Tilburg University

Insider Trading, News Releases and Ownership Concentration

Fidrmucova, J.; Goergen, M.; Renneboog, L.D.R.

Publication date:
2005

Citation for published version (APA):
Fidrmucova, J., Goergen, M., & Renneboog, L. D. R. (2005). *Insider Trading, News Releases and Ownership Concentration*. (CentER Discussion Paper; Vol. 2005-97). Finance.

INSIDER TRADING, NEWS RELEASES AND OWNERSHIP CONCENTRATION

By Jana Fidrmuc, Marc Goergen, Luc Renneboog

August 2005

TILBURG ◆ UNIVERSITY

Insider Trading, News Releases and Ownership Concentration

Jana Fidrmuc
University of Warwick and RSM Erasmus University Rotterdam

Marc Goergen
Sheffield University Management School and European Corporate Governance Institute (ECGI)

Luc Renneboog
Tilburg University and ECGI

Corresponding author: Luc Renneboog, Tilburg University, Department of Finance, P.O. Box 90153, 5000 LE Tilburg, the Netherlands, Tel: + 31 13 466 8210; Fax: + 31 13 466 1875; Email: Luc.Renneboog@uvt.nl

Insider Trading, News Releases and Ownership Concentration

ABSTRACT

This paper investigates the market's reaction to UK insider transactions and analyzes whether the reaction depends on the firm's ownership. There are three major findings. First, differences in regulation between the UK and US, in particular the speedier reporting of trades in the UK, may explain the observed larger abnormal returns in the UK. Second, ownership by directors and outside shareholders has an impact on the abnormal returns. Third, it is important to adjust for news released before directors' trades. In particular, trades preceded by news on mergers & acquisitions and CEO replacements contain significantly less information.

JEL codes: *G14, G39*

Keywords: Insider trading, directors' share dealings, corporate governance, ownership and control.

INTRODUCTION

Insiders, defined as managers and members of the board of directors of publicly traded corporations, usually possess more information about their company than (small) outside shareholders. The main argument in favor of insider trading is that it conveys this superior information to outsiders. Leland (1992) shows that when insider trading is allowed, share prices are higher and incorporate more information. Although an insider purchase conveys positive information about the firm's prospects, it is less clear what information is conveyed by an insider sale. On the one hand, an insider sale conveys bad information about the firm's prospects. On the other hand, an insider sale may be less informative if it is made to meet the liquidity needs of the seller.

Seyhun (1986), Lin and Howe (1990), and Chang and Suk (1998) report positive abnormal returns on insider purchases for the US. Similarly, several UK studies, such as Gregory, Matatko and Tonks (1997), find positive abnormal returns for the UK over horizons of 6 to 12 months following directors' purchases.[1] A more recent UK study by Friederich, Gregory, Matatko and Tonks (2002) on daily share prices corroborates these findings for short-term horizons. We analyze the immediate market reaction to directors' transactions (excluding sales after the exercise of options) for companies listed on the London Stock Exchange during the 1990s. Our results support the findings from previous studies that directors' trades convey new information on the firm's prospects.

An interesting aspect of the paper is that we give a detailed account of the UK and US regulation on insider trading and directors' share dealings. There are marked differences in the definitions of insiders, (illegal) insider trading, the main aspects of the regulation (as shown by the frequency of information releases and trading bans), the period within which insiders have to report their trades, and the level of enforcement of the regulation. We conclude from the discussion on the regulatory differences between the two countries that directors' trades in the UK are likely to be more informative and hence trigger larger market reactions.

Our paper makes two major contributions to the existing literature. First, the paper is innovative in terms of the event study methodology used in the context of insider trading. We adjust the abnormal returns on insider trades for the release of news during the period preceding the trade. We examine whether the share price reactions to directors' trades remain significant if the trades follow news releases on the firm's prospects, corporate restructuring, changes in capital structure, board restructuring, and other business events. We find that in general directors' transactions transmit new information to the market even if preceded by news releases. However, the informational content of

---

[1] The other papers reporting positive abnormal returns are King and Röell (1988), Pope, Morris and Peel (1990), and Gregory, Matatko, Tonks and Purkis (1994).

trades is smaller when news on mergers and acquisitions (and to a lesser extent CEO replacement) precede the trades. In these cases, purchase transactions do not contain new information.

Second, when measuring the market reaction to directors' purchases and sales we differentiate between the ownership of the directors who trade as well as the ownership held by outsiders. To the best of our knowledge, no other study has explored the impact of the presence of different types of blockholders on the announcement effect of directors' transactions. We argue that the market takes into account all available public information – including director and outsider ownership – when reacting to insider transactions. As a result, directors' trades in firms with outside blockholders who monitor the firm may have relatively less informational value than directors' trades in widely held firms which may suffer from higher informational asymmetry. Our analysis thus provides new evidence on the market's perception of ownership and control.

Our results confirm that the market takes into account the firm's ownership structure when reacting to directors' trades. The market reaction differs significantly depending on the degree of outsider ownership, director ownership, and the type of outsider ownership. In particular, firms controlled by other companies or by individuals or families unrelated to the directors experience significantly lower cumulative abnormal returns (CARs) in absolute value. This suggests that monitoring by these blockholders reduces informational asymmetry and ensures that the management focuses on value maximization. Directors' trades then convey less information. In contrast, firms with institutional investors as their dominant shareholders have on average higher CARs. This suggests a higher information content of directors' transactions and confirms the findings by Franks, Mayer and Renneboog (2001) and Faccio and Lasfer (2002) that UK institutional shareholders do not monitor the firms they invest in and do not mitigate problems of asymmetric information. Further, our evidence is congruent with institutional investors trading on the information signal conveyed by directors' trades. Interviews with fund managers in the City of London confirm that this is indeed the case.

Our results also demonstrate that the market takes into account directors' ownership when reacting to their trades. For firms with little director ownership, the CARs of directors' purchases are strongly positive, which is in line with the precommitment explanation. In contrast, for firms whose directors hold large stakes, the positive news contained in directors' purchases is mitigated by the danger of increased entrenchment. Similarly, the market reacts less negatively when directors with significant stakes sell, as this reduces their dominant position.

For poorly performing firms and those close to financial distress, we find stronger market reactions. The reaction to directors' purchases (sales) is then significantly positive (negative) irrespective of

the shareholder structure. We fail to find support for the information hierarchy hypothesis (Seyhun (1986)). Although CEOs are assumed to have the best knowledge about their company's prospects, the information content of their trades is lower than that of other directors' trades. It is possible that CEOs, who may be subject to a more close scrutiny by the market, trade more cautiously and at less informative moments.

The remainder of the paper is organized as follows. The next section summarizes the UK regulation on directors' dealings and compares it to the US regulation. Section II develops the hypotheses based on the existing literature. Section III describes the data and discusses the methodology. Section IV analyses the results and Section V concludes.

I. UK AND US REGULATION ON INSIDER TRADING

In the US, insider trading is regulated by the Securities Exchange Commission (SEC). The 1934 Securities and Exchange Act and its amendments impose restrictions on insider trading. In the UK, the 1977 Model Code of the London Stock Exchange (LSE) and the 1985 Companies Act regulate insider trading. There are major differences between the two countries in terms of (i) the definition of (illegal) insider trading, (ii) the essence of the regulation, (iii) the definition of an insider, (iv) the time within which insiders have to report their trades and (v) the level of enforcement of the regulation.

The definitions of insider trading and directors' (share) dealings frequently cause confusion. Insider information is, according to the UK Misuse of Information Act, information that is 'material, current, reliable and not available to the market' and is legally qualified as 'new and fresh'. The Criminal Justice Act makes trading on insider information (information not regularly available and obtained through insiders) a legal offence. This paper does not deal with illegal insider trading, but focuses on legal trading by directors as defined in the listing rules of the London Stock Exchange (Source Book August 2002, Chapter 16). Whereas in the UK there is a distinction between (illegal) insider trading and (legal) directors' dealings, the US regulation does not make such a distinction. Throughout the paper, we use the term directors' dealings to refer to the (legal) insider trading or share transactions by directors. We also adopt the UK definition of a director. In the UK, the term director covers both non-executives and executives. Conversely, in the US, executives are normally referred to as officers and non-executives as directors.

In general, the essence of US rules on insider trading is that insiders must either abstain from trading on undisclosed information or release this information to the public before they trade (Hu and Noe (1997)). The UK approach is different. UK regulation contained in the 1977 Model Code of the

London Stock Exchange (LSE) – which became effective in April 1979[2] – and the 1985 Companies Act is stricter than the US regulation (Hillier and Marshall (1998)). The directors of companies traded on the LSE cannot trade during the two months preceding a preliminary, final or interim earnings announcement and one month prior to a quarterly earnings announcement.[3] Outside the trading ban periods, directors still require clearance to trade from the board's chairman. In general, there are no such restrictions in the US system[4] which favors frequent disclosure to remove possible insider advantages rather than trading bans during price-sensitive times.

In the US, insiders are defined as officers,[5] directors, other key employees and shareholders holding more than 10% of any equity class (Lakonishok and Lee (2001)). All of these are prohibited from trading on undisclosed 'material' information. The UK definition of insiders is narrower. Insiders include the members of the board of directors (both executives and non-executives), but exclude other key employees and large shareholders.

The period within which insider trades have to be reported also differs substantially between the UK and the US. The UK Model Code prescribes much faster reporting of directors' dealings. The directors must inform their company as soon as possible after the transaction and no later than the fifth business day after a transaction for their own account or on behalf of their spouses and children (Hillier and Marshall (2002)). In turn, a company must inform the LSE without delay and no later than the end of the business day following receipt of the information.[6] Via its Regulatory News Service (RNS), the LSE then disseminates this information immediately to data vendors. The company is also required to enter this information into its Register, which is available for public inspection, within three days of the reporting by the director. In the US, insiders only have to report their holdings within the first ten days of the month *following* the month of the trade (Persons (1997)). The capital gains US insiders make on short-term swings in prices (formally within six months) must be repaid to the company. Insider transactions are published in the SEC's online *Insider Trading Report*. Chang and Suk (1998) write that trades normally appear in the online report

---

[2] See Pope *et al.* (1990, p.371).

[3] In exceptional circumstances where it is the only reasonable course of action available to a director, clearance may be given to the director to sell (but not to purchase) when he would otherwise be prohibited from doing so.

[4] Lustgarten and Mande (1995) show that the volume of US insider trading declines as an earnings announcement approaches but it does not decline to zero. It should be noted, however, that besides the federal regulation, a large fraction of US firms impose additional insider-trading restrictions on their directors and officers that in many cases also include trading bans (Bettis et al. (2000)). Further, the Sabanes-Oxley Act of 2002, effective since 2003, imposes insider trading bans during pension fund blackout periods.

[5] The term 'officer' covers the company president, principal financial officer, principal accounting officer, any vice president in charge of any principal business unit, division, or function (such as sales, administration, or finance), and any other person who performs a policy-making function within the company (Bettis et al. (2000)).

[6] This implies that information about an insider transaction can reach the market as late as 6 days after the transaction. However, in practice, this information is disclosed faster: for 85% of the directors' dealings in our sample the announcement day coincides with the transaction day or is the following day.

within the same day that the SEC is informed. Shortly afterwards, the information is published in the Wall Street Journal (WSJ) and other publications. Chang and Suk (1998) find that there is a significant share price reaction even after the announcement in the WSJ which suggests that the SEC online report is only read by a small number of investors whereas the WSJ is read by a larger number of investors.[7] This implies that not only is the reporting process in the US slower, but it also takes time for the information contained in the insider trades to be reflected in the share price.[8]

The difference in the speed of reporting is also likely to have major implications for the size of the abnormal returns measured around the announcement of insider trading. Given that the period between the trading day and the announcement in the UK covers at worst 6 days compared to up to 40 days in the US, we expect insider trades in the UK to be highly informative whereas insider trades in the US are more likely to be based on stale information.

Still, although the regulation in the UK may be stricter than in the US, what matters is its enforcement. According to Hillier and Marshall (1998), the UK regulation is well enforced as insider trading is virtually non-existent during the two-month period prior to the final and interim earnings announcements. Similarly, the regulator, the Financial Services Authority (FSA), argues that past and present regulation has been sufficiently strict and that there have only been few violations to the trading bans.[9] In addition, the Financial Services and Markets Act (FSMA) of 2000 (effective from 1 December 2001) further refines the definitions of illegal insider trading[10] and specifies a dual prosecution track which facilitates the procedures to bring insider trading violations to court. Lack of disclosure, violation of trading bans, or misuse of inside information can be prosecuted under the Misuse of Information Act using a civil law or a criminal law procedure.[11] Given that the new procedures have only recently been introduced and that investigations take time, there has only been one conviction since 2001 (via a civil court procedure), namely that of the

---

[7] Lakonishok and Lee (2001, p.88) report that even after a trade has been reported it may still take several days for outsiders to obtain the information. Further, McConnell, Servaes and Lins (2005) opt for a 6 day event window for their cumulative abnormal returns because 'the information usually does not enter the public domain for several days after it is filed with the SEC'.

[8] Dedman (2004) reports further evidence that in the US new information is only gradually reflected in stock prices and also that there is leakage of price-sensitive information to the opposite of the UK. Reviewing the existing literature on the UK and US, she finds that in the US stock prices start adjusting 5 days before a profit warning and that the adjustment takes up to 5 days after the warning. Conversely, there is no such leakage in the UK.

[9] Based on interviews with several members of the FSA.

[10] 'Any person who does act or engages in any course of conduct which creates a false or misleading impression as to the market in or the price or value of any relevant investments is guilty of an offence if he does so for the purpose of creating that impression and of thereby inducing another person to acquire, dispose of, subscribe for or underwrite those investments or to refrain from doing so or to exercise, or refrain from exercising, any rights conferred by those investments' (FSMA 2000, s.397).

[11] In 2000, the LSE's authority to impose administrative penalties was transferred to the FSA. Still, the LSE passes any information raising the suspicion of insider trading on to the FSA for further investigation.

Company Secretary[12] of Middlemiss who traded equity prior to earnings announcements.[13,14] In the US, the Insider Trading and Securities Fraud Enforcement Act (ITSFEA) of 1988 raised the maximum fine for insider trading to $1 million and 10 years of imprisonment as a reaction to frequent violations of existing insider regulation. The Act also placed the liability for illegal insider trading by any of the company's employees with the top management. Garfinkel (1997) documents that the Act has changed the timing of trading by US insiders. After the Act was passed by Congress, insider trading – especially selling – tended to happen after, rather than before earnings announcements. He also found that the earnings surprise – defined as the difference between the actual earnings and the median analysts' forecast – increased after the Act. He states that this 'is consistent with less informed trading prior to earnings announcements during the post-Act period and the notion that informed trading encourages price discovery'.[15]

To summarize, there are substantial differences between the UK and US regulation on insider trading. The differences pertain to the definition of an insider, the essence of the regulation, the enforcement and the delay within which trades have to be reported. We conclude that UK insider trades are likely to be more informative on the announcement day than US trades for the following reasons. (i) A trade must be made public within at most 6 business days in the UK, compared to up to 40 days in the US. (ii) Both Lakonishok and Lee (2001) and McConnell et al. (2005) report that the information on insiders' trades enters the public domain in the US only several days after it is released by the SEC. We show below that no such delay occurs in the UK. (iii) In the UK, mandatory reporting by insiders is limited to top management (executive board members) and to the non-executive directors only. In contrast, US insiders (legally) comprise a much larger group: insiders are large shareholders, (non-executive) directors and managers (officers). The latter include not only the top management with board seats, but also a wider group of managers (e.g. any vice president in charge of any principal business unit, division, or function such as sales, administration, or finance), who may de facto possess less information about their firm's prospects. (iv) The UK regulator has opted for trading bans in price-sensitive periods whereas the US regulator favors more frequent disclosure. All these elements suggest that directors' trades in the UK are more informative and hence trigger larger market reactions.

---

[12] In the UK, the Company Secretary is responsible for keeping the minutes at board and general meetings and for making the various records which must be kept at the registered office. He or she is also responsible for all formal administrative matters.

[13] The conviction occurred in February 2004. About the current state of affairs, the FSA states that 'several cases, a mixture of lack of disclosure, violation of trading ban periods and misuse of insider information, are currently being investigated and some of which will be brought to court via the civil or criminal procedure.'

[14] For an alternative view, see Dedman (2004).

[15] Although Lakonishok and Lee's (2001) study covers the period before the Act (1975-1988) as well as the period after the Act (1989-1995), they do not report CARs separately for the two periods.

II. LITERATURE REVIEW AND HYPOTHESES

The existing empirical literature uses two approaches to measure the effect of insider information on share prices. One strand of the literature argues that the price reaction to insider trading is gradual. This literature measures the price reaction via the cumulative abnormal returns earned over the 6 to 12 months after the transaction. The existence of significant abnormal returns over this period is interpreted as proof of superior information held by insiders (see, e.g., Jaffe (1974), Rozeff and Zaman (1988), Lin and Howe (1990), Gregory et al. (1997), and Lakonishok and Lee (2001)). The second strand of the literature assumes that stock markets are (to some degree at least) informationally efficient and that share prices adjust rapidly to insider trades. These studies measure the abnormal return on the date of announcement of the insider trade (Jaffe (1974), Chang and Suk (1998), and Friederich et al. (2002)). Our research is part of the second strand of the literature.

We first test the benchmark hypothesis whether directors trade on superior information (or at least, whether the market believes that the directors trade on superior information). By purchasing shares in their firm, directors convey a positive signal about the future value of the firm to the market. The signal is costly as the directors put their own wealth at stake and bear the cost of holding less than optimally diversified investment portfolios. Therefore, directors' purchases are credible signals to outsiders. Conversely, directors signal negative news when selling shares. Nevertheless, this signal may be less informative as liquidity needs – rather than changes in their expectations about the firm's future cash flows – may force them to sell shares (Lakonishok and Lee (2001) and Friederich et al. (2002)). Given the mixed reasons behind sales, we expect that the absolute value of the market reaction to sales is lower than that to purchases. Hence:

Hypothesis 1: (a) *The market reaction to the announcement of directors' purchases is positive.*

(b) *The market reaction to the announcement of directors' sales is negative.*

(c) *The absolute value of the market reaction to directors' sales is smaller than that to purchases.*

Next, we test the information hierarchy hypothesis which postulates that the information content of the transactions depends on the type of director who is trading (Seyhun (1986)). According to this hypothesis, directors who are familiar with the day-to-day operations of the company trade on more valuable information. Seyhun (1986) and Lin and Howe (1990) partially confirm this hypothesis on US data.[16] Seyhun shows that CAARs following the transactions by officers are significantly higher

---

[16] Seyhun (1986) measures the market reaction to insider trades by the CARs covering the first 50 and 100 days, respectively, following the day of the trade. Lin and Howe (1990) use six- and twelve-month CARs.

than those by non-executive directors. Lin and Howe (1990) demonstrate that trades by chairmen, directors, officer-directors, and officers contain more information than those by large shareholders. In contrast, Jeng, Metrick and Zeckhauser (1999) question whether insiders can benefit from their information advantage. "Some insiders are more 'inside' than others. The chief executive, for example, is likely to have better information about the firm's prospects than lesser officers. Since the CEO's trades are likely to be carefully scrutinized, both by shareholders and by regulators, he may be more reluctant to trade on his informational advantage. The net effect of these considerations on the profitability of insider trading is an empirical question." They conclude that insiders benefit 'handsomely' from their informational advantage, especially from their purchases. However, they do not find any support for the information hierarchy: CEOs realize lower abnormal returns (though not significantly lower) than those earned by other officers and directors.[17] Their explanation is that CEOs, who are more carefully scrutinized by market participants and regulators, may be more reluctant to trade on an informational advantage. Furthermore, the earlier support of the information hierarchy documented by Seyhun (1986) and Lin and Howe (1990) may have been driven by transaction size. In these studies, trades by CEOs are on average twice as large as those by other officers or directors, and larger transactions trigger stronger price reactions.

Hypothesis 2: The abnormal returns associated with purchases and sales depend on the type of director. The positive (negative) abnormal returns following purchases (sales) decrease in absolute value by category of director in the following order: CEO, other executive directors, non-executive chairman, and non-executive directors.

We proceed by relating informational asymmetries to ownership and control structures. Admati, Pfleiderer and Zechner (1994) argue that holding a large stake in a firm encourages the owner to engage in monitoring the management. Similarly, Maug (1998) contends that corporations are more closely scrutinized by large shareholders who have more incentives and sufficient voting power to intervene. This is what Maug calls the 'lock-in effect'. Further, Stoughton and Zechner (1998) theorize that large shareholders employ a monitoring technology that increases the expected value of the end-of-period cash flow distribution. Still, the use of this monitoring technology comes at a cost, such that the use of this technology only pays off for sufficiently large shareholders. Monitoring is here defined as any activity that creates value which is shared by all shareholders in proportion to their holdings. As monitoring is inherently unobservable and small investors can free-ride on these activities, the incentive for monitoring must be a function of ownership.

---

[17] The results of Seyhun (1986) and Lin and Howe (1990) are not directly comparable to those of Jeng et al. (1999) given the different methodologies for calculating the returns.

Given that monitoring activities are likely to benefit all shareholders, the information asymmetry between management and shareholders is reduced. Hence, directors' dealings are likely to be less important a signal to the market in the presence of a large outsider. This implies that the absolute value of the announcement effect of directors' dealings is likely to be smaller in firms with major outside blockholders.

Holderness and Sheehan (1988) show that the ability and incentives of major shareholders to monitor the management depend on their type. Most empirical studies distinguish between three categories: corporations, institutional investors, and individuals or families not related to the management. UK institutional investors, such as banks, investment and pension funds, and insurance companies, are not deemed to monitor the companies they invest in (see e.g. Franks et al. (2001)). They do not usually have the resources to monitor the (many) firms they invest in. In addition, monitoring would provide them with inside information and their investments would therefore be locked in (Goergen and Renneboog (2001)). Thus, only outsiders such as corporations, and individuals or families unrelated to the management are expected to monitor the firms they invest in.

Hypothesis 3: (a) The announcement effect of directors' purchases and sales is weakened by the presence of an outside blockholder who monitors the firm (corporations, and individuals or families unrelated to the directors).

(b) The announcement effect of directors' purchases and sales is not influenced by the presence of an institutional blockholder.

Directors do not only have direct access to restricted information but also have different incentives as compared to outside blockholders (Holderness and Sheehan (1988)). For directors, the performance of their shares may be of secondary importance if they derive substantial private benefits of control from their positions in the firm. These private benefits are not transferable but are investor-specific. For director-owners, they may consist of above-market-rate salaries, perquisites, and prestige or reputation (Johnson et al. (2000), Dyck and Zingales (2003), Holmen and Högfeldt (2005)). At low levels, ownership by the directors is believed to align their incentives with those of the other shareholders (Jensen and Meckling (1976)) and increases in ownership may reflect the directors' precommitment to focus on shareholder value creation. Therefore, in widely-held firms, the precommitment effect of directors' purchases (sales) may lead to a stronger market reaction. However, at higher levels of ownership by the directors, their purchases may lead to entrenchment such that they may become insulated from disciplinary actions in the case of poor performance (Morck, Shleifer and Vishny (1988), Franks et al. (2001)). Consequently, whereas the market may react positively to an increase in a director's holding resulting in a modest stake, it may respond

negatively to a director's purchase if his ownership is already substantial. The negative effect of increased entrenchment may even dominate the otherwise positive signal about the firm's prospects.[18] Similarly, the market may react positively to a director's sale if it considers that the benefits from reduced managerial discretion outweigh the negative signal.

The entrenchment problem in firms with high ownership by the directors may be less prominent if a large monitoring (outside) shareholder reduces the otherwise high managerial discretion. Conversely, the entrenchment problem may not be reduced by a passive shareholder, i.e. an institutional investor.

Hypothesis 4:   *(a) In firms with strong control by directors and without other major shareholders, the positive announcement effect of directors' purchases is weaker when the purchases increase directors' entrenchment. Likewise, in such firms, the negative announcement effect of directors' sales is weaker when the sales erode directors' entrenchment.*

      (b) The market is more concerned about directors' entrenchment in firms with large share blocks held by both directors and institutional investors. Hence, purchases (sales) trigger a weaker positive (negative) announcement effect. In contrast, the market is less concerned about entrenchment in firms with monitoring outside blockholders (families or corporations. Hence, the announcement effect is stronger.

For poorly performing or financially distressed firms, the probability of insolvency is substantial such that the market awaits new information on the firm's prospects more eagerly. Therefore, we expect a stronger market reaction to directors' transactions. Moreover, given that the costs of a wrong signal in such firms are much more substantial to the directors, the signal is also more credible to the market. Hence, if directors buy more shares in a loss-making firm, then the market reaction should be significantly more positive. If directors of poorly performing or financially distressed firms sell shares, this may reflect their loss of confidence in the firm. The CAARs are then expected to be strongly negative irrespective of the ownership structure.

Hypothesis 5: For poorly performing or financially distressed companies, directors' purchases and sales trigger stronger announcement reactions.

---

[18] The entrenchment effect refers to the fact that directors with substantial voting power may become unaccountable and/or exploit their private benefits at the expense of other shareholders. There is evidence that entrenchment frequently occurs in the UK. Lai and Sudarsanam (1997), Franks et al. (2001), and Faccio and Lasfer (2000) show that directors with substantial voting power cannot be ousted even in the wake of poor performance.

III. DATA SOURCES, DESCRIPTIVE STATISTICS AND METHODOLOGY

A. Data sources

Our data covers directors' dealings, ownership, daily returns, company specific information such as capital structure changes, number of shares outstanding, industry, accounting data and news items.

Directors' dealings data covers the period of 1991 to 1998 and was obtained from Hemmington Scott (HS). The original file contains 58,363 entries and includes information on company names, directors' names, directors' shareholdings, directors' positions on the board, transaction and announcement dates, numbers of shares traded, prices, security types (90 different types),[19] and transaction types (12 different types).[20] The exclusion of directors' trades in financial firms, duplicate entries and some inaccurate or incomplete reporting of transactions reduce the number of observations by roughly 40%.[21] We aggregate multiple purchases (or sales) by the same director on a given day (e.g. one sale of 10,000 shares and another one of 5,000 shares make one sale of 15,000 shares). Furthermore, when a director purchases and sells shares on the same day, we net the transactions (e.g. a purchase of 10,000 shares and a sale of 5,000 shares becomes a net purchase of 5,000 shares). Following all these adjustments, the sample covers 35,439 directors' transactions in 1,498 firms.

The most frequent transactions are on ordinary shares and the exercise of options: 27,416 trades (78% of all insider transactions) and 5,885 transactions (17%), respectively. As very small transactions are likely to be ignored by the market, we only retain the (net) transactions involving at least 0.1% of the shares outstanding. Furthermore, as sales after the exercise of options are likely to be related to the remuneration package of directors and whether the options are in the money, their information content is expected to be low. Hence we exclude these sales. These rules eliminate 83% of all purchases on ordinary shares (12,019 out of 14,500) and 61% of all sales (4,101 out of a total of 6,769 transactions). We analyze the transactions with respect to their relative rather than absolute value because the paper focuses on relative voting power and changes in control.[22]

---

[19] The 90 security types include, among others, ordinary shares, restricted voting shares, options, warrants, and convertibles. The full list of security types is available upon request.

[20] Transaction types are buy, sell, exercise, options granted, sale post-exercise, take up, scrip dividend, inherited, bed & breakfast, gift given, gift recorded, and scrip issue.

[21] The main reason for the reduction in observations is the deletion of duplicate information resulting from the fact that directors' transactions were collected from various sources (Regulatory News Service, Reuters, Thomson Financial, and LexisNexis). The number of errors refers to entries for which there is no code indicating whether the transaction is a sale, sale post-exercise, etc., or to typographical errors in the codes. The number of such omissions is very limited: only 253 out of 58,363 entries.

[22] A threshold based on relative size has the disadvantage that the value of the threshold (0.1% of market capitalization) varies from company to company. In value terms, our threshold of 0.1% amounts to GBP 14,616 (GBP 63,626) for the median (average) purchase transaction, while it amounts to GBP 31,908 (GBP 107,433) for the median (average) sales

Changes in company names are traced with the help of the London Share Price Database (LSPD) which also provides information on the SEDOL number, birth and death dates, and the reason for delisting. The number of shares outstanding for each firm-year and the industry code are also collected from the LSPD and matched with the directors' dealings file. The number of shares outstanding is used to calculate the relative size of each transaction.

Ownership data is obtained from Worldscope which records all direct ownership stakes of 5% or more of the ordinary shares outstanding. We classify these stakes according to their owner: directors (insiders), corporations, institutional investors, and individuals or families not related to the directors. We use the Stock Exchange Yearbooks to check whether the individuals reported in the database (around 7,400 persons) are: (i) a CEO, (ii) another executive director, (iii) a non-executive chairman, (iv) another non-executive director, (v) a former director who has recently left the company, or (vi) an individual who is neither a director nor related to a director. The equity stakes held by direct family members (spouses, children, parents) of the directors were added to the ownership stakes of the latter.

Adjusted daily prices, dividends, data on the FTSE All Share Index, market capitalization, earnings after tax, return on equity, book-to-market ratio, debt-equity ratio and interest coverage are obtained from Datastream.

B. Descriptive statistics

Table I reports the summary statistics on trades. Panel A shows the statistics for all the trades (including those resulting from the exercise of options which we exclude later on). These statistics are directly comparable to those of Lakonishok and Lee (2001) for the US. Panel B shows the statistics on the transaction sizes of net purchases and net sales, respectively, which represent at least 0.1% of the market capitalization of a firm. Panel C shows the ownership structure of the firms. According to Panel A, directors of UK firms trade less frequently than their US counterparts. There are, on average, each year only 1.49 (1.09) purchases (sales) per UK firm compared to 2.77 (4.74) purchases (sales) per US firm.[23] We believe that the lower trading activity of UK directors compared

---

transaction. Still, a threshold based on absolute transaction value (e.g. GBP 25,000) is also arbitrary and, moreover, the absolute size of the transaction is more likely to be dependent on the director's wealth rather than on company-specific characteristics. The absolute size of the transaction would necessarily have to be standardized by some benchmark of the director's wealth (e.g. by the value of his remuneration package). Yet another alternative threshold could be based on the transaction size expressed as a percentage of the director's existing ownership stake. However, the signal emitted by the director's transaction depends on how the relative transaction size relates to the distribution of voting power of the outside blockholders which would not be captured by this threshold.

[23] Directors' trading activity, measured by the total number of shares traded per firm-year (not shown in the table), increased throughout the beginning of the period, peaked in 1996, and decreased thereafter. During the sample period, UK directors sold only two to three times as many shares as they bought compared to seven times for US directors.

to US directors is due to the stricter regulation (trading bans) in the UK. Furthermore, the higher frequency of directors' sales in the US could be due to the fact that American directors are awarded more stock options than their British counterparts (Conyon and Murphy (2000)) and the sales after the exercise of options are not treated as a separate category in most US studies.

[Insert Table I about here.]

Panel B shows that, on average, directors' purchases are smaller than their sales. The median net purchase is £36,000 compared to £147,000 for the median net sale. The median net purchase (sale) as a proportion of market capitalization amounts to 0.27% (0.48%). CEOs and chairmen are the most active traders accounting for 582 and 492 (490 and 350) purchases (sales), respectively. Former directors who have recently left the company sell more frequently than they purchase (626 versus 396 transactions).[24]

Directors sell more shares than they purchase in larger firms, more profitable firms, and those with less debt and lower book-to-market ratios (not reported in the table). According to Friederich et al. (2002), directors purchase stock when they believe it is undervalued (as measured by a high book-to-market ratio). Panel C of Table I shows the ownership structure – measured at the beginning of the year of the transaction – for firms with net purchases and those with net sales, respectively. Sixty-nine percent of the firms with net purchases and 66.1% of the firms with net sales have a blockholder, i.e. a shareholder owning more than 5% of the equity. In the firms with blockholders, the outside blockholders jointly hold on average 28.2% of the equity in firms whose directors purchase shares, while they control 22.0% in firms whose directors are net sellers. Institutional investors are blockholders in the majority of firms (in 60.0% and 55.6% of firms with net purchases and net sales, respectively) but their blockholdings are more modest as they hold 22.6% (18.2%) on

---

[24] Hemmington Scott obtained the list of former directors from the Directors' Reports in the annual reports. For a firm whose financial year runs from e.g. April to March, the financial-year report for 2001 will list the former directors who were directors for some time during the period of April 2000 to March 2001 but left at or before the end of March 2001 (for most UK firms, the financial year ends in March). The report also shows the former directors' shareholdings and whether there was a change in their equity stake. The trades of these directors are then recorded for the period starting with their departure and ending up to two months after the end of the financial year (in our example until the end of May 2001) either directly from the Directors' Report or from the Jordan's database which is based on information obtained from the Company Registers. This means that for a director who resigns on 31 March 2001, the trades are recorded for only 2 months after (s)he left the firm, whereas for those leaving early in the financial year (e.g. April 2000), the trades may be recorded for more than 1 year. We estimate for how many months the trades of former directors are traced using the director turnover data of Franks et al. (2001). The vast majority of natural turnover is related to retirement (with a few cases of departure due to illness or death); and most of the retiring directors stay until the end of the financial year. Hence, the average departure date for this type of turnover is the final month of the financial year. This means that, for about 70% of the directors who leave, the trades are traced for only 2 months after their departure. For 'conflictual' turnover, the average retirement date lies near the end of month 9. For this category, around a third (10% of the total) leave in the final month of the financial year as this category of turnover also includes the departure of directors reaching the end of their (non-renewed) contract. Only slightly less than one fifth of directors leave at various times throughout the year. To conclude, the transactions of 80% (88%) of all former directors are followed for 2 (3) months. The

average in firms with net purchases (net sales). Directors are the largest shareholders. They own jointly on average around 24.8% (23.0%) in firms with net directors' purchases (net sales). Individuals or families unrelated to the management control hold only around 9 and 10% in firms with net purchases and sales, respectively, compared to about 15 and 14%, respectively, for corporations.

C. Methodology

We compute the cumulative (average) abnormal returns (C(A)ARs) by using the market model for a period of 41 days centered on the announcement day. The market return is proxied by the FTSE All Share index excluding investment trusts, and the beta is estimated over a period of 200 to 21 days prior to the event day. To check the robustness of the results, we also calculate market-adjusted returns. Several studies (e.g. Rozeff and Zaman (1988) for the US, and Gregory et al. (1994) for the UK) highlight the importance of controlling for size when calculating abnormal returns over a long post-event window, or when the sample includes a large number of smaller companies.[25] We use the same size-adjustment method as in Lakonishok, Shleifer and Vishny (1994) and form ten size portfolios based on market capitalization at the beginning of the calendar year and calculate the equally-weighted average return for each portfolio. Each return $R_{i,t}$ is adjusted by return $R_{p(i),t}$ earned on the size portfolio p which security i belongs to.[26] To test the null hypothesis that the CAARs are equal to zero for a sample of N securities, we use three parametric test statistics: t_{CAAR} based on Barber and Lyon (1997), and J_1, and J_2 both based on Campbell, Lo and McKinley (1997).[27] We also use Corrado's (1989) non-parametric rank test-statistic. Further details on these test statistics as well as information on how we dealt with non-synchronous trading and event clustering are discussed in the Appendix.

At a later stage, we also adjust the CARs for the possible release of news prior to a director's transaction.[28] It is important to make such an adjustment given the nature of the regulation in the

---

transactions of only a small minority of former directors are traced over longer time windows. Therefore, it is not implausible that these former directors are considered as 'insiders'.

[25] Rozeff and Zaman (1988) argue that abnormal returns are higher for smaller companies. If directors' purchases are concentrated in smaller firms, and if their shares tend to earn positive abnormal returns, then the abnormal returns on directors' trades may be partly attributable to the size effect.

[26] An alternative method would be the Dimson and Marsh (1986) method that uses betas obtained from size portfolios. However, Gregory et al. (1997) report that the difference between the Dimson-Marsh benchmark and the Lakonishok et al. (1994) benchmark is relatively small for UK data.

[27] If the true abnormal return is larger for securities with higher variance, then the test statistic should give equal weight to the realized cumulative abnormal returns of each security, which is what J1 does. If the true abnormal return is constant across securities then the test statistic should give more weight to the securities with the lower abnormal return variance, which is what J2 does. In most studies the results are not likely to be sensitive to the choice of J1 versus J2 because the variance of the CAR is of a similar magnitude across securities (Campbell, Lo and MacKinlay 1997, page 162).

[28] We are grateful to the referee for suggesting further analysis along these lines.

UK. Directors are only allowed to trade after – and not before – the release of corporate information. If there is a news release preceding a trade, this may influence the market reaction to the trade. Hence, we need to ascertain whether the significant CAR is the result of the signal of the director's transaction or rather the result of the release of price-sensitive corporate news. Also, UK rules on insider trading proscribe trading prior to earnings announcements. For preliminary, interim and final earnings announcements, the period during which directors must not trade is as much as two months. In our regression models (see below), we correct for different types of news: information on board restructuring, asset restructuring, changes in the capital structure, and earnings announcements. This allows us to determine whether the market reacts to the news or to the directors' transactions.

Information on news items comes from two sources. The first source is the Regulatory News Service (RNS) of the London Stock Exchange (information relating to M&As, legal disclosure requirements, changes to the board, corporate restructurings, etc.). The second source is annual reports, preliminary results and other corporate announcements as well as the analysis of this information by brokers, journalists or analysts, as covered by Thomson Financial, LexisNexis, Reuters, Bloomberg, and Jordan's Database. After eliminating duplicate news items (e.g. when Reuters disseminates the exact text from the RNS announcements), we categorize these news items into the following classes. The first class of news items relates to changes to the board of directors and/or the audit firm/corporate advisors: (i) a change in the CEO, (ii) the departure/appointment of non-executive directors, (iii) the replacement of an executive director (excluding the CEO), and (iv) a change in the firm's advisors such as the auditors, solicitors, registrars, financial advisers or stockbrokers. The second class covers news relating to corporate and capital restructuring: (i) M&As, (ii) a disposal of a major part of the business, a division or important assets, (iii) a share repurchase, (iv) a change in equity capital (including a new stock issue to pay off existing debt). A third class covers news on the outlook of the firm, prospects and other business events: (i) a forward-looking statement about the company's performance, (ii) a business event containing any news item that is deemed to be price sensitive but not falling into any of the preceding categories (e.g. a name change, the signing of a new contract, a product launch, a change in accounting policy, a debt roll-over, a move to the AIM market, and a change of sector). Given that the archives of the RNS have only been available since 1995, we can only adjust the abnormal returns for news releases from this year onwards. We collect a total of 15,138 news releases over the four-year period.

Panel A of Table II shows that about 27% of all news items relate to changes in the board of directors or to the advisors of the firm. Almost 14% of the information is related to corporate restructurings such as mergers and acquisitions, the acquisition of a minority stake, the acquisition of a division of another firm, the creation of a joint venture, etc. About 4% of news items relate to

asset disposals and 6% to changes in the capital structure. The bulk of the information releases (about 35%) relate to information on the firms' prospects.

[Insert Table II about here.]

Panel B of Table II reports the incidence of trades preceded by news items. Out of a total of 1,444 purchases, 457 purchases were preceded by news releases during the 30 trading days before the trade, and 251 purchases were preceded by news releases within the week prior to the trade.[29] Out of the 457 purchases preceded by news, 97 were preceded by two news releases whereas 109 were preceded by more than two news releases. All of this suggests that it may be important to correct the CARs for news releases prior to the trade. We make this correction in section IV.E. Panel B also shows whether different types of news items trigger directors' purchases in the periods of 2, 7 and 30 days subsequent to the news release, respectively. Overall, we find that there are not many firms with purchases after the release of new information. For instance, in only 2.8% of the firms, one or more directors purchase shares subsequent to news on the departure or appointment of a CEO. Even after major asset restructuring (M&A activity, asset disposals), directors' trading remains modest as in only about 6% of the firms these news items trigger a purchase within a week. Purchases are most frequent after news releases covering the firm's prospects.

IV. RESULTS

We start this section by presenting the CAARs triggered by purchases and sales. As a robustness check we use different measures for the CAARs. We also contrast the market impact of large versus small trades and explain why the CAARs in the UK are larger than in the US. We then test the information hierarchy hypothesis in Subsection B and outline the impact of the presence of different types of blockholders in Subsection C. In Subsection D, we investigate the value of the signal under poor performance and financial distress. We adjust our models in Subsection E for the release of potentially price-sensitive news prior to a trade to determine whether the CARs are caused by the trades or by news releases. Finally, we check our results for the possible effect of thin trading.

A. The market reaction to directors' trades

Table III reports the market reaction to purchases and sales. The table consists of three different panels. Panel A reports the CAARs for large trades, i.e. those exceeding 0.1% of the firm's market capitalization. Panel B shows the CAARs for all the trades irrespective of their size, whereas Panel C documents the CAARs for small trades. In the following subsections, we focus on the effect of

---

[29] Data on news releases was only available for the period of 1995-1998. A table similar to Table II, relating news items to directors' sales, is available upon request.

large trades only. However, we report the figures for all the trades and small trades here to allow for a direct comparison of our results with those from US studies.

The results reported in Table III strongly support our benchmark hypothesis, Hypothesis 1(a), which states that there is a strong positive market reaction to directors' purchases given their high informational content. For example, Panel A shows that for large trades the two-day CAAR based on the announcement day and the following day from the market model is 3.1% and strongly significantly different from zero whatever the test statistic used.[30] Conversely, the CAAR is significantly negative (–1.27%) over the twenty days prior to purchases. This suggests that directors are able to time their purchases.

Panel A also shows that the market reacts negatively to the announcements of large sales. The CAAR measured over the announcement day and the following day is –0.37% and is significantly different from zero. The positive CAAR follows a period of positive abnormal returns of about 3% over the twenty days preceding the announcement. As with purchases, directors seem to be able to time their sales very well. We conclude that directors' sales are also information-revealing events, but are interpreted as negative news. Hence, we fail to reject Hypothesis 1(b). Our results also confirm Hypothesis 1(c), namely that the absolute market reaction to directors' purchases is larger than that to sales. This is in line with Jeng et al. (1999) and Lakonishok and Lee (2001) for US firms, and Friederich et al. (2002) for UK firms. For instance, Lakonishok and Lee (2001) report that insider purchases trigger 4 times larger abnormal returns than sales. Similarly, for the longer run, Jeng et al. (1999) show that purchases yield significantly higher returns than sales. The reason for this pattern may be that markets attach less informational content to sales because part of the sales may be made due to directors' liquidity needs rather than bad insider news.

[Insert Table III about here.]

The abnormal returns in Panel A of Table III refer to large transactions only. As mentioned above, to facilitate a direct comparison of our results with most US studies which consider all transactions irrespective of size, Panel B and Panel C present the CAARs for all the trades and the subset of small transactions, respectively. The announcement effect for all the purchases is only about one third of that for the large purchases, while the CAAR for all sales is 30% smaller than those for the large sales. Comparing the UK results of Panel B with the US results of Lakonishok and Lee (L&L hereafter) (2001; Table 3), the UK abnormal returns are in absolute terms three times as high as the US ones. Over the 5-day window the UK CAAR for all the purchases (sales) is 1.65% (–0.49%)

---

[30] The two-day CAAR from the market-adjusted model is 2.9% and that from the size-adjusted model is 2.9%. Both are significantly different from zero.

compared to a US CAAR of only 0.59% (0.13%).[31] Finally, in Panel C we observe that the announcement effects of small trades in our sample are much smaller than for the large transactions. The abnormal returns triggered by purchases at the announcement amount to only one quarter (0.79%) of those for the large trades and the sales related returns are one third smaller (–0.25%).

An important question that arises from comparing our results with those from US studies is why the UK CAARs are so much higher. Above, we have already given one explanation, i.e. regulation and the speedier reporting of trades in the UK compared to the US. In the UK, directors' transactions are known to the market within 6 days of the transaction (see Section I). In most cases, the market knows about a trade already within 1 or 2 days. We find that for more than 85% of our transactions the announcement day coincides or immediately follows the transaction date, and that the information is immediately in the public domain via the Regulatory News Service, Reuters and Bloomberg.[32] In the US, directors' trades are announced at the earliest 10 days and at the latest 40 days after the transaction. Furthermore, Lakonishok and Lee (2001) and McConnell et al. (2005) argue that even after a trade has been reported, it takes several days for outsiders to get to know about it. We calculate the abnormal returns for (i) the trades whose transaction and announcement dates coincide (this is the case for 36% of the purchases and 41% of the sales) and (ii) those trades whose transaction date precedes the announcement date in order to examine whether the reporting speed *per se* really matters. For the purchases where the announcement and transaction dates coincide the CAAR(0,1) is 3.9% as compared to only 2.7% for the purchases where the two dates differ. As this difference is statistically significant, it seems that the reporting speed matters for purchases. This suggests that the informational value of insider purchases diminishes over time. Conversely, the difference in the CAAR for sales is not statistically significant.

A second reason why the UK CAARs may be higher than those in the US is that UK directors are not allowed to trade over periods that may cover up to 6 months a year (prior to earnings announcements; see above) whereas US regulation does not impose trading bans. As UK directors trade less frequently, their transactions may contain more information.

Third, the definition of insiders in the US is different from that in the UK. US insiders are officers (comparable to UK executives), directors (comparable to UK non-executives) *as well as* other key

---

[31] L&L do not report the statistical significance of their findings, but mention in a footnote that 'most abnormal returns are significantly different from zero'. Still, they consider that their results are not 'economically significant'.
[32] Throughout the remainder of the paper we focus on returns measured around the announcement date rather than the trading date. We focus on the former, because a director's identity is only disclosed when this information is released via the RNS (and not when the order is placed). The identity of the party trading is even not known by the market maker. This was confirmed by the Financial Services Authority (FSA) as well as several investment trust managers.

employees and large shareholders owning more than 10% of the equity.[33] As some US papers only show aggregate results for insiders, it is not surprising that their CAARs are lower than those from UK studies because some insiders may have less inside information than officers or directors. Even though some US studies exclude large shareholders, the results still cannot be directly compared to those for the UK. Whereas in the UK insiders are defined as executives and non-executives, US insiders comprise (i) officers including the company president, principal financial officer, principal accounting officer, and any vice president in charge of any principal business unit, division, or function (such as sales, administration, or finance), (ii) directors and other persons who perform a policy-making function within the company (Bettis et al. (2000)), as well as (iii) other key employees. Thus, given the more wide-ranging definition of insiders in the US, we expect that US insider trades are less informative and hence trigger smaller price reactions.[34]

Fourth, it is possible that the news released prior to the directors' trades contaminate the abnormal returns around the announcement date.[35] Still, as pointed out in the methodology section, the incidence of directors' transactions within a 2-day or 7-day period subsequent to the release of news is relatively modest for most types of news (apart from news related to the firm's prospects). In Subsection E, a detailed analysis of the impact of news releases on the CARs of directors' trades gives little credence to this fourth reason as the contamination effect by the news items is very modest, except for the announcements of mergers and acquisitions and CEO replacements.

Therefore, we argue that the main reason why 'insider' trades trigger higher CAARs in the UK has to do with differences in regulation and reporting speed.

B. The information hierarchy hypothesis

Hypothesis 2, the information hierarchy hypothesis, postulates that those directors who are more familiar with the day-to-day operations of the company trade on more valuable information. Our dataset distinguishes between five categories of directors: CEOs (including joint CEO-chairmen), other executive directors (the deputy CEO and the financial officer), chairmen (non-executives in more than 90% of the cases), other incumbent directors (both executive and non-executive directors not included in the previous categories), and former directors. Former directors' trades are traced for

---

[33] Not all large shareholders are considered to be insiders. Regardless of the size of their holdings, the following shareholders are not viewed as insiders: commercial banks, brokers, insurance companies, investment banks, investment advisers, employee benefit plans, pension funds and mutual funds.

[34] It should also be noted that some US studies include sales after the exercise of options. We exclude such sales from our study as they reveal less information given that the directors may merely sell to release that part of their remuneration (Friederich et al. (2002), Jeng et al. (1999), and Lustgarden and Mande (1995)).

[35] We are grateful to the referee for suggesting further analysis along these lines.

up to two months after the end of the financial year during which they left the company.[36] The categories are listed in decreasing order of the superior information they are supposed to possess. As the three most senior executives are already included in the first two categories, those of 'CEOs' and 'other top executives' (defined as the deputy CEO and financial director), and there are usually on average three executives on the board of a UK firm, the overwhelming majority of directors in the category of 'other incumbent directors' are non-executives.[37]

We test the information hierarchy hypothesis in two ways. First, we compare the average abnormal returns earned after trades by each of the individual categories of directors. Second, we perform a regression analysis with the two-day CAR as the dependent variable and dummy variables representing the individual categories as explanatory variables. The regressions allow us to control for other factors such as the transaction size, firm size, industry affiliation, simultaneous trading by several directors and information releases just prior to the transactions.

Panel A of Table IV reports the results of the event studies for purchases made by the different categories of directors. The J-form pattern of the abnormal returns around purchases that was observed for the whole sample also applies to the purchases made by all the individual categories of directors. For all the categories of directors, the CAARs are significantly negative over the twenty days prior to the announcement, but become increasingly positive after the announcement day. In general, the CAARs covering the announcement day and the next day range from 2.4% to 3.8%, and are strongly significant. However, there is no support for Hypothesis 2 on the information hierarchy as the differences between the (two-day) CAARs for the different categories of director are not statistically significant (these t-statistics are not reported in the table), apart from the differences between the CAARs of CEOs on one side, and other incumbent (mainly non-executive) directors and former directors on the other side. Surprisingly, the market reaction is weakest for purchases by CEOs (see below for possible explanations).

[Insert Table IV about here.]

Panel B of Table IV summarizes the regression results for directors' purchases. The dependent variable is the CAR covering the announcement day and the following day using the market model as a benchmark. In order to construct mutually exclusive director categories, we use the following algorithm. The dummy 'other top executives' is set to one if the deputy CEO or the financial director buys shares, but the CEO does not purchase any shares. The dummies for chairmen, other

---

[36] Former directors are defined in footnote 24.
[37] The Higgs (2003, p.18) report shows that the average board size of all UK listed firms is 6.7 made out of a chairman (1), the executive directors (3) and the non-executive directors (2.7).

incumbent directors, and former directors, are defined in a similar way. Hence, the constant picks up the effect of the CEO purchasing shares. The coefficients for the other dummy variables then pick up any differential market reaction as compared to the CEO effect. If the coefficients are negative, then the information hierarchy is upheld as the market reaction to the CEO buying shares is highest. If the coefficients are positive, then the market reaction to other types of directors buying is higher than that to the CEO buying. We control for the (relative) transaction size and firm size (market capitalization at the beginning of the year). We also adjust for the possibility of multiple trades, as the fact that, on some days, more than one director of the same company buys shares may strengthen the signal.[38] We use two different types of dummies to adjust for multiple trading. The first one is 'multiple purchases', which is set to one, if more than one director purchases (with a minimum transaction value of 0.1% of the firm's market capitalization) and set to zero otherwise. For example, if both the CEO and a former director buy shares on the same day, then the CEO dummy is set to one (as a CEO is higher up the information hierarchy than a former director) and the 'multiple purchases' dummy is set to one. The second type of dummies is interactive dummies. Using the above example, the CEO dummy is set to one as well as the interactive dummy, 'CEO – multiple purchases'.

Model 1 in Panel B of Table IV shows that the coefficients for all the categories of directors are positive and only one (that for the chairman) is not statistically significant at the 10% level. The information effect of a CEO purchase (measured by the constant which is positive and significantly different from zero) is therefore lowest compared to all the other categories. For example, if a top executive other than the CEO buys shares, the market reaction is 4.9% (2.5+2.4) compared to only 2.5% if the CEO buys. This contradicts Hypothesis 2 on the information hierarchy. Jeng et al. (1999) also do not find any support for the information hierarchy. They explain this as follows: the fact that the market follows CEO transactions more closely may cause CEOs to trade more cautiously and at less informative moments. Another possible explanation is that the positive news associated with purchases of shares is toned down by the negative news that the CEO strengthens his control over the firm to a level that causes entrenchment.

The 'multiple purchases' dummy variable in Model 1 picks up the effect of several directors purchasing shares on the same day. The positive and significant coefficient documents that this constitutes a stronger signal for the market. Model 2 in Panel B shows a similar result: multiple

---

[38] For 96% of all the days on which directors trade, all transactions are either all purchases or all sales. Hence, for only 4% of those days, there are simultaneous purchases and sales . In these cases, an event is labeled as a purchase if the size (measured as a proportion of the firm's market capitalization) of the purchase(s) exceeds the size of the sale(s) by at least 0.1%. If there is more than one (net) purchase exceeding 0.1% of the firm's market capitalization, the 'multiple purchases' dummy is set to one.

purchases make the positive market reaction even stronger. The model includes interaction terms between director-category dummy variables and the dummy for multiple purchases. So, for example, the coefficient on the first interaction term 'CEO – multiple purchases' indicates that, when both the CEO and another director purchase shares on the same day, the CAR is on average double (0.23+0.20) than when only the CEO buys shares. Note that the coefficients on the other interaction terms are not significantly different from zero (these coefficients refer to cases when more than two directors of the other categories purchase shares but the CEO does not). Hence, the results suggest that CEO purchases that are accompanied by purchases by other directors have higher information content than purchases by the CEO alone.

Table V is on the market reaction to sales by the different categories of directors. Panel A reports the market reaction measured by the CAARs. The CAARs are negative for all the directors' categories and are significantly different from zero, except for former directors (for the windows of two, four and six days starting with the announcement day). This suggests that there is no significant market reaction to former directors' sales as their sales are likely to be caused by portfolio diversification needs and hence are not a signal to the market. Similar to purchases, the market reaction to sales by CEOs tends to be lower than that to sales by other directors. Still, the differences are not statistically significant which implies that Hypothesis 2 is not supported.

[Insert Table V about here.]

Panel B of Table V shows the regression results for the sales. Model 3 is similar to Model 1 for purchases in Panel B of Table IV.[39] The regression has very low explanatory power and none of the coefficients on the types of directors is significantly different from zero. The only coefficient which is significantly different from zero (although small in economic terms) is that on multiple sales. This suggests that the market interprets directors' sales as negative news if several directors sell simultaneously. Conversely, if only one director sells, the market seems to treat this as a sale due to liquidity needs rather than bad news. In line with the regressions for purchases, the regression for sales does not uphold Hypothesis 2 on the information hierarchy.

C. The effect of outside ownership

In what follows we test the impact of ownership concentration on the information content of directors' trades (Hypotheses 3 and 4). The two-day cumulative abnormal returns (CARs) are regressed on a set of ownership variables that measure the possible information content of directors'

---

[39] We do not report the equivalent of Model 2 for sales as the model is not significant.

transactions in firms with different categories of blockholders: corporations, individuals or families unrelated to the directors, institutional investors, and directors. A specific ownership concentration dummy is set to one if there is a shareholder of that category owning at least 5% of the equity (this is our definition of a blockholder).[40] We also control for other determinants that may influence the information content of directors' transactions, i.e. simultaneous trading by several directors, transaction value, firm size, book-to-market ratio, profitability, and leverage.

Table VI contains the regression results for directors' purchases whereas Table VII shows the results for sales.[41] The results from Model 4 in Panel A of Table VI for purchases provide strong support for Hypothesis 3(a). The coefficients measuring the information effect of blockholders who are likely to monitor the management – corporations, and individuals or families – are both negative. However, only the coefficient on corporations is significantly different from zero (at the 1% level of significance). Our results confirm that directors' purchases convey less new information when other corporations own a considerable stake in the firm.

[Insert Table VI about here.]

Hypothesis 3(b) postulates that the presence of institutional blockholders has no effect on the signal of directors' transactions. Our findings do not support the hypothesis but support the notion that institutional blockholders do not act as monitors. The coefficient on the institutional investor dummy is positive and highly significant (at the 1% level). This implies that the market reaction is higher for firms with institutional ownership. Thus institutional owners do not act as monitors and hence do not lower the informational asymmetry. Moreover, the fact that institutional investors do not monitor gives them the opportunity to trade on publicly available signals. They seem to follow directors' purchases in order to rebalance their portfolios as their trades strengthen the positive (negative) signal of directors' purchases (sales).[42]

Hypothesis 4(a) postulates that the positive informational effect of directors' purchases is weakened by the danger of (more) entrenchment. Panel A of Table VI supports the hypothesis. The coefficient

---

[40] Dispersed ownership is the base case.

[41] There are 5 very large purchases involving more than 30% of the equity. As such large acquisitions trigger a mandatory tender offer for all shares outstanding, we also run the regressions without these trades. However, this does not change any of the results in models 4-8.

[42] We interviewed 6 fund managers based in the City of London (from Schroder Investment Management, Morgan Stanley, Credit Suisse, Knox d'Arcy and Deutsche Bank London). Five of those managers informed us that some of the funds they manage consider the quality of management, changes in the ownership by directors, the reasons why directors leave, and the change in the equity position of directors who leave when making their investment decisions. Some funds (e.g. Credit Suisse Insider Strategy and funds managed by Knox d'Arcy) use directors' transactions (including those made by directors leaving the firm) to create trading rules. The purchases by the former directors act as a signal of their confidence in the remaining, incumbent management of the firm. The fund managers confirmed that the fact that a director, who leaves the firm or who has recently left liquidates his equity stake, does not constitute a signal to the market. However, if such a director increases his share stakes, this sends important information to the market.

on directors' block ownership is negative and statistically significant. In the presence of substantial ownership by the directors, their purchases convey two important counteracting signals: (i) the positive news about the firm's prospects and (ii) the negative news associated with increased entrenchment. Our results suggest that the latter effect is quite strong (within the 1% level of significance). The adjusted R^2 for Model 4 is more than double that for Models 1 and 2 without the control dummies. However, Models 4 and 5 do not reject the existence of a precommitment effect: in widely-held firms (the base case), directors' purchases trigger strongly significant abnormal returns. As directors' ownership is low, there is as yet no danger of entrenchment.

Model 5 in Panel A tests for the impact of the relative power of the different categories of blockholders on the CARs. We now focus on the effect of the *dominant* blockholder type as opposed to the effect of the presence of a blockholder type regardless of the relative size of its holding. A particular type of blockholder is dominant, if the sum of the shareholdings of this category is larger than that of any other category.[43] Since this set of dummy variables is mutually exclusive, only one dummy variable is equal to one at a time and the dummy variables for all the other categories are equal to zero. Once we have determined which specific category of shareholder dominates a firm, we also use interaction terms that indicate whether the other categories of owners are among the firm's blockholders.[44]

Again, Model 5 presents a test of hypothesis 4(b) which states that there is a danger of potential entrenchment by the directors in the presence of passive outside blockholders, i.e. institutional investors. The coefficient on the dummy of a dominant institutional investor is positive and highly significant which provides support in addition to that obtained from Model 4. More importantly, the interactive term between the dominant institutional investor dummy and the dummy which equals one if the directors are blockholders is negative and highly significant. This implies that when directors are already large shareholders in the presence of a dominant institutional investor, the market no longer perceives their purchases as a signal of good news.

Model 5 fails to support Hypothesis 3(b) as the presence of dominant institutional investors strengthens the positive market reaction to purchases. The interaction term of dominant institutional investors with corporate blockholders shows that the above effect is largely neutralized if corporations are present as blockholders. This provides further evidence for Hypothesis 3(a): monitoring by blockholders reduces the information value of directors' purchases. Moreover, Model

---

[43] When we consider the largest blockholder by category of owner rather than the sum of the category's shareholdings, the results remain largely similar. This makes sense as in most companies there is at most only one large blockholder within each specific category.
[44] We multiply the dominant blockholder dummy by the dummies for individual blockholder categories.

5 confirms the findings of Model 4 in supporting Hypothesis 3(a): the information gap is reduced as the positive market reaction to directors' purchases is less strong when individuals or families are the dominant blockholders.[45]

Model 5 also presents a test of Hypothesis 4(b) which states that there is a danger of potential entrenchment by the directors in the presence of passive outside blockholders, i.e. institutional investors. The coefficient on the dummy of a dominant institutional investor is positive and highly significant. More importantly, the interactive term between the dominant institutional investor dummy and the dummy which equals one if the directors are blockholders is negative and highly significant. This implies that when directors are already large shareholders in the presence of a dominant institutional investor, the market no longer perceives their purchases as a signal of good news.

Panel A of Table VII confirms that the information content of sales is much lower than that of purchases. As stated in Hypothesis 1(c), directors' sales are less informative as some of the sales may be due to liquidity needs. Further, the negative signal of directors' sales is much stronger in smaller firms. This may be due to the higher uncertainty and the lower availability of information about smaller firms as they are, for instance, followed by fewer analysts. The improved liquidity of the stock as a result of the sale may also cause a stronger market reaction. Lakonishok and Lee (2001) observe the same pattern for the US. Panel A of Table VII also shows that with the exception of directors, the presence of specific categories of blockholders has little impact on the CARs (Model 9). When directors are blockholders, a reduction in their control (and hence a reduced potential for private benefits of control) is positively received by the market and reduces the negative signal of directors' sales. This finding supports Hypothesis 4(a).[46] Model 10 is similar to Model 5 in Table VI and is also based on relative ownership. We find that in the presence of dominant institutional investors, the market reaction to directors' sales is significantly negative. However, when the dominance of institutional investors is accompanied by strong ownership by the directors, the market reaction to sales is neutral. This provides further support for Hypothesis 4(b) on entrenchment.

[Insert Table VII about here.]

---

[45] The coefficient on dominant directors in Model 5 of Table VI is not statistically significant which is caused by the fact that there are few companies with dominant directors and that the negative effect of directors' blockholdings is already captured by the interaction terms.

[46] Model 9 does not include the sales transaction value as it was highly correlated with firm size and book-to-market ratio.

D. The effect of bad performance and financial distress

Poor financial performance and near-insolvency is also expected to influence the information content of directors' trades. For the case of purchases, Models 6-8 in Panel B of Table VI are similar to those in Panel A, but include additional regressors consisting of interaction terms between director categories and blockholder types on the one side, and poor performance and/or financial distress, on the other side. We measure poor performance and financial distress by dummy variables that are set to one if there are earnings losses (Model 6), low interest coverage (Model 7)[47] and decreased or omitted dividends (Model 8), respectively. Poor performance and near-insolvency are expected to trigger more intensive shareholder and/or creditor monitoring. We find that purchases cause positive CARs which are substantially higher when the company incurs losses or is financially distressed (see the interaction terms between the directors' types and losses/interest coverage in Models 6 and 7). Thus, in situations of poor performance and near-insolvency, the market interprets purchases as strong positive signals. This supports Hypothesis 5.

The signs and significance levels for the coefficients on the blockholder dummies in Models 6-8 of Panel B are similar to those in Panel A. However, the interaction terms between ownership concentration and poor performance (measured by earnings losses and dividend reductions), or between ownership and near-insolvency (low interest coverage) are not significant. The fact that in poorly performing companies with strong outsiders and directors who can facilitate corporate recovery the directors' trading signal is not stronger suggests that the market does not expect the blockholders to turn around the firm. This result is not at all surprising as poor performance may not only be the consequence of poor management but also poor past blockholder monitoring. To conclude, in the wake of poor performance, the signal of directors' purchasing shares is important irrespective of the shareholder structure.

For directors' sales (Panel B of Table VII), we also use a set of interaction terms between director categories and blockholder types, on one side, and losses (Model 11), low interest coverage (Model 12), and dividend decreases/omissions (Model 13), respectively, on the other side. The results of Models 11 and 12 again strongly support Hypothesis 5 as the interaction term between the incumbent directors' dummy[48] and poor performance is highly significant. This suggests that for poorly performing or financially distressed companies, directors' sales trigger more negative CARs. Table VIII provides an overview of the hypotheses and summarizes the results.

---

[47] The interest coverage becomes dangerously low when it falls below 2. At this stage, a firm's bonds typically lose investment grade (Copeland, Koller and Murrin (1995)).

[48] Using interactive terms based on the individual directors' categories as used in Table VI gave less significant results as the number of observations for individual directors' categories was small.

[Insert Table VIII about here.]

E. The impact of news releases prior to directors' transactions

In the methodology section, we mentioned that it may be important to account for news releases preceding trades as they may be one of the reasons why the CARs we find are larger than those found by studies based on US data. Indeed, the announcement effect may not be due to the directors' transactions but to the release of news. Although, Panel B of Table II has shown that a relatively small percentage of news items are followed by directors' transactions (apart from the announcements relating to the firm's prospects), the CARs may still be significantly influenced by specific types of price-sensitive information.

We rerun Models 1 to 13 and include dummy variables capturing the release of news 2, 7, and 30 days, respectively, prior to the directors' transactions. The results for purchases are reported in Table IX. On the whole, our previous findings are upheld. We also show that most news releases prior to directors' transactions do not have any impact on the value of the signal, not even the frequent announcements about a firm's prospects.

There is one type of news releases which has a significant impact on the CARs. Table IX shows that if news regarding a merger or acquisition is released within the 7 or 30 days prior to a purchase, the market reaction is close to zero. This suggests that directors' purchases do not contain much additional information after an M&A announcement.[49] We also find (weaker) evidence that the information value of directors' trades is reduced when the trade follows within a month after news concerning the replacement of the CEO. These two types of news reduce or even cancel out the otherwise positive market reaction to purchases.

Betzer and Theissen (2004) investigate the market reaction to executives' and non-executives' trades in German firms *prior* to news releases on the firm's prospects. They conclude that '[their] results also provide a rationale for the UK type of regulation that prevents insiders from trading prior to earnings announcements. Trades that occur during the blackout period do have a larger price impact. This is consistent with informational asymmetries between corporate insiders and the capital market being larger prior to earnings announcements'. The reason why the authors argue in favor of trading bans is that insiders trading on inside information in Germany seem to benefit from their informational advantage, which violates the principle of equal treatment of shareholders.

[Insert Table IX about here]

---

[49] The estimation results of models 5-8 with the news dummies are not reported in a table. However, all the tables are available on request from the authors.

As shown in Subsection A, directors' sales are less informative than their purchases. There is little impact of news releases on the market effect of sales. Only when directors sell equity immediately after the replacement of executive directors is the negative sales signal strengthened.

F. Thin trading

Although the abnormal returns are corrected for non-synchronous trading (Dimson and Marsh (1986)), our results may still be biased because of a correlation between the CARs and thin trading.[50] No or limited trading over specific periods may prevent the information conveyed by directors' transactions from being incorporated in the share price. We therefore set up a simple test: we record the number of non-trading days for each firm and classify firms into two categories: 'firms with thin trading' (the number of non-trading days is above the median) and 'firms without thin trading' (the number of non-trading days is below the median). We find that the announcement effect of directors' transactions is negatively related to thin-trading. The purchase announcement effect (CAAR(0,1)) amounts to 3.5% for firms without thin trading whereas it is only 2.7% for firms with thin trading. For sales, the announcement effect for firms with more thin trading is stronger (–0.6%) than that for firms with less thin trading (–0.2%). When we include a thin trading dummy (which equals one if the number of non-trading days is above the median) in models 1-13, we find that the market is more receptive to signals conveyed by directors' trades in firms suffering less from thin trading. However, even when correcting for possible thin trading, all the results from Section IV are upheld.[51]

V. CONCLUSIONS

This study provides a major contribution to the literature on the information content of executive and non-executive directors' trading by analyzing the impact of ownership and control. In order to avoid a contamination of the signal conveyed by the directors' transactions, we adjust the market reaction for recent releases of corporate news related to board and asset restructuring (such as M&A activity and asset disposals), to the firm's prospects, and to other important business events. Several important conclusions emerge. First, consistent with most existing UK and US studies, directors' purchases and sales trigger significant immediate market reactions of 3.12% and –0.37%, respectively, measured over the two-day window starting with the announcement day. The lower market reaction to sales suggests that the market associates a lower informational content with sales,

---

[50] We are grateful to the referee for pointing this out.
[51] All tables are available upon request. The correlation coefficients between share illiquidity and control concentration by category of shareholder are positive but below 0.1. As expected, the correlation between illiquidity and the free float is negative (but only 0.08). The inclusion of a Herfindahl index in all our models – which captures the distribution of the ownership concentration – does not change the results and its coefficient is not statistically significant.

because part of them at least may be due to liquidity needs. As directors are banned from trading prior to earnings announcements it is likely that they trade on additional information relative to that contained in the earnings announcement. Alternatively, earnings announcements do not convey all available information on the company. The existence of trading bans does not appear to curtail the value of the signal.

Second, when several directors trade on the same day, the announcement reaction is stronger. Clearly, multiple trades give more credibility to the signal conveyed to the market.

Third, we do not find support for the information hierarchy hypothesis. Although CEOs are assumed to have the best knowledge about their company's prospects, the information content of their trades is lower than that of other directors' trades. The most plausible explanation is that the FSA and the market may follow CEO transactions more closely, and thus make CEOs trade more cautiously and at less informative moments.

Fourth, there is a strong relation between the presence of specific categories of blockholders and the price reaction to directors' transactions. It is important to distinguish between blockholdings held by directors and different types of outsiders. Additionally, it is also important to distinguish between blockholders who are likely to monitor the management (i.e. corporations, and individuals or families unrelated to the directors) and those who are not (i.e. institutional investors). We find that, if corporations, or individuals or families are blockholders, then the price reaction to directors' purchases is reduced. The presence of institutional investors causes the opposite effect. The evidence is congruent with institutional investors trading on the directors' trade signal. Although the presence of institutional investors strengthens the negative sales signal, the result is less strong than for the purchases.

Fifth, the market reacts to increases and decreases in directors' entrenchment. Generally, the positive impact of directors' purchases is reduced when the directors already own substantial stakes. Conversely, the market reaction resulting from directors' sales is less.

Sixth, the share price reactions to directors' transactions as well as the above effects caused by the firm's control structure remain valid when the transactions are preceded by news on board changes, corporate restructuring, changes in the capital structure and the firm's prospects. However, it is crucial to adjust for news regarding mergers and acquisitions (and to a lesser extent CEO replacements) as these news items cancel out the significant share price reactions to directors' purchases.

Finally, although in general the ownership and control structure has a strong impact, it does not matter in poorly performing or financially distressed firms as in these firms directors' trades always convey stronger signals about the future prospects (perhaps even about the likelihood of survival) irrespective of any potential monitoring or entrenchment effects.

All in all, this paper provides strong evidence that the market takes into account the firm's control structure, the level of director entrenchment and whether there are several directors trading when it reacts to directors' trades.

References

Admati, A. R., Pfleiderer, P., and Zechner, J., 1994, Large Shareholder Activism, Risk Sharing, and Financial Market Equilibrium, Journal of Political Economy 102, 1097-1130.

Barber, B., and Lyon, J. D., 1997, Detecting Long-run Abnormal Stock Returns: The Empirical Power and Specification of Test Statistics, Journal of Financial Economics 43, 341-372.

Bernard, V. L., 1987, Cross-Sectional Dependence and Problems in Inference in Market-Based Accounting Research, Journal of Accounting Research 25, 1-48.

Bettis J. C., Coles, J. L. and Lemmon, M. L., 2000, Corporate Policies Restricting Trading by Insiders, Journal of Financial Economics 57, 191-220.

Betzer, A. and E. Theissen, 2004, Insider Trading and Corporate Governance – The Case of Germany, working paper, University of Bonn.

Brown, S. J., and Warner, J. B., 1985, Using Daily Stock Returns: The Case of Event Studies, Journal of Financial Economics 14, 3-31.

Campbell, J.Y., Lo, A. and MacKinlay, A.C., 1997. The Econometrics of Financial Markets, (Princeton University Press, Princeton, N.J).

Campbell, C., and Wasley, C. E., 1993, Measuring Security Price Performance Using Daily NASDAQ Returns, Journal of Financial Economics 33, 73-92.

Chang, S., and Suk, D. Y., 1998, Stock Prices and Secondary Dissemination of Information: The Wall Street Journal's 'Insider Spotlight' Column, Financial Review 33, 115-128.

Conyon, M. J., and Murphy, K. J., 2000, The Price and the Pauper? CEO Pay in the U.S. and U.K., Economic Journal 110, 640-671.

Copeland, T., Koller, T., and Murrin, J., 1995. Valuation: Measuring and Managing the Value of Companies, (Wiley, New York).

Corrado, C. J., 1989, A Nonparametric Test for Abnormal Security-Price Performance in Event Studies, Journal of Financial Economics 23, 385-395.

Dedman, E., 2004, Discussion of Reactions of the London Stock Exchange to Company Trading Statement, Journal of Business Finance & Accounting 31, 37-47.

Dimson, E., 1979, Risk Measurement when Shares are Subject to Infrequent Trading, Journal of Financial Economics 7, 197-226.

Dimson, E., and Marsh, P., 1986, Event Study Methodologies and the Size Effect, Journal of Financial Economics 17, 113-142.

Dyck, A., and Zingales, L., 2004, Private Benefits of Control: An International Comparison, Journal of Finance 59, 537-600.

Faccio, M. and Lasfer, M. A., 2000, Do Occupational Pension Funds Monitor Companies in which They Hold Large Stakes?, Journal of Corporate Finance 6, 71-110.

Faccio, M., and Lasfer, M. A., 2002, Institutional Shareholders and Corporate Governance: The Case of U.K. Pension Funds, in J. McCahery et al. (eds.), Corporate Governance Regimes: Convergence and Diversity, (Oxford University Press: Oxford), 603-624.

Franks, J., Mayer, C., and Renneboog, L., 2001, Who Disciplines Management in Poorly Performing Companies?, Journal of Financial Intermediation 10, 209-248.

Friederich, S., Gregory, A., Matatko, J., and Tonks, I., 2002, Short-Run Returns around the Trades of Corporate Insiders on the London Stock Exchange, European Financial Management 8 (1), 7-30.

Garfinkel, J. A., 1997, New Evidence on the Effects of Federal Regulation on Insider Trading: The Insider Trading and Securities Fraud Enforcement Act (ITSFEA), Journal of Corporate Finance 3, 89-111.

Goergen, M. and Renneboog, L., 2001, Strong Managers and Passive Institutional Investors in the UK, in F. Barca and M. Becht (eds.), The Control of Corporate Europe, (Oxford University Press: Oxford), 258-284.

Gregory, A., Matatko, J., and Tonks, I., 1997, Detecting Information from Directors' Trades: Signal Definition and Variable Size Effects, Journal of Business Finance and Accounting 24(3), 309-342.

Gregory, A., Matatko, J., Tonks, I., and Purkis, R., 1994, U.K. Directors' Trading: The Impact of Dealings in Smaller Firms, Economic Journal 104, 37-53.

Higgs, D., (2003), The Review of the Role and Effectiveness of the Non-Executive Director, Department of Trade & Industry, http://www.ecgi.org/codes/country_documents/uk/higgsreport.pdf.

Hillier, D., and Marshall, A. P., 1998, The Timing of Directors' Trades, Journal of Business Law, 454-467.

Hillier, D., and Marshall, A. P., 2002, Are Trading Bans effective? Exchange Regulation and Corporate Insider Transactions around Earnings Announcements, Journal of Corporate Finance 8, 393-410.

Holderness, C. G., and Sheehan, D., 1988, The Role of Majority Shareholders in Publicly Held Corporations, Journal of Financial Economics 20, 317-346.

Holmen, M. and P. Högfeldt, 2005, Pyramidal discounts: tunneling or agency costs?, working paper, European Corporate Governance Institute.

Hu, J., and Noe, T., 1997, The insider trading debate, Federal Reserve Bank of Atlanta Economic Review (Fourth Quarter), 34-45.

Jaffe, J. F., 1974, Special Information and Insider Trading, Journal of Business 47, 410-428.

Jain, P., 1986, Analyses of the Distribution of Security Market Model Prediction Errors for Daily Returns Data, Journal of Accounting Research 24 (1), 76-96.

Jeng, L. A., Metrick, A., and Zeckhauser, R., 1999, The Profits to Insider Trading: A Performance-Evaluation Perspective, NBER Working Paper No. 6913.

Jensen, M., and Meckling, W., 1976, Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure, Journal of Financial Economics 3, 305-360.

Johnson, S., La Porta, R., Lopez-de-Silanes, F., and Shleifer, A., 2000, The Near Crash of 1998 – Tunneling, American Economic Review 90, 22-27.

King, M., and Röell, A., 1988, Insider Trading, Economic Policy 7, 163-193.

Lai, J. and Sudarsanam, S., 1997, Corporate restructuring in response to performance decline: impact of ownership, governance and lenders, European Finance Review 1, 197-233.

Lakonishok, J., and Lee, I., 2001, Are Insiders' Trades Informative?, Review of Financial Studies 14, 79-112.

Lakonishok, J., Shleifer, A., and Vishny, R.W., 1994, Contrarian Investment, Extrapolation, and Risk, Journal of Finance 49, 1541-1678.

Leland, H. E., 1992, Insider trading, should it be prohibited?, Journal of Political Economy 100, 859-887.

Lin, J., and Howe, J., 1990, Insider Trading at the OTC Market, Journal of Finance 52, 1273-1284.

Lustgarden, S., and Mande, V., 1995, Financial Analysts' Earnings Forecasts and Insider Trading, Journal of Accounting and Public Policy 14, 233-261.

MacKinlay, A. C., 1997, Event Studies in Economics and Finance, Journal of Economic Literature 35, 13-39.

Maug, E., 1998, Large Shareholders as Monitors: Is there a Trade-Off between Liquidity and Control? Journal of Finance 53, 65-98.

McConnell, J., Servaes, H. and Lins, K., 2005, Changes in Equity Ownership and Changes in the Market Value of the Firm, working paper, London Business School.

Morck, R., Shleifer, A., and Vishny, R. W., 1988, Management Ownership and Market Valuation: An Empirical Analysis, Journal of Financial Economics 20, 293-315.

Persons, O., 1997, SEC's Insider Trading Enforcements and Target Firms' Stock Values, Journal of Business Research 39, 187-194.

Pope, P. F., Morris, R. C., and Peel, D. A., 1990, Insider Trading: Some Evidence on Market Efficiency and Directors' Share Dealings in Great Britain, Journal of Business Finance and Accounting 17, 359-380.

Rozeff, M. S., and Zaman, M. A., 1988, Market Efficiency and Insider Trading: New Evidence, Journal of Business 61, 25-44.

Scholes, M. S., and Williams, J., 1977, Estimating Betas from Nonsynchronous Data, Journal of Financial Economics 5, 309-327.

Seyhun, H. N., 1986, Insiders' Profits, Costs of Trading and Market Efficiency, Journal of Financial Economics 16, 189-212.

Stoughton, N. M., and Zechner, J., 1998, IPO-Mechanisms, Monitoring and Ownership Structure, Journal of Financial Economics 49, 45-77.

APPENDIX

Test statistics

To test the null hypothesis that the cumulative average abnormal returns are equal to zero for a sample of N securities, we use three parametric test statistics:

$$t_{CAAR} = \frac{\frac{1}{N}\sum_{i=1}^{N} CAR_i}{s(CAR)/\sqrt{N}}, \qquad J_1 = \frac{CAAR}{s(CAAR)}, \quad \text{and} \qquad J_2 = \sqrt{\frac{N(L_i - 4)}{L_i - 2}} \frac{1}{N}\sum_{i=1}^{N} \frac{CAR_i}{s(CAR_i)}$$

where CAR_i is the cumulative abnormal return for security i;

$CAAR$ is the cumulative average abnormal return;

$s(CAR_i)$ is the sample standard deviation of the individual cumulative abnormal returns:

$$s(CAR_i) = \sqrt{\sum_{t=t_1}^{t_2} s_i^2} \quad \text{with} \quad s_i = \sqrt{\frac{1}{L_i - 2}\sum_{t=T_{0i}}^{T_{1i}} \left(R_{i,t} - \hat{\alpha}_i - \hat{\beta}_i R_{m,t}\right)^2} \quad \text{which is the usual sample}$$

standard error from the market model regression over the estimation window;

$s(CAAR)$ is the standard deviation of the cumulative average abnormal returns

$$s(CAAR) = \sqrt{\frac{1}{N^2}\sum_{i=1}^{N}\sum_{t=t_1}^{t_2} s_i^2} \quad \text{with } s_i \text{ defined as above.}$$

The t_{CAAR} is the test statistic as in Barber and Lyon (1997). It is Student-t distributed with N-1 degrees of freedom and approaches the normal distribution as N increases. J_1, and J_2 are based on Campbell, Lo and McKinley (1997). The choice between these two statistics depends on the hypotheses regarding the variance of the abnormal returns. If the abnormal return is larger for securities with higher variance, J_1 is preferable as it gives equal weight to the realized cumulative abnormal return of each security. If the true abnormal return is constant across securities, J_2 is preferable as it gives more weight to the securities with the lower abnormal return variance (Campbell et al. 1997:162). For most studies, Campbell et al. argue, the results are expected not to be sensitive to the choice of the above test-statistics because the variance of the CAR is usually of a similar magnitude across securities.

The above test statistics are based on the assumption that returns are jointly normally, independently, and identically distributed. Below, we discuss the following robustness checks: (i) non-normality of abnormal returns, (ii) non-synchronous trading, and (iii) event clustering. To check the robustness of our results with respect to non-normality, we use the non-parametric t_{rank} test – Corrado's (1989) non-parametric rank statistic. This non-parametric rank statistic does not require abnormal returns to be normally distributed. Moreover, Campbell and Wasley (1993) document that, compared to the (parametric) standardized test statistic and to the (parametric) portfolio test statistic, this rank statistic is consistently the best specified and most powerful test statistic across numerous event conditions. It is robust to multi-day event periods, clustered event dates, and increases in variance on the event day.

The non-trading (or non-synchronous trading) effect arises when prices are assumed to be recorded at time intervals of one length when in fact they are recorded at time intervals of other, possibly irregular lengths (MacKinlay (1997)). This can lead to biased betas in the market model. Scholes and Williams (1977) and Dimson (1979) present a consistent estimator of beta in the presence of non-trading that adjusts the beta estimates upwards. This results in smaller abnormal returns for thinly traded securities. However, Jain (1986) shows that, in general, the adjustment for thin trading is not substantial. Campbell and Wasley (1993) also conclude that adjustment according to Scholes and Williams (1977) does not improve the Type I error or the power of parametric test statistics. Furthermore, they show that the rank statistic using the abnormal returns obtained from the market model performs best. Therefore, we also rely on the rank test for the robustness checks of the test-statistics of firms suffering from thin trading.

The above expressions for the standard deviation of the CARs assume that the event windows of individual securities do not overlap. This assumption of absence of clustering allows us to calculate the variance of the sample's cumulative abnormal returns without concern about the covariances across securities as they are zero (MacKinlay (1997)). If this assumption is incorrect, then the parametric tests may be biased. Still, Brown and Warner (1985) conclude that, in general, the use of daily or weekly data makes clustering of events on a single day much less severe than the use of monthly data. Also, diversification across industries further mitigates the problem (Bernard (1987)). The rank statistic takes care of the event clustering problem as it takes cross-sectional dependence into account via the aggregation of the abnormal returns on an individual security into time series of portfolio mean ranks. Campbell and Wasley (1997) show that the rank test is again well-specified, also for multi-day event periods. Therefore, the rank test is a good robustness check in case of event clustering. It should also be noted that event clustering is not a serious problem in this study as the average number of insider transactions per firm over the 8-year period of 1991-1998 is 2.86 purchases and 2.77 sales with medians of 2 for both.

Furthermore, for hypothesis tests over intervals of more than one day, the autocorrelation of the abnormal returns should be taken into consideration. Failure to do so may result in misspecification of the estimated variance of the cumulative average abnormal returns. However, Brown and Warner (1985) show that, even though autocorrelation is present, the benefits from autocorrelation adjustments appear to be limited. Campbell and Wasley (1993) draw a similar conclusion: they show that test statistic specifications are not significantly affected by serial dependence. A shift in the variance and the mean of the returns on the event day resulting from the release of new information may cause another type of misspecification, namely, event-induced variance. Still, Campbell and Wasley (1993) show that the rank test is not liable to such misspecification.

Table I: Summary statistics for directors' trades from 1991-98

Panel A shows the summary statistics for all directors' trades independent of the trades' size. This Panel is comparable to table 1 of Lakonishok and Lee (2001). *'Fraction'* is the fraction of firms with at least one trade. *'# of trades'* is the average number of trades per firm per year. *'% Market capitalization'* is the average across firms of the number of shares traded by the directors over the number of shares outstanding at the beginning of the year. Panels B and C refer to all purchases and sales of UK directors during 1991-98 representing at least 0.1% of a company's market capitalization. *'Trade value'* is the total number of shares traded by the directors times the share price at the beginning of the year. *'CEO', 'Other top executives', 'Chairman'* and *'Other incumbent directors'* represent the dealings of the CEO/managing director, of the deputy CEOs/deputy managing directors/financial directors, the board's chairman and those of all incumbent directors that are neither executives nor chairmen, respectively. *Former directors'* dealings are traced up to 2 months beyond the year in which they left.

Panel A: UK sample description (comparable to Lakonishok and Lee (2001) for directors in US)

	All	Purchases	Sales	Sales post exercise	Sales & sales post exercise	Exercise
Fraction	0.71	0.51	0.33	0.17	0.50	0.24
# of trades	4.26	1.49	0.69	0.40	1.09	0.59
% Market capitalization	0.69%	0.24%	0.46%	0.09%	0.48%	0.14%
Number of firms	1492	1385	1119	690	1203	837

Panel B: Directors' large trades (>0.1% of market capitalization)

	Mean	Median	Minimum	Maximum
Net purchases (2,188 trades)				
Trade value (£'000)	1,076	36	0.019	1,590,000
% Market capitalization	0.96%	0.27%	0.10%	77.45%
% Market capitalization by category of director				
CEO (582 trades)	1.04%	0.31%	0.10%	77.45%
Other top executives (112 trades)	1.29%	0.28%	0.10%	44.29%
Chairman (492 trades)	1.30%	0.36%	0.10%	52.27%
Other incumbent directors (606 trades)	1.34%	0.29%	0.10%	77.45%
Former directors (396 trades)	1.51%	0.31%	0.10%	77.45%
Net sales (2,347 trades)				
Trade value (£'000)	1,305	147	0.032	81,300
% Market capitalization	1.38%	0.48%	0.10%	39.05%
% Market capitalization by category of director				
CEO (490 trades)	1.85%	0.82%	0.10%	18.47%
Other top executives (115 trades)	1.58%	0.54%	0.11%	14.43%
Chairman (350 trades)	2.07%	0.69%	0.10%	39.05%
Other incumbent directors (766 trades)	1.29%	0.46%	0.10%	39.05%
Former directors (626 trades)	1.55%	0.51%	0.10%	23.62%

Table I continued

Panel C: Ownership structure

	% of firms with share stake >5%	Mean % of ownership	Min. % of ownership	Max.% of ownership	Median % of ownership
Firms with net purchases					
All blockholders with more than 5%	69.1%	41.6%	2.6%	97.0%	40.9%
All outsiders	65.1%	28.2%	2.0%	97.0%	26.0%
Corporations	17.9%	14.5%	1.5%	76.3%	8.7%
Institutional investors	60.0%	22.6%	2.0%	81.8%	19.8%
Individual outsiders	23.8%	9.2%	1.1%	34.2%	7.5%
All directors	42.0%	24.8%	1.0%	77.6%	18.2%
Firms with net sales					
All blockholders with more than 5%	66.1%	34.5%	2.0%	89.0%	32.2%
All outsiders	62.0%	22.0%	1.1%	65.6%	18.6%
Corporations	13.8%	13.6%	0.9%	50.0%	8.5%
Institutional investors	55.6%	18.2%	1.1%	62.3%	16.4%
Individual outsiders	16.2%	10.0%	0.9%	34.7%	7.0%
All directors	39.9%	23.0%	1.1%	88.0%	16.5%

Table II: Frequency of each type of news announcement.

Panel A shows the incidence of news announcements by category and by year. *'Prospects'* is a forward-looking statement on the company's performance. *'Business event'* contains news that is deemed to be price sensitive but not included in any of the preceding categories: it relates to a name change, the signing of a new contract, a product launch, a change in accounting policy, a debt roll-over, a move to the AIM market, and a change of sector. Panel B shows the incidence of purchases subsequent to news releases.

Panel A: Occurrence of news items by type of information content					
	1995	1996	1997	1998	Average % for 95-98
News on changes to the board / advisers					
CEOs	68	80	117	143	2.7 %
Executive directors (excluding CEOs)	293	430	641	669	13.4 %
Non-executive directors	229	327	408	503	9.7 %
Advisors, auditors, solicitors	27	38	66	84	1.4 %
News on corporate / equity restructuring					
Mergers, acquisitions, joint ventures	228	391	618	870	13.9 %
Asset disposals	54	84	227	224	3.9 %
Changes in capital structure, seasoned equity offerings and share buy backs	47	107	243	449	5.6 %
News on prospects / other business event					
Prospects	1123	1303	1404	1461	35.0 %
Other business event	127	291	788	976	14.4 %
Total	2196	3051	4512	5379	100 %

Panel B: Incidence of purchases after news releases (1995-98)

Number of purchases preceded by		**2 days**	**7 days**	**30 days**
A news release during this period:		178	251	457
No news release during this period:		1266	1193	987
Number of firms with a news item on		**2 days**	**7 days**	**30 days**
CEO change	215			
Subsample of firms with purchases:		6 (2.8%)	6 (2.8%)	11 (5.1%)
Executive director change	464			
Subsample of firms with purchases:		17 (3.7%)	30 (6.5%)	68 (14.7%)
Non-executive director change	429			
Subsample of firms with purchases:		17 (4.0%)	17 (4.0%)	40 (9.3%)
M&A	393			
Subsample of firms with purchases:		11 (2.8%)	22 (5.6%)	38 (9.7%)
Asset disposals	268			
Subsample of firms with purchases:		2 (0.7%)	2 (0.7%)	6 (2.2%)
Capital structure change	321			
Subsample of firms with purchases:		9 (2.8%)	13 (4.1%)	31 (9.7%)
Firm's Prospects	513			
Subsample of firms with purchases:		75 (14.6%)	93 (18.1%)	144 (28.1%)
Business event	417			
Subsample of firms with purchases:		12 (2.9%)	20 (4.8%)	45 (10.8%)

Table III: Market reaction to directors' transactions around the announcement day

This table reports the cumulative average abnormal returns (CAARs) for directors' purchases and sales for three intervals around the announcement day of the transactions. Panel A covers the trades of at least 0.1% of a company's market capitalization, Panel B deals with all the trades irrespective of transaction size, and Panel C reports the abnormal returns of the trades making out less than 0.1% of market cap. The β_i's are estimated over the (–200;–21)-day window. The test statistics are described in the appendix and in the methodology section.

Panel A: Large trades (>0.1%)

	CAAR (-20;-1)	CAAR (0;1)	CAAR (0;4)
Large purchases (1,861 trades)			
CAAR	-1.27%	3.12%	4.62%
t_{CAAR}	-2.66	14.84	17.14
J_1	-3.63	28.29	26.46
J_2	-11.81	41.30	39.54
t_{rank}	-2.50	9.17	8.89
Large sales (2,004 trades)			
CAAR	3.07%	-0.37%	-0.53%
t_{CAAR}	8.68	-4.69	-4.51
J_1	14.38	-5.42	-5.01
J_2	22.74	-7.01	-6.16
t_{rank}	7.58	-4.92	-3.95

Panel B: All trades

	CAAR (-20;-1)	CAAR (0;1)	CAAR (0;4)
All purchases (10,140 trades)			
CAAR	-2.01%	1.16%	1.65%
t_{CAAR}	-13.38	20.78	21.95
J_1	-18.71	34.15	30.73
J_2	-35.21	42.21	39.15
t_{rank}	-6.73	7.65	7.15
All sales (5,523 trades)			
CAAR	2.29%	-0.26%	-0.49%
t_{CAAR}	13.54	-6.05	-7.96
J_1	20.89	-7.38	-9.01
J_2	29.98	-8.23	-10.94
t_{rank}	8.96	-4.51	-4.98

Panel C: Small trades (<0.1%)

	CAAR (-20;-1)	CAAR (0;1)	CAAR (0;4)
Small purchases (8,378 trades)			
CAAR	-2.18%	0.79%	1.07%
t_{CAAR}	-14.30	15.62	15.46
J_1	-20.74	23.82	20.38
J_2	-34.14	28.93	25.93
t_{rank}	-7.56	6.52	5.89
Small sales (3,519 trades)			
CAAR (Market model)	1.84%	-0.25%	-0.55%
t_{CAAR}	10.81	-6.59	-8.59
J_1	15.62	-6.87	-9.30
J_2	20.50	-7.17	-10.47
t_{rank}	8.29	-3.96	-5.14

Table IV: Market reaction to directors' purchases according to director categories

Panel A reports the CAARs of directors' share purchases (of at least 0.1% of the market capitalization) based on the market model. The announcement day is day 0. *'CEOs'* and *'Chairmen'* stand for the CEOs/managing directors and chairmen of the board, respectively. *'All top executive directors'* represents the CEOs, deputy CEOs, and financial directors. *'Other incumbent directors'* are all directors not included in previous categories. *'All incumbent directors'* comprise CEOs, top executive directors, chairmen, and other incumbent directors. *'Former directors'* refers to former directors whose trades are traced up to 2 months subsequent to the year in which they left the firm. In Panel B, the dependent variable is CAR(0,1). The number of observations is 1905. All models include year and industry dummies. All coefficients are adjusted for heteroscedasticity (White procedure). *'CEO'* equals 1 if the CEO purchases shares. *'CEO – multiple purchases'* is set to 1 when a CEO and at least 1 other director purchase on the same day. *'Other top executives'* is 1 when a deputy CEO/managing director, or the finance director purchases while the CEO does not. *'Chairman'* equals 1 if he buys while the CEO or other executives do not. *'Other incumbent directors'* is 1 if directors (excluding the CEO, another executive, or the chairman) buy while no CEO, other executive, or chairman buys. *'Former directors'* is set to 1 if a former director buys while no incumbent director buys. *'Other top executives (chairmen, other incumbent directors, or former directors) – multiple purchases'* equals 1 if at least 1 director of that category buys while another director also buys. *'Multiple purchases'* is set to 1 if more than one director buys on the same day. *'Transaction size'* is the total number of shares bought by directors (over a day) over the total number of shares outstanding at the beginning of the year. *'Market capitalization'* is the total number of shares outstanding at the beginning of the year times the share price on the first trading day of that year. [a] For the (0,1) event window, the difference in CAARs for CEO and former directors is significantly different at the 5% level (t=2.07), as is the differences in CAARs of CEOs and other incumbent directors at 10% (t=1.91).

Panel A: CAARs by director type

Event window	CAAR (-20;-1)	CAAR (0;1)	CAAR (0;3)	CAAR (0;5)	# of observations
CEOs	-2.76%	2.38%[a]	3.71%	4.53%	582
t-statistic	-3.76	6.35	8.55	9.37	
All top executive directors	-2.57%	2.71%	4.19%	4.98%	677
t-statistic	-3.87	7.54	9.99	10.81	
Chairmen	-1.40%	3.17%	5.02%	6.26%	493
t-statistic	-1.57	6.98	9.02	9.81	
Other incumbent directors	-2.12%	3.51%[a]	5.17%	5.64%	572
t-statistic	-2.52	7.68	9.53	10.07	
All incumbent directors	-2.40%	2.92%	4.43%	5.14%	1591
t-statistic	-5.12	11.86	14.81	15.74	
Former directors	-2.50%	3.83%[a]	6.34%	7.21%	396
t-statistic	-2.09	6.47	8.61	8.77	

Panel B: Cross-sectional regression results with CAR(0,1) as the dependent variable

	Model 1		Model 2	
	coef.	t-stat.	coef.	t-stat.
Constant	0.025	2.76	0.023	2.62
CEOs – multiple purchases	–	–	0.020	1.78
Other top executives	0.024	2.03	0.020	1.57
Other top executives – multiple purchases	–	–	0.034	1.20
Chairman	0.008	1.29	0.010	1.70
Chairman – multiple purchases	–	–	0.003	0.15
Other incumbent directors	0.010	1.66	0.012	2.03
Other current dirrectors – multiple purchases	–	–	0.004	0.13
Former directors	0.020	2.76	0.021	2.75
Former directors – multiple purchases	–	–	0.017	0.81
Multiple purchases	0.015	1.87	–	–
Transaction size	-0.216	-1.40	-0.214	-1.41
Market capitalization	-0.039	-1.21	-0.041	-1.10
Adjusted R^2	1.40%		1.29%	
F	2.59		1.96	

Table V: Market reaction to directors' sales according to director categories

Panel A reports the market model-based CAARs of directors' share sales (of at least 0.1% of the market capitalization). The announcement day is the event day. The definitions are similar to those in Table IV, but refer to sales rather than purchases. Model 3 includes time and industry dummies. It has 1993 observations. [a] For the (0,1) event window, the difference in CAARs for current and former directors is significantly different at 10% significance level. All other pair-wise tests on differences of CAARs (0;1) are not statistically significant.

Panel A: CAARs by type of director

Event window	CAAR (-20;-1)	CAAR (0;1)	CAAR (0;3)	CAAR (0;5)	# observations
CEOs	3.49%	-0.42%	-0.58%	-0.81%	490
t-statistic	5.96	-2.86	-2.66	-2.98	
All top executive directors	3.42%	-0.48%	-0.67%	-0.95%	563
t-statistic	5.88	-3.26	-3.17	-3.60	
Chairmen	3.19%	-0.50%	-0.56%	-0.88%	350
t-statistic	4.72	-3.15	-2.46	-3.17	
Other incumbent directors	3.05%	-0.59%	-0.77%	-1.06%	684
t-statistic	4.97	-4.52	-4.48	-4.97	
All incumbent directors	3.31%	-0.46%	-0.59%	-0.84%	1476
t-statistic	8.76	-5.26	-5.05	-5.73	
Former directors	2.61%	-0.16%[a]	-0.20%	-0.18%	626
t-statistic	3.53	-1.10	-0.98	-0.77	

Panel B: Cross-sectional regression results with CAR(0,1) as the dependent variable

	Model 3	
	coef.	t-stat.
Constant	-0.004	-1.54
Other top executives	-0.004	-0.74
Chairman	-0.001	-0.43
Other incumbent directors	-0.001	-0.36
Former directors	0.002	0.83
Multiple sales	-0.005	-2.12
Transaction size	0.068	1.05
Market capitalization	-0.700	-1.50
Adjusted R^2	0.52%	
F	1.20	

Table VI: Market reaction to directors' purchases and control structure

The dependent variable is as defined in Panel A of Table IV. *'Concentrated blockholder dummies – corporations, institutional investors, individuals / families and directors'* are dummy variables. All these dummy variables equal 1 if a blockholder of the corresponding type holds a stake of at least 5% of the equity and is 0 otherwise. *'Dispersed ownership'* is a dummy which is set to 1 if the firm does not have a blockholder. *'Dominant blockholder dummies – corporation, institutional investor, individual and insider'* are dummy variables set to 1 if the sum of all the blocks of that type of blockholder is the largest compared to the combined stakes of other blockholder types. *'With corporation, institutional investor, individual, or directors present'* is an interaction term between the 'dominant' blockholder dummy and a 'concentrated' blockholder dummy of another type. Director categories are defined as in Panel B of Table IV. *'Transaction value'* is the value of the share block purchased by the director and it is defined as natural log of total number of shares transacted by a director times the price per share at the beginning of the calendar year. *'Size'* is the natural log of total number of employees at the beginning of the year. *'B/M ratio'* is the book value divided by the market value, both measured at the beginning of the year. *'ROE'* and *'Leverage'* are the return on equity and the debt-equity ratio at the beginning of the year, respectively. The *'Negative earnings'* dummy in Panel B equals 1 if earnings after tax in the previous year is negative. *'Low interest coverage'* equals 1 if the interest coverage at the beginning of the year is below two. *'Dividend decrease'* is set to 1 if the firm decreased or omitted the dividend over the previous year. All models include year and industry dummies. The number of observations in Panel A is 1428 and 1481 in Panel B.

Panel A: Regressions with dominant blockholders

	Model 4		Model 5	
	coef.	t-stat.	coef.	t-stat.
Constant	0.050	2.16	0.044	1.95
Other top executives	0.016	1.51	0.015	1.35
Chairmen	0.002	0.36	0.003	0.52
Other incumbent directors	0.009	1.16	0.009	1.18
Former directors	0.015	2.00	0.016	2.15
Concentrated blockholder dummies				
Corporations	-0.021	-2.84	–	–
Institutional investors	0.013	2.29	–	–
Individuals / families	-0.010	-1.58	–	–
Directors	-0.014	-2.59	–	–
Dominant blockholder dummies				
Dominant corporations	–	–	0.007	0.28
with institutional investors present	–	–	-0.016	-0.69
with individuals/families present	–	–	0.021	1.04
with directors present	–	–	-0.027	-1.21
Dominant institutional investors	–	–	0.027	3.08
with corporation present	–	–	-0.029	-2.90
with individuals/families present	–	–	-0.013	-1.15
with directors present	–	–	-0.026	-3.10
Dominant individuals/families	–	–	-0.021	-2.28
with institutional investors present	–	–	0.019	0.94
Dominant directors	–	–	0.011	1.26
with corporation present	–	–	-0.058	-2.20
with institutional investors present	–	–	-0.006	-0.67
with individuals/families present	–	–	-0.017	-1.75
Other variables				
Multiple purchases	0.014	1.56	0.014	1.62
Transaction value	-0.001	-0.67	-0.002	-0.70
Size	-0.001	-0.20	0.000	-0.16
B/M ratio	-1.609	-0.86	-2.289	-1.22
ROE	1.687	2.41	1.644	2.29
Leverage	0.002	0.94	0.003	0.98
Adjusted R^2	3.35%		4.57%	
F	2.15		2.06	

Table VI continued

Panel B: Regressions with concentrated blockholders and loss dummies

	Model 6		Model 7		Model 8	
	Negative earnings		Low interest coverage		Dividend decrease	
	coef.	t-stat.	coef.	t-stat.	coef.	t-stat.
Constant	0.045	1.95	0.044	1.87	0.048	2.04
Other top executives	0.012	1.07	0.015	1.17	0.009	0.89
Chairman	-0.004	-0.58	-0.006	-0.89	0.002	0.34
Other incumbent directors	0.007	0.94	0.010	1.28	0.007	0.85
Former directors	0.024	2.66	0.023	2.47	0.017	2.02
Concentrated blockholder dummies						
Corporations	-0.020	-3.08	-0.020	-2.96	-0.021	-2.38
Institutional investors	0.012	1.96	0.014	2.21	0.012	1.97
Individuals / families	-0.010	-1.38	-0.018	-2.61	-0.011	-1.52
Directors	-0.011	-1.72	-0.010	-1.61	-0.010	-1.70
Interaction term: director category x loss dummy						
CEO	0.052	2.11	0.038	1.79	0.001	0.05
Other top executives	0.063	1.97	0.041	1.50	0.027	0.70
Chairman	0.071	2.60	0.056	2.45	-0.003	-0.13
Other incumbent directors	0.062	2.24	0.035	1.41	0.010	0.44
Former directors	0.023	0.87	0.016	0.68	-0.013	-0.55
Interaction term: blockholder x loss dummy						
Corporations	-0.011	-0.66	-0.011	-0.73	0.002	0.14
Institutional investors	-0.031	-1.53	-0.022	-1.30	0.006	0.40
Individuals / families	-0.008	-0.48	0.018	1.18	0.008	0.48
Directors	-0.028	-1.72	-0.017	-1.25	-0.014	-0.94
Dispersed	-0.056	-2.22	-0.032	-1.46	0.016	0.63
Other variables						
Multiple purchases	0.013	1.48	0.013	1.44	0.013	1.41
Transaction value	-0.001	-0.53	-0.001	-0.49	-0.001	-0.58
Size	-0.001	-0.21	0.000	-0.19	-0.001	-0.24
B/M ratio	-2.456	-1.18	-2.594	-1.24	-1.602	-0.82
ROE	1.454	2.05	1.717	2.36	1.518	2.29
Leverage	0.002	0.99	0.002	0.83	0.002	0.79
Adjusted R^2	4.62%		4.44%		3.74%	
F	2.13		2.11		1.69	

Table VII: Market reaction to insider sales and control structure

All variables are as defined in Tables IV and VI. All models include year and industry dummies. The number of observations is 1681.

Panel A: Regressions with dominant blockholders

	Model 9		Model 10	
	coef.	t-stat.	coef.	t-stat.
Constant	0.007	1.27	0.005	0.99
Other top executives	0.001	0.15	-0.001	-0.05
Chairmen	0.001	0.43	0.001	0.49
Other incumbent directors	0.001	0.32	0.001	0.32
Former directors	0.004	1.48	0.004	1.59
Concentrated blockholder dummies				
Corporations	-0.001	-0.32	–	–
Institutional investors	-0.002	-0.99	–	–
Individuals / families	-0.004	-1.63	–	–
Directors	0.004	2.01	–	–
Dominant blockholder group dummies				
Dominant corporations	–	–	-0.003	-0.57
with institutional investors present	–	–	0.007	0.96
with individuals/families present	–	–	0.020	1.36
with directors present	–	–	-0.009	-1.03
Dominant institutional investors	–	–	-0.004	-1.83
with corporation present	–	–	-0.009	-1.82
with individuals/families present	–	–	-0.005	-1.21
with directors present	–	–	0.005	1.97
Dominant individuals/families	–	–	-0.008	-1.24
with institutional investors present	–	–	0.016	1.65
with directors present	–	–	-0.009	-0.85
Dominant directors	–	–	0.002	0.61
with corporation present	–	–	0.010	1.15
with institutional investors present	–	–	0.002	0.42
with individuals/families present	–	–	-0.007	-1.69
Other variables				
Multiple sales	-0.004	-1.61	-0.004	-1.64
Size	-0.002	-2.36	-0.001	-2.01
B/M ratio	-0.714	-0.80	-0.880	-0.95
ROE	3.410	1.09	3.710	1.15
Leverage	0.348	0.79	0.505	1.07
Adjusted R^2	2.02%		3.30%	
F	1.55		1.57	

Table VII continued

Panel B: Regressions with concentrated blockholders and loss dummies

	Model 11		Model 12		Model 13	
	Negative earnings		**Low interest coverage**		**Dividend decrease**	
	coef.	t-stat.	coef.	t-stat.	coef.	t-stat.
Constant	0.008	1.54	0.008	1.55	0.007	1.46
Former directors	0.002	1.00	0.002	0.96	0.004	1.72
Concentrated blockholder dummies						
Corporations	0.000	0.09	-0.001	-0.31	0.000	-0.01
Institutional investors	-0.001	-0.70	-0.002	-1.03	0.000	-0.11
Individuals / families	-0.002	-0.79	-0.003	-1.14	-0.005	-1.70
Directors	0.004	1.96	0.004	1.97	0.003	1.54
Interaction term: director category x loss dummy						
Incumbent directors	-0.038	-3.10	-0.031	-2.71	-0.015	-0.96
Former directors	-0.031	-2.41	-0.023	-1.98	-0.018	-1.27
Interaction term: blockholder x loss dummy						
Corporations	0.005	0.61	0.009	1.15	-0.010	-0.59
Institutional investors	0.020	1.88	0.019	1.88	-0.006	-0.49
Individuals / families	-0.010	-1.18	-0.006	-0.69	0.010	0.98
Directors	0.015	1.93	0.009	1.18	0.021	1.84
Dispersed	0.041	3.16	0.029	2.41	0.025	1.53
Other variables						
Multiple sales	-0.004	-1.87	-0.004	-1.91	-0.004	-1.79
Size	-0.002	-2.34	-0.002	-2.31	-0.002	-2.36
B/M ratio	-0.663	-0.73	-0.394	-0.44	-0.642	-0.69
ROE	2.666	0.99	2.546	0.91	3.418	1.12
Leverage	0.527	1.19	0.448	1.02	0.315	0.70
Adjusted R^2	3.32%		2.79%		3.03%	
F	1.94		1.61		1.62	

Table VIII: Summary of findings

Directors' share dealings	Purchases		Sales	
Hypothesis	Expected announcement effect	Hypothesis confirmed (Y/N)	Expected announcement effect	Hypothesis confirmed (Y/N)
H1(a)/(b) Announcement effect	positive	Yes	negative	Yes
H1(c) The absolute value of the market reaction to purchases is higher than that to sales	higher absolute reaction to purchases	Yes	lower absolute reaction to sales	Yes
H2 Information hierarchy	more strongly positive for executives	No	more strongly negative for executives	No
H3(a) Monitoring outsider blockholders reduce informational asymmetry	less positive	Yes	less negative	No
H3(b) Institutional investors do not have any impact on the market reaction	no impact	No, institutions follow directors	no impact	No, institutions follow directors
H4(a) Director entrenchment reduces the market reaction	less positive in firms with strong directors'	Yes	less negative	Yes
H4(b) Market is more concerned about director entrenchment in presence of passive shareholders investors and is less concerned in presence of monitoring shareholders	weaker positive effect in the presence of institutional investors	Yes	weaker negative effect in the presence of institutional investors	Yes
H(5) Poor performance / financial distress triggers stronger market reactions	strongly positive	Yes	strongly negative	Yes
Other findings				
With multiple transactions	more strongly positive	Yes	more strongly negative	Yes
With larger transaction size	more strongly positive	No	more strongly negative	No
With smaller corporate size	more strongly positive	No	more strongly negative	Yes
Immediately after news releases	no impact	No; only reduced market reaction for news on M&A and CEO changes	no impact	No; only reduced negative reaction to exec. director change
In firms with thin trading	less strongly positive	Yes	less strongly negative	Yes

Table IX: The impact of news releases prior to directors' purchases

This table shows Model 4 which now also includes the news releases. The dependent variable is CAR(0,1) around the announcement date. The number of observations is 873. The variables on the news items are dummies which equal 1 for 'CEO', 'Executive directors' and 'Non-executive directors' if there is news on changes to each of these types of board positions, respectively. A second set of dummy variables equals 1 in case of news relating to corporate and capital restructuring: 'mergers and acquisitions', 'asset disposals', 'capital structure changes' (including a new stock issue to pay off existing debt), and 'equity buybacks', respectively. A third set of dummies equals 1 when there is news on the 'firm's prospects' and on other 'business events' (e.g. a name change, the signing of a new contract, a product launch, a change in accounting policy, a debt roll-over, a move to the AIM market, and a change of sector), respectively. All other independent variables are defined as in Table VI. All models include year and industry dummies.

Timing of news	Up to 2 days prior to purchase		Up to 7 days prior to purchase		Up to 30 days prior to purchase	
	coef.	t-stat.	coef.	t-stat.	coef.	t-stat.
Constant	0.069	2.36	0.068	2.30	0.071	2.41
Other top executives	0.015	1.20	0.015	1.20	0.013	1.01
Chairmen	0.002	0.27	0.003	0.42	0.003	0.41
Other incumbent directors	-0.008	-0.93	-0.008	-0.98	-0.008	-0.99
Former directors	0.015	1.24	0.016	1.32	0.018	1.49
Concentrated blockholder						
Corporations	-0.028	-2.58	-0.028	-2.57	-0.028	-2.57
Institutional investors	0.006	0.99	0.006	1.03	0.007	1.17
Individuals / families	-0.016	-1.77	-0.016	-1.69	-0.017	-1.89
Directors	-0.011	-1.85	-0.011	-1.87	-0.011	-1.80
News items on:						
CEOs	-0.102	-1.33	-0.114	-1.41	-0.058	-1.98
Executive directors	0.002	0.05	0.001	0.03	0.001	0.08
Non-executive directors	0.028	0.74	0.013	0.60	0.012	0.87
Mergers and acquisitions	-0.060	-1.48	-0.041	-2.26	-0.035	-3.04
Asset disposals	0.007	0.15	-0.016	-0.42	-0.024	-1.05
Capital structure changes	0.004	0.11	-0.006	-0.32	-0.012	-0.91
Equity buybacks	-0.015	-1.32	-0.015	-1.28	-0.018	-1.79
Firm's prospects	0.008	0.53	0.008	0.79	0.008	1.14
Business events	-0.072	-1.64	-0.034	-1.35	-0.016	-0.95
Other variables						
Multiple purchases	0.005	0.46	0.005	0.44	0.007	0.57
Transaction value	-0.004	-1.19	-0.004	-1.12	-0.004	-1.23
Size	-0.001	-0.17	-0.001	-0.22	-0.001	-0.27
B/M ratio	-2.506	-1.03	-2.574	-1.06	-2.649	-1.12
ROE	1.733	2.32	1.780	2.36	1.882	2.47
Leverage	0.003	0.72	0.004	0.80	0.004	0.88
Adjusted R^2	5.81%		5.19%		5.31%	
p-value of F-test	0.00		0.00		0.00	