=175)	
ABRET3Y				
Mean	-0.0069	-0.0349	0.0196	-0.0545
<i>p-value</i>	0.4444	0.3246	0.3767	0.2896
Median	-0.1614***	-0.2068***	-0.1220	-0.0848**
<i>p-value</i>	0.0005	0.0007	0.1450	0.0500
	(n=332)	(n=161)	(n=171)	
NPRbeforeEA				
Mean	0.0291	-0.0345	0.0902*	-0.1247*
<i>p-value</i>	0.2371	0.2736	0.0591	0.0626
Median	0.0000	0.0000	0.0000**	0.0000
<i>p-value</i>	0.1524	0.9169	0.0429	0.1423
NPRafterEA				
Mean	0.1100***	0.0043	0.2114***	-0.2071***
<i>p-value</i>	0.0010	0.4629	0.0000	0.0015
Median	0.0000***	0.0000	0.0000***	0.0000***
<i>p-value</i>	0.0008	0.8037	0.0000	0.0033

Notes:

DACC stands for the performance matched discretionary accruals estimated by the modified Jones model; *ABRET* is the cumulative value weighted abnormal return measured from two days before to two days after the acquisition announcement; *ABRET1Y* is the buy and hold abnormal returns measured over 12 months from the announcement of the acquisition; *ABRET2Y* is the buy and hold abnormal returns measured over 24 months from the announcement of the acquisition; *ABRET3Y* is the buy and hold abnormal returns measured over 36 months from the announcement of the acquisition; *NPRbeforeEA* stands for the Net Purchase Ratio based on the evidence on insider trading during the fiscal year preceding the acquisition announcement; *NPRafterEA* stands for the Net Purchase Ratio based on the evidence on insider trading taking place after the earnings announcement but before the acquisition; *p-values* are reported in parentheses and additionally, *, ** and *** denote significance at the 10%, 5% and 1% respectively.

Table 4.4 shows the announcement returns to stock and cash acquisitions for the sub-samples of observations formed based on the presences and timing of directors' purchases or not. More specifically, Panel A shows the abnormal returns for the sub-sample of acquisition where directors abstain from purchasing shares, Panel B for the sub-sample with directors' purchases after the earnings announcement, Panel C for the sub-sample with directors' purchases before the earnings announcement and Panel D, for the sub-sample whereby directors purchase throughout the financial year ending prior to the acquisition and up to acquisition announcement. The descriptive statistics show that the acquisition announcement returns for stock acquisitions are insignificantly different from zero when directors abstain from purchasing shares (mean 0.0011, p -value: >0.10). A negative reaction to stock acquisitions, as well as a significant difference from the reaction to cash acquisitions occurs only when directors purchase shares after the earnings announcement. Our descriptive statistics exhibit the negative reaction in Panel B, where directors trade after the earnings announcement only (-0.0212, p -value <0.10) and in Panel D where directors trade after as well as before the earnings announcement (-0.0159, p -value <0.10). We also observe a significant difference between the returns in cash and stock acquisitions in panels B and D (mean returns are -0.0224, p -value <0.05 and -0.0293, p -value <0.05 , respectively). Such evidence could lead to premature inferences about insider purchases being an indicator of overconfidence and as such, affecting adversely the market's reaction. Notably, the market reaction to stock acquisitions where directors have been net purchasers only before the earnings announcement is significantly positive (0.0373, p -value <0.01) but also it is significantly larger than the reaction to

cash acquisitions (0.0291, $p\text{-value}<0.05$). This finding is in line with the prediction that insider purchases that are contemporaneous with the development of discretionary accruals are also associated with a higher earnings persistence (Beneish and Vargus, 2002). In the setting of acquisitions, we re-interpret their inferences to imply that those particular insider purchases credibly signal the lack of opportunistic earnings management.

Finally, the acquisition announcement returns of cash acquisitions are positive throughout all Panels here and significant in Panels A, C and D. However, our inferences here could be influenced by various risk or other acquisition related parameters. We address those concerns in our multivariate tests as well.

Table 4.4: Market reaction to cash and stock acquirers and the impact of directors' purchases

	Stock	Cash	Stock-Cash
Panel A: No Buys			
Observations	98	76	
Mean	0.0011	0.0107**	-0.0096
<i>p-value</i>	0.4366	0.0113	0.1415
Median	0.0007	0.0059**	-0.0052
<i>p-value</i>	0.5926	0.0297	0.2966
Panel B: Buys after earning announcement			
Observations	18	29	
Mean	-0.0212*	0.0012	-0.0224**
<i>p-value</i>	0.0515	0.4292	0.0444
Median	-0.0094	0.0020	-0.0114
<i>p-value</i>	0.1221	0.8542	0.1202
Panel C: Buys before earning announcement			
Observations	38	31	
Mean	0.0373***	0.0082*	0.0291**
<i>p-value</i>	0.0035	0.0664	0.0305
Median	0.0136***	0.0068**	0.0068
<i>p-value</i>	0.0089	0.0396	0.1581
Panel D: Buys before and after earning announcement			
Observations	15	40	
Mean	-0.0159*	0.0134*	-0.0293**
<i>p-value</i>	0.0832	0.0612	0.0313
Median	-0.0088	0.0090*	-0.0178*
<i>p-value</i>	0.1914	0.0546	0.0563

4.5.2 Discussion of findings

Table 4.5 presents the empirical implementation of model (4.1) in our sample.⁶¹ Consistently with investors undoing the effects of earnings management, the coefficient of $DACC_{i,s}$ in stock acquisitions is negative and significant (-0.1208, p -value < 0.05).

Louis (2004) argues that investors are fooled by earnings management and they don't fully capture its effects at the acquisition announcement. Consequently, he establishes a negative relation between pre-acquisition discretionary accruals and subsequent post-acquisition returns. As it is shown in Table 4.6, we also establish a similar relationship for abnormal returns measured over one, two and three years ahead. However, as the evidence reported in Tables 4.7 and 4.8 shows, such conclusion is premature.

⁶¹ Models (4.1) and (4.2) are estimated here by means of an OLS regression with robust standard errors (to allow for heteroscedasticity) and allowing for clustering at the firm level and year fixed effects.

Table 4.5: Acquirers' performance and earnings management

$$ABRET_{i,t} = \sum_{s=0}^1 (\alpha_{0,s} + \alpha_{1,s}DACC_{i,t} + Controls_{i,t}) + \varepsilon_{i,t}$$

	STOCK	CASH
DACC	-0.1208** (0.0317)	-0.0193 (0.4975)
RUNUP	0.0060 (0.8440)	0.0073 (0.7439)
EACAR	-0.0262 (0.7556)	-0.0869 (0.2749)
BM	0.0004 (0.9255)	0.0005 (0.9629)
Ln_MV	-0.0057 (0.2198)	-0.0029 (0.2488)
LEVERAGE	0.0186 (0.6285)	0.0365 (0.2174)
LISTED	-0.0181 (0.1274)	0.0019 (0.8452)
CROSS-BORDER	0.0009 (0.9474)	0.0051 (0.4411)
INTRA-INDUSTRY	-0.0223** (0.0295)	-0.0038 (0.5826)
DEALVALUE	-0.0050*** (0.0003)	-0.0030 (0.2558)
YEAR CONTROLS		YES
CONSTANT	0.0443 (0.1869)	0.0159 (0.5121)
Observations		345
R-squared		0.1684
F		3.323
p-value		0.0000

Notes:

ABRET is the cumulative abnormal return measured from two days before, to two days after the acquisition announcement market-adjusted returns using the FT All Share Index. *DACC* represents discretionary accruals; *RUNUP* is the acquirer's price run-up measured as the buy and hold return calculated over the 60 days ending to 30 days before the acquisitions announcement using the FTSE All share index as the market return; *EACAR* is the acquirer's market adjusted returns cumulated over one day before to four days after the earnings announcement; *BM* is the book to market ratio; *Ln_MV* is the natural logarithm of the market value at the year end; *LEVERAGE* is the leverage ratio calculated as total debt divided by total assets. *LISTED* is a binary variable that equals to 1 if the target is listed and 0 otherwise; *CROSS-BORDER* is a binary variable that equals to 1 if

the target does not operate in the UK and 0 otherwise; *INTRA-INDUSTRY* is a binary variable that equals to 1 if the target operates in the same SIC industry classification; and *DEAL-VALUE* equals the value of the deal. The statistical significance of the coefficients is based on robust standard errors (to allow for heteroscedasticity) allowing for clusters at the firm level (in brackets); additionally, *, ** and *** denote significance at the 10%, 5% and 1% respectively.

Table 4.6: Long term acquirers' performance and the influence of earnings management

$$ABRET_{i,t} = \sum_{s=0}^1 (\alpha_{0,s} + \alpha_{1,s}DACC_{i,t} + Controls_{i,t}) + \varepsilon_{i,t}$$

	<i>ABRET1Y</i>		<i>ABRET2Y</i>		<i>ABRET3Y</i>	
	STOCK	CASH	STOCK	CASH	STOCK	CASH
DACC	-0.6765** (0.0129)	-0.6092* (0.0876)	-0.8030** (0.0162)	-0.5637 (0.4067)	-0.9072** (0.0390)	-0.4362 (0.5346)
Controls/Year effects	YES		YES		YES	
CONSTANT	0.0290 (0.8503)	-0.0691 (0.6772)	-0.0273 (0.8938)	0.1816 (0.4736)	0.1089 (0.7101)	0.0821 (0.7823)
Observations	345		343		332	
R-squared	0.1874		0.1289		0.0927	
F	0.0927		0.0268		-0.0176	
p-value	3.858		3.157		1.905	

Notes:

ABRET1Y is the buy and hold abnormal returns measured over 12 months from the announcement of the acquisition; *ABRET2Y* is the buy and hold abnormal returns measured over 24 months from the announcement of the acquisition; *ABRET3Y* is the buy and hold abnormal returns measured over 36 months from the announcement of the acquisition; *DACC* represents discretionary accruals; Controls included but not reported here are and defined as in table 4.5. The statistical significance of the coefficients is based on robust standard errors (to allow for heteroscedasticity) allowing for clusters at the firm level (in brackets); *, ** and *** denote significance at the 10%, 5% and 1% respectively.

We inform the relation between discretionary accruals and the short term market reaction by introducing the presence and the timing of net insider purchases denoting their credibility. In line with H2a, the results reported in Table 4.7 indicate that the relation between discretionary accruals and announcement returns is negative when managers trade only after the earnings announcement (-0.2285 , $p\text{-value} < 0.10$) or they don't trade at all (-0.1117 , $p\text{-value} < 0.10$). Had we followed Veenman (2012), we could have argued that the presence of insider purchases enhances the precision of discretionary accruals and prevents investors from understanding their reversal. To the extent that this interpretation holds, we should have observed a milder initial reaction during the acquisition announcement. The milder reaction would have been associated with the trust to the managers' precision of private information with regard to their estimates of the reversal of earnings management. However, this is not the case since the corresponding coefficient in Table 4.7, although larger, is not significantly different from the coefficient of discretionary accruals in the absence of any net insider purchases. Therefore, at the acquisition announcement, investors treat all cases where there is no evidence of credible signalling for the absence of opportunism as having overstated their earnings. Our research design allows us to identify a case of credible signal for the absence of earnings management in the form of net insider purchases before the earnings announcement. As Beneish and Vargus (2002) show, this type of information is associated with higher earnings quality. The positive sign of the estimated coefficient for discretionary accruals in the presence of net purchases before the earnings announcement (0.0368 , $p\text{-value} > 0.10$) confirms those predictions. Finally, we observe a substantial negative reaction to discretionary accruals when managers trade throughout the financial year prior the acquisition

and up to its announcement, albeit not statistically significant (-0.2894 , $p\text{-value}>0.10$). It could be argued that the lack of significance may be attributed to the contradictory indications conveyed by insider purchases taking place before the earnings announcement.

The test results reported in Table 4.8 confirm that the interpretation of the continuing negative relation between discretionary accruals and post-acquisition returns in Louis (2004) is premature. Specifically, we find that the negative response to discretionary accruals in the presence of net insider purchases after the earnings announcements is consistently large and significant (one year ahead: -1.5810 , $p\text{-value}<0.01$; two years ahead: -2.5202 , $p\text{-value}<0.05$ and three years ahead, -3.4966 , $p\text{-value}<0.01$). No other combination between discretionary accruals and net insider purchases after the earnings announcement explain the long term returns. These results suggest that the reaction to earnings management is complete at the acquisition announcement, unless discretionary accruals are accompanied with insider purchases after the earnings announcement. Now, it becomes obvious that the results reported in Table 4.6 are driven by a reaction to overconfidence.

Table 4.7 Acquisition announcement returns and the influence of net purchases before and after the earnings announcements

$$ABRET_{i,t} = \sum_{s=0}^1 \alpha_{0,s} + b_{1,s}NBDACC_{i,t} + b_{2,s}BUYbeforeEA_DACC_{i,t} + b_{3,s}BUYafterEA_DACC_{i,t} + b_{4,s}BUYbefore\&afterEA_DACC_{i,t} + b_{5,s}BUYbeforeEA_{i,t} + b_{6,s}BUYafterEA_{i,t} + b_{7,s}BUYbefore\&afterEA_{i,t} + Controls_{i,t} + \varepsilon_{i,t}$$

	STOCK	CASH
NBDACC	-0.1117* (0.0620)	0.0074 (0.8013)
BUYbeforeEA	0.0240 (0.1174)	-0.0033 (0.7097)
BUYbeforeEA_DACC	0.0368 (0.8066)	-0.1066 (0.3581)
BUYafterEA	-0.0261* (0.0742)	-0.0140 (0.1648)
BUYafterEA_DACC	-0.2285* (0.0564)	-0.0503 (0.4784)
BUYafter&beforeEA	-0.0098 (0.4738)	-0.0017 (0.8753)
BUYafter&beforeEA_DACC	-0.2894 (0.1446)	-0.0943 (0.5322)
Controls/Year effects	YES	
CONSTANT	0.0406 (0.2368)	0.0131 (0.5939)
Observations	345	
R-squared	0.2156	
F	0.0888	
p-value	3.090	

Notes:

ABRET is the cumulative abnormal return measured from two days before, to two days after the acquisition announcement market-adjusted returns using the FT All Share Index. *NBDACC* stands for discretionary accruals when directors abstain from purchasing shares during the financial year preceding the acquisition and up to the acquisition announcement, and zero otherwise; *BUYbeforeEA* is a binary variable taking the value of one if there is evidence of net insider purchases taking place during the financial year; *BUYbeforeEA_DACC* stands for discretionary accruals when directors engage with insider purchases during the financial year preceding the acquisition, and zero otherwise; *BUYafterEA* is a binary variable taking the value of one if there is evidence of net insider purchases taking place after the earnings announcement but before the acquisition announcement; *BUYafterEA_DACC* stands for discretionary accruals when directors engage with purchasing shares after the latest earnings announcement and up to the acquisition announcement, and zero otherwise; *BUYbefore&afterEA* is a binary variable taking the value of one if there is evidence of net insider

purchases taking place after the earnings announcement but before the acquisition announcement and during the financial year; *BUYbefore&afterEA_DACC* stands for discretionary accruals when directors engage with purchasing shares during the financial year preceding the acquisition and up to the acquisition announcement, and zero otherwise; Controls included but not reported here are and defined as in table 4.5. The statistical significance of the coefficients is based on robust standard errors (to allow for heteroscedasticity) allowing for clusters at the firm level (in brackets); *, ** and *** denote significance at the 10%, 5% and 1% respectively

Table 4.8: Long term acquirers' performance and the influence of net purchases before and after the earnings announcements

$$ABRET_{i,t} = \sum_{s=0}^1 \alpha_{0,s} + b_{1,s}NBDACC_{i,t} + b_{2,s}BUYbeforeEA_DACC_{i,t} + b_{3,s}BUYafterEA_DACC_{i,t} + b_{4,s}BUYbefore\&afterEA_DACC_{i,t} + b_{5,s}BUYbeforeEA_{i,t} + b_{6,s}BUYafterEA_{i,t} + b_{7,s}BUYbefore\&afterEA_{i,t} + Controls_{i,t} + \varepsilon_{i,t}$$

	ABRET1Y		ABRET2Y		ABRET3Y	
	STOCK	CASH	STOCK	CASH	STOCK	CASH
NBDACC	-0.4936 (0.1910)	-0.5482 (0.2048)	-0.5836 (0.1135)	0.0079 (0.9891)	-0.5930 (0.2199)	-0.2636 (0.5788)
BUYbeforeEA	-0.0682 (0.4210)	0.0373 (0.7072)	0.0310 (0.8168)	0.2301 (0.1378)	0.2503 (0.2147)	0.3297 (0.1740)
BUYbeforeEA_DACC	-0.4446 (0.4390)	-0.4280 (0.8472)	-0.1227 (0.9147)	-1.2428 (0.7861)	0.7668 (0.5914)	-3.2292 (0.6057)
BUYafterEA	-0.0517 (0.6544)	-0.0333 (0.6428)	0.1795 (0.3539)	0.1970* (0.0766)	0.4726* (0.0765)	0.2934* (0.0573)
BUYafterEA_DACC	-1.5810*** (0.0039)	0.3660 (0.5890)	-2.5202** (0.0295)	-0.1940 (0.8690)	-3.4966*** (0.0046)	-0.5830 (0.7112)
BUYafter&beforeEA	-0.0569 (0.6134)	0.0528 (0.5491)	0.0603 (0.7324)	0.2521* (0.0510)	0.3384 (0.3731)	0.2521* (0.0933)
BUYafter&beforeEA_DACC	0.7778 (0.5240)	-1.9821* (0.0658)	1.1997 (0.5924)	-2.2686 (0.1871)	3.0038 (0.6016)	-0.1770 (0.9180)
Controls/Year effects	YES		YES		YES	
CONSTANT	0.0260 (0.8661)	-0.1064 (0.5308)	-0.0956 (0.6493)	0.0592 (0.7995)	-0.0689 (0.7994)	-0.0152 (0.9566)
Observations	345		343		332	
R-squared	0.2051		0.1577		0.1433	
F	0.0766		0.0206		-0.00152	
p-value	2.969		2.645		1.747	

Notes:

ABRET1Y is the buy and hold abnormal returns measured over 12 months from the announcement of the acquisition; ABRET2Y is the buy and hold abnormal returns measured over 24 months from the announcement of the acquisition; ABRET3Y is the buy and hold abnormal returns measured over 36 months from the announcement of the acquisition; NBDACC stands for discretionary accruals when directors abstain from purchasing shares during the financial year preceding the acquisition and up to

the acquisition announcement, and zero otherwise; *BUYbeforeEA* is a binary variable taking the value of one if there is evidence of net insider purchases taking place during the financial year; *BUYbeforeEA_DACC* stands for discretionary accruals when directors engage with insider purchases during the financial year preceding the acquisition, and zero otherwise; *BUYafterEA* is a binary variable taking the value of one if there is evidence of net insider purchases taking place after the earnings announcement but before the acquisition announcement; *BUYafterEA_DACC* stands for discretionary accruals when directors engage with purchasing shares after the latest earnings announcement and up to the acquisition announcement, and zero otherwise; *BUYbefore&afterEA* is a binary variable taking the value of one if there is evidence of net insider purchases taking place after the earnings announcement but before the acquisition announcement and during the financial year; *BUYbefore&afterEA_DACC* stands for discretionary accruals when directors engage with purchasing shares during the financial year preceding the acquisition and up to the acquisition announcement, and zero otherwise; Controls included but not reported here are and defined as in table 4.5. The statistical significance of the coefficients is based on robust standard errors (to allow for heteroscedasticity) allowing for clusters at the firm level (in brackets); *, ** and *** denote significance at the 10%, 5% and 1% respectively

Overall, our results show that during the acquisition announcement, rational investors have no means to know to which extent the precision of managers' optimistic expectations has any realistic basis. Investors though are aware of the complexity of merging two firms' fundamentals. They are also aware that competent or lucky managers may ultimately achieve what they implicitly promise through their net purchases. Thus, we argue that market participants observe managers' actions and reports in the post-acquisition period in order to assess their ability to deliver the outcomes that have been initially promised. The higher the extent of earnings management, the more difficult the task of concealing its reversal becomes and thus, the more overconfident managers appear. Notably, a similar relation holds in the case where managers are not net buyers. Nevertheless, in this case, there is no implicit promise that the earnings management reversal will be mitigated and therefore, their ability is not judged upon this specific ability and consequently, there is no significant adverse market reaction. Therefore, we argue that the combination of earnings management and insider purchases after the earnings announcement is penalised by disappointed investors over overconfident managers' ability to take control of the process of merging two firm's fundamental streams. On the other hand, investors do not appear to penalise overconfidence in the sense conceived in the finance literature and expressed by net insider purchases. Our results do not capture any such evidence from the net insider purchases effects. In fact, those variables indicate mostly a positive albeit typically insignificant response to long term market reactions in the case of stock acquisitions.

Our discussion of results relies considerably upon the notion of the earnings management reversal. We investigate whether and when discretionary accruals

reverse and report the results of our investigation in Table 4.9. The tests examine the relationship between discretionary accruals and subsequent operating performance in terms of return on assets over one, two and three years ahead, where return on assets is defined as earnings before interest and taxes scaled by contemporaneous total assets. Due to the database constraints in terms of the necessary data for the dependent variable in those tests, the number of observations employed does not correspond to the number of observations in our main tests. Hence, we are duly cautious when drawing inference from those tests to explain our earlier results. However, when we perform our earlier tests for this reduced sample our results are unchanged which provides at least some confidence to our conclusions.

The findings reported in Table 4.9 suggest that there is statistically significant evidence of earnings management reversal over two years from the acquisition. Those findings confirm Fairfield *et al.* (2007)'s arguments that acquisitions provide managers with opportunities to conceal the unwinding of earnings management, at least in the short term. Furthermore, we don't observe any significant evidence of earnings management reversal in cases where such purchases had occurred (-0.1891, insignificant). The results support our argument that discretionary accruals accompanied with insider purchases before the earnings announcement signal the absence of earnings management. Investors also appear quite rational to not react negatively during and after the acquisition announcement in those cases. On the other hand, we observe significant evidence on the reversal of earnings management in cases where we have a significant negative market reaction during

the acquisition.⁶² The magnitude of the reversal appears to follow the pattern in those reactions both in the case of the absence of insider purchases and in the case of insider purchases after the earnings announcement (-0.6756, *p-value*<0.05; -0.9399, *p-value*<0.05, respectively). Furthermore, we don't have significant evidence that the reversal of earnings management is more pronounced in the second case. Therefore, there is no obvious difference in timing and the magnitude of the impact of discretionary accruals on future operating performance. In addition, we note the adverse long term implication of earnings management in the presence of insider purchases after the earnings announcement but not otherwise, as presented in Table 4.8. Taken together, the significant post-acquisition reactions are more likely to be driven by cost of capital effects. In other words, during the post-acquisition period, investors observe the reversal of earnings management and compare the realised outcome to the initial precision of managers' precision of optimistic expectations. This deviation puts the managers' ability at question and as a result, investors require a higher rate of return to compensate against the risk involved in manager's ability to deal with the post-acquisition complexity.

⁶² This result may suggest that the earnings management reversal is unavoidable. However, the results here capture an average effect. It is always possible that some managers achieve to prevent the earnings management reversal to affect the post-acquisition operating performance and justify the precision of their optimistic projections. On the other hand, overconfident managers tend to exhibit more flawed judgement. For instance, Hribar and Yang (2010) show that overconfident CEOs are more likely to miss their own forecasts.

Table 4.9: Long term acquirers' operating performance and the influence of net purchases before and after the earnings announcements

$$ROA_{i,t} = \sum_{s=0}^1 \alpha_{0,s} + b_{1,s}NBDACC_{i,t} + b_{2,s}BUYbeforeEA_DACC_{i,t} + b_{3,s}BUYafterEA_DACC_{i,t} \\ + b_{4,s}BUYbefore\&afterEA_DACC_{i,t} + b_{5,s}BUYbeforeEA_{i,t} + b_{6,s}BUYafterEA_{i,t} \\ + b_{7,s}BUYbefore\&afterEA_{i,t} + Controls_{i,t} + \varepsilon_{i,t}$$

	ROA1Y		ROA2Y		ROA3Y	
	STOCK	CASH	STOCK	CASH	STOCK	CASH
NBDACC	-0.3479 (0.2432)	0.0408 (0.7084)	-0.6756** (0.0379)	0.0903 (0.4743)	-0.8304 (0.2876)	0.1572 (0.4402)
BUYbeforeEA	-0.0170 (0.5899)	0.0107 (0.7293)	0.0673 (0.1492)	0.0468 (0.1266)	0.0837 (0.1537)	0.0487 (0.1508)
BUYbeforeEA_DACC	0.4619 (0.1564)	0.7751 (0.3128)	-0.1891 (0.7496)	-0.3894 (0.3654)	0.1306 (0.7829)	0.1838 (0.7248)
BUYafterEA	0.0385 (0.2341)	0.0215 (0.4258)	0.0015 (0.9878)	0.0412 (0.2552)	0.0561 (0.5235)	0.0143 (0.7406)
BUYafterEA_DACC	-0.5433 (0.2118)	-0.0558 (0.8899)	-0.9399** (0.0174)	-0.1921 (0.6412)	-0.2688 (0.6075)	0.2089 (0.6080)
BUYafter&beforeEA	0.0026 (0.9187)	0.0456* (0.0608)	0.0635 (0.3001)	0.0640** (0.0445)	0.0947 (0.1634)	0.0349 (0.3876)
BUYafter&beforeEA_DACC	0.5222 (0.1731)	0.1208 (0.5188)	0.4767 (0.4319)	0.1128 (0.7276)	0.5865 (0.4435)	-0.4946 (0.1917)
Controls/Year effects	YES		YES		YES	
CONSTANT	-0.0824 (0.1723)	0.0447 (0.5489)	-0.2673* (0.0645)	0.0052 (0.9508)	-0.3508** (0.0338)	-0.1722 (0.2179)
Observations	338		313		269	
R-squared	0.4271		0.3316		0.2666	
F	0.332		0.211		0.107	
p-value	10.01		5.207		3.552	

Notes:

ROA1Y is the return on assets one year after the acquisition; ROA2Y is the return on assets two years after the acquisition; ROA3Y is the return on assets three years after the acquisition; NBDACC stands for discretionary accruals when directors abstain from purchasing shares during the financial year preceding the acquisition and up to the acquisition announcement, and zero otherwise; BUYbeforeEA is a binary variable taking the value of one if there is evidence of net insider purchases taking place during the financial year; BUYbeforeEA_DACC stands for discretionary accruals when directors engage with insider purchases during the financial year preceding the acquisition, and zero otherwise; BUYafterEA is a binary variable taking the value of one if there is evidence of net insider purchases

taking place after the earnings announcement but before the acquisition announcement; *BUYafterEA_DACC* stands for discretionary accruals when directors engage with purchasing shares after the latest earnings announcement and up to the acquisition announcement, and zero otherwise; *BUYbefore&afterEA* is a binary variable taking the value of one if there is evidence of net insider purchases taking place after the earnings announcement but before the acquisition announcement and during the financial year; *BUYbefore&afterEA_DACC* stands for discretionary accruals when directors engage with purchasing shares during the financial year preceding the acquisition and up to the acquisition announcement, and zero otherwise; Controls included but not reported here are and defined as in table 4.5. The statistical significance of the coefficients is based on robust standard errors (to allow for heteroscedasticity) allowing for clusters at the firm level (in brackets); *, ** and *** denote significance at the 10%, 5% and 1% respectively.

4.7 Concluding remarks

In this study, we employ the presence and more importantly, the timing of directors' net insider purchases to identify overconfidence in the use of earnings management prior to acquisitions. We argue that in an acquisition context, overconfident managers overestimate the magnitude of the combined entity's earnings by believing that the adverse consequences of aggressive accounting can be concealed during the integration process. The issue is especially pertinent for stock acquisitions where earnings management is employed to enhance the exchange ratio for the benefit of the acquirer's shareholders. In the same time, overconfident managers underestimate the probability of new, difficult or contentious accounting issues and possible business integration problems that may compound those issues. Given this information uncertainty associated with the integration period, overconfident managers' subjective estimates tend to be unjustifiably precise. We show that market participants understand both the incentives and the opportunities for earnings management and adjust share prices during the acquisition announcement. We also show that the post-acquisition reaction to earnings management is a reaction to the precision by which managers' optimistic expectations have been initially conveyed.

In contrast to Louis (2004), our approach does not support a mispricing or market inefficiency explanation for the relation between earnings management and market reaction during and after an acquisition. Following the Roll's hubris hypothesis, we attribute it to overconfident managers. Takeovers reflect decisions taken by individuals who have the opportunity to conduct a few acquisitions during their career. Hence, they may be more prone to make mistakes in terms of the first (optimism) and second moment (precision) of their subjective probability

distribution of the combined entity's future cash flows. In our setting, where serial acquirers are excluded, this becomes even more likely.

We argue that the market learns about managers' overconfidence gradually, over the course of the integration process by following up their actions and reports; this learning leads to an inverse relation between pre-acquisition earnings management and long term returns. Brav and Heaton (2002) argue that mistakes or risk premiums that result from incomplete information can generate financial anomalies. Specifically, they refer to investors who make optimal statistical decisions but they lack critical structural knowledge. It is likely that our approach here lies within a "rational structural uncertainty" explanation as market participants have an incomplete set of information about the valuation parameters initially and update their beliefs subsequently, as new information arrives during the integration period.

An interesting question that may also arise is how and whether overconfidence and its adverse effects can be mitigated through a regulatory mechanism. Armour and Skeel (2006) point out to the differences in the litigiousness in the regulation of acquisitions between the UK, which is our case here, and the U.S.A. In the more litigious environment of the U.S.A, there is evidence that acquirers often face lawsuits after stock acquisitions with the most common complaint being managers issuing false and misleading statements and consequently misguiding investors (Gong *et al.*, 2008). Interestingly, it is difficult to envisage a lawsuit against managers who have engaged with insider purchases as this puts them in the same position as the deceived investors. Moreover, even the large incidence of lawsuits does not have the expected result to inspire caution as Gong *et al.* (2008) claim which could also be an indication of overconfidence. Future research could

establish whether and how differences in the litigiousness and other institutional features across jurisdictions affect managers' overconfidence in the context of acquisitions (e.g. whether less litigious regulation encourages managers to become overconfident).

5 Constraining financial reporting discretion: Evidence from the capitalisation of development expenditures in the UK

5.1 Introduction

Accounting choice is a mechanism by which better informed insiders can impart information to less informed parties about the timing, magnitude and risk of future cash flows (Fields *et al.*, 2001). However, under conditions of high uncertainty, accounting choice hands in to insiders an information advantage. This implies significant costs to financial statement users who need to unravel insiders' accounting choices and more particularly, the underlying motivations. An obvious reaction to those information processing costs is to constraint the level of discretion up to a level that curbs the opportunism and in the same time, allows for the communication of private information. In this chapter, we show that such attempts may achieve the desired outcome at the expense of a loss of information about future benefits.

Prior research has only hinted so far to the loss of information out of constraining insiders' discretion. For example, Stark (2008) comments that removing discretion over the treatment of development expenditures, as it happened with the transition from SSAP 13 to IAS 38 in the UK, removes a useful way for firms to communicate information to the stock markets. We also develop our study on constraining discretion based on this specific setting. Specifically, we employ the transition from an accounting standard which allows firms the discretion, but not the compulsion, to capitalise development expenditures under certain conditions (SSAP 13) to a similar accounting standard which disallows this discretion (IAS 38) as it happened

in the UK. We refer to the former as a discretionary capitalisation regime and the latter as a mandatory capitalisation regime.

Stark (2008) underplays the implications of constraining discretion upon capitalisation for the efficient operation of the UK market. Based on prior research (Nixon, 1997; Oswald, 2008), he points out that managers are reluctant to take advantage of the allowed discretion to capitalise development expenditure and notes that only a small percentage of firms engage with capitalisation. However, he does not take into account that forcing managers to comply with a mandatory capitalisation standard, results to an extension of the scope of capitalisation over firms that previously resisted to this choice. Consistently, we find that the transition to a mandatory capitalisation regime is marked by a widespread application of the standard upon firms whose projects that appear to fulfil the capitalisation criteria.

Stark (2008) as well as Oswald and Zarowin (2007) explain that managers are reluctant to capitalise due to measurement and record keeping costs and the possibility of conveying information by alternative channels, for example, voluntary disclosure. As opposed to disclosure, capitalisation is costly because recognised amounts are subject to audit. In addition, Barth et al. (2003) shows that recognition results in prices reflecting more information given the costs unsophisticated investors face to extract information from voluntary disclosures. Moreover, the recognition of capitalised expenditures increases managers' exposure to potential penalties in case that expected benefits are not realised. Such costs involve future impairments with the associated market penalties or even, litigation. Thus, managers' reluctance to engage with capitalisation, even when their projects fulfil the standards' criteria, implies that their own private information prescribes an

uncertainty threshold that is at least higher than the uncertainty threshold in the accounting standard.

In the present study, we argue that the adverse consequences of constraining discretion are related to the uncertainty threshold to which managers are forced to comply with and may not reflect the firm's underlying economics. An early warning on this issue comes from Wyatt (2005) who stresses that the accounting standard needs to be benchmarked to the economics of the intangible investments so that compliance results in firms reporting in accordance with their firm's economics. To the extent that capitalised assets aggregate a number of projects which fulfil the criteria but they have diverse success rates, investors may doubt the reliability of the future benefits arising from those assets. Consistently, our empirical findings point to a loss of information about future earnings reflected in current share price returns as a result of constraining discretion.

The impact of constraining discretion should not be evaluated based on its costs only. Following prior research, we also argue that the opportunistic and signalling motivations co-exist during a regime of discretionary capitalisation. We show that market participants are aware of insiders' information advantage under those conditions and employ the disclosure of insider purchases to unravel the uncertainty around the purpose of capitalisation. In this context, insider purchases represent insiders' information advantage or the insiders' relatively higher information precision over the outsiders' information precision under conditions of uncertainty. Our results show a statistically significant influence on the assessment of reported earnings for firms that engage with capitalisation. Specifically, the presence (absence) of insider purchases strengthens (weakens) the relation between the revisions in expectations about current earnings and returns. This

result suggests that investors, under a discretionary capitalisation regime, use this disclosure to assess whether the earnings inflation arising from capitalisation is due to signalling or opportunism.

We argue that disallowing discretion, not only eliminates the scope for opportunism but also, it levels the imbalance in information precision between insiders and outsiders. This is achieved by forcing an uncertainty threshold which enables expenditures for projects with variable rates of success to find their way on the balance sheet. Hence, the insiders' information advantage is addressed sub-optimally since both insiders and outsiders have a similarly noisy information set. Those ideas are confirmed in our tests where, under a mandatory capitalisation regime, we have no significant evidence about insiders' information advantage as identified under the discretionary capitalisation regime.

We acknowledge that the transition from a discretionary capitalisation (SSAP 13) to a mandatory capitalisation regime (IAS 38) has not been a major issue for the investing community. In a related vein, in a recent update (July, 2014) with regard to the revisions of the Conceptual Framework for Financial Reporting, IASB tentatively decided that no guidance is needed in the Conceptual Framework on the role of constrained discretion in the identification of assets. We contribute to this debate by shedding light on the costs and benefits of constraining discretion upon capitalisation. More specifically, we attempt to draw attention to the sub-optimal trade-off between the benefits of curbing the insiders' opportunity to abuse an accounting choice with respect to the identification of an intangible asset and the cost of losing relevant information in an attempt to suppress insiders' information advantage. This chapter also contributes to the stream of literature that has expressed concerns over the adoption of the standard. While Stark (2008) and

Wyatt (2008) have expressed their concerns over the adoption of IAS 38, we provide empirical support these concerns and show that prices reflect less forward looking earnings information. Furthermore, this chapter contributes to the joint signal literature which considers insider trading and financial reporting discretion (e.g. Beneish and Vargus, 2002; Veenman, 2012). Our results show that a necessary condition for insider purchases to be useful disclosure to unravel managers' private information in financial reporting is that significant discretion in financial reporting is permitted.

The remainder of the chapter is organized as follows. The next section discusses prior research and develops our hypothesis. Section 3 presents the research design employed in the chapter. Section 4 describes the data and the sample. Section 5 discusses the empirical results and section 6 presents the conclusions of the study.

5.2 Hypothesis development

5.2.1 Discretionary versus mandatory capitalisation: Implications for communicating future benefits.

R&D projects are characterised by a particular type of information asymmetry between insiders and outsiders. Outsiders cannot easily infer relevant information by observing the productivity of R&D projects in other firms or by referring to an organised market for R&D (Aboody and Lev, 2000). On the other hand, insiders are in an advantageous position to observe the links between those projects and value creation (Wyatt, 2008). The capitalisation of development expenses addresses this information asymmetry since this gives to managers the ability to

communicate their own private information on the value creation process of R&D projects and thus, the predictability of related future benefits.⁶³

Accounting standard setters have prescribed the capitalisation of development expenses at either a mandatory (e.g. IAS 38⁶⁴) or a discretionary (e.g. SSAP 13) basis. Both mandatory and discretionary capitalisation treatments rely on the compliance with a list of similar criteria to establish that the project's future expected benefits are certain enough. The criteria outline an "uncertainty threshold" whereby expenditures should be capitalised if the uncertainty of expected future benefits falls below this threshold, and expensed otherwise (Mohd, 2005). In the case of discretionary capitalisation, managers have the choice to set a higher "uncertainty threshold" (but not a lower one) and thus, forego the capitalisation even if a project meets the criteria. We argue that discretionary capitalisation allows managers to act upon their private information and best estimates. On the other hand, this option is not permitted in the case of mandatory capitalisation. Managers must uphold to the "uncertainty threshold" and, possibly ignore private information discouraging capitalisation that is not accounted for in the standard, for the sake of complying with the standard. Consequently, the inherent concern in the case of mandatory capitalisation is whether expenditures whose associated future benefits are not reliable enough find their way into the balance sheet.

⁶³ Using Australian data, Wyatt(2005) demonstrates that the choice to capitalise R&D expenditures is associated the strength of the technology affecting the firm's operations, the length of the technology cycle time and property rights related factors that affect the firm's ability to appropriate the investment benefits.

⁶⁴ IAS 38 maintains a certain level of discretion since it permits management to apply their judgement in deciding whether the, mostly qualitative, conditions for capitalisation have been satisfied (Prencipe *et al.*, 2008). Consistently, we argue that IAS 38 constraints discretion instead of "removes" discretion.

Those concerns over the mandatory capitalisation of R&D are not new ones to preparers of financial statements in the UK. Stark (2008) reviews the history of the development of SSAP 13 in the UK and points out that there has never been a widespread demand for capitalisation of development expenditures. Moreover, according to the survey results reported by Nixon (1997), 60% of the respondents oppose a recommendation for mandatory capitalisation as proposed in the Corfield Report (1990). Interestingly, both Nixon (1997) and Stark (2008) note that the vast majority of UK firms have a strong preference for the conservative solution of immediate expensing for R&D. Similarly for large software firms in the USA and with reference to SFAS No. 86, Mohd (2005) shows that companies choose to expense, despite their software products being successful and the criteria for capitalisation being met.⁶⁵ Those early findings suggest that managers are reluctant towards the capitalisation of R&D expenditures. Oswald (2008) explains that this could be attributed to measurement and record keeping costs as well as consideration of analysts' preferences towards expensing. More important, he notes the managers' private concerns about the implications of capitalisation for the quality of current and future earnings.

The managers' reluctance to engage with capitalisation, as noted in Stark (2008), gives us hints that the managers' own uncertainty threshold is at least equal or even higher than the uncertainty threshold set out by accounting standard setters. Following along these lines, we investigate whether discretionary capitalisation results into R&D assets whose future expected benefits are more reliable and more homogeneous in terms of probable rates of success than mandatory capitalisation.

⁶⁵ We acknowledge that the US GAAP disallows the capitalisation of R&D expenditure (SFAS No. 2) and only permits the capitalisation of software development costs (SFAS No. 86)

Existing ample evidence indicates that this accounting choice provides value relevant information (Smith *et al.*, 2001; Ke *et al.*, 2004; Oswald, 2008; Wyatt, 2008). However, Wyatt (2005) notes that constraining discretion over the capitalisation of intangible assets impedes accounting to convey the economics of intangible investments with adverse consequences over its relevance.⁶⁶ Consistent with the arguments in Wyatt (2005), recent empirical evidence reported in Shah *et al.* (2013) shows that the value relevance of the capitalized R&D asset in the UK decreases from the pre-IFRS (SSAP 13) to the post-IFRS (IAS 38) period. Nevertheless, those results do not provide explicit evidence to address the issue of whether mandatory capitalisation under IAS 38 results in prices reflecting less information about the future performance of the firm than discretionary capitalisation.

Summarising the discussion above, we question the improvement brought about by mandatory capitalisation to the information environment of U.K. firms that engage with R&D. To the extent that investors understand this decrease in the reliability of generated R&D assets, this information will be less useful for predicting future earnings. That leads us to our first hypothesis:

H1: Under a mandatory capitalisation regime, the information about future earnings reflected in the returns of firms presenting an R&D asset is less than the information under a discretionary capitalisation regime.

⁶⁶ Using Australian data, Wyatt (2005) shows that the recognition of intangibles assets which are subject to managerial discretion are associated with the strength of the technology affecting the firm's operations, the length of the technology cycle time and property rights related factors that affect the firm's ability to appropriate the investment benefits. On the other hand, highly regulated intangible assets are less correlated with these underlying economic factors. Those results suggest that managerial discretion tend to improve the quality of information on financial statements.

5.2.2 *Discretionary versus mandatory capitalisation: Implications for the quality of earnings information.*

The flexibility allowed by discretionary capitalisation can also be employed opportunistically in order to manipulate earnings. Abusing this choice implies that current earnings can be inflated by capitalising expenditures whose future benefits are unreliable, rendering future earnings subject to impairments. Prior research shows that this choice has been employed for earnings smoothing purposes or as a means to meet or beat earnings benchmarks (Markarian *et al.*, 2008; Cazavan-Jeny *et al.*, 2011). While this evidence comes from Italian and French firms respectively, the evidence in Oswald (2008) indicate that this may also be the case in the UK. Specifically, his findings suggest that the determinants of the choice to capitalise R&D expenditure may be driven by opportunistic motivations (e.g. firms with higher earnings variability and loss making firms are more likely to capitalise).

Opportunistic motivations do not appear to have adverse implications for the information that is communicated to the market. This is evident in the value relevance tests of capitalised R&D assets as well as the share price anticipation tests reported in Oswald and Zarowin (2007). Other prior research also argues that earnings management does not hinder the ability of capitalisation to communicate useful information (Healy *et al.*, 2002; Chambers *et al.*, 2003). This may be the case if, for instance, managers choose capitalisation in order to engage with earnings management for signalling purposes (Markarian *et al.*, 2008).

There is no evidence to date on the implications of constraining the discretion upon capitalisation for earnings management. Our hypothesis H1 supports that constraining discretion upon capitalisation has adverse consequences on the information about future earnings in share prices. In other words, we hypothesise

that the introduction of the standard results in unintended adverse consequences for the signalling ability of capitalisation. However, a more desirable outcome is that it curbs opportunism by limiting managers' discretion.

We investigate whether mandatory capitalisation curbs either signalling or opportunistic motivations by looking at a mechanism that could be employed by investors to identify them under a regime of discretionary capitalisation. If this mechanism becomes obsolete during a mandatory capitalisation, we could infer indirectly, that mandatory capitalisation achieves its purpose with respect to earnings management.

We are motivated by Francis *et al.* (2007) to argue that rational investors rely on additional disclosures that increase the precision of information in order to resolve uncertainty. We similarly argue that in the presence of uncertainty about the opportunistic or signalling motivation for discretionary capitalisation, investors rely on the disclosure of managers' insider purchases. Prior research shows that this type of disclosure is associated with managers' private information about the firm's earnings persistence. Piotroski and Roulstone (2007) show that insiders trade on persistent earnings innovations. In a more relevant context, Beneish and Vargus (2002) find that managers are more likely to buy their firms' shares when current earnings are driven by permanent positive accruals. Investors, on the other side, appear to acknowledge the information in insider purchases for earnings persistence and price it accordingly. For instance, Badertscher *et al.* (2011) find that market participants use the information in prior insider trading activity when confronted with a restatement announcement and show that the presence of purchases results in less negative market reaction.

Being a costly signal in terms of wealth commitment and portfolio under-diversification (e.g. Fidrmuc *et al.*, 2006; Veenman *et al.*, 2011) and thus credible as well as precise, insider purchases are argued here to indicate managers' information advantage. In our context, when managers have enough discretion to employ this accounting choice either for signalling or opportunistic purposes, they maintain an information advantage which then, becomes obvious in their trading. We hypothesise that the information precision that is inherent in insiders' purchases is employed by investors in order to resolve the uncertainty surrounding earnings. Specifically, we investigate whether inflating current earnings, as result of capitalisation, is motivated by signalling or opportunism.⁶⁷ Given the evidence in Piotroski and Roulstone (2007) and Beneish and Vargus (2002), we argue that the presence of insiders' purchases communicates that the capitalisation (leading to higher earnings than expensing) is associated with signalling. We predict that the relationship between earnings and returns would be more pronounced for firms that engage with capitalisation in the presence rather than in the absence of insider purchases. On the contrary, capitalisation in the absence of insider purchases is more likely to be interpreted by market participants as possibly stemming out of opportunism.

As long as the constraint over discretion under a mandatory capitalisation limits the scope for earnings management, there might not be a role for insider purchases anymore in investors' assessments. When capitalisation becomes subject to the compliance with a set of criteria instead of managers' decision, there is no much

⁶⁷ It is always possible that insider purchases in the presence of capitalisation may also denote managerial overconfidence. The context of high uncertainty that is inherent in the value creation process of R&D projects is a fertile ground for this type of behaviour. Overconfidence though would provide misguided information about future earnings.

underlying discretion to unravel. However, insofar the standard's application results to the capitalised expenditures of projects with diverse rates of success, managers' information is likely to be noisy and their information advantage compromised.

Summarising the discussion, our second hypothesis sets out that:

H2a: Under a discretionary capitalisation regime, share prices reflect more information about earnings in the presence of insider purchases than in their absence

H2b: Under a mandatory capitalisation regime, the presence of insider purchase makes no difference in the information share prices reflect about earnings.

Hypothesis H2 implies an unintended consequence of constraining financial reporting discretion over capitalisation. Allowing discretion to make accounting choices is also handing in a significant information advantage to insiders. This information advantage does not depend only their intimate knowledge of the R&D projects' success rate but more important, on the heightened precision of this information over the precision of information that is publicly available. By constraining the discretion over capitalisation, capitalised assets include projects with various rates of success. Insiders' information is no longer more precise than the information that is publicly available about the future benefits of those projects. Whilst eliminating insiders' information advantage and limiting the scope for opportunism is a desirable outcome of constraining discretion, this appears to arise together with significant loss in the investors' information set.

5.3 Research design

5.3.1 Share price anticipation tests

Our research question here is about accounting choice and the implications of constraining it. Accounting choice consists of a mechanism by which better informed insiders can impart information to less informed parties about the timing, magnitude and risk of future cash flows (Fields *et al.*,2001). Following Oswald and Zarowin (2007), we argue that share price anticipation tests address directly the inherent question in accounting choice as outlined in Fields *et al.* (2001). In particular, we test how much information about earnings is impounded in returns as a result of this choice, by examining the association between returns and revisions in earnings building upon the model proposed by Collins *et al.* (1994).

The Collins *et al.* (1994) model assumes that that the share return over the year is partly due to the unexpected portion of current year's earnings realization and partly due to changes in expectations about future earnings. Collins *et al.* (1994) capture the unobservable innovations about current performance and future earnings expectations by means of changes in current and future earnings. In a subsequent equivalent⁶⁸ transformation, Lundholm and Myers (2002) use the level of earnings to proxy for the unexpected earnings.⁶⁹ Following the latter and the related study of Oswald and Zarowin (2007), our base research design is set out below:

$$R_{i,t} = b_0 + b_1E_{i,t-1} + b_2E_{i,t} + b_3E_{i,t+1} + b_4R_{i,t+1} + Controls_{i,t} + \varepsilon_{i,t}$$

(5.1)

⁶⁸ Lundholm and Myers (2002, footnote 5, p.814).

⁶⁹ Lundholm and Myers (2002) argue that this allows the regression to find the best representation of the prior expectation for earnings, allowing this process to be either mean reverting or random walk. In contrast, the approach in Collins *et al.* (1994) implies a restriction that earnings follow a random walk process.

where, $R_{i,t}$ is the firm's i buy and hold return at time t measured over the 12 months ending four months after the year end; $E_{i,t-1}$ is the firm's earnings before extraordinary items in year $t-1$; $E_{i,t}$ is the firm's earnings before extraordinary items in year t ; and $E_{i,t+1}$ is the firm's earnings before extraordinary items in year $t+1$; $R_{i,t+1}$ is subsequent one year buy and hold return. In equation (5.1), the coefficient b_3 or the future earnings response coefficient (FERC), represents the information about future earnings that is impounded in current returns. The coefficients b_2 and b_1 jointly capture the surprise in current realised earnings over prior expectations at the beginning of the year and they are expected to be positive and negative respectively. A further variable, R_{t+1} , is also added in (5.1) to mitigate the error-in-variables bias introduced by the fact that we replace the unobservable expected earnings by realised future earnings (Collins *et al.*, 1994).

Prior literature (e.g. Schleicher and Walker, 1999; Gelb and Zarowin, 2002; Lundholm and Myers, 2002) employs similar models in order to investigate whether disclosure “brings the future forward”. In our context, we follow Oswald and Zarowin (2007) and we take a different approach to ask firstly, whether an accounting choice “brings the future forward” and secondly, whether constraining this choice entails a loss of information about future earnings for market participants. To this end, we extend (5.1) as follows:

$$R_{i,t} = b_0 + b_1 E_{i,t-1} + b_2 E_{i,t} + b_3 E_{i,t+1} + b_4 R_{i,t-1} + b_5 CAP_{i,t} + b_6 CAP_{i,t} * E_{i,t-1} + b_7 CAP_{i,t} * E_{i,t} + b_8 CAP_{i,t} * E_{i,t+1} + b_9 CAP_{i,t} * R_{i,t+1} + Controls_{i,t} + \varepsilon_{i,t}$$

(5.2)

Equation (5.2) accommodates the effect of capitalisation by introducing a binary variable CAP , taking the value of one when a firm presents R&D assets on its

balance sheet and zero when a firm expenses all its R&D costs. We introduce CAP both as a main effect as well as an interaction with all the independent variables in (5.1). In (5.2), the coefficient b_3 now stands for the FERC of firms which expense all their R&D costs under a discretionary capitalisation regime. In addition, the coefficient b_8 stands for the *incremental* FERC of firms that exhibit R&D assets on their balance sheet.⁷⁰ A positive and significant coefficient b_8 would denote that capitalisation has the ability to convey managers' private information about the future benefits of R&D.

A possible caveat is that managers who do not engage with capitalisation may convey their private information through voluntary disclosure or other means. The extent to which that disclosure can substitute an accounting choice may work against our prediction for the coefficient b_8 . However, we believe that recognition conveys a much more credible signal than disclosure here since recognised amounts are subject to audit. Moreover, recognition, as opposed to disclosure, exposes them to potential penalties in case expected benefits are not realised. Such costs may involve future impairments with the associated market penalties or even, litigation.

Equation (5.2) informs about the benefits of capitalisation in terms of share price informativeness. However, the focus of the present study is on the implications of the constraint in discretion upon capitalisation employing the UK as a natural experiment. To this end, we run equation (5.2) separately for the two regimes of

⁷⁰ In order to make the results of the regression comparable between firms which capitalise R&D with those expensing R&D, we adjust earnings on an "expense pro-forma" basis. Similarly to Oswald and Zarowin (2007) and Oswald (2008), we subtract the excess (or add the deficit) of after tax amount of development costs capitalised minus amortisation expense from reported net income.

discretionary and mandatory capitalisation.⁷¹ Under the regime of discretionary capitalisation, we expect the coefficients of b_3 and b_8 to be both positive and significant. A positive and significant coefficient b_8 confirms the evidence in Oswald and Zarowin (2007) that capitalising R&D costs results to returns impounding more information about future earnings than expensing R&D under a discretionary capitalisation regime. On the other hand, under mandatory capitalisation, the corresponding coefficient b_8 is predicted to be affected by the constraint in accounting choice. In line with our hypothesis, we argue that investors do not perceive the R&D asset as a reliable indicator of sustainable future earnings. This would lead to a loss in the information provided by mandatory capitalisation and will be reflected in the coefficient of b_8 . Consequently, we expect the magnitude of b_8 to be lower under the regime of mandatory capitalisation compared to the discretionary capitalisation regime. We make a similar prediction with respect to the comparison of the *overall* FERC of firms that exhibit R&D assets on their balance sheet given by the sum of b_3+b_8 .

Oswald and Zarowin (2007) as well as prior research which employs the Collins *et al.* (1994) research design and its variations focus on the future earnings response coefficient. This research design provides also evidence on the current earnings response coefficient which allows inferences on the quality of reported earnings. However, so far we have not put forth any prediction with respect to the market response to reported earnings. Based on the discussion preceding the development of our second hypothesis, we argue that the coefficients of b_6 and b_7

⁷¹ Applying a model which allows the coefficients to vary across the two periods yields the same results. We prefer this approach as it allows standard errors to vary across the two periods.

in equation (2) reflect an aggregated influence of opportunism and signalling in reported earnings.

Our second hypothesis postulates that insider purchases under discretionary capitalisation consist of a costly and precise signal whose presence can discriminate between cases where this accounting choice is associated with signalling from cases where this is more likely to be motivated by opportunism. More importantly, the second hypothesis sets out that this mechanism becomes useless as insiders lose their information advantage.

We test our second hypothesis' predictions by extending equation (5.2) to incorporate the influence of insider purchases. We introduce a binary variable *BUY*, taking the value of one when managers engage in net purchases during the financial year *t* and zero otherwise. We introduce *BUY* both as a main effect as well as an interaction with all the independent variables in (5.2), as follows:

$$\begin{aligned}
 R_{i,t} = & b_0 + b_1 E_{i,t-1} + b_2 E_{i,t} + b_3 E_{i,t+1} + b_4 R_{i,t+1} + b_5 CAP_{i,t} + b_6 CAP_{i,t} * E_{i,t-1} + \\
 & b_7 CAP_{i,t} * E_{i,t} + b_8 CAP_{i,t} * E_{i,t+1} + b_9 CAP_{i,t} * R_{i,t+1} + b_{10} BUY_{i,t} * E_{i,t-1} + b_{11} BUY_{i,t} * \\
 & E_{i,t} + b_{12} BUY_{i,t} * E_{i,t+1} + b_{13} BUY_{i,t} * R_{i,t+1} + b_{14} BUY_{i,t} * CAP_{i,t} * E_{i,t-1} + b_{15} BUY_{i,t} * \\
 & CAP_{i,t} * E_{i,t} + b_{16} BUY_{i,t} * CAP_{i,t} * E_{i,t+1} + b_{17} BUY_{i,t} * CAP_{i,t} * R_{i,t+1} + Controls_{i,t} + \\
 & \varepsilon_{i,t}
 \end{aligned}
 \tag{5.3}$$

Under a discretionary capitalisation regime, we predict that the interaction between insider purchases and capitalisation conveys signalling. Therefore, we expect to find a more pronounced and positive relation between earnings and returns for firms that engage with capitalisation in the presence of net purchases, denoted by the positive and significant coefficients b_{14} , b_{15} and b_{16} . On the other hand, under a mandatory capitalisation regime, we expect that insiders' information advantage is

mitigated and thus, the corresponding coefficients b_{14} , b_{15} and b_{16} will be no longer significant.

Finally, as Oswald and Zarowin (2007) point out, an inherent feature of accounting choice is endogeneity. Similarly, to Oswald and Zarowin (2007) equations (5.2) and (5.3) include a control for endogeneity in the form of the inverse Mills ratio.⁷² Acknowledging that the determinants of capitalisation change between the discretionary and mandatory regime, we estimate the inverse Mills ratio separately for the two reporting regimes. This is important because mandatory capitalisation does not entirely remove managers' discretion over capitalisation. Managers are still permitted to apply their judgement in deciding whether the, mostly qualitative, conditions for capitalisation have been satisfied (Prencipe *et al.*, 2008).

5.4 Data

5.4.1 Sample selection

Our initial sample includes all companies reporting R&D expense or R&D asset in Datastream or Extel, from 1992 to 2008.⁷³ This search yields a sample of 7,541 firm year observations. The sample is reduced by 1,153 observations due to missing accounting data. Furthermore, the sample is further reduced by 1,378 observations due missing returns data from Datastream. In order to prevent our inferences to be confounded by the transition to IFRS, we exclude the first year of

⁷² The model and its empirical application is presented and discussed further in the Appendix.

⁷³ While prior research in the UK utilise either Worldscope (e.g. Shah *et al.*, 2013) or Extel (e.g. Anagnostopoulou, 2010), we employ both. We begin with collecting data from Datastream /Worldscope for R&D asset (Worldscope Code: WC02504) and R&D amortisation (Worldscope Code: WC01153). We note that the coverage in Worldscope is limited at the early years of our sample. We supplement our sample with R&D asset and amortisation from Extel, which is available from the online platform of Thomson One Banker. We acknowledge, however, that Oswald and Zarowin (2007) employ Datastream Items, which are no longer available since Worldscope acquired Datastream. Consequently, the results presented in this study can be replicated.

IFRS adoption and the last year of UK GAAP.⁷⁴ We also exclude 2,064 observation because the lack of data availability before and after the adoption of IFRS. Finally, to limit the influence of extreme observation we exclude 85 observations characterised as outliers using studentised residuals.⁷⁵ After the above exclusions, the final consists of 2,190 firm year observations. Table 5.1, Panel A summarises the sample selection procedure, while Table 5.1, Panel B reports the number of companies expensing R&D expenditure (expensers) and the number of companies capitalising R&D expenditure in any given year (capitalisers). Similar to prior research (e.g. Green *et al.*, 1996; Oswald, 2008) we find that prior to the adoption of IFRS, only a small percentage of companies choose to capitalise R&D expenditures. With regards to the period after the adoption of IFRS, we find that capitalisation occurs more often.⁷⁶ This initial evidence appears to corroborate the argument that under a discretionary capitalisation regime, managers appear to be reluctant to capitalise R&D expenditures, even in cases where the criteria of the standard were fulfilled. Oswald and Zarowin (2007) point out to concerns about analysts, accounting quality as well as measurement and record keeping costs. On the other hand, the relatively widespread capitalisation under a mandatory capitalisation regime reflects the implications of constraining this accounting

⁷⁴ We exclude the last year of reporting under the UK GAAP because we measure FERC by the coefficient of future earnings on current returns and we require future earnings to be reported under the same regime as current and past earnings.

⁷⁵ The critical values for characterising an observation as highly influential are defined by using the Bonferroni adjustment.

⁷⁶ Comparison with prior research is not very clear. For instance, Tsoigkas and Tsalavoutas (2011) use a sample of R&D intensive companies and find that 48% of the firms in their sample capitalise R&D after the adoption of IFRS. On the other hand, Shah *et al.* (2013) employs all companies which engage in R&D and show that R&D asset has increased after the adoption of IFRs and R&D expense decreases. They conclude that firms tend to capitalise more R&D expenditure following the adoption of IFRS. However, we acknowledge that they do not provide further descriptive statistics to compare our sample with theirs in a more meaningful way.

choice. In Appendix, we explore further the issue of the determinants of the capitalisation choice and their differences across the two regimes.

Table 5.1: Sample observations

Panel A: Sample selection		
Initial sample	7,541	
Missing accounting data	1,153	
Missing market data	1,378	
Excluding transition year	671	
Excluding observations that do not have at least one observation in the pre and post IFRS period	2,064	
Outliers	85	
Final sample	2,190 (238 firms)	
Panel B: Sample distribution		
	Pre IFRS	Post IFRS
Firm year observations with no R&D asset (expensers)	(207firms)	(123 firms)
Firm year observations with R&D asset (capitalisers)	(31 firms)	(115 firms)
Final sample	238	238

5.4.2 Insider trading

We obtain information on directors' trading from the Hemmington Scott Directors' Trading Dataset for the period from 1996-2008 and before that from Directus Ltd. In line with prior research in the UK (e.g. Pope *et al.*, 1990; Gregory *et al.*, 1994; Hillier and Marshall, 2002b; Fidrmuc *et al.*, 2006), we define insider transactions as purchases or sales by both executive and non-executive directors.⁷⁷ Motivated by prior literature (Beneish and Vargus, 2002; Core *et al.*, 2006; Sawicki and Shrestha, 2008; Beneish *et al.*, 2012), we use a firm-specific net measure of inside trading aggregating all directors' trading activity taking place during the fiscal year end. Following prior research (e.g. John and Lang, 1991; Beneish, 1999), we calculate the net purchases ratio (NPR) defined as follows:

⁷⁷ We do not examine illegal insider trading; rather, we focus on legal insider trading by directors.

$$\text{NPR} = [\text{PURCHASES} - \text{SALES}] / [\text{PURCHASES} + \text{SALES}]$$

where, PURCHASES are the number of shares purchased by directors and SALES are the number of shares sold. A positive NPR could be the result of directors purchasing more shares or selling fewer shares and *vice versa* for a negative NPR. A positive NPR indicates net insider buying, whereas a negative NPR indicates net insider selling.⁷⁸ In order to ensure that the trades that are observed are associated with insiders' private information, the insider trading measure is estimated by using only open market purchases and sales of common shares, since those trades are more likely to be informative about the future prospects of the firm. The need to focus on open market transactions is also confirmed by the findings in Veenman *et al.* (2011) who show that only open market purchases are associated with positive future news as opposed to stock options conversions. The main interest of the present study is insider trading transactions that occur contemporaneously with the decision to capitalise R&D, similar to Beneish and Vargus (2002) and Sawicki and Shrestha (2008). We establish directors purchases in 654 cases in the pre IFRS period of which 44 relate to capitalisers and 273 cases in the post IFRS period of which 116 relate to capitalisers.

5.5 Analysis

5.5.1 Descriptive statistics

Panel A of Table 5.2 reports the descriptive statistics for the full sample, while Panel B and Panel C show the statistics of the sample prior and after the adoption of IFRS

⁷⁸ We have also used the value of shares purchased and sold and the results are qualitative the same.

respectively. We note an obvious contrast in the profitability of firms between the capitalisation regimes. Consistent with Oswald and Zarowin (2007), companies which choose to expense R&D prior to the adoption of IFRS and under a discretionary capitalisation regime are more profitable. Following Oswald (2008), it appears that firms with lower profitability capitalize their development expenditures in order to avoid reducing their net income by expensing R&D and profitable firms are more likely to expense development expenditures to signal their financial health. In contrast, under the mandatory capitalisation regime following the adoption of IFRS, firms that capitalise their R&D expenses tend to be more profitable than firms that expense their R&D. This result should be interpreted by taking into consideration that mandatory capitalisation has led to a more extensive application of this accounting treatment than discretionary capitalisation. A more insightful discussion of the comparative features of firms that expense and capitalise R&D relates those to the capitalisation decision.

The results of the probit regression (reported in the Appendix) examining the capitalisation decision show that opportunistic motivations to capitalise development expenditures are very likely during a discretionary capitalisation regime as the coefficient of earnings variability is positive and significant (0.0355, $p\text{-value}<0.01$). A similar motivation is no longer likely to be relevant under a mandatory capitalisation regime, whereby this coefficient is negative and not significantly different from zero (-0.0043, $p\text{-value}>0.10$). A result that is also in line with this inference is shown with respect to the direction of the firm's profitability, albeit with those coefficients being insignificant in either periods. We note also that under the discretionary capitalisation regime, we have statistically significant evidence that the capitalisation decision is negatively associated with size, R&D

intensity and R&D value. Overall, those indications point to small firms with not established R&D record and reputation (as denoted by R&D intensity and R&D value) taking the costly option to capitalise R&D in order to signal their prospects. Those results suggest that both signalling and opportunistic motivations for engaging with capitalisation co-exist when discretion is allowed.

On the other hand, under a mandatory capitalisation regime, the determinants of this accounting choice that are statistically significant do not point out opportunistic or signalling motivations. More specifically, we observe a negative relation with the book to market ratio, a similar relation with the R&D value as well as a positive relation with the firm's beta. Overall, those results are in line with our intuition that mandatory capitalisation results to an arbitrary uncertainty threshold that allows more risky projects with less reliable future benefits to find their way to the balance sheet.

Table 5.2: descriptive statistics

	Mean			Median		
	Expensers	Capitalisers	Difference	Expensers	Capitalisers	Difference
Full sample						
E_{t+1}	0.0558	0.0409	-0.0149*	0.0849	0.0661	-0.0188***
E_t	0.0380	0.0360	-0.0020	0.0852	0.0677	-0.0175***
E_{t-1}	0.0175	0.0251	0.0076	0.0787	0.0594	-0.0193***
R_t	0.0163	-0.0951	-0.1115***	-0.0020	-0.0855	-0.0835***
EARN_VAR	0.0290	0.0359	0.0069*	0.0046	0.0051	0.0005***
SIZE	5.0689	4.7999	-0.2690**	5.0196	4.3628	-0.6569**
BM	0.5596	0.6072	0.0476	0.4135	0.4211	0.0076
RDINT	0.0699	0.0516	-0.0183***	0.0288	0.0206	-0.0082***
RDVALUE	53.3421	56.4163	3.0741	10.2259	6.6833	-3.5426***
BETA	0.9747	1.0838	0.1091**	0.8825	0.9843	0.1018***
Pre IFRS						
E_{t+1}	0.0666	0.0314	-0.0353**	0.0937	0.0676	-0.0261***
E_t	0.0503	0.0282	-0.0220	0.0920	0.0663	-0.0257***
E_{t-1}	0.0319	0.0279	-0.0040	0.0877	0.0588	-0.0289***
R_t	0.0292	0.0133	-0.0160	0.0065	-0.0153	-0.0218
EARN_VAR	0.0245	0.0192	-0.0053	0.0044	0.0044	0.0000
SIZE	5.0978	5.0735	-0.0244	5.0654	4.8324	-0.2330
BM	0.5842	0.5951	0.0109	0.4309	0.3993	-0.0316
RDINT	0.0646	0.0282	-0.0364***	0.0287	0.0077	-0.0210***
RDVALUE	35.8835	20.6873	-15.1963	10.6551	7.4291	-3.2260
BETA	0.9477	0.9810	0.0333	0.8509	0.9802	0.1293
Post IFRS						
E_{t+1}	0.0098	0.0444	0.0346**	0.0573	0.0646	0.0073
E_t	-0.0140	0.0389	0.0528***	0.0573	0.0680	0.0108*
E_{t-1}	-0.0434	0.0240	0.0674***	0.0445	0.0600	0.0155***
R_t	-0.0381	-0.1354	-0.0972***	-0.0633	-0.1456	-0.0822**
EARN_VAR	0.0478	0.0421	-0.0057	0.0068	0.0063	-0.0005
SIZE	4.9468	4.6984	-0.2484	4.6031	4.1526	-0.4505
BM	0.4555	0.6116	0.1561**	0.3783	0.4298	0.0514**
RDINT	0.0920	0.0603	-0.0317**	0.0295	0.0242	-0.0054***
RDVALUE	127.0730	69.6726	-57.4004*	8.9466	6.2415	-2.7051***
BETA	1.0885	1.1219	0.0334	1.0098	0.9935	-0.0163

Notes:

$E_{i,t+1}$ is earnings at time $t+1$ (adjusted to “as if expense” basis for capitalisers); $E_{i,t}$ is earnings at time t (adjusted to “as if expense” basis for capitalisers); $E_{i,t-1}$ is earnings at time $t-1$ (adjusted to “as if expense” basis for capitalisers); $R_{i,t}$ is the buy and hold return measured over the 12 months ending four months after the year end; EARN_VAR is firm i 's earnings variance w calculated using all available data requiring at least three observations per firm; SIZE i is the natural logarithm of market value of the firm i 's measured at the fiscal year end; BM is firm i 's book to market ratio within each firm's industry-year; RDINT is R&D expenditure divided by total assets (adjusted to “as if expense” basis for capitalisers); RDVALUE is the difference between the market value of equity and book value of equity (adjusted to “as if expense” basis for capitalisers) divided by the sum of current and lagged annual R&D expenditure; BETA firm i 's beta estimated using the market model and employing monthly returns ending at the month of the fiscal year end (we require at least 12 months and maximum 60 months to estimate the beta); test of difference is based on t-test for the means and on Wilcoxon signed-ranks test for medians while *, ** and *** denote the significance at the 10%, 5% and 1%.

5.5.2 Discussion of findings

Table 5.3 presents the results from the empirical implementation of equation (5.2).⁷⁹ Discretionary capitalisation results in prices reflecting more forward looking earnings information as denoted by the positive coefficient of $Cap_t * E_{t+1}$ (0.8348, p -value < 0.01). In contrast, mandatory capitalisation results in prices that do not reflect forward looking earnings information as denoted by the insignificant coefficient of $Cap_t * E_{t+1}$ (0.2525, p -value > 0.10). Moreover, our results suggest that the capitalisers' overall future earnings response coefficient under a regime of mandatory capitalisation is significantly lower than the corresponding coefficient under a regime of discretionary capitalisation (-0.9260, p -value < 0.05). Those results confirm both the evidence reported in prior research with respect to discretionary capitalisation and support our hypothesis. Moreover, the expensers' future earnings response coefficient is positive and significant under both the discretionary and mandatory regimes (0.7422, p -value < 0.001 and 0.3985, p -value < 0.10, respectively) and their difference is not statistically significant either (-0.3437, p -value > 0.10). Those results suggest that the significant difference observed with respect to firms that engage with capitalisation across regimes is not likely to be driven by any omitted variables (e.g., macroeconomic circumstances, the impact of other accounting standards that were also introduced during the transition to IFRS) affecting the relation between returns and future earnings.

⁷⁹ The model presented in equation (5.2) and all the models presented in this study include fixed effects for industry and year which are omitted for brevity. We also cluster standard errors at the firm level.

Table 5.3: R&D capitalisation and the future earnings response coefficient

$$R_{i,t} = b_0 + b_1 E_{i,t-1} + b_2 E_{i,t} + b_3 E_{i,t+1} + b_4 R_{i,t-1} + b_5 CAP_{i,t} + b_6 CAP_{i,t} * E_{i,t-1} + b_7 CAP_{i,t} * E_{i,t} + b_8 CAP_{i,t} * E_{i,t+1} + b_9 CAP_{i,t} * R_{i,t+1} + Controls_{i,t} + \varepsilon_{i,t}$$

R _t	UK GAAP	IFRS
E _{t+1}	0.7422*** (0.0000)	0.3985* (0.0575)
E _t	0.5645*** (0.0004)	0.5416*** (0.0077)
E _{t-1}	-0.5744*** (0.0000)	-0.0629 (0.5838)
R _{t+1}	-0.0743** (0.0188)	-0.1616*** (0.0019)
Cap _t *E _{t+1}	0.8348*** (0.0096)	0.2525 (0.5041)
Cap _t *E _t	0.6654 (0.1474)	0.1617 (0.5976)
Cap _t *E _{t-1}	-1.3607** (0.0135)	-0.4438* (0.0572)
Cap _t *R _{t+1}	0.0434 (0.6056)	0.0922 (0.1178)
Cap _t	0.4052 (0.1755)	0.1075 (0.4944)
IMR _t	0.1380*** (0.0002)	0.2923** (0.0195)
Cap _t *IMR _t	-0.2000 (0.1971)	-0.2070 (0.2583)
Constant	0.1801* (0.0590)	-0.0860 (0.4374)
Observations	1,562	628
Adjusted R-squared	0.283	0.370
F test	127.91***	70.51***

<u>FERC testing</u>	<u>Coef.</u>	<u>p-value</u>
Expensers UKGAAP=IFRS	-0.3437	0.192
Capitalisers UKGAAP=IFRS	-0.9260**	0.029

Notes:

E_{i,t+1} is earnings at time t+1 (adjusted to “as if expense” basis for capitalisers); E_{i,t} is earnings at time t (adjusted to “as if expense” basis for capitalisers); E_{i,t-1} is earnings at time t-1 (adjusted to “as if expense” basis for capitalisers); R_{i,t} is the buy and hold return measured over the 12 months ending four months after the year end; Cap_{i,t} equals to one if a company is classified as a capitalizer and zero otherwise; Buy_{i,t} equals to one if directors' were purchasing shares during the fiscal year end; IMR_{i,t} is the inverted mills ratio estimated from the Probit model; p-values in brackets; *, ** and *** denote significance at the 10%, 5% and 1% respectively.

In Table 5.4, we present further evidence that the results reported in Table 5.3 are not driven by firm characteristics either. This is a pertinent issue given the different uncertainty thresholds set out by mandatory and discretionary capitalisation. We argue that this difference has also implications for the subset of firms that adopt this accounting choice. An extension of the subset of firms that capitalise development expenditures under a mandatory capitalisation regime is likely to result in the inclusion of firms with different characteristics from the subsample of firms that do so under a discretionary capitalisation regime. Following Ettredge *et al.* (2005), we control for firms' characteristics that may affect the incorporation of information about earnings in returns. This exercise allows us to confirm that the results reported in Table 5.3 are driven by the accounting standards and not from the sample composition. To this end, we control for earnings persistence using a dummy variable that equals one if current earnings are negative, and zero otherwise.⁸⁰ The underlying reasoning here is that losses are more difficult for the market to predict than profits, which are more likely to be more persistent in a going concern firm. In a similar vein, we control for earnings variability using the percentile rank of firm *i*'s earnings variance within each firm's industry while earnings variance is calculated using all available data requiring at least three observations per firm. Finally, we control for the firm's information environment, in terms of size and for growth in terms of the book to market ratio. We extend the model in equation (5.2) to include the interactions of each of those controls with future, current and lagged earnings as well as future returns. The results reported in Table 5.4⁸¹ suggest that our inferences about the impact of mandatory capitalisation in the share price

⁸⁰ We have also used a dummy variable if future earnings are negative and our results are qualitatively similar.

⁸¹ In Table 5.4, we don't report the interactions between our controls and future, current, lagged earnings as well as future returns for the sake of brevity.

anticipation of future earnings are not influenced by firm characteristics and firm composition and this holds uniformly throughout all our tests here.

Table 5.4: R&D capitalisation and the future earnings response coefficient

$$R_{i,t} = b_0 + b_1 E_{i,t-1} + b_2 E_{i,t} + b_3 E_{i,t+1} + b_4 R_{i,t-1} + b_5 CAP_{i,t} + b_6 CAP_{i,t} * E_{i,t-1} + b_7 CAP_{i,t} * E_{i,t} + b_8 CAP_{i,t} * E_{i,t+1} + b_9 CAP_{i,t} * R_{i,t+1} + b_{10} CTRL * E_{i,t-1} + b_{11} CTRL * E_{i,t} + b_{12} CTRL * E_{i,t+1} + b_{13} CTRL * R_{i,t+1} + Controls_{i,t} + \varepsilon_{i,t}$$

R _t	Losses		Earn_Var		Size		Growth	
	UK GAAP	IFRS	UK GAAP	IFRS	UK GAAP	IFRS	UK GAAP	IFRS
E _{t+1}	1.3034*** (0.0000)	1.0198*** (0.0016)	1.5372*** (0.0000)	0.9855*** (0.0070)	0.3062 (0.1668)	-0.1482 (0.6370)	0.4135 (0.2192)	-0.2327 (0.3552)
E _t	0.2663 (0.5480)	0.2450 (0.5900)	-0.4387 (0.2662)	0.7563* (0.0889)	1.0217*** (0.0000)	0.9038*** (0.0017)	0.3593 (0.3043)	0.5488** (0.0184)
E _{t-1}	-1.2553*** (0.0000)	-0.3728 (0.1312)	-0.2782 (0.3908)	-0.7415** (0.0130)	-0.3150 (0.1031)	0.0083 (0.9522)	-0.4614*** (0.0045)	0.1305 (0.3045)
R _{t+1}	-0.0828** (0.0495)	-0.1909*** (0.0004)	-0.1789*** (0.0024)	-0.2613*** (0.0006)	-0.0023 (0.9623)	-0.1676** (0.0325)	-0.1485* (0.0506)	-0.1593* (0.0617)
Cap _t *E _{t+1}	0.7823** (0.0235)	-0.0297 (0.9362)	1.0003*** (0.0078)	0.1493 (0.6836)	0.9512*** (0.0069)	0.0728 (0.8374)	0.5562 (0.1039)	0.2236 (0.5389)
Cap _t *E _t	0.3975 (0.3863)	0.1588 (0.6340)	0.6390 (0.1686)	0.1796 (0.5301)	0.4857 (0.3630)	0.1125 (0.7171)	0.8472* (0.0685)	-0.0851 (0.8003)
Cap _t *E _{t-1}	-0.9666 (0.1226)	-0.2027 (0.3739)	-1.5830*** (0.0068)	-0.3506* (0.0877)	-1.3109** (0.0182)	-0.2985 (0.1861)	-1.3764** (0.0146)	-0.2115 (0.2628)
Cap _t *R _{t+1}	0.0601 (0.4979)	0.0960* (0.0912)	-0.0270 (0.7431)	0.1140* (0.0566)	0.0207 (0.8133)	0.0928* (0.0924)	0.0676 (0.4730)	0.1066* (0.0610)
Cap _t	0.3926 (0.2101)	0.0626 (0.6914)	0.3488 (0.2190)	0.1647 (0.2796)	0.3499 (0.2185)	0.1815 (0.2428)	0.3846 (0.2065)	0.0636 (0.6712)
IMR _t	0.1236*** (0.0006)	0.2082 (0.1120)	0.1266*** (0.0022)	0.3605*** (0.0028)	0.1149*** (0.0011)	0.3723*** (0.0045)	0.1581*** (0.0001)	0.1221 (0.3311)
Cap _t *IMR _t	-0.1995 (0.2171)	-0.1361 (0.4499)	-0.1695 (0.2494)	-0.2659 (0.1332)	-0.1765 (0.2342)	-0.2848 (0.1085)	-0.1867 (0.2353)	-0.1558 (0.3629)
Constant	0.2349** (0.0117)	-0.2955** (0.0143)	0.1878* (0.0845)	-0.0918 (0.3920)	0.1615* (0.0803)	-0.5183*** (0.0001)	0.2116** (0.0360)	-0.1122 (0.3927)
Observations	1,562	628	1,562	628	1,562	628	1,562	628
Adjusted R-squared	0.315	0.401	0.291	0.391	0.307	0.400	0.301	0.430
F test	143.37***	129.55***	111.07***	94.54***	114.22***	50.17***	117.44***	68.52***

FERC testing	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value
Expensers								
UKGAAP=IFRS	-0.2836	0.514	-0.5517	0.248	-0.4544	0.218	-0.6462	0.122
Capitalisers								
UKGAAP=IFRS	-1.0957**	0.028	-1.4027**	0.032	-1.3327***	0.008	-0.9788*	0.0840

Notes:

$E_{i,t+1}$ is earnings at time t+1 (adjusted to “as if expense” basis for capitalisers); $E_{i,t}$ is earnings at time t (adjusted to “as if expense” basis for capitalisers); $E_{i,t-1}$ is earnings at time t-1 (adjusted to “as if expense” basis for capitalisers); $R_{i,t}$ is the buy and hold return measured over the 12 months ending four months after the year end; $Cap_{i,t}$ equals to one if a company is classified as a capitalizer and zero otherwise; $Buy_{i,t}$ equals to one if directors' were purchasing shares during the fiscal year end; $IMR_{i,t}$ is the inverted mills ratio estimated from the Probit model; $Losses$ equals to one if a firm reports losses; $EARN_VAR$ is firm i's earnings variance w calculated using all available data requiring at least three observations per firm; $SIZE$ i is the natural logarithm of market value of the firm i's measured at the fiscal year end; $Growth$ is firm i's book to market ratio within each firm's industry-year; p-values in brackets; *, ** and *** denote significance at the 10%, 5% and 1% respectively.

Our second hypothesis predicts that under a discretionary capitalisation regime, the credible and precise information in insider purchases enhance the signalling interpretation of capitalisation. According to this prediction, we expect to find a more pronounced and positive relation between earnings and returns for firms that engage with capitalisation in the presence of net purchases. The results reported in Table 5.5 suggest that this takes place only with respect to the coefficient of $Buy_t * Cap_t * E_{t-1}$. As already discussed, the coefficients of current and lagged earnings jointly capture the unexpected portion of current year's earnings realization. More particularly, we interpret the positive and significant coefficient of $Buy_t * Cap_t * E_{t-1}$ (2.5223, $p\text{-value} < 0.05$) as evidence that investors consider capitalisation as signalling that the earnings' inflation due to capitalisation is a permanent component. This comes at a contrast to the negative and significant coefficient of $Cap_t * E_{t-1}$ (-1.4742, $p\text{-value} < 0.05$) which denotes that investors view capitalisation under an unfavourable light. Interestingly, those results are robust to further controls for firm characteristics, which further reinforce our inferences. Notably, we don't find any significant evidence with respect to future earnings expectations. While this is not consistent with our predictions, we acknowledge that discretionary capitalisation is an already costly signal about future earnings and as such, it may subsume any further information in insider purchases. Moreover, while we have no related predictions about the firms which expense all their R&D costs, we find that insider purchases do not enable investors to unravel the uncertainty with respect to future benefits. Again, we attribute this to accounting choice subsuming the information in insider purchases.

On the other hand, we don't establish any further statistically significant impact of the information in insider purchases in terms of the relation between current and

future earnings. Based on those results, we conclude that under a regime of discretionary capitalisation, insider purchases enable investors to evaluate the level of reported earnings and the extent to which the effects of capitalisation are permanent or transitory. Specifically, this information allows them to evaluate whether the inflation in reported earnings that is due to capitalisation arises from signalling or opportunistic motivations. More importantly, the ability of insiders' purchases to discriminate among those two motivations disappears under a regime of mandatory capitalisation with the respective coefficients being not only statistically insignificant but also, exhibiting signs that are not consistent. Further robustness tests taking into account the impact of firm characteristics on the incorporation of information in returns, deliver mixed and inconclusive evidence in this respect.

Summarising the results in Table 5.5, we find that opportunistic and signalling motivations for capitalisation co-exist under a discretionary capitalisation regime. Moreover, investors appear to seek guidance in insiders' information advantage with respect to the motivation of capitalisation. However, we don't find any evidence to suggest that insiders maintain an information advantage during a mandatory capitalisation regime as investors no longer use them in evaluating reported earnings. Taking into account the results reported in Tables 5.3 and 5.4, we conclude that constraining discretion in capitalisation seems to eliminate insiders' information advantage but in doing so, it also results to a significant loss of information about future earnings.

Table 5.5: R&D capitalisation, directors' purchases and the future earnings response coefficient

$$R_{i,t} = b_0 + b_1 E_{i,t-1} + b_2 E_{i,t} + b_3 E_{i,t+1} + b_4 R_{i,t+1} + b_5 CAP_{i,t} + b_6 CAP_{i,t} * E_{i,t-1} + b_7 CAP_{i,t} * E_{i,t} + b_8 CAP_{i,t} * E_{i,t+1} + b_9 CAP_{i,t} * R_{i,t+1} + b_{10} BUY_{i,t} * E_{i,t-1} + b_{11} BUY_{i,t} * E_{i,t} + b_{12} BUY_{i,t} * E_{i,t+1} + b_{13} BUY_{i,t} * R_{i,t+1} + b_{14} BUY_{i,t} * CAP_{i,t} * E_{i,t-1} + b_{15} BUY_{i,t} * CAP_{i,t} * E_{i,t} + b_{16} BUY_{i,t} * CAP_{i,t} * E_{i,t+1} + b_{17} BUY_{i,t} * CAP_{i,t} * R_{i,t+1} + b_{18} CTRL * E_{i,t-1} + b_{19} CTRL * E_{i,t} + b_{20} CTRL * E_{i,t+1} + b_{21} CTRL * R_{i,t+1} + Controls_{i,t} + \varepsilon_{i,t}$$

R _t	No control		Losses		Earn_Var		Size		Growth	
	UK GAAP	IFRS	UK GAAP	IFRS	UK GAAP	IFRS	UK GAAP	IFRS	UK GAAP	IFRS
E _{t+1}	0.6265***	0.6574*	1.2146***	1.0961***	1.5274***	1.3184***	-0.0519	0.1888	0.3236	0.1212
	(0.0084)	(0.0829)	(0.0004)	(0.0011)	(0.0001)	(0.0042)	(0.8501)	(0.6566)	(0.3895)	(0.7624)
E _t	0.7663***	0.1496	0.5032	-0.0817	-0.3115	0.1670	1.4216***	0.6227**	0.5610	0.0856
	(0.0022)	(0.6322)	(0.3190)	(0.8420)	(0.5021)	(0.7122)	(0.0000)	(0.0433)	(0.1305)	(0.8161)
E _{t-1}	-0.7126***	0.0861	-1.3842***	-0.3844	-0.4537	-0.4778	-0.3817**	0.2385	-0.6301***	0.2357
	(0.0000)	(0.5714)	(0.0001)	(0.1039)	(0.1295)	(0.1138)	(0.0418)	(0.1953)	(0.0064)	(0.1185)
R _{t+1}	-0.0285	-0.1361**	-0.0579	-0.1431**	-0.1364*	-0.2444***	0.0775	-0.1758**	-0.1119	-0.0851
	(0.5309)	(0.0162)	(0.2934)	(0.0120)	(0.0516)	(0.0028)	(0.2023)	(0.0284)	(0.1549)	(0.3467)
Cap _t *E _{t+1}	0.9688**	0.3664	0.9762**	0.0495	1.0617**	0.2259	1.3335***	0.4143	0.7366*	0.1785
	(0.0123)	(0.4708)	(0.0225)	(0.9152)	(0.0152)	(0.6327)	(0.0019)	(0.3234)	(0.0714)	(0.7283)
Cap _t *E _t	0.6476	0.6402	0.3860	0.5310	0.7369	0.6335	0.2532	0.4309	0.8140	0.1931
	(0.2109)	(0.1732)	(0.4574)	(0.1807)	(0.1459)	(0.1551)	(0.6759)	(0.3150)	(0.1137)	(0.6995)

Cap _t *E _{t-1}	-1.4742**	-0.2114	-1.1671*	0.0750	-1.7310***	-0.0839	-1.4727**	-0.0492	-1.4791**	0.0248
	(0.0115)	(0.4493)	(0.0852)	(0.7533)	(0.0071)	(0.7687)	(0.0116)	(0.8470)	(0.0106)	(0.9395)
Cap _t *R _{t+1}	0.0243	0.0210	0.0613	0.0196	-0.0517	0.0510	-0.0260	0.0346	0.0552	0.0121
	(0.8062)	(0.7841)	(0.5610)	(0.7951)	(0.6012)	(0.5079)	(0.8033)	(0.6230)	(0.6145)	(0.8689)
Buy _t *E _{t+1}	0.2862	-0.3941	0.2501	-0.3001	0.0731	-0.4092	0.5607*	-0.2147	0.3675	-0.5140
	(0.4058)	(0.3998)	(0.4568)	(0.5272)	(0.8315)	(0.3288)	(0.0777)	(0.6078)	(0.2713)	(0.1838)
Buy _t *E _t	-0.3299	0.7177	-0.3810	0.6038	-0.1243	0.7034*	-0.5302*	0.6737*	-0.3515	0.7606*
	(0.2938)	(0.1072)	(0.1995)	(0.1740)	(0.6793)	(0.0894)	(0.0724)	(0.0736)	(0.2796)	(0.0762)
Buy _t *E _{t-1}	0.2158	-0.2040	0.2259	-0.1417	0.1763	-0.1487	0.0851	-0.2603	0.2162	-0.0495
	(0.2907)	(0.3826)	(0.2348)	(0.4918)	(0.3561)	(0.4621)	(0.6672)	(0.1878)	(0.3340)	(0.8260)
Buy _t *R _{t+1}	-0.1075	-0.0873	-0.0675	-0.1060	-0.0965	-0.0725	-0.1340**	-0.0815	-0.1145*	-0.1449*
	(0.1047)	(0.2368)	(0.3047)	(0.1359)	(0.1459)	(0.3400)	(0.0355)	(0.2423)	(0.0840)	(0.0515)
Buy _t *Cap _t *E _{t+1}	-0.1077	0.1461	-0.5257	0.2611	0.0955	0.2502	-0.9686	-0.3391	-0.5323	0.2651
	(0.9307)	(0.8207)	(0.6745)	(0.6960)	(0.9449)	(0.6742)	(0.4496)	(0.5708)	(0.6521)	(0.6715)
Buy _t *Cap _t *E _t	-1.4378	-0.6453	-1.7006	-0.5007	-1.7173	-0.6513	-0.3752	-0.4233	-1.5135	-0.3759
	(0.2193)	(0.3411)	(0.1531)	(0.4416)	(0.1852)	(0.3110)	(0.7619)	(0.4975)	(0.1702)	(0.5699)
Buy _t *Cap _t *E _{t-1}	2.5223**	-0.6860	3.2789**	-0.7793**	2.6277**	-0.7509*	2.2476*	-0.7329*	2.0497*	-0.6181
	(0.0355)	(0.1459)	(0.0105)	(0.0387)	(0.0388)	(0.0838)	(0.0713)	(0.0854)	(0.0861)	(0.2177)
Buy _t *Cap _t *R _{t+1}	-0.1511	0.1607	-0.2143	0.1783	-0.0825	0.1352	-0.0665	0.1350	-0.1887	0.2404**
	(0.5308)	(0.1529)	(0.3727)	(0.1035)	(0.7289)	(0.2332)	(0.7942)	(0.2043)	(0.4513)	(0.0340)

Cap _t	0.4375 (0.1962)	0.1976 (0.2388)	0.4410 (0.2147)	0.1235 (0.4525)	0.3740 (0.2478)	0.2576 (0.1161)	0.3501 (0.2894)	0.2817* (0.0782)	0.4394 (0.2074)	0.1201 (0.4675)
Buy _t	0.0441* (0.0707)	0.0719* (0.0788)	0.0446* (0.0550)	0.0586 (0.1390)	0.0473* (0.0529)	0.0651* (0.0942)	0.0397* (0.0943)	0.0872** (0.0297)	0.0458* (0.0595)	0.0962*** (0.0076)
Cap _t *Buy _t	0.1031 (0.8475)	-0.0973 (0.5976)	0.0247 (0.9640)	-0.0762 (0.7024)	0.0948 (0.8556)	-0.1421 (0.4404)	0.1724 (0.7324)	-0.1255 (0.4832)	0.1945 (0.7112)	-0.0634 (0.7474)
IMR _t	0.1461*** (0.0001)	0.3495*** (0.0062)	0.1312*** (0.0004)	0.2704** (0.0365)	0.1404*** (0.0011)	0.4035*** (0.0014)	0.1169*** (0.0015)	0.4383*** (0.0008)	0.1709*** (0.0000)	0.1832 (0.1474)
Cap _t *IMR _t	-0.2058 (0.2259)	-0.3622* (0.0560)	-0.2097 (0.2404)	-0.2443 (0.1892)	-0.1705 (0.2961)	-0.4256** (0.0222)	-0.1626 (0.3337)	-0.4466** (0.0144)	-0.2088 (0.2342)	-0.2420 (0.2008)
Buy _t *Cap _t										
*IMR _t	-0.0987 (0.7483)	0.1306 (0.5250)	-0.0614 (0.8411)	0.0938 (0.6744)	-0.0984 (0.7438)	0.1910 (0.3536)	-0.1409 (0.6242)	0.1611 (0.4283)	-0.1083 (0.7170)	0.0674 (0.7633)
Constant	0.1725* (0.0759)	-0.4387*** (0.0004)	0.2181** (0.0228)	-0.3569*** (0.0029)	0.1639 (0.1446)	-0.1538 (0.1864)	0.1706* (0.0747)	-0.6371*** (0.0000)	0.2050** (0.0478)	-0.1860 (0.1601)
Observations	1,562	628	1,562	628	1,562	628	1,562	628	1,562	628
R-squared(adj.)	0.2840	0.4000	0.3170	0.4200	0.2920	0.4190	0.3090	0.4390	0.3040	0.4500
F test	110.36***	35.44***	110.28***	121.30***	98.78***	78.69***	106.19***	31.39***	125.21***	71.14***

FERC testing	Coef.	p-value								
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<u>Non Buys</u>										
Expensers	0.0309	0.943	-0.1185	0.802	-0.2090	0.714	0.2406	0.625	-0.2024	0.701
Capitalisers	-0.5715	0.249	-1.0453*	0.080	-1.0449	0.108	-0.6785	0.219	-0.7606	0.225
<u>Buys</u>										
Expensers	-0.6494*	0.099	-0.6687	0.202	-0.6913	0.192	-0.5347	0.206	-1.0839**	0.017
Capitalisers	-0.9981	0.377	-0.8086	0.467	-1.3725	0.296	-0.8245	0.490	-0.8446	0.448

Notes:

$R_{i,t}$ is the buy and hold return measured over the 12 months ending four months after the year end; $E_{i,t+1}$ is earnings at time t+1 (adjusted to “as if expense” basis for capitalisers); $E_{i,t}$ is earnings at time t (adjusted to “as if expense” basis for capitalisers); $E_{i,t-1}$ is earnings at time t-1 (adjusted to “as if expense” basis for capitalisers); $R_{i,t+1}$ is the buy and hold future return measured over one year starting four months after the year end; $Cap_{i,t}$ equals to one if a company is classified as a capitalizer and zero otherwise; $Buy_{i,t}$ equals to one if directors’ were purchasing shares during the fiscal year end; $IMR_{i,t}$ is the inverted mills ratio estimated from the Probit model; p-values in brackets; *, ** and *** denote significance at the 10%, 5% and 1% respectively.

5.6 Concluding remarks

Discretion upon financial reporting enables managers to communicate relevant private information to market participants and thus, enhances market efficiency. However, discretion under uncertainty also hands in a significant information advantage to insiders. The presence of insiders' information advantage then introduces a different aspect of uncertainty with respect to its signalling or opportunistic use and implies related information processing costs. An obvious reaction to those information processing costs is to constraint the level of discretion up to a level that curbs the opportunities for opportunistic earnings management and in the same time, allows for the communication of private information.

We identify the setting of the transition from a discretionary capitalisation (SSAP13) to a mandatory capitalisation (IAS 38) regime in the UK as an opportunity to investigate the implications of constraining discretion. In line with prior research, we show that discretion over this accounting choice provides relevant information to the market. Furthermore, we establish that under a discretionary capitalisation regime, insiders have an information advantage which can be employed by market participants to assess whether the motivations underlying this choice are opportunistic or signalling. Following the introduction of a mandatory capitalisation regime, we argue that insiders' information advantage is suppressed and subsequently, the opportunities for self-serving behaviour. Nevertheless, the benefits of constraining discretion come at the expense of the reliability of private information that is communicated to the markets by means of capitalisation. Our findings suggest a significant loss of information with respect to future earnings which may have sub-optimal implications for the overall market efficiency.

We acknowledge that the present study's inferences may be subject to limitations. First, as Fields *et al.* (2001) discuss, there is an array of market imperfections which influence accounting choices stemming out of agency costs, information asymmetries, and externalities affecting non-contracting parties. A more comprehensive investigation may test the hypotheses here taking into account a richer set of accounting choice determinants. Second, the extent to which capitalisation is employed with an opportunistic motive may be subject to the availability of alternative methods for earnings management under managers' discretion. Third, our inferences may have been influenced by the implications of the IFRS introduction in terms of the enhancement of the overall firms' information environment. More specifically, according to Brochet (2010) increased comparability improves investors' ability to understand a firm's relative performance and concurrently diminish insiders' informational advantage. However, as already pointed out, outsiders cannot easily infer relevant information by observing the productivity of R&D projects of peer firms and therefore, it is unlikely that the comparability improvements may affect our inference here. On other hand, it could be argued that IFRS has brought about an increase in disclosure requirements. Our research design is able to capture the extent to which overall disclosure enhances the share price anticipation of future earnings. The empirical findings do not support such a conjecture about the IFRS influence in our setting.

The results of the present study point to a loss of information about future earnings as a result of constraining discretion. While this could be considered an adverse development for market efficiency, it would be interesting to investigate whether the loss of information is also translated to capital misallocation. Further research

could also corroborate our inferences about the loss of insiders' information advantage by observing abnormal returns following insider purchases. Those two ideas for further research could be of interest to standard setters as well. For the moment, our main contribution is to identify the costs associated with the exogenous constraint over capitalization; we assume that the benefits in terms of suppressing opportunistic motivations are already considered by accounting standard setters. We acknowledge that the outcome of accounting standard setting depends on a cost and benefits analysis. In this respect, the present study sheds further light into both dimensions.

6 Summary and conclusions

This thesis presents three empirical chapters examining the capital market effects of the interplay between financial reporting discretion and insider trading. The material presented here aims to provide answers to an array of questions that are set out in the beginning of this thesis.

One of those questions refers to the long standing controversy about the role of insider trading in supporting or compromising market efficiency. The research presented in Chapter 3 addresses this question directly by testing hypotheses in the context of a well-established market anomaly, namely the post earnings announcement drift. We provide only partial support for the argument that capital markets benefit from insider trading and more specifically, only with reference to transactions that prior research has identified as informative. We then introduce the role of financial reporting discretion from the perspective of information acquisition costs and the ensuing information uncertainty. Interestingly, the initial results are robust to this factor. This finding highlights also an adverse role for insider trading in relation to market efficiency. It is shown that the disclosure of informative insider trading in this setting subsumes the efforts of market participants to use financial reporting information to interpret the earnings surprise. While this implies a sub-optimal mechanism of price discovery in the case of informative trades, this becomes insidious in the case of non-informative trades.

Another question set out at the beginning of this thesis asks what can be learned about the managers' motivations for engaging with financial reporting discretion by looking at their insider trades. In Chapter 4, this question is examined in the context of stock acquisitions. The findings suggest that the presence and the timing of

directors' net purchases can be employed to identify overconfident managers, or managers who overestimate the magnitude of the combined entity's earnings and underestimate the adverse consequences of aggressive accounting during the integration process.

The issue is especially pertinent for stock acquisitions where earnings management is employed to enhance the exchange ratio for the benefit of the acquirer's shareholders. In the same time, overconfident managers underestimate the probability of new, difficult or contentious accounting issues and possible business integration problems that may compound those issues. Given this information uncertainty associated with the integration period, overconfident managers' subjective estimates tend to be unjustifiably precise. We show that market participants understand both the incentives and the opportunities for earnings management and adjust share prices during the acquisition announcement. We also show that the post-acquisition reaction to earnings management is a reaction to the precision by which managers' optimistic expectations have been initially conveyed. The findings reported here also suggest that market participants understand both the incentives and the opportunities for earnings management and adjust share prices during the acquisition announcement. Moreover, contrary to prior research which attributed the post-acquisition market reaction to earnings management to mispricing, the tests reported here show that this is a reaction to the precision by which overconfident managers' expectations have been initially conveyed. Those results are also in line with the recent developments in the finance literature which engages with the role of managerial overconfidence in acquisitions' underperformance. The research in Chapter 4 suggests that it is important to take into account financial reporting

discretion into account for the overconfidence explanation to be consistent with its definition.

A final question that is also set out in the beginning of the thesis asks under which circumstances insider trading can assist market participants to interpret financial reporting discretion. The research reported in Chapter 5 aims to answer this question through the perspective of changing levels of allowed financial reporting discretion. More particularly, the research in this Chapter employs the setting of the transition from a discretionary capitalisation (SSAP13) to a mandatory capitalisation (IAS 38) regime in the UK as an opportunity to investigate the implications of constraining discretion. In line with prior research, the findings demonstrate that discretion over this accounting choice provides relevant information to the market. Furthermore, under a discretionary capitalisation regime, insiders have an information advantage which can be employed by market participants to assess whether the motivations underlying this choice are opportunistic or signalling. Following the introduction of a mandatory capitalisation regime, insiders' information advantage is suppressed and subsequently, the opportunities for self-serving behaviour. Nevertheless, the benefits of constraining discretion come at the expense of the reliability of private information that is communicated to the markets by means of capitalisation. While the findings overall support a significant loss of information that can be inferred by the capitalisation choice, it is also shown that under such circumstances, market participants can no longer use the information in insider trading disclosure to assess the information in earnings.

6.1 Limitations and avenue for further research

The three empirical studies presented in this thesis are subject to a number of limitations. Firstly, all three empirical chapters employ insider trading taking place in the UK prior to 2009 when the Financial Service Authority first successful criminal prosecution for insider trading. Considering that we have no means to establish illegal insider trading within the database we employ, our sample may include undetected cases. To the extent that the undetected cases drive our results, then it is possible that the results may not be generalizable in other contexts where enforcement is stronger (e.g. the U.S.A) or in more contemporaneous periods when the enforcement has become tougher. This is an open empirical question for future research. Secondly, the first two studies focus on the interaction between insider trading and accruals based earnings management. We acknowledge that managers could also engage in real earnings management by, for example, cutting down discretionary expenses, increasing production to lower the cost of goods sold or accelerating the timing of sales through increased price discounts. Further research could investigate how the trade-off between real and accrual earnings management could have affected the inferences drawn in this thesis. For instance, it would be interesting to investigate whether and how insider trading informs market participants about the future implications of cuts in R&D expenditures when such expenditures are subject to different levels of allowed discretion with respect to their capitalisation. However, initial findings in this respect by recently published research (Sawicki and Shrestha, 2014) does not establish any relation between insider trading and real earnings management.

Thirdly, the thesis focuses on financial reporting discretion which may be an endogenous decision. To the extent that this is a serious concern the estimates

would be incorrect and could lead to statistically insignificant coefficients in the models. For instance, it is still an open question whether the level of discretionary accruals is determined jointly with the direction of the directors' trades around the earnings announcement. Could non-informative trades be deliberately associated with an attempt to mislead investors by discretion upon accruals? Could capitalisation decisions be driven by managers' trading decisions? Such questions could be undertaken by future research and are beyond the scope of this thesis.

In a related vein, a firm's decision may also stem out from an array of other considerations which have not been investigated in this thesis. This issue may be more pertinent to the research reported in Chapter 5. While this chapter focuses on the capital market consequences of management's decision to capitalise R&D, it is acknowledged that a firm's decision may be driven by other factors which were not considered in this thesis. For instance, a firm may be reluctant towards capitalisation of R&D since its disclosure would reveal proprietary information to competitors about the success of product development.

The analysis in Chapters 3 and 4 relies on measures of earnings management which are based on the regression residuals of Jones' type models.⁸² While those types of models are widely used and accepted in the literature, they have also been criticised about their ability to identify the discretionary component of accruals. For instance, Bernard and Skinner (1996) argue that Jones' type models are subject to measurement errors since they fail to decompose accruals correctly. Consequently, discretionary accruals include a large component of normal (non-

⁸² It could be said that the IFRS introduction may also affect the inferences here. Unreported tests have examined this possibility. There is no obvious effect from the IFRS introduction in the results reported in Chapters 3 and 4.

discretionary) accruals. Similarly, Guay *et al.* (1996) show that the Jones' type models estimate the discretionary component of accruals with considerable imprecision. More recent research (e.g. Hribar and Collins, 2002; Owens *et al.*, 2013) shows that acquisitions are “non-articulation” events associated with significant business shocks which introduce significant biases into the estimation of discretionary accruals. Therefore, in an attempt to minimise the measurement errors, the models employed in this thesis to estimate “normal” accruals exclude firm year observations with acquisitions. Considering the measurement errors associated with Jones' type model, it can be argued that relying on an alternative methodology, for example, the methodology in Dechow and Dichev (2002), may have been appropriate. However, applying a Dechow and Dichev type models as a proxy for information acquisition costs in chapter 3 would have resulted in a significant loss of observations. Furthermore, applying this type of models in chapter 4, which focus on corporate acquisition, would have been problematic as the design involves cash flow figures that need to be taken from the post-acquisition period. Furthermore, the conclusions drawn in Francis *et al.* (2007), with reference to the information acquisition costs, and Veenman (2012), with reference to the precision of earnings, are robust to these alternative models. Apart from these general limitations, there are also specific caveats pertaining to each empirical chapter.

The sample size across all empirical chapters is relatively small. For instance, in chapter 3, the subsample of active informative trading in the lowest earnings surprise portfolio has 20 observations while the subsample of passive informative trading at the top earnings surprise portfolio has 24 observations. The results presented in Chapter 4 with regards to the directors' purchasing occurring after the

earnings announcement but before the acquisition announcement rely on 33 acquisitions. However, the observed adverse relation between post acquisition and pre-acquisition earnings management are consistent with the long term underperformance of these acquisitions. In line with prior research, Chapter 5 shows that only a small sample of UK firms chooses to capitalise R&D (approximately 13% of the companies) prior to the adoption of IFRS. Despite the small sample, the results are similar to those presented in prior research. Moreover, the regressions reported in this thesis do not exhibit significant problems (e.g., insignificant F-tests). This issue also relates to the data availability for conducting this research.

The results presented in chapter 3 are subject to the specific practises and guidelines in the UK. Directors in the UK have to receive a clearance to trade by the board which increase the timeliness for the disclosure of their trades to the market. Furthermore, the London Stock Exchange Model Code (1977) prohibits insiders from trading up to two months preceding an annual earnings announcement. Consequently, replicating the analysis of this study in other markets may be challenging given these unique institutional characteristics. For instance, in the US blackout periods of insider trading are voluntarily imposed by the firms and their duration and time period may vary across companies (Bettis *et al.*, 2000).

The conclusions from the findings reported in Chapter 4 allude to managers' overconfidence explaining the under-performance of stock financed acquisitions. However, managers' overconfidence may be influenced by the probability of lawsuits and the potential litigation costs. For instance, the US is a highly litigious environment and stock financed acquirers tend to face a lawsuit for issuing

misleading statements. In contrast, the UK is less a litigious setting which may encourage overconfident managers. Thus, the results of this study may not be generalizable due to the differences in the litigiousness and other institutional features across jurisdictions. Nevertheless, it would be interesting to examine the extent to which differences in litigiousness across two “common law” countries affects managerial overconfidence in this setting.

The investigation in Chapter 5 with regards to the amount of information about future earnings impounded in current prices is limited to one year ahead due the availability of the data and the research design. Consequently, employing a relatively short period may not fully capture the benefits of R&D which may take longer to unravel. Despite this limitation, the empirical evidence in the pre-IFRS period is in line with the results presented in prior research which alleviate, at least to some extent, this concern.

Appendix

In this section, we present the results on the determinants of the capitalisation choice across the two reporting regimes which we employed in order to control for the endogeneous decision to capitalise R&D. Following Oswald and Zarawin (2007), we compute the inverse Mills ratio from the parameters estimated from the Probit model which examines the decision to capitalise R&D expenditure as a function of a firm's life cycle and whether the firm meets the conditions for capitalisation. Lev *et al.* (2005) show a firm's life cycle is related to the effect of capitalisation on profitability. Thus, relating the decision to capitalise R&D to a firm's life cycle is deemed important (Oswald and Zarowin, 2007; Oswald, 2008). We control for the success of R&D and the ability to capitalise using the R&D value, while to capture life cycle we include earnings variability as a measure of risk and persistence, profitability, size, book to market ratio, as a measure of risk and growth, R&D intensity and beta, which proxies for the firm's discount rate, because the coefficient on earnings is related to the rate at which earnings are discounted (Collins and Kothari, 1989):

$$CAP_{i,t} = b_0 + b_1 EARN_SIGN_{i,t} + b_2 EARN_VAR_{i,t} + b_3 SIZE_{i,t} + b_4 BM_{i,t} + b_5 RDINT_{i,t} + b_5 RDVALUE_{i,t} + \varepsilon_{i,t}$$

	Pre IFRS	Post IFRS
EARN_SIGN	0.0816	-0.0592
	(0.5432)	(0.6420)
EARN_VAR	0.0355***	-0.0043
	(0.0003)	(0.6915)
SIZE	-1.1967***	-0.0761
	(0.0000)	(0.7803)
BM	0.2163	-0.3361*
	(0.2740)	(0.0875)
RDINT	-0.8797***	-0.4190
	(0.0018)	(0.1311)
RDVALUE	-1.3160***	-0.9801***
	(0.0000)	(0.0000)
BETA	-0.2203	0.4189*
	(0.3569)	(0.0600)
Constant	-0.2143	0.6343*
	(0.5509)	(0.0796)
Observations	1,562	628
Chi squared	54.00	29.94
Pseudo R-squared	0.0702	0.0346

Notes:

CAP equals to one if a company is classified as a capitalizer and zero otherwise; EARN_SIGN equals to one if earnings are positive (adjusted to “as if expense” basis for capitalisers), and zero otherwise; EARN_VAR is the percentile rank of firm i’s earnings variance within each firm’s industry while earnings variance is calculated using all available data requiring at least three observations per firm; SIZE is the percentile rank of firm i’s size within each firm’s industry-year while size is the natural logarithm of market value of the company measured at the fiscal year end; BM is the percentile rank of firm i’s book to market ratio within each firm’s industry-year; RDINT is the percentile rank of firm i’s R&D intensity within each firm’s industry-year while R&D intensity is R&D expenditure divided by total assets (adjusted to “as if expense” basis for capitalisers) ; RDVALUE is the percentile rank of firm i’s R&D value within each firm’s industry-year while R&D value is the difference between the market value of equity and book value of equity (adjusted to “as if expense” basis for capitalisers) divided by the sum of current and lagged annual R&D expenditure; BETA is the percentile rank of firm i’s beta within each firm’s industry-year while beta is estimated using the market model and employing monthly returns ending at the month of the fiscal year end (we require at least 12 months and maximum 60 months to estimate the beta). p-values in brackets; *, ** and *** denote significance at the 10%, 5% and 1% respectively.

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