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Why are abnormal returns after insider transactions larger in better shareholder protection countries?*

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Abstract

We use a unique data set of around 100 thousand reported insiders' share purchases across 15 European countries and the US to analyze the link between country-level shareholder protection and abnormal returns following insider trades. Our analysis shows that abnormal returns are positively correlated with country-level shareholder protection against expropriation by corporate insiders. We test two possible explanations for this positive relationship: information content hypothesis and substitution hypothesis. The data support the information content hypothesis that associates abnormal returns with the information conveyed by the trades to outside investors. Market reaction to insider purchases increases with shareholder protection because shareholder protection enhances transparency and trustworthiness of insiders' actions, limits possibilities for direct profit diversion and thus more information is eventually reflected in stock prices. We find rather limited support for the substitution hypothesis which conjectures that insiders in stronger shareholder protection countries substitute direct corporate rent extraction with insider trading profits.

JEL classification: G14, G34

Keywords: Shareholder protection, Insider trades, Rent extraction, Information content

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1. Introduction

Prior literature based on one-country samples documents significant abnormal returns following reported share transactions by corporate insiders, which suggests that insiders use their superior information about their firms when trading.¹ As the issue of insider trading has led to many controversies regarding the role and importance of insiders' transactions, an analysis of the link between abnormal returns after insider trades and country-level shareholder protection seems to be particularly appealing and important. This link is quite natural as corporate governance affects insider behavior and actions. At the same time, however, ample empirical evidence indicates that country-level corporate governance is the key factor shaping insider behavior (La Porta et al. (2000); Leuz et al. (2003); Doidge et al. (2007)). Still, empirical evidence on the relationship is so far missing in the literature. In this paper, we analyze this issue on a unique data set of reported insider transactions across 15 European countries and the US.

To draw predictions on how shareholder protection may influence price changes after insider trades, we would like to build on the discussion in the academic literature as well as arguments stemming directly from insider trading regulations. Perhaps not surprisingly, no clear-cut view prevails. Insider trading regulations in many countries around the world clearly prohibit trading on the basis of 'material' and 'non-public' information. The regulations are usually justified as providing fairness and equity (Bainbridge (2000)) and, hence, they aim to limit rent extraction by informed inside traders at the expense of less informed outside investors. At the same time, however, regulators acknowledge that transactions by corporate insiders should be disclosed in a timely manner as they provide 'a highly valuable source of information to investors' (EU Market Abuse Directive).² Academic literature also reflects the

¹ See e.g., Seyhun (1986), Datta and Iskandar-Datta (1996) and Ravina and Sapienza (2009) for US evidence, Friederich et al. (2002) and Fidrmuc et al. (2006) for UK evidence, and Betzer and Theissen (2009) for evidence from Germany.

² Also the US SEC acknowledges that "many investors believe that reports of directors' and executive officers' transactions in company equity securities provide useful information as to management's views of the performance or prospects of the company" (Brochet (2010), footnote 2).

two arguments of rent extraction and information content. Ausubel (1990), Leland (1992) and Fishman and Hagerty (1992) argue that insider trading transfers wealth from uninformed investors to informed insiders and results in adverse effects of insider trading on investment, liquidity and informational efficiency of the stock market. In a similar vein, Fried (1998) and Bebchuk and Fried (2003) present abnormal trading profits made by corporate insiders as agency costs. In contrast, Manne (1966) and Carlton and Fischel (1983) stress the informational role of insider trading and argue that insider trading helps information to flow and stock prices to reflect private information faster. In support of the informational role of insider trades, Piotroski and Roulstone (2004) document that insider trading increases the relative amount of firm-specific information incorporated in stock prices, and Aktas et al. (2008) find that price discovery is faster on insider trading days.

An analysis of the link between investor protection and abnormal returns following insider transactions should therefore explore the two dimensions of rent extraction and information content. In this context, we consider two sets of hypotheses. First, approaching insider trading as a mechanism for rent extraction, better shareholder protection might curb insider trading and result in lower insider profits (the *monitoring hypothesis*). Alternatively, shareholder protection might curb only profit diversion by insiders directly from the firm and therefore leave open space for more rent extraction through insider trading and result in larger insider profits (the *substitution hypothesis*). Second, exploring the informational role of insider transactions for outside investors, we propose another set of opposing hypotheses: The *ex-ante information hypothesis* emphasizes the impact of good governance on better pre-event information environments that in turn has a diminishing effect on post-trade abnormal returns. Alternatively, the *information content hypothesis* emphasizes the process of information incorporation into stock prices and conjectures that insider trades convey more information to outside investors in better shareholder protection economies reflecting lower overall profit

diversion, higher corporate transparency and higher insider trustworthiness. Our empirical strategy is to see which of the hypotheses have support in the data.

Our analysis focuses on purchase transactions as they are, on average, much more likely relative to sales to be driven by non-public information and therefore they are more suitable for testing the rent extraction and information content explanations. Sell transactions tend to be motivated by diversification and liquidity needs rather than information (e.g., Lakonishok and Lee (2001); Fidrmuc et al. (2006); Rozanov (2009)).³ We choose to proxy the quality of shareholder protection with the anti-self-dealing index due to Djankov et al. (2008). The index is constructed on the basis of legal rules governing a hypothetical related-party transaction and as such it directly measures the ability of insiders to divert corporate wealth to themselves at the expense of outside investors. Hence, the index reflects the central aspect of corporate governance which is at the core of the arguments behind rent extraction and information content. In the context of our study, it is likely to shape both insiders' behavior as well as market perception of insiders' actions. Even though our data set covers only developed countries, sample variation with respect to shareholder protection is surprisingly high. The anti-self-dealing index ranges from 0.20 for the Netherlands to 0.95 for the United Kingdom (on a scale from 0 to 1), with the sample mean of 0.42 and the standard deviation of 0.22 which are not far from the mean of 0.44 and the standard deviation of 0.24 for 72 countries covered in Djankov et al. (2008).

Overall, our results for over 100,000 purchases across 16 countries show that better shareholder protection against expropriation by corporate insiders is associated with higher post-trade abnormal returns. This is the case for event windows of 6, 11 and 101 days starting on the insider purchase day. Our results are unlikely to be driven by differences in insider trading laws and reporting requirements because recent regulatory changes in both the US and

³ To test the rent extraction and information content explanations for insider sales we would have to carefully control for diversification and liquidity motives for trading that are closely related to equity-based compensation (Ofek and Yermack, 2000). Unfortunately, we do not have compensation data for our large sample of countries and firms.

European Union resulted in the unification of insider trading regulation across all countries in our sample.⁴ Also, our tests show that the results are robust to excluding from the sample all US transactions which constitute a relatively large fraction of our data set.

The positive relationship between shareholder protection and abnormal returns is consistent with both the substitution as well as information content hypotheses. Both explanations are equally plausible and might be in play simultaneously. We develop a set of further tests to differentiate between the two alternative explanations and we find more support for the information content rather than substitution hypothesis. The substitution hypothesis suggests more insider trading in stronger investor protection environments, while we find that the average number of trades per firm per year is not significantly different in weaker versus stronger shareholder protection countries, and the mean and median transaction value (and relative transaction value) is significantly higher in weaker protection countries. Furthermore, when we replace abnormal returns with abnormal profits (abnormal returns multiplied by the value of shares traded) as the dependent variable in our regressions to capture profits made by insiders and test the substitution hypothesis more directly, the anti-self dealing index becomes insignificant.

In contrast, we find support for the information content hypothesis. First, we show that the effect of the anti-self-dealing index is larger when information asymmetry between insiders and outside investors is likely to be larger: in smaller firms and in firms with lower analyst coverage. Similarly, the effect of the anti-self-dealing index is larger for larger transactions when more information might be conveyed. Second, decomposition of the anti-self-dealing index shows that provisions accommodating ease of proving wrongdoing with respect to self-dealing by insiders (e.g. ex-post protection) seem to be more important relative to disclosure requirements reflected in the ex-ante index. To support robustness of our results to alternative explanations potentially correlated with shareholder protection and abnormal returns, we

⁴ See Section 3 for details.

discuss stock market efficiency, insider trading law enforcement, ownership concentration and executive remuneration. We find that our results are robust to all these alternative influences.

Overall, our results favoring the information content hypothesis contribute to the wider literature on the relation between corporate governance and equity returns (Morck et al. (2000), Gompers et al. (2003), Cremers and Nair (2005) and Ferreira and Laux (2007)). Understanding the link between shareholder protection and the way the market reads into information conveyed through insider transactions helps us comprehend the wider picture of why stock price informativeness differs across countries. Our analysis provides new evidence that stronger shareholder protection is an important factor contributing to prices better reflecting fundamental firm values. The result that rent extraction through insider trading finds weaker support in our data perhaps enforces the importance and effectiveness of insider trading regulations that prohibit trading on material information.

The remainder of the paper is organized as follows. Section 2 explains the hypotheses in more detail, and Section 3 outlines insider trading reporting requirements and legal definitions in our sample countries. Section 4 describes the data and provides descriptive statistics while Section 5 presents our results. Section 6 concludes the paper.

2. Hypotheses development

To develop our hypotheses on the link between shareholder protection and abnormal returns following share transactions by corporate insiders we look at two dimensions of insider trading. First, we look at insider trading as a channel of rent extraction and analyze how rent extraction through insider trading interacts with outright profit diversion from the company by corporate insiders. Second, we consider the informational role of legal insider trades and develop hypotheses on the basis on how investor protection shapes the firm's informational environment and how it influences the way investors read into visible insiders' actions.

Shareholder protection curbs rent extraction by corporate insiders and results in less space for profit diversion. If the limits on exploitation of outside investors are wide reaching and curb also insiders' opportunistic trading on non-public information, insider trading might be less profitable with stronger shareholder protection. In the same vein, weak shareholder protection with lower insider accountability for their overall actions provides more scope for insiders to profit both from tunneling as well as insider trading. Therefore, the *monitoring hypothesis* predicts a negative relationship between shareholder protection and insider trading profitability. On a one-country level, Rozanov (2009) and Ravina and Sapienza (2010) show support for the prediction in the US looking at board and ownership structure and anti-takeover provisions, respectively. The *substitution hypothesis*, in contrast, argues that strong corporate governance limits insiders' direct private benefits extraction through profit diversion but does not reach as far as curbing insider trading activities. Therefore, insiders, who are not able to benefit from direct profit diversion, engage in insider trading that provides them with an alternative source of wealth extraction. Insiders in firms with weak corporate governance have more opportunities to divert corporate profits directly from their firms and therefore are not motivated much to engage in profitable insider trading. Cziraki et al. (2010) find support for this hypothesis in the Netherlands.

The monitoring and substitution hypotheses perceive the relationship between corporate governance and insider trading from a perspective of rent extraction by insiders. At the same time however, insiders' transactions (especially purchases) are followed by significant stock price adjustments that indicate that some new information is communicated to the market through the transactions. Given this market reaction to insider transactions, it is possible that shareholder protection affects not only motivations of insiders to engage in transactions enhancing their private wealth, but also relates to the way market perceives firm value enhancements signaled through the transactions. This is not to say that insiders are not motivated to extract rents. Still, as documented in the literature, insider transactions are

valuable source of information concerning future growth prospects of their own firms and the firm value enhancement conveyed through insider purchases to outside investors could also be directly related to shareholder protection. In other words, in order to provide an overall picture of a relationship between shareholder protection and abnormal returns following insider purchase transactions, we should also consider the informational role of insider purchases for outside investors and its potential association with shareholder protection.

Viewing the relationship between shareholder protection and abnormal returns through the perspective of information conveyed in the transactions, we apply insights provided in theoretical disclosure models (Holthausen and Verrecchia (1988), Kim and Verrecchia (1991, 1994) and Verrecchia (2001)). Overall, two alternative effects could prevail. First, a negative effect of shareholder protection might stem from shareholder protection improving disclosure standards and therefore increasing precision of information available to outside investors just before insider purchases, which leads to lower information content of the purchases themselves. According to Bailey et al. (2006) and Chung et al. (2010), information asymmetries are in general smaller and prices reflect more public information in countries with stronger shareholder protection. Moreover, Leuz et al. (2003) suggest that governance provisions may improve financial transparency by mitigating insiders' ability and motivation to distort information disclosures. Thus, the *ex-ante information hypothesis* conjectures that higher information precision and more information incorporated in prices just before insiders' trades might be associated with lower price adjustments following insider transactions.

Second, price adjustments after information disclosures are also directly associated with the amount of information conveyed in the disclosures and the precision of that information. In case shareholder protection enhances transparency and trustworthiness of corporate insiders' actions, other things equal, an insider transaction may convey more news in better shareholder protection environments. Morck et al. (2000) show that among developed economies, price informativeness measured by firm-specific stock price variation is positively

associated with investor protection. They further argue that “in countries that provide poorer protection for public investors from corporate insiders, problems such as intercorporate income shifting could make firm-specific information less useful to risk arbitrageurs, and therefore impede the capitalization of firm-specific information into stock prices... [reducing] firm-specific stock price variation” (p. 217). Rational risk arbitrageurs, knowing that they cannot predict where firm-specific abnormal profits will come to rest, invest fewer resources in predicting firms-specific abnormal profits and this results in less firm-specific information entering stock prices in economies where income shifting is easier (Morck et al. (2000), p. 254). Durnev et al. (2003) document that higher firm-specific return variation indeed measures more information incorporated in stock prices. The literature also suggests that insiders are unwilling to signal true situation when they expropriate outside investors and they often use visible actions to camouflage reality. Weaker shareholder protection countries are hence associated with more earnings management (Leuz et al. (2003)) and lower executive compensation (Bebchuk et al. (2002) and Fernandes et al. (2009)).

Consistent with this mechanism we conjecture that, as insiders in countries with poorer investor protection have more possibilities to divert corporate profits, outside investors do not consider their reported actions as credible and containing much meaningful information for price discovery and, thus, stock prices adjust less after insider purchases. Insiders’ actions might be considered as more transparent and credible in stronger shareholder protection countries and therefore insiders’ trades might be associated with more information and larger stock price adjustments. “If insiders trade, the share price will move closer to what it would have been had the information been disclosed. How close will depend on the amount of ‘noise’ surrounding the trade.” (Carlton and Fischel (1983), p. 868). We propose in line with Morck et al. (2000) that this ‘noise’ decreases with shareholder protection. This *information content hypothesis* therefore conjectures a positive effect of shareholder protection on abnormal returns. Consistent with this mechanism, DeFond et al. (2007) find that the market reaction to

earnings announcements is stronger in stronger shareholder protection countries. In a similar vein, Bailey et al. (2006) show that market reaction to earnings announcements is stronger after a firm cross-lists in the US documenting that stronger institutions in the US may increase credibility of information disclosure.

3. Insider trading laws and reporting requirements

The laws prohibiting trading on insider information are in place in all our sample countries. The US has the longest history of insider trading regulations that date back to the 1934 Securities Exchange Act. Recently, these regulations were amended in 2002 by Section 403 of the Sarbanes-Oxley Act. Europe followed the US 1934 Securities Exchange Act a few decades later, but in some countries the regulations were introduced as late as in the 1990s (Bhattacharya and Daouk (2002)). An important development in Europe was the 1989 Insider Dealing Directive (89/592/EEC), which was replaced by a more comprehensive Market Abuse Directive (2003/6/EC) and Directive 2004/72/EC that specifies reporting of transactions by corporate insiders. These Directives, which are considered to be heavily influenced by US regulations (Engle (2010)), set a standard across the European Union with which the internal laws, regulations and provisions of the member states must comply. This is in contrast to the period before 1989, when insider trading was regulated differently in each EU member country. Switzerland should be considered a separate case because unlike all other European countries in our sample it is not a member of the EU and hence is not subject to the Directives. The relevant insider trading laws were introduced in Switzerland in 1988 (Bhattacharya and Daouk (2002)) and adjusted in 2005 by the Directive on the Disclosure of Management Transactions.

The key clause in the regulations in both the US and EU is that insiders must not trade on the basis of ‘material’ and ‘non-public’ information (Engle (2010)). Such information is understood to be precise and, when disclosed, would have an impact on investors’ assessment of the situation of the firm and hence on the value of its securities. Recently, it appears that

regulatory authorities across many countries also agree on the approach of greater transparency and timely public information on insiders' transactions. The Market Abuse Directive (2003/6/EC) clearly acknowledges that public access to information on transactions by corporate insiders is 'a preventive measure against market abuse', and that a disclosure of insiders' transactions provides 'a highly valuable source of information to investors.'

Another important regulatory issue is the speed of reporting. According to the new Section 403 of the Sarbanes-Oxley Act in the US, directors, officers and principal stockholders (i.e. owners of more than 10% of equity) are obliged to report their transactions to the SEC no later than on the second trading day following the transaction date. The Act accelerated the reporting deadline specified in the 1934 Securities and Exchange Act which was the tenth day after the end of the month in which the transaction was executed. The SEC publishes the notifications online no later than on the business day following the filing date. In the European Union, the Market Abuse Directive (2003/6/EC) specifies that persons discharging managerial responsibilities should notify competent authorities about transactions in their firm's securities and that the public should have access to that information as soon as possible. Further and more specific regulations regarding the notification of managers' transactions were introduced by the Directive 2004/72/EC defining persons obliged to report their transactions as members of the administrative, management or supervisory bodies of a firm. The notification of the trade should be made within five working days of the transaction date. For smaller transactions, the member states may set a EUR 5,000 threshold for the total value of transactions within a calendar year below which no notification is required or the notification can be delayed until the 31 January of the following year.

In Switzerland, according to the 2005 Directive on the Disclosure of Management Transactions, members of the board of directors and senior management are obliged to report their transactions to the issuer within two working days of the transaction date. The issuer is obliged to notify the Swiss Exchange about the trade within two working days in case the total

value of the transactions by any individual exceeds CHF 100,000 within one calendar month. If the total value of the transactions does not exceed the threshold, the issuer reports to the exchange all transactions jointly no later than four trading days following the end of the month. The stock exchange publishes on its website the information on the reported trades, but only on those that exceed the CHF 100,000 threshold.

In our view, insider trading regulations across all countries in our sample are of comparable very high standard and therefore our results are not likely to be driven by differences in regulations. However, in robustness tests we also consider the effect of enforcement of the regulations. According to Fernandes and Ferreira (2009), enforcement of insider trading regulation enhances stock price informativeness, especially in developed countries that we analyze in this paper. Our data set starts only in August 2002 and therefore covers a period after the first enforcement of insider trading laws in all countries in our sample. Even though all countries have experience with insider laws enforcement, it may be the case that some countries have higher tendency to obey law and therefore general law enforcement might be higher and affect our results. Our robustness checks control for the rule of law. Furthermore, we also control for the effect of the adoption and enforcement of the Market Abuse Directive which may lead to some heterogeneity in the legal environment (Christensen et al. (2011); Dubois et al. (2011)).

4. Data and comparative statistics

4.1. Data

The data on directors' trades are collected from several sources. For the US and UK we download our data from Thomson Insider Filings and Hemscott, respectively.⁵ Data for the larger European countries come from Directors Deals Ltd. For smaller countries, we hand collect the data from local stock exchanges, securities and exchange commissions, or central

⁵ They are widely used in the literature, see e.g., Ravina and Sapienza (2010) and Fidrmuc et al. (2006).

banks (see Table 1 for details). In our analysis we look at purchase transactions only. It is well documented in the insider trading literature that purchases rather than sales are more likely to signal new information about firms' future prospects and have higher information content (e.g., Lakonishok and Lee (2001); Fidrmuc et al. (2006); Rozanov (2009)). As such they better serve the purpose of this study.

Our sample period starts in August 2002, when the new Sarbanes-Oxley Act regulations were introduced in the US.⁶ In Europe, the EU Directive 2004/72/EC significantly affected reporting of insider trading with many EU member states improving on their reporting. Unfortunately, some member states started reporting only as late as in 2005-2006. Therefore, our coverage for many countries starts later than 2002. The sample period ends in May 2007 with the exception of the US, UK and Ireland for which we have data only till the end of 2006. Table 1 provides details on data coverage and data sources across all countries in our sample.

For all transactions, we collect the following information: name and identifiers of the company, transaction date, announcement date, transaction type (e.g., buy, sell, grant), number of shares traded, transaction price, insider's name and position in the firm (e.g., executive officer, non-executive director), and additional notes on the trade if available. Some data items are not available for individual countries. For example, we miss announcement dates for Austria, the Czech Republic, Greece, Poland, Slovenia and Switzerland. Moreover, for Switzerland we do not have directors' names but we have information about directors' position. We include only transactions by members of the board of directors (or equivalent for the two-tier board structure) and individuals holding managerial positions. For simplicity we call all these individuals 'insiders' or 'directors', even though only some of them formally hold a director position. We exclude all transactions by large shareholders that do not fall into the previous category. Also, we analyze only open market stock purchases and we exclude any

⁶ Brochet (2010) shows that the more timely disclosure of insider transactions in the US introduced by SOX significantly increases market reaction to reported insider transactions.

transactions in derivatives, option exercises, stock grants, transfers, etc. For countries for which data come from Thomson, Hemscott and Directors Deals, we rely on transaction classifications introduced by the data providers. As some of the other sources do not provide detailed classifications and refer to all holding increases (decreases) as ‘purchases’ (‘sells’), we screen them for non-open market transactions identifiable through additional notes on the trades. Moreover, to exclude all possible stock grants, option exercises and other transactions not at the market price, we delete all transactions with a reported transaction price that is 20% higher or lower than the closing price on the trading date.

Individual directors may report multiple trades executed on the same day. In such a case, we add up the amount of shares bought and deduct the total amount of shares sold (if any). For Switzerland, as we do not have directors’ identity we analyze all reported trades separately. Moreover, some announcements in the Polish data report trades executed over several consecutive days. In these cases, we take the date of the first trade as the transaction date. If the period for which the trades are reported jointly is longer than five days, the observation is dropped. All our data sources report individual transaction values in local currencies. We convert all transaction values to US dollars using the daily exchange rate at the date of the transaction downloaded from Datastream.

We measure stock price behavior around the director’s transaction date using daily US dollar stock returns that are adjusted for redistributions and stock splits. The market-wide behavior is measured with US dollar denominated Datastream indices for non-US sample countries and with the CRSP value weighted index for the US. For each transaction we calculate abnormal stock price performance over different horizons following the trade from the transaction day through to the 5th, 10th and 100th trading day after the transaction. The abnormal returns are market-adjusted. For each day around the trade we calculate daily abnormal stock return by subtracting the return on the respective market index from the stock return. Daily abnormal returns are then cumulated over different horizons.

Because we do not have information on announcement dates for a few countries in our sample we compute abnormal returns after the trading date. Bearing in mind that the market reaction can be fully observed only once the trading is officially disclosed to the market, we define our event windows so that they are very likely to cover the announcement date. We also check the reporting gap between the trading and announcement dates (in calendar days) for countries with available data for both dates. The median lag is 0 days (immediate disclosure) for the Netherlands, one day for the UK and Ireland, two days for the US, four days for Germany, Spain and Sweden, five days for Italy, eight days for Belgium, and 14 days for France. As our shortest event window runs from the transaction date through to the fifth trading day that covers eight calendar days taking into account weekends, we include the announcement date in majority of trades in our sample even with the shortest event window.⁷

Company level financial data and stock market data are downloaded from Datastream for all European countries and from CRSP and Compustat for the US. Number of analysts following a stock is obtained from IBES. All currency denominated variables are converted to US dollars using daily exchange rates sourced from Datastream. Variables based on stock prices (e.g. market capitalization, market-to-book ratio) are measured on the date of the transaction. Variables based on accounting data (e.g. total assets) are as of the last reported quarter before the trading date or other interim report if a firm does not report on a quarterly basis. To avoid possible causality issues between directors' trading variables and analyst coverage, we use lagged analyst coverage in the cross-sectional regressions. We use the anti-self-dealing index due to Djankov et al. (2008) as our primary corporate governance measure. This relatively new index reflects protection against the ability of corporate insiders to divert corporate wealth for themselves and therefore fits our analysis very well. It quantifies the quality of legal rules governing a hypothetical self-dealing transaction between two firms

⁷ In fact, the eight-calendar-day shortest CAR window covers the 75th percentile of the reporting lag distribution in all countries except for Belgium and France.

controlled by the same person which aims to benefit that person at the expense of outside investors. Detailed variable definitions are reported in Table 2.

4.2. Comparative statistics

Table 3 with transaction statistics shows that patterns of insider purchases vary widely across the countries in our data set. The number of trades differs significantly from as few as 25 purchase transactions in the Czech Republic to as many as 52,460 transactions in the US. In order to account for different coverage length and also for different size of the stock markets in our sample countries, we report the average number of purchase transactions per firm per year (*Avg # of trades per firm per year*). On average across the 16 countries, directors in our sample firms make over 4 purchase transactions every year. The least active are insiders in the Netherlands, the Czech Republic, Poland, and Slovenia with, on average, less than two purchases per firm per year. In contrast, UK, Italian, and Spanish firms have on average more than 5 trades each year, with Greek firms having as many as 19. Because these means are conditional on a company being in our data set with at least one purchase transaction over the period covered, we also report an alternative measure that takes into account the average total number of firms listed in the sample countries over the sample period (*Avg # of trades per listed firm per year*). Across all countries, there are on average fewer than 3 purchases annually, with a similar distribution and clustering of countries over the trading intensity range as for the first measure.

Also the mean and median transaction size, expressed both in absolute (USD thousands) and relative terms (percentage of market capitalization) differs across the countries. On average, directors purchase shares in value of USD 287 thousand per transaction that represent 0.16% market capitalization of their companies. The transaction size distribution is highly skewed and the respective median values are USD 10 thousand and 0.005%. Across the countries, purchase transactions are on average the largest in Spain with directors purchasing almost USD 12 million per transaction (with the median value of USD 193 thousand). In

relative terms, directors in Spain buy on average only 0.19% of their firm's equity, which indicates that they purchase shares in relatively large firms. The average purchase transaction value is large also in France, the Netherlands, and Austria with USD 2.9, 1.2, and 1.1 million per transaction, respectively. It is very small in the Czech Republic (USD 45 thousand) and Slovenia (USD 52 thousand). In relative terms, directors buy the largest fraction of their firms in Germany (1.1% of market capitalization). The relative trade size is also high in Poland, Sweden, and the Netherlands. Insider purchases in the US are quite small both in dollar value as well as relatively to the market capitalization.

Slightly more than half (52%) of the trades in our sample are executed by executive directors. Even here, the variation across countries is relatively wide with Czech, German and Dutch executives being less active (12-23%) and Greek and US executives being more active as they participate in 75% and 66% of all purchase transactions, respectively. The bottom of Table 3 shows that even though directors do not trade more often in low shareholder protection countries, their transactions are significantly larger both in absolute and relative sense relatively to high shareholder protection countries. Moreover, trades by executive directors represent a larger fraction of purchase transactions in low shareholder protection countries.

Table 4 reports firm characteristics for all firms with director purchases across the 16 countries in our data set and shows that variation across the countries is again large. In general, Belgian, UK, Irish and Spanish firms with insider trading are relatively large, while German, Greek, Polish and Swedish firms belong to the smallest in our sample.⁸ The median book-to-market ratio varies from 1.2 in Slovenia to 3.0 in Spain. The median analyst coverage ranges from 0 to 5 with the exception for Spanish firms that have a median of as many as 12 analysts. Past stock performance shows that directors purchase shares after their stock lost on average 1.48% of their value over the last 100 days. This indicates that insiders are able to time their

⁸ Overall, the mean and median total assets are higher than respective statistics for the market capitalization. It is because the data coverage for total assets is smaller than for market capitalization and supposedly it is clustered among relatively larger firms. We have information on total assets for 90% of our insider trading observations while the coverage of market capitalization data is 99%.

purchases and follow contrarian strategies. Figure 1 plotting the country average cumulative abnormal returns over the window from 20 days before to 20 days after the transaction shows that for majority of the countries abnormal returns decrease in the pre-trading period and then increase after the trade. Still, the mean past return is significantly positive in the Czech Republic, Greece, the Netherlands, Poland and Switzerland which suggest that the contrarian strategy is not pervasive across all countries in our sample. Overall, when comparing low versus high shareholder protection countries directors in low shareholder protection countries purchase shares in smaller firms with less analyst coverage and after less negative returns.

Table 5 reports cumulative abnormal returns over 6, 11 and 101-day windows starting on the transaction day. The overall average market reaction over all three windows is positive and significant at the one percent level. With market adjusting on average by 1.4%, 1.9%, and 5.8% over the three horizons, the economic effect is also significant. For the 6 and 11-day event window, the market reacts positively in all countries except in the Czech Republic, France, Italy and Spain. The market reacts most strongly in the US and Poland. Longer-term abnormal returns over 101 days are on average larger than abnormal returns over 6 and 11 days, but they are insignificant in 6 out of the 16 countries. Nevertheless, no country performs significantly negatively in 101 days after the transactions. Overall, market reacts to insider purchases more in high investor protection countries relative to low protection countries for all horizons (all the differences are statistically significant at the one-percent level). In summary, the univariate statistics indicate that abnormal returns differ across countries with different shareholder protection. Also, they highlight the importance of controlling for firm and transaction characteristics in our analysis as they also vary widely with corporate governance. Tables 3 through 5 present descriptive statistics based on unwinsorized data. In the regression analysis, however, we winsorize all variables at the 1st and 99th percentiles to reduce the impact of outliers and potential data errors on our results.⁹

⁹ Our results are largely unchanged with unwinsorized data.

5. Empirical results

5.1. Main results

Our main research question looks at the effect of country-level corporate governance on abnormal returns after insider purchases. Table 6 provides regression results with cumulative abnormal returns (CARs) over 6, 11, and 101 days starting on the transaction day as the dependent variable. The impact of shareholder protection on CARs is estimated using the country-level anti-self-dealing index but we also control for a set of transaction-level and firm-level characteristics. In short, we estimate the following regression model:

$$CAR_{ijc} = \alpha + \beta ASDindex_c + \gamma X_{ijc} + \delta YearDummy_{ijc} + u_j + \varepsilon_{ijc} \quad (1)$$

where CAR_{ijc} is the cumulated abnormal return for transaction i in company j located in country c . $ASDindex_c$ is our main variable of interest measuring the effect of country-level shareholder protection against expropriation by corporate insiders. X_{ijc} is a vector of transaction and firm characteristics that includes the (log of) transaction value (in USD), past return, market-to-book ratio, (log of) market capitalization, a dummy for multiple trades executed by a director on the same day, and an executive director dummy.¹⁰ Finally, $YearDummy_{ijc}$ is a vector of year dummy variables that controls for global factors that can affect the market reaction to all trades in a given year, but also reduces the impact of differing time coverage of our insider trading data across countries. Because the time dimension is not of a primary importance for our analysis, we do not report the estimated coefficients of the year dummies. Detailed definitions of all variables are presented in Table 2.

All regressions are estimated with firm random effects u_j . By including the firm-specific effects we control for unobservable firm characteristics that might influence the abnormal stock performance and also insiders' trading incentives and constraints within firms

¹⁰ In a supplementary unreported analysis we include total assets or analyst coverage instead of market capitalization. We include the three variables interchangeably because they are highly correlated. The alternative measures of firm size do not alter our results.

(Ravina and Sapienza (2010)).¹¹ This approach of controlling for firm effects is supported by the Breusch-Pagan Lagrange multiplier test that strongly rejects the hypothesis that error terms are independent within firms. The random effect estimation using the generalized least-squares (GLS) approach addresses the dependence of error terms within firms, while allowing us to estimate the effect of country-level corporate governance variables that by definition do not change within a firm (see also, La Porta et al. (2002)). Moreover, we cluster standard errors of the coefficients at the firm level to reduce the bias if the firm-specific effects change over time (Petersen (2009)).

Model 1 in Panel A shows that the coefficient of the anti-self-dealing index is positive and significant at the one-percent level. Thus, controlling for firm and transaction characteristics, the six-day cumulative abnormal return after insider purchases is larger in countries with better shareholder protection against profit diversion by insiders. The economic effect is also large. A regression specification with a dummy variable for index scores above the cross-country median (Model 2) shows that strong shareholder protection results in cumulative abnormal returns that are on average 1.1% higher compared to weak shareholder protection countries. This is a sizable economic effect given that the unconditional mean of the six-day cumulative returns in our sample is 1.4%. To make sure that our results are not driven by US observations that constitute 52% of our sample and have a high anti-self-dealing index, we re-run the regression without the US. The results reported in Model 3 show that the shareholder protection effect is strong and significant even after excluding all US transactions. The positive and statistically significant effect of shareholder protection pertains also for the horizons of 11 and 101 days in Panels B and C. We conclude that Table 6 provides strong evidence that insider purchases are associated with higher abnormal returns in better investor protection countries.

¹¹ For example, Bettis et al. (2000) report that many US firms adopt blackout periods around earnings announcements as a way to prevent insiders from trading on material non-public information. The inclusion of firm-specific effects in our regressions allows us to test the effect of country level investor protection controlling for the tendency to self-regulate insider trading at the firm level.

The positive correlation between shareholder protection and abnormal returns supports both the substitution as well as the information content hypotheses. Both of the interpretations are plausible and not mutually exclusive. It is possible that insiders in stronger versus weaker shareholder protection countries feel more curbed in direct profit diversion from their firms and in order to extract some private rents engage in insider trading. In fact, the anti-self-dealing index does not incorporate any insider trading provisions and thus by construction allows space for substitution of rent extraction through insider trading. At the same time, however, outside investors in stronger shareholder protection countries might perceive insider purchases as a stronger and more precise signal of better future prospects of the firms. In what follows, we design several tests that might provide support for the substitution versus information content story.

Table 7 summarizes regression results where we replace CARs with dollar abnormal profits to trading insiders defined as the corresponding CAR multiplied by the value of the purchased shares (in US dollar value). This measure should better fit the substitution story as it also reflects the number of shares insiders decide to purchase. Even though the first column supports the conjecture that shareholder protection affects significantly and positively overall insider profits for all 3 horizons, the second column shows that the effect disappears once we exclude US observations. The coefficient for the anti-self-dealing index becomes insignificant for all horizons. Moreover, our univariate statistics in the previous section are also not supportive of the substitution hypothesis. In line with the hypothesis, we would expect that insiders tend to trade more (more frequently and in higher quantities) in stronger investor protection countries in order to gain higher rents. We find that frequency of insider purchases is not significantly different for weaker versus stronger shareholder protection countries. Moreover, insiders engage in larger transactions (both in absolute and relative term) in weaker shareholder protection countries. Also, the fraction of executive directors' transactions is larger

in weaker shareholder protection countries. All these results, in our view, indicate that support in the data for the substitution hypothesis is rather weak.

Still, the results for CARs in Table 6 are very strong and robust. We believe this indicates support for the information content hypothesis: stock value appreciation to outside investors is significantly positively correlated with shareholder protection despite the fact that insiders' profits are not correlated in the same way. If it is indeed the information content hypothesis that explains the found relationship, we would expect to find that shareholder protection matters more in situations when it is more likely that insider purchases convey more information to market participants. Higher information asymmetry and consequent higher information content is more likely in smaller firms and in firms with lower analyst coverage. Higher information content is also more likely when insiders purchase more shares. Table 8 shows results for the horizon of up to 10 trading days after insiders' purchase transactions. The essence of the reported results does not change for the other two horizons and neither when excluding US observations.¹² In Panel A of Table 8, we compare the effect of the anti-self-dealing index across firms in the smallest, middle and largest quintile by total assets.¹³ The coefficient for the anti-self-dealing index is decreasing in magnitude and significance as firm size increases indicating that shareholder protection affects abnormal returns more in smaller firms with larger information asymmetries when it is more likely that insiders' transactions convey more good news. The same pattern is present in Panels B and C: shareholder protection has a stronger effect in firms with one or two analysts and when insiders purchase a larger fraction of their firms' shares. Abnormal returns are larger in stronger shareholder protection countries and this effect is more pronounced in environments when more information is likely to flow.

The information content hypothesis proposes that insider purchases convey information to market participants. This however does not mean that insider purchases are signals of good

¹² All the results are available upon request.

¹³ We do not report results for the 2nd and 4th quintiles.

future prospects in a pure sense: insiders do not purchase shares just to give a signal. What we believe is that insiders might purchase shares to profit, but in doing so they cannot help but signal better firm prospects. Insiders purchase shares because given their information they consider firm's shares undervalued. Their purchases might be related to their private information and past stock returns. The fact that insiders are contrarian traders who are able to time their purchases just after significant price drops has been documented in the literature (Lakonishok and Lee (2001), Jenter (2005)). For our hypothesis, it is important to show that the relationship between abnormal returns and shareholder protection is not just a reflection of insiders' contrarian trading, but that it reflects some extra information in addition to information contained in past stock returns. Table 4 shows that past returns, defined as cumulative abnormal returns over hundred days just before the transaction date, are more negative in better shareholder protection countries. Insiders are on average more contrarian in better shareholder protection countries. So it might indeed be the case that abnormal returns are larger in better shareholder protection countries only because insiders time their trades better in these countries. In our regressions, however, we control for past returns and therefore we are quite confident that undervaluation as reflected in past stock prices is not a sole cause of the significant anti-self-dealing index coefficient. The coefficient for past return is negative and highly significant indicating that insiders are indeed on average very good contrarian traders and the market reflects that when adjusting prices after insiders purchase shares.

Nevertheless, we provide one additional test in Panel A of Table 9. We partition our data set into two subsets with observations after negative versus positive past returns. The two subsamples have very similar numbers of observations which shows that insiders purchase shares frequently also after stock price increases. Regression results for the two subsets show that the anti-self-dealing index remains significant at the one percent level in both specifications. Abnormal returns are positively correlated with shareholder protection even for purchases after stock price increases indicating that the relative undervaluation of stocks in the

eyes of insiders is probably based on more than just pure contrarian strategies and the market recognizes it by larger price adjustments in better shareholder protection countries. We believe insiders take advantage of some private information that does not necessarily have to be material in the legal sense. Insiders exploit their general superior knowledge about their firm's prospects.¹⁴ The anti-self-dealing index remains significant even after excluding all US observations for the positive past returns subsample in Model 27. In a similar vein, Jiang and Zaman (2010) show that the predictive ability of aggregate insider trading is due to insider's ability to predict future cash-flow news rather than from adopting a contrarian investment strategy.

As the next step, we explore a quite interesting aspect of the anti-self-dealing index embedded in its construction. According to Djankov et al. (2008), the overall protection of outside shareholders against expropriation by corporate insiders comes from ex-ante as well as ex-post provisions. For possible related-party transactions that might harm outside shareholders but enrich the controlling shareholders, the index of ex-ante private control of self-dealing by investors summarizes approval requirements and immediate disclosures required by law before related transactions, as well as the immediate disclosures after the decision to enter into the transaction has been made. The ex-post private control of self-dealing index keeps track of the ease with which minority shareholders can obtain redress through the courts when the transaction damages the company even if all disclosure and approval requirements are met and combines proxies for ex-post disclosure and the ease of proving wrongdoing. For our sample countries, the two sub-indices have a correlation coefficient of 0.69. Panel B of Table 9 shows that both the sub-indices are significant, when included separately, but the ex-post index has a higher economic effect.¹⁵ The higher importance of the ex-post index is confirmed in Model 30 that includes both the partial indices simultaneously.

¹⁴ Our data set includes only reported insider transactions that are most probably not based on material information. In general, insiders are careful about trading before price sensitive events. For example, Agrawal and Nasser (2011) show that insiders abstain from purchasing shares in the run-up to takeover announcements.

¹⁵ Table 9 reports only results for the horizon of 10 days after the transaction. Results of the other two horizons are very similar and are available upon request.

In fact, the ex-post anti-self-dealing index has a larger effect even when compared with the overall anti-self-dealing index (coefficient of 0.033 versus 0.024). This shows that even though both the ex-ante disclosure as well as the ex-post ease of proving wrongdoing are important for insider purchases communicating more information to outside investors, the latter factor seems to have a larger effect. Investors read into actions of insiders more in case they feel they can prove wrongdoing with more ease.

The information content hypothesis builds extensively on the idea of Roll (1988) and French and Roll (1986) as extended by Morck et al. (2000) that shareholder protection affects incorporation of firm-specific information (usually measured by the firm-specific stock price variation) into stock prices. If this is the case, we should find a similar positive effect when replacing our anti-self-dealing index with country-level firm-specific stock price variation. Panel C of Table 9 shows that indeed the coefficient for firm-specific stock price variation is positive and significant at the one-percent level. Countries where firm-specific information is capitalized into prices are also associated with higher abnormal returns after insider purchases. Model 32 shows that inclusion of the firm-specific variation index together with the anti-self-dealing index decreases the size of the anti-self-dealing coefficient but does not decrease its significance. Interestingly, inclusion of the ex-post anti-self-dealing index in Model 33 results in insignificant firm-specific variation coefficient indicating that shareholder protection fits the relationship better.

5.2. Robustness checks

In the previous section, we argue that our results are consistent with the information content explanation for the positive relationship between shareholder protection and abnormal returns. Still, we have to consider and rule out some alternative explanations for the relationship. First, one can argue that our results only reflect a market efficiency effect. That is, it might be the case that markets across our sample countries are efficient to differing degrees and that their efficiency is correlated with shareholder protection and our results then only show spurious

correlation. We do not believe this is the case as our sample includes only the most developed countries where stock market efficiency should be reasonably high. Moreover, it might take longer for some countries in our sample to reflect all publicly available information, but our 101 day horizon is long enough to make the effect disappear. As we still find significant differences in market reaction to insider purchase transaction after 101 days, we believe this suggests there is more information to capitalize into stock prices in stronger shareholder protection countries.

A second argument might be that even though regulation of insider trading in our sample countries is relatively comparable, enforcement of these laws might not be at par. If enforcement of insider trading is correlated with shareholder protection, the anti-self-dealing coefficient might be picking up the effect of enforcement. In fact, this is quite possible as Fernandes and Ferreira (2009) show that enforcement of insider trading has a significant positive effect on stock-price informativeness, especially in developed countries. Fernandes and Ferreira (2009) measure enforcement using a step function that switches to one after insider trading laws had been enforced in a country for the first time. We check the first case of insider trading prosecution across our sample countries. As our sample period starts as late as 2002 (and for some countries even later), all our observations appear exclusively after the first insider trading enforcement case across all countries in our sample and so insider trading enforcement is high (in the Fernandes and Ferreira (2009) sense) in all our countries. Nevertheless, we run an additional test by including the insider trading prevalence index that measures the perception of how widespread insider trading in a given country is, and therefore it should be negatively correlated with insider trading enforcement. Even though the insider trading prevalence index affects abnormal returns negatively and significantly when included in a regression separately (not reported), it turns insignificant when included together with the anti-self-dealing index (Model 34 in Table 10). As the anti-self-dealing index remains positive and significant, we remain confident that our results are not driven by different enforcement

standards across our sample countries. The enforcement of law in general may also play a role for price informativeness. Model 35 shows that the rule of law index has a positive and significant effect indicating that abnormal returns are larger in countries that obey the (general) law on books more closely. The result is also consistent with the information content hypothesis that builds on transparency of insiders' actions. The anti-self-dealing index in Model 35 remains positive and highly significant.

Thirdly, we should pay attention to the Market Abuse Directive (MAD). Even though the directive applies equally across the EU, the directive was adopted in national regulations at different points in time and also the enforcement of the national regulations differs across countries (Christensen et al. (2011); Dubois et al. (2011)). As these issues may lead to heterogeneity in the regulatory environment across countries in our sample, we add a MAD adoption dummy (equal to one for transactions after the MAD was adopted in the given country) and a MAD enforcement dummy (equal to one for countries in which regulators took at least one enforcement action under MAD) in Model 36 in Table 10. The model excludes the U.S. and Switzerland as these are two non-EU countries in our sample. The coefficients of the two MAD variables are insignificant and the coefficient of the anti-self-dealing index remains positive and highly significant. We conclude that possible heterogeneity in the national insider trading regulations and their enforcement does not influence our results. In unreported regressions with $CAR(0,5)$ and $CAR(0,100)$ as the dependent variable, the MAD enforcement dummy becomes significantly negative (with the coefficient of the ASD index remaining positive and significant), which is in line with the argument in Bhattacharya and Daouk (2002) on the economic importance of law enforcement relative to law adoption.

Fourthly, we check whether our results are not driven by differences in ownership structures across countries. It is well documented that in countries with weaker investor protection corporate ownership tends to be more concentrated (La Porta et al., 1998), and controlling shareholders typically serve as top managers (La Porta et al., 1999). This might

affect the link between investor protection and stock price reaction to insider trades as the market reacts negatively (less positively) to insiders increasing their ownership further when they are entrenched (Fidrmuc et al. (2006); McConnell et al. (2008)). Ideally, we would like to control for ownership concentration at the firm level, but we do not have detailed ownership data for all firms in all countries in our sample. Nevertheless, we argue that ownership concentration is usually time invariant and therefore should be captured by our firm effects and clustered standard errors. In order to control for country level variation in ownership concentration that is not captured by the firm effects, we include a country-level average by La Porta et al. (2006). Model 37 in Table 10 confirms the conjecture that the market reacts less positively to insider ownership increases in countries where ownership concentration is higher. Still the effect of the anti-self-dealing index prevails.

Finally, we check whether the anti-self-dealing index is not picking up the effect of different executive compensation practices across countries (Fernandes et al., 2009). When managers receive shares or share options through their remuneration packages, they might purchase additional shares less often and only when they have very strong positive views on their firms' prospects. Table 3 reveals that the frequency of trading does not differ across countries and shareholder protection. Nevertheless, to control for a possible effect of different compensation practices we include the country-level mean of the proportion of equity incentive pay in total CEO compensation in Model 38 (Table 10). The effect of the ASD index becomes weaker but is still highly significant. The coefficient for equity pay is significantly positive confirming that more equity compensation increases the information contained in insider trading.

6. Conclusions

In this paper we analyze a unique data set of around 100,000 insider purchases from 15 European countries and the US to test whether abnormal returns after insider purchases differ across country-level investor protection environments. Our results reveal a positive

relationship between shareholder protection and post-trade cumulative abnormal returns. We suggest two explanations. First, higher abnormal returns in stronger shareholder protection countries might reflect that insiders substitute direct rent extraction, that is curbed by strong shareholder protection, by insider trading profits. Second, because abnormal returns measure the firm value adjustments as perceived by outside investors, insider purchases might convey more information to outside shareholders when shareholders are more protected against expropriation. Market participants are willing to trade on more firm-specific information because they are protected by law from insider self-dealing. Our results show more support for the latter explanation – the information content hypothesis. We show that the positive effect of the anti-self-dealing index is not solely due to insiders' contrarian strategies and is stronger in situations when insiders are more likely to signal more information: in smaller firms, firms with lower analyst following and when insiders purchase more shares. Interestingly, decomposition of the overall anti-self-dealing index into the ex-ante and ex-post component indicates that the ex-post protection in form of ease to prove wrong doing is more important for stronger market reaction to insider purchases.

Our results seem to favor the information content perspective (John and Lang (1991)) based on the notion that insider trades reveal private information to the market and contribute to prices better reflecting fundamental firm values (Manne (1966); Leland (1992)). In line with Morck et al. (2000) we argue that insider actions are less transparent and less credible in weak investor protection environments, where larger risks of profit diversion discourage outside investors from acting upon firm-specific information. In general, this paper provides evidence that good corporate governance contributes to higher price informativeness. We show that better investor protection improves incorporation of information into stock prices leading to stock prices better reflecting fundamental firm values.

In the course of this study we uncover that insider trading patterns differ across countries. It would be interesting to shed more light on the factors that determine the volume

and frequency of insider trading across different institutional settings. Such an analysis would complement findings of this study and could enrich our understanding of the role that trading by corporate insiders plays in stock markets across the globe.

References

- Agrawal, Anup, and Tareque Nasser, 2011, Insider Trading in Takeover Targets, 5th Annual Conference on Empirical Legal Studies Paper, available at <http://ssrn.com/abstract=1517373>.
- Aktas, Nihat, Eric de Bodt, and Hervé Van Oppens, 2008, Legal insider trading and market efficiency, *Journal of Banking and Finance* 32, 1379-1392.
- Ausubel, Lawrence M., 1990, Insider Trading in a Rational Expectations Economy, *American Economic Review* 80, 1022-1041.
- Bailey, Warren, G. Andrew Karolyi, and Carolina Salva, 2006, The economic consequences of increased disclosure: Evidence from international cross-listings, *Journal of Financial Economics* 81, 175-213.
- Bainbridge, Stephen M., 2000, Insider Trading. In: Bouckaert, Boudewijn, and Gerrit De Geest (Eds.), *Encyclopedia of Law and Economics, Vol. III, The Regulation of Contracts*. Edward Elgar, Cheltenham.
- Bebchuk, Lucian A., and Jesse M. Fried, 2003, Executive Compensation as an Agency Problem, *Journal of Economic Perspectives* 17, 71-92.
- Bebchuk, Lucian A., Jesse M. Fried, and David I. Walker, 2002, Managerial Power and Rent Extraction in the Design of Executive Compensation, *University of Chicago Law Review* 69, 751-846.
- Bettis, J. Carr, Jeffrey L. Coles, and Michael L. Lemmon, 2000, Corporate Policies Restricting Trading by Insiders, *Journal of Financial Economics* 57, 191-220.
- Betzer, Andre, and Eric Theissen, 2009, Insider Trading and Corporate Governance: The Case of Germany, *European Financial Management* 15, 402-429.
- Bhattacharya, Utpal, and Hazem Daouk, 2002, The World Price of Insider Trading, *Journal of Finance* 57, 75-108.
- Brochet, Francois, 2010, Information Content of Insider Trades before and after the Sarbanes-Oxley Act, *The Accounting Review* 85, 419-446.
- Carlton, Dennis W., and Daniel R. Fischel, 1983, The Regulation of Insider Trading, *Stanford Law Review* 35 (5), 857-95.
- Christensen, Hans B., Luzi Hail, and Christian Leuz, 2011, Capital-Market Effects of Securities Regulations: The Role of Implementation and Enforcement, NBER Working Paper No. 16737.
- Chung, Kee H., John Elder, and Jang-Chul Kim, 2010, Corporate Governance and Liquidity, *Journal of Financial and Quantitative Analysis* 45, 265-291.
- Cziraki, Peter, Peter de Goeij, and Luc Renneboog, 2010, Insider Trading, Option Exercises and Private Benefits of Control, TILEC Discussion Paper 2010-015.
- Datta, Sudip, and Mai E. Iskandar-Datta, 1996, Does insider trading have information content for the bond market? *Journal of Banking and Finance* 20, 555-575.
- DeFond, Mark, Mingyi Hung, and Robert Trezevant, 2007, Investor protection and the information content of annual earnings announcements: International evidence, *Journal of Accounting and Economics* 43, 37-67.
- Dubois, Michel, Pascal Dumontier, and Laurent Fresard, 2011, Regulating Conflicts of Interest: The Effect of Sanctions and Enforcement, University of Neuchatel Working Paper.
- Durnev, Artyom, Randall Morck, Bernard Yeung, and Paul Zarowin, 2003, Does Greater Firm-Specific Return Variation Mean More or Less Informed Stock Pricing? *Journal of Accounting Research* 41, 797-836.

- Djankov, Simeon, Rafael La Porta, Florencio Lopez-de-Silanes, and Andrei Shleifer, 2008, The Law and Economics of Self-Dealing, *Journal of Financial Economics* 88, 430-465.
- Doidge, Craig, G. Andrew Karolyi, and Rene M. Stulz, 2007, Why Do Countries Matter So Much for Corporate Governance, *Journal of Financial Economics* 86, 1-39.
- Engle, Eric, 2010, Insider Trading in US and EU Law: A Comparison, *European Business Law Review* 26, 265-490.
- Fernandes, Nuno and Miguel A. Ferreira, 2009, Insider Trading Laws and Stock Price Informativeness, *Review of Financial Studies* 22, 1845-1887.
- Fernandes, Nuno, Miguel A. Ferreira, Pedro Matos, and Kevin J. Murphy, 2009, The Pay divide: (Why) Are U.S. Top Executives Paid More? ECGI Working Paper 255/2009.
- Fidrmuc, Jana P., Marc Goergen, and Luc Rennooog, 2006, Insider Trading, News Releases and Ownership Concentration, *Journal of Finance* 61, 2931-2973.
- Fishman, Michael J., and Kathleen M. Hagerty, 1992, Insider Trading and the Efficiency of Stock Prices, *RAND Journal of Economics* 23, 106-122.
- French, Kenneth R. and Richard Roll, 1986, Stock return variances: the arrival of information and the reaction of traders, *Journal of Financial Economics* 17, 5-26.
- Fried, Jesse M., 1998, Reducing the Profitability of Corporate Insider Trading through Pretrading Disclosure, *Southern California Law Review* 71, 303-392.
- Friederich, Sylvain, Alan Gregory, John Matatko, and Ian Tonks, 2002, Short-run Returns around the Trades of Corporate Insiders on the London Stock Exchange, *European Financial Management* 8, 7-30.
- Holthausen, Robert W., and Robert E. Verrecchia, 1988, The effect of sequential information releases on the variance of price changes in an intertemporal multi-asset market, *Journal of Accounting Research* 26, 82-106.
- Jenter, Dirk, 2005, Market timing and managerial portfolio decisions, *Journal of Finance* 60, 1903-1949.
- Jiang, Xiaoquan, and Mir A. Zaman, 2010, Aggregate insider trading: Contrarian beliefs or superior information? *Journal of Banking and Finance* 34, 1225-1236.
- John, Kose, and Larry H.P. Lang, 1991, Insider Trading and Dividend Announcements: Theory and Evidence, *Journal of Finance* 46, 1361-1389.
- Kaufmann, Daniel, Aart Kraay, and Massimo Mastruzzi, 2007, Governance Matters VI: Governance Indicators for 1996-2006, World Bank Policy Research.
- Kim, Oliver, and Robert E. Verrecchia, 1991, Trading volume and price reactions to public announcements, *Journal of Accounting Research* 29, 302-321.
- Kim, Oliver, and Robert E. Verrecchia, 1994, Market liquidity and volume around earnings announcements, *Journal of Accounting and Economics* 17, 41-67.
- Lakonishok, Josef, and Inmoo Lee, 2001, Are Insider Trades Informative?, *Review of Financial Studies* 14, 79-111.
- La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny, 1998, Law and Finance, *Journal of Political Economy* 106, 1113-1155.
- La Porta, Rafael, Florencio Lopez-de-Silanes, and Andrei Shleifer, 1999, Corporate Ownership Around the World, *Journal of Finance* 54, 471-517.
- La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny, 2000, Agency problems and dividend policies around the world, *Journal of Finance* 55, 1-33.

- La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny, 2002, Investor Protection and Corporate Valuation, *Journal of Finance* 57, 1147-1170.
- La Porta, Rafael, Florencio Lopez-de-Silanes, and Andrei Shleifer, 2006, What Works in Securities Laws? *Journal of Finance* 61, 1-32.
- Leland, Hayne E., 1992, Insider Trading: Should It Be Prohibited?, *Journal of Political Economy* 110, 859-887.
- Leuz, Christian, Dhananjay Nanda, and Peter D. Wysocki, 2003, Earnings management and investor protection: an international comparison, *Journal of Financial Economics* 69, 505-527.
- Manne, Henry, 1966, *Insider Trading and the Stock Market*, New York: The Free Press.
- McConnell, John J., Henri Servaes, and Karl V. Lins, 2008, Changes in insider ownership and changes in the market value of the firm, *Journal of Corporate Finance* 14, 92-106.
- Morck, Randall, Bernard Yeung, and Wayne Yu, 2000, The Information Content of Stock Markets: Why Do Emerging Markets have Synchronous Stock Price Movements?, *Journal of Financial Economics* 58, 215-260.
- Ofek, Eli, and David Yermack, 2000, Taking Stock: Equity-Based Compensation and the Evolution of Managerial Ownership, *Journal of Finance* 55, 1367-1384.
- Petersen, Mitchell A., 2009, Estimating Standard Errors in Finance Panel Data Sets: Comparing Approaches, *Review of Financial Studies* 22, 435-480.
- Piotroski, Joseph D., and Darren T. Roulstone, 2004, The Influence of Analysts, Institutional Investors, and Insiders on the Incorporation of Market, Industry, and Firm-Specific Information into Stock Prices, *Accounting Review* 79, 1119-1151.
- Ravina, Enrichetta, and Paola Sapienza, 2010, What Do Independent Directors Know? Evidence from Their Trading, *Review of Financial Studies* 23, 962-1003.
- Roll, Richard, 1988, R^2 , *Journal of Finance* 43, 541-566.
- Rozanov, Konstantin, 2009, Corporate Governance and Insider Trading, Working paper London Business School.
- Seyhun, H. Nejat, 1986, Insiders' profits, costs of trading, and market efficiency, *Journal of Financial Economics* 16, 189-212.
- Verrecchia, R., 2001, Essays on disclosure, *Journal of Accounting and Economics* 32, 98-180.

Table 1. Country and time coverage and data sources

Country	Time coverage	Data source
Austria	04/2005 – 05/2007	FMA - Austrian Financial Market Authority
Belgium	05/2006 – 05/2007	Directors Deals Ltd
Czech Rep.	02/2004 – 05/2007	Czech National Bank
France	04/2006 – 05/2007	Directors Deals Ltd
Germany	08/2002 – 05/2007	Directors Deals Ltd
Greece	07/2005 – 05/2007	Athens Exchange
Ireland	08/2002 – 12/2006	Hemscott
Italy	10/2005 – 05/2007	Directors Deals Ltd
Netherlands	08/2002 – 05/2007	Directors Deals Ltd
Poland	08/2002 – 05/2007	Interia.pl, Parkiet.com
Slovenia	06/2003 – 05/2007	Ljubljana Stock Exchange
Spain	09/2006 – 05/2007	Directors Deals Ltd
Sweden	08/2002 – 05/2007	FI - Swedish Financial Supervisory Authority
Switzerland	07/2005 – 05/2007 (excl. 01-02/2006)	SWX Swiss Exchange
United Kingdom	08/2002 – 12/2006	Hemscott
United States	08/2002 – 12/2006	Thomson Insider Filings

Table 2: Variable definitions

Variable	Definition
Anti-self-dealing index (ASD index)	Numerical measure of legal protection of minority shareholders against self-dealing by corporate insiders. Average of ex-ante and ex-post private control of self-dealing. Considers a fixed self-dealing transaction, and then measures the hurdles that the controlling shareholder must jump in order to get away with this transaction. Measures the intensity of regulation of self-dealing along a variety of dimensions, covering private enforcement mechanisms, such as disclosure, approval, and litigation. <i>Source:</i> Djankov et al. (2008).
High ASD	A dummy variable equal to one if a country's ASD index is above the cross-country median value of the index, and zero otherwise.
Ex-ante ASD index	A building block of the overall anti-self-dealing index defined above emphasizing approval requirements and immediate disclosures required by law before related transactions, as well as disclosures followed immediately after the decision to enter into related transactions has been made. <i>Source:</i> Djankov et al. (2008).
Ex-post ASD index	A building block of the overall anti-self-dealing index defined above that keeps track of the ease with which minority shareholders can obtain redress through courts when the transaction damages the company even if all disclosure and approval requirements are met. It combines proxies for ex post disclosure and the ease of proving wrongdoing. <i>Source:</i> Djankov et al. (2008).
Firm-specific variation	A country-level variable that reports time-series means of the median relative firm-specific stock return variation estimated using an international two-factor model for US dollar excess returns across all firms for each country in each year over 1980–2003. <i>Source:</i> Fernandes and Ferreira (2009).
Insider trading prevalence	A measure of insider trading, which ranges from one (low level of insider trading) to seven (high level of insider trading) as provided by the World Economic Forum through its Global Competitiveness Report. <i>Source:</i> Fernandes and Ferreira (2009).
Rule of law	Measures the extent to which governmental authority is legitimately exercised only in accordance with written, publicly disclosed laws adopted and enforced in accordance with established procedure. The principle is intended to be a safeguard against arbitrary governance. Rule of law includes agents' perceptions of the incidence of both violent and non-violent crime, the effectiveness and predictability of the judiciary, and the enforceability of contracts. The data averages rule of law estimates for the year 2004. <i>Source:</i> Kaufmann et al. (2007).
MAD adoption	A dummy variable equal to one for trades executed after the Market Abuse Directive was adopted in the given country, and zero otherwise. <i>Source:</i> Christensen et al. (2011).
MAD enforcement	A dummy variable equal to one for countries in which the local stock market regulator took at least one enforcement action under the Market Abuse Directive by the end of 2009, and zero otherwise. <i>Source:</i> Christensen et al. (2011).
Ownership concentration	Average percentage of common shares owned by the top three shareholders in the ten largest non-financial, privately-owned domestic firms in a given country. A firm is considered to be privately-owned if the State is not a known shareholder in it. <i>Source:</i> La Porta et al. (2006).
Equity-based pay	The average value of stock and stock options awarded as a percentage of total CEO compensation in a given country. Measured as of 2006. <i>Source:</i> Fernandes et al. (2009).
Total assets	For each transaction calculated as the most recent (as of transaction date) reported value of assets, converted to USD using the daily exchange, and reported in millions. The natural logarithm of the variable is used in the regressions. <i>Sources:</i> Compustat, Datastream.
Market capitalization	Calculated as the number of shares outstanding multiplied by the closing price on the transaction date. The variable is converted to USD using the daily exchange rate sourced from Datastream and reported in millions. In the regressions the natural logarithm of the variable is used. <i>Sources:</i> CRSP, Compustat, Datastream.

Table 2: - *continued*

Market-to-book ratio	The ratio of market value of equity on the transaction date to the recent reported (as of transaction date) book value of equity. <i>Sources:</i> CRSP, Compustat, Datastream.
Number of analysts	The number of earnings estimates in the month prior to annual earnings announcements, measured for the most recent year before the transaction. For companies not included in the IBES files it is assumed to be zero In the regression the following transformation of the variable is used: the natural logarithm of (1 + the number of analysts). <i>Source:</i> IBES.
Transaction value	Calculated by multiplying the reported number of shares traded by the reported transaction price. The variable is converted to USD using the daily exchange rate sourced from Datastream, and reported in thousands. In the regressions the natural logarithm of the variable is used. <i>Sources:</i> primary insider trading data, see Table 1.
Relative value	Calculated as the number of shares traded divided by the number of shares outstanding. <i>Sources:</i> primary insider trading data, see Table 1, Compustat, Datastream.
Past return	Daily abnormal stock returns cumulated over the window (-100, -1) relative to the transaction date. Daily abnormal stock returns are calculated by deducting the daily return on the respective market index from the daily stock return. <i>Sources of primary data:</i> CRSP, Datastream.
Multiple trades	Equals one if a director executes more than one trade on the same day and zero otherwise. <i>Source:</i> primary insider trading data.
Executive director	Equals one if at least one executive director purchases shares on the given day and zero otherwise. <i>Source:</i> primary insider trading data.

Table 3: Summary statistics for trading data

The table presents descriptive statistics on stock purchases by corporate insiders in 15 European countries and the US. *Total # of trades* is the total number of purchase transactions in our data set for the given country. *Total # of firms* is the number of firms with at least one transaction over the whole period that a country is in our data set. *Time coverage* is the number of months for which we have insider trading data for a country (see, Table 1 for details). *Avg # of trades per firm per year* is calculated as the total number of trades divided by the total number of firms, divided by the number of months for which the data for the given country are available, and multiplied by 12. *Avg # of trades per listed firm per year* is calculated as the total number of trades divided by the average number of listed firms in the country over the sample period, divided by the number of months for which the data for the given country are available, and multiplied by 12. *Transaction value* is calculated as the reported number of shares traded multiplied by the reported transaction price expressed in USD using the daily exchange rate. *Relative transaction value* is the transaction value divided by the firm's market capitalization. *Trades by executives* are transactions by insiders holding executive positions as a fraction of all transactions expressed in percentage. *Anti-self-dealing (ASD) index* is a measure of legal protection of minority shareholders against self-dealing by corporate insiders as defined in Djankov et al. (2008). For *Time coverage*, *Avg # of trades per firm per year*, *Avg # of trades per listed firm per year* and *Anti-self-dealing (ASD) index*, the statistics reported for the full sample and high and low ASD subsamples are cross-country averages. For all other characteristics they are calculated across all transactions. A country is classified as having a high ASD index if its index score is above the cross-country median value, and as having a low ASD index otherwise. Wilcoxon rank-sum test is used to test for the equality of the medians. ***, ** and * denote the significance at the 1%, 5% and 10% level, respectively. Insider trading data sources are presented in Table 1. Supplementary data (market capitalization, daily exchange rates) are sourced from CRSP/Compustat and Datastream. The number of listed firms is from World Development Indicators, BME Spanish Exchanges and London Stock Exchange.

	Total # of trades	Total # of firms	Time coverage (months)	Avg # of trades per firm per year	Avg # of trades per listed firm per year	Transaction value (USD thousands)		Relative transaction value (% market cap)		Trades by executives (% of all)	Anti-self- dealing (ASD) index
						Mean	Median	Mean	Median		
Austria	398	49	26	3.7	2.0	1,143	53	0.32%	0.011%	52%	0.21
Belgium	85	37	13	2.1	0.5	310	89	0.06%	0.006%	31%	0.54
Czech Republic	25	4	40	1.9	0.2	45	3	<0.01%	<0.001%	12%	0.33
France	1,234	215	14	4.9	1.5	2,912	46	0.22%	0.008%	43%	0.38
Germany	3,258	391	58	1.7	1.0	596	29	1.06%	0.026%	22%	0.28
Greece	6,864	187	23	19.2	11.5	366	21	0.14%	0.016%	75%	0.22
Ireland	693	48	53	3.3	2.8	145	19	0.05%	0.002%	44%	0.79
Italy	1,768	185	20	5.7	3.8	773	66	0.13%	0.008%	41%	0.42
Netherlands	439	63	58	1.4	0.4	1,159	24	0.53%	0.001%	23%	0.20
Poland	724	131	58	1.1	0.6	189	15	0.65%	0.040%	40%	0.29
Slovenia	126	18	48	1.8	0.3	52	15	0.05%	0.006%	48%	n/a
Spain	447	67	9	8.9	4.3	11,680	193	0.19%	0.008%	34%	0.37
Sweden	7,175	412	58	3.6	5.4	312	14	0.64%	0.014%	55%	0.33
Switzerland	640	108	21	3.4	1.4	986	85	0.28%	0.026%	58%	0.27
UK	24,040	1,035	53	5.3	4.1	91	1	0.03%	<0.001%	66%	0.95
US	52,460	4,399	53	2.7	2.2	150	11	0.09%	0.007%	44%	0.65

(continued)

Table 3: - *continued*

	Total # of trades	Total # of firms	Time coverage (months)	Avg # of trades per firm per year	Avg # of trades per listed firm per year	Transaction value (USD thousands)		Relative transaction value (% market cap)		Trades by executives (% of all)	Anti-self- dealing (ASD) index
						Mean	Median	Mean	Median		
Full sample	100,376	7,349	38	4.4	2.6	287	10	0.16%	0.005%	52%	0.42
High ASD	80,727	5,986	31	4.7	2.7	252	9	0.07%	0.004%	51%	0.59
Low ASD	19,523	1,345	43	4.5	2.8	430	20	0.52%	0.017%	55%	0.27
<i>High ASD vs. low ASD</i>											
<i>T-stat/z-stat</i>			1.22	0.08	0.04	2.66 ^{***}	53.05 ^{***}	9.75 ^{***}	76.81 ^{***}	11.26 ^{***}	3.96 ^{***}

Table 4: Summary statistics for firm characteristics

The table presents descriptive statistics for firm-level characteristics calculated for all trades in our data set. The data set includes stock purchases by corporate insiders in 15 European countries and the US Insider trading data sources are presented in Table 1. Variable definitions are provided in Table 2.

	Total assets (USD millions)		Market cap (USD millions)		Market-to-book ratio		Past return		Number of analysts	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Austria	15,463	1,726	3,245	815	2.11	1.59	0.03%	-2.05%	3.1	1
Belgium	201,323	1,264	13,192	1,100	1.80	1.74	-1.95%	-0.62%	6.4	3
Czech Republic	16,177	16,491	6,056	227	2.14	2.44	13.52%	5.50%	3.2	0
France	32,522	1,259	8,259	510	7.70	2.35	-2.54%	-1.68%	6.0	2
Germany	20,858	130	2,753	72	2.58	1.65	-1.75%	-2.23%	5.9	2
Greece	3,548	282	590	124	2.10	1.83	5.65%	1.39%	2.0	0
Ireland	54,390	2,951	5,548	1,817	2.50	2.02	-2.26%	-1.41%	6.5	5
Italy	18,905	657	3,483	495	2.28	1.91	-2.78%	-3.43%	4.0	2
Netherlands	28,315	2,183	11,280	1,658	2.81	2.07	1.68%	-2.84%	7.6	4
Poland	1,225	94	243	33	-1.94	2.31	3.98%	1.55%	0.3	0
Slovenia	784	743	438	264	1.52	1.20	-1.69%	-4.37%	0.2	0
Spain	35,752	6,631	12,283	5,959	3.80	3.00	3.84%	1.03%	13.0	12
Sweden	8,380	232	3,196	121	3.87	1.96	-5.17%	-1.25%	5.3	1
Switzerland	1,031	385	619	250	2.64	1.46	0.04%	-1.28%	1.5	0
UK	61,529	1,315	19,286	997	1.53	1.82	-1.57%	0.32%	5.0	3
US	5,901	503	2,186	156	2.88	1.94	-1.92%	-0.92%	3.6	2
Full sample	21,479	575	6,483	247	2.58	1.90	-1.48%	-0.44%	4.1	2
High ASD	23,333	662	7,495	288	2.54	1.92	-1.81%	-0.50%	4.1	2
Low ASD	10,130	259	2,223	119	2.79	1.83	-0.07%	-0.22%	4.0	1
<i>High ASD vs. low ASD</i>										
<i>T-stat/z-stat</i>	<i>10.99***</i>	<i>41.61***</i>	<i>12.13***</i>	<i>52.07***</i>	<i>0.90</i>	<i>11.32***</i>	<i>7.73***</i>	<i>7.34***</i>	<i>4.13***</i>	<i>31.47***</i>

Table 5: Cumulative abnormal returns (CAR) after insider stock purchases

The table presents mean and median cumulative abnormal returns (CAR) in various windows relative to insider stock purchases. Day 0 is the transaction day. Abnormal returns are market adjusted. ***, ** and * denote the significance of the mean or median CAR at the 1%, 5% and 10% level, respectively. Wilcoxon signed-rank test is used to test the significance of the median. Wilcoxon rank-sum test is used to test for the equality of the medians. Insider trading data sources are presented in Table 1.

	CAR(0,5)		CAR(0,10)		CAR(0,100)	
	Mean	Median	Mean	Median	Mean	Median
Austria	1.70% ^{***}	0.87% ^{***}	1.56% ^{***}	0.86% ^{***}	3.79% ^{***}	1.45% ^{***}
Belgium	1.20% ^{***}	0.04% [*]	0.51%	-0.06%	-0.56%	1.46%
Czech Republic	2.22%	1.88% [*]	0.95%	0.44%	2.99%	4.61%
France	0.02%	-0.14%	0.26%	-0.17%	-0.50%	-0.24%
Germany	0.88% ^{***}	0.08% ^{***}	1.39% ^{***}	0.55% ^{***}	0.22%	-0.33%
Greece	0.59% ^{***}	-0.16% ^{**}	0.74% ^{***}	-0.36%	5.43% ^{***}	1.95% ^{***}
Ireland	1.04% ^{***}	0.18% ^{**}	1.68% ^{***}	0.82% ^{***}	1.34% [*]	0.26%
Italy	0.02%	-0.21%	0.01%	-0.30%	0.66% [*]	-1.06%
Netherlands	0.94% ^{***}	0.17% ^{***}	1.31% ^{***}	0.37% ^{***}	2.48% ^{**}	-1.19%
Poland	2.41% ^{***}	0.77% ^{***}	2.48% ^{***}	1.78% ^{***}	6.60% ^{***}	2.85% ^{***}
Slovenia	1.28% ^{***}	0.28% ^{**}	1.63% ^{***}	0.79% ^{***}	-0.50%	-1.84%
Spain	-0.97% ^{**}	-0.37% ^{**}	-1.44% ^{***}	-0.64% ^{***}	-1.64%	0.28%
Sweden	1.16% ^{***}	0.34% ^{***}	1.61% ^{***}	0.45% ^{***}	0.97% ^{***}	1.02% ^{***}
Switzerland	0.30% [*]	0.09%	0.48% [*]	0.23% ^{**}	3.06% ^{***}	2.42% ^{***}
UK	0.52% ^{***}	0.16% ^{***}	0.72% ^{***}	0.22% ^{***}	2.08% ^{***}	1.63% ^{***}
US	2.10% ^{***}	0.90% ^{***}	2.80% ^{***}	1.01% ^{***}	9.16% ^{***}	4.19% ^{***}
Full sample	1.42% ^{***}	0.47% ^{***}	1.89% ^{***}	0.57% ^{***}	5.84% ^{***}	2.76% ^{***}
High ASD	1.53% ^{***}	0.54% ^{***}	2.04% ^{***}	0.65% ^{***}	6.58% ^{***}	3.08% ^{***}
Low ASD	0.94% ^{***}	0.16% ^{***}	1.26% ^{***}	0.20% ^{***}	2.74% ^{***}	1.28% ^{***}
<i>High ASD vs. low ASD</i>						
<i>T-stat/z-stat</i>	8.91 ^{***}	11.88 ^{***}	9.39 ^{***}	10.73 ^{***}	17.91 ^{***}	15.76 ^{***}

Table 6: Regression results

This table shows results of random (firm) effects regression model of the following form for insider purchases:

$$CAR_{ijt} = \alpha + \beta ASDindex_c + \gamma X_{ijt} + \delta YearDummy_{ijt} + u_j + \varepsilon_{ijt}$$

CAR_{ijt} is the abnormal return cumulated over 6 days in Panel A, 11 days in Panel B, and 101 days in Panel C relative to the transaction date, respectively. $ASDindex_c$ is the country-level anti-self-dealing index. X_{ijt} is a vector of transaction and firm characteristics. All variables are winsorized at the 1st and 99th percentiles. Observations with negative market-to-book ratio are dropped. All models in the last column report results when excluding all US observations. Coefficients for the year dummies are not reported. ***, ** and * denote the significance at the 1%, 5% and 10% level, respectively. Sources and time coverage of insider trading data are presented in Table 1 and definitions of the variables in Table 2.

PANEL A: CAR(0,5)	Model 1		Model 2		Model 3	
	coeff.	s.e.	coeff.	s.e.	coeff.	s.e.
Constant	0.0112***	(0.0033)	0.0172***	(0.0037)	0.0140***	(0.0043)
ASD index	0.0172***	(0.0025)			0.0106***	(0.0025)
High ASD			0.0105***	(0.0014)		
Transaction value	0.0024***	(0.0002)	0.0024***	(0.0002)	0.0015***	(0.0002)
Past return	-0.0324***	(0.0025)	-0.0324***	(0.0025)	-0.0306***	(0.0038)
Market-to-book ratio	-0.0001	(0.0002)	-0.0001	(0.0002)	-0.0007***	(0.0003)
Market capitalization	-0.0056***	(0.0004)	-0.0057***	(0.0004)	-0.0034***	(0.0005)
Multiple trades	0.0019**	(0.0008)	0.0017**	(0.0008)	-0.0018	(0.0014)
Executive director	0.0023***	(0.0007)	0.0023***	(0.0007)	0.0016***	(0.0009)
# of observations	92650		92650		44425	
χ^2	601.56***		601.03***		192.57***	
R ²	3.87%		3.88%		2.22%	
PANEL B: CAR(0,10)	Model 4		Model 5		Model 6	
	coeff.	s.e.	coeff.	s.e.	coeff.	s.e.
Constant	0.0392***	(0.0046)	0.0526***	(0.0056)	0.0377***	(0.0059)
ASD index	0.0236***	(0.0035)			0.0141***	(0.0034)
High ASD			0.0162***	(0.0020)		
Transaction value	0.0028***	(0.0002)	0.0028***	(0.0002)	0.0014***	(0.0003)
Past return	-0.0769***	(0.0033)	-0.0767***	(0.0033)	-0.0756***	(0.0041)
Market-to-book ratio	-0.0008***	(0.0003)	-0.0009***	(0.0003)	-0.0016***	(0.0004)
Market capitalization	-0.0110***	(0.0005)	-0.0112***	(0.0006)	-0.0075***	(0.0007)
Multiple trades	0.0004	(0.0011)	0.0002	(0.0011)	-0.0008	(0.0021)
Executive director	0.0024***	(0.0009)	0.0024***	(0.0009)	0.0020*	(0.0011)
# of observations	92650		92650		44425	
χ^2	1288.48***		1294.74***		676.65***	
R ²	7.78%		7.75%		6.55%	
PANEL C: CAR(0,100)	Model 7		Model 8		Model 9	
	coeff.	s.e.	coeff.	s.e.	coeff.	s.e.
Constant	0.3111***	(0.0203)	0.3443***	(0.0201)	0.1345***	(0.0251)
ASD index	0.0839***	(0.0139)			0.0423***	(0.0119)
High ASD			0.0935***	(0.0077)		
Transaction value	0.0020***	(0.0006)	0.0020***	(0.0006)	0.0020***	(0.0007)
Past return	-0.0875***	(0.0118)	-0.0865***	(0.0118)	-0.0991***	(0.0191)
Market-to-book ratio	-0.0073***	(0.0013)	-0.0074***	(0.0013)	-0.0129***	(0.0021)
Market capitalization	-0.0562***	(0.0028)	-0.0574***	(0.0028)	-0.0296***	(0.0036)
Multiple trades	0.0040	(0.0029)	0.0029	(0.0029)	-0.0020	(0.0060)
Executive director	0.0064***	(0.0024)	0.0065***	(0.0024)	0.0009	(0.0033)
# of observations	92650		92650		44425	
χ^2	847.76***		888.32***		321.85***	
R ²	3.89%		4.22%		1.53%	

Table 7: Dollar profit regression results

This table shows results of random (firm) effects regression model of the following form for insider purchases:

$$Profit_{ijt} = \alpha + \beta ASDindex_c + \gamma X_{ijt} + \delta YearDummy_{ijt} + u_j + \varepsilon_{ijt}$$

$Profit_{ijt}$ is the total value of shares purchased (in US dollar thousands) multiplied by the abnormal return cumulated over 6 days in Panel A, 11 days in Panel B, and 101 days in Panel C relative to the transaction date, respectively. $ASDindex_c$ is the country-level anti-self-dealing index. X_{ijt} is a vector of transaction and firm characteristics. *Relative transaction value* is scaled by 0.001. All variables are winsorized at the 1st and 99th percentiles. Observations with negative market-to-book ratio are dropped. The second column reports results when excluding all US observations. Coefficients for the year dummies are not reported. ***, ** and * denote the significance at the 1%, 5% and 10% level, respectively. Sources and time coverage of insider trading data are presented in Table 1 and definitions of the variables in Table 2.

PANEL A: PROFIT(0,5)	Model 10		Model 11	
	coeff.	s.e.	coeff.	s.e.
Constant	-6.10***	(0.73)	-4.33***	(1.00)
ASD index	2.39***	(0.59)	0.05	(0.56)
Relative transaction value	2.20***	(0.17)	1.46***	(0.20)
Past return	-1.97***	(0.29)	-2.02***	(0.45)
Market-to-book ratio	0.02	(0.03)	-0.06	(0.04)
Market capitalization	0.86***	(0.09)	0.82***	(0.13)
Multiple trades	1.11***	(0.16)	0.28	(0.38)
Executive director	0.24**	(0.12)	0.36**	(0.18)
# of observations	92771		44546	
χ^2	392.28***		143.60***	
R ²	12.12%		6.38%	
PANEL B: PROFIT(0,10)	Model 12		Model 13	
	coeff.	s.e.	coeff.	s.e.
Constant	-5.79***	(0.86)	-4.01***	(1.16)
ASD index	3.84***	(0.79)	0.83	(0.74)
Relative transaction value	2.71***	(0.20)	1.74***	(0.22)
Past return	-4.32***	(0.41)	-4.76***	(0.71)
Market-to-book ratio	-0.05	(0.04)	-0.21***	(0.06)
Market capitalization	0.67***	(0.11)	0.71***	(0.17)
Multiple trades	1.22***	(0.21)	0.32	(0.52)
Executive director	0.04	(0.15)	0.07	(0.25)
# of observations	92771		44546	
χ^2	489.65***		191.04***	
R ²	11.65%		6.00%	
PANEL C: PROFIT(0,100)	Model 14		Model 15	
	coeff.	s.e.	coeff.	s.e.
Constant	0.00	(2.69)	1.68	(3.87)
ASD index	5.89***	(2.19)	0.06	(2.08)
Relative transaction value	4.26***	(0.52)	2.54***	(0.64)
Past return	-4.17***	(1.04)	-5.31***	(1.58)
Market-to-book ratio	-0.35*	(0.19)	-0.90***	(0.20)
Market capitalization	-0.25	(0.39)	-0.01	(0.58)
Multiple trades	2.32***	(0.51)	0.25	(1.26)
Executive director	0.60	(0.40)	1.87***	(0.72)
# of observations	92771		44546	
χ^2	267.30***		120.48***	
R ²	4.75%		1.70%	

Table 8: The effect of asymmetric information

This table shows results of random (firm) effects regression model of the following form for insider purchases:

$$CAR_{ijt} = \alpha + \beta ASDindex_c + \gamma X_{ijt} + \delta YearDummy_{ijt} + u_j + \varepsilon_{ijt}$$

CAR_{ijt} is the total abnormal return cumulated over 11 days relative to the transaction date. $ASDindex_c$ is the country-level anti-self-dealing index. X_{ijt} is a vector of transaction and firm characteristics. *Small, medium sized and large firms* indicate the smallest, middle and the largest quintile of transactions according to the total assets of their firms, respectively. *Small, medium and large transactions* indicate the smallest, middle and the largest quintile of firms according to the relative size of the transactions, respectively. All variables except the ASD index are winsorized at the 1st and 99th percentiles. Observations with negative market-to-book ratio are dropped. Coefficients for the year dummies are not reported. ***, ** and * denote the significance at the 1%, 5% and 10% level, respectively. Sources and time coverage of insider trading data are presented in Table 1 and definitions of the variables in Table 2.

PANEL A: FIRM SIZE	Model 16		Model 17		Model 18	
	small firms		medium sized firms		large firms	
	coeff.	s.e.	coeff.	s.e.	coeff.	s.e.
Constant	0.0269**	(0.0127)	0.0246**	(0.0107)	0.0576***	(0.0126)
ASD index	0.0436***	(0.0098)	0.0239***	(0.0063)	0.0036	(0.0046)
Transaction value	0.0072***	(0.0009)	0.0039***	(0.0006)	0.0010***	(0.0003)
Past return	-0.0715***	(0.0068)	-0.0866***	(0.0069)	-0.0833***	(0.0093)
Market-to-book ratio	-0.0008	(0.0005)	-0.0005	(0.0005)	0.0000	(0.0006)
Market capitalization	-0.0236***	(0.0028)	-0.0120***	(0.0021)	-0.0072***	(0.0013)
Multiple trades	-0.0005	(0.0031)	0.0015	(0.0018)	0.0017	(0.0018)
Executive director	-0.0005	(0.0034)	0.0053***	(0.0017)	0.0012	(0.0016)
# of observations	17,015		16,901		17,530	
χ^2	299.34***		326.39***		135672***	
R ²	5.91%		9.40%		9.37%	
PANEL B: ANALYSTS' FOLLOWING	Model 19		Model 20		Model 21	
	1 or 2 analysts		3 and more analysts		no analysts	
	coeff.	s.e.	coeff.	s.e.	coeff.	s.e.
Constant	0.0414***	(0.0105)	0.0659***	(0.0080)	0.0397***	(0.0078)
ASD index	0.0373***	(0.0076)	0.0165***	(0.0052)	0.0330***	(0.0062)
Transaction value	0.0028***	(0.0006)	0.0020***	(0.0003)	0.0036***	(0.0005)
Past return	-0.0764***	(0.0079)	-0.0858***	(0.0064)	-0.0717***	(0.0052)
Market-to-book ratio	-0.0004	(0.0005)	-0.0004	(0.0003)	-0.0017***	(0.0005)
Market capitalization	-0.0148***	(0.0016)	-0.0125***	(0.0009)	-0.0162***	(0.0014)
Multiple trades	0.0017	(0.0022)	0.0015	(0.0015)	-0.0014	(0.0019)
Executive director	-0.0015	(0.0026)	0.0028**	(0.0012)	0.0033**	(0.0016)
# of observations	19,910		40,655		32,085	
χ^2	386.26***		510.44***		535.21***	
R ²	7.97%		11.21%		5.76%	
PANEL C: RELATIVE TRANSACTION SIZE	Model 22		Model 23		Model 24	
	small transactions		medium transactions		large transactions	
	coeff.	s.e.	coeff.	s.e.	coeff.	s.e.
Constant	0.0140*	(0.0083)	0.0193**	(0.0093)	0.0012	(0.0111)
ASD index	0.0074	(0.0049)	0.0117**	(0.0046)	0.0398***	(0.0067)
Relative transaction value	0.0012**	(0.0005)	0.0035**	(0.0017)	0.0072***	(0.0011)
Past return	-0.0688***	(0.0083)	-0.0742***	(0.0054)	-0.0818***	(0.0055)
Market-to-book ratio	-0.0009***	(0.0003)	-0.0007**	(0.0003)	-0.0007	(0.0005)
Market capitalization	-0.0033***	(0.0009)	-0.0084***	(0.0017)	-0.0149***	(0.0014)
Multiple trades	-0.0005	(0.0024)	-0.0010	(0.0020)	0.0033	(0.0024)
Executive director	0.0006	(0.0011)	0.0030*	(0.0016)	0.0056**	(0.0025)
# of observations	18,877		18,600		17,856	
χ^2	125.86***		385.04***		544.29***	
R ²	3.74%		5.48%		9.71%	

Table 9: Sensitivity checks

This table shows results of random (firm) effects regression model of the following form for insider purchases:
 $CAR_{jic} = \alpha + \beta_1 ASDindex_c + \beta_2 OTHERindex_c + \gamma X_{jic} + \delta YearDummy_{jic} + u_j + \varepsilon_{jic}$.

CAR_{jic} is the abnormal return cumulated over 11 days relative to the transaction date. $ASDindex_c$ is the country-level anti-self-dealing index. In Panel B, it includes also the ex-ante and ex-post anti-self-dealing index in some specifications. $OTHERindex_c$ is the country-level firm-specific stock price variation in Panel C. X_{jic} is a vector of transaction and firm characteristics. *Negative (positive) past return* indicates all transactions with negative (positive) cumulative abnormal returns over hundred days just before the purchase transactions. Model 27 excludes all US observations. All variables except the indices are winsorized at the 1st and 99th percentiles. Observations with negative market-to-book ratio are dropped. Coefficients for the year dummies are not reported. ***, **, and * denote the significance at the 1%, 5% and 10% level, respectively. Sources and time coverage of insider trading data are presented in Table 1 and definitions of the variables in Table 2.

PANEL A: PAST RETURN	Model 25		Model 26		Model 27	
	negative past return		positive past return		positive past return	
	coeff.	s.e.	coeff.	s.e.	coeff.	s.e.
Constant	0.0104	(0.0071)	0.0377***	(0.0064)	0.0320***	(0.0085)
ASD index	0.0258***	(0.0044)	0.0149***	(0.0042)	0.0076**	(0.0039)
Transaction value	0.0028***	(0.0003)	0.0022***	(0.0003)	0.0012***	(0.0004)
Past return	-0.1340***	(0.0095)	-0.0679***	(0.0071)	-0.0691***	(0.0095)
Market-to-book ratio	-0.0005*	(0.0003)	-0.0012***	(0.0003)	-0.0019***	(0.0005)
Market capitalization	-0.0082***	(0.0006)	-0.0093***	(0.0006)	-0.0067***	(0.0008)
Multiple trades	0.0013	(0.0015)	0.0007	(0.0014)	-0.0007	(0.0029)
Executive director	0.0033***	(0.0012)	0.0019*	(0.0012)	0.0021	(0.0015)
# of observations	46,845		45,805		22,561	
χ^2	685.60***		406.93***		167.31***	
R ²	12.09%		2.24%		1.76%	
PANEL B: SUB-INDICES	Model 28		Model 29		Model 30	
	coeff.	s.e.	coeff.	s.e.	coeff.	s.e.
	Constant	0.0608***	(0.0056)	0.0259***	(0.0052)	0.0259***
Ex-ante ASD index	0.0067***	(0.0023)			-0.0022	(0.0024)
Ex-post ASD index			0.0327***	(0.0039)	0.0338***	(0.0042)
Transaction value	0.0027***	(0.0002)	0.0028***	(0.0002)	0.0028***	(0.0002)
Past return	-0.0771***	(0.0033)	-0.0767***	(0.0033)	-0.0767***	(0.0033)
Market-to-book ratio	-0.0008***	(0.0003)	-0.0009***	(0.0003)	-0.0009***	(0.0003)
Market capitalization	-0.0108***	(0.0005)	-0.0110***	(0.0005)	-0.0110***	(0.0005)
Multiple trades	0.0006	(0.0011)	0.0000	(0.0011)	-0.0001	(0.0011)
Executive director	0.0024***	(0.0009)	0.0025***	(0.0009)	0.0025***	(0.0009)
# of observations	92,650		92,650		92,650	
χ^2	1253.74***		1319.23***		1319.58***	
R ²	7.57%		7.85%		7.83%	
PANEL C: FIRM-SPECIFIC VARIATION	Model 31		Model 32		Model 33	
	coeff.	s.e.	coeff.	s.e.	coeff.	s.e.
	Constant	0.0291***	(0.0064)	0.0116*	(0.0064)	0.0210***
ASD index			0.0182***	(0.0035)		
Ex-post ASD index					0.0266***	(0.0053)
Firm-specific variation	0.0493***	(0.0064)	0.0426***	(0.0063)	0.0139	(0.0086)
Transaction value	0.0028***	(0.0002)	0.0028***	(0.0002)	0.0028***	(0.0002)
Past return	-0.0768***	(0.0033)	-0.0766***	(0.0033)	-0.0766***	(0.0033)
Market-to-book ratio	-0.0009***	(0.0003)	-0.0009***	(0.0003)	-0.0009***	(0.0003)
Market capitalization	-0.0108***	(0.0005)	-0.0109***	(0.0005)	-0.0110***	(0.0006)
Multiple trades	-0.0001	(0.0011)	-0.0001	(0.0011)	-0.0001	(0.0011)
Executive director	0.0025***	(0.0009)	0.0025***	(0.0009)	0.0025***	(0.0009)
# of observations	92,650		92,650		92,650	
χ^2	1315.26***		1326.31***		1332.30***	
R ²	7.65%		7.83%		7.88%	

Table 10: Alternative indices

This table shows results of random (firm) effects regression model of the following form for insider purchases: $CAR_{ijt} = \alpha + \beta_1 ASDindex_c + \beta_2 OTHERindex_c + \gamma X_{ijt} + \delta YearDummy_{ijt} + u_j + \varepsilon_{ijt}$.

CAR_{ijt} is the abnormal return cumulated over 11 days relative to the transaction date. $ASDindex_c$ is the country-level anti-self-dealing index. $OTHERindex_c$ is the insider trading prevalence, rule of law, MAD adoption, MAD enforcement, ownership concentration and equity based pay, respectively. X_{ijt} is a vector of transaction and firm characteristics. All variables except the indices are winsorized at the 1st and 99th percentiles. Observations with negative market-to-book ratio are dropped. Coefficients for the year dummies are not reported. ***, ** and * denote the significance at the 1%, 5% and 10% level, respectively. Sources and time coverage of insider trading data are presented in Table 1 and definitions of the variables in Table 2.

	Model 34		Model 35		Model 36	
	coeff.	s.e.	coeff.	s.e.	coeff.	s.e.
Constant	0.0414***	(0.0094)	0.0026	(0.0095)	0.0419***	(0.0062)
ASD index	0.0269***	(0.0045)	0.0238***	(0.0035)	0.0152***	(0.0037)
Insider trading prevalence	0.0026	(0.0020)				
Rule of law			0.0038***	(0.0008)		
MAD adoption					-0.0020	(0.0057)
MAD enforcement					-0.0050	(0.0032)
Transaction value	0.0028***	(0.0002)	0.0028***	(0.0002)	0.0015***	(0.0003)
Past return	-0.0769***	(0.0033)	-0.0767***	(0.0033)	-0.0755***	(0.0041)
Market-to-book ratio	-0.0008***	(0.0003)	-0.0009***	(0.0003)	-0.0016***	(0.0004)
Market capitalization	-0.0110***	(0.0005)	-0.0110***	(0.0005)	-0.0076***	(0.0008)
Multiple trades	0.0004	(0.0011)	0.0002	(0.0011)	-0.0008	(0.0021)
Executive director	0.0024***	(0.0009)	0.0025***	(0.0009)	0.0021	(0.0011)
# of observations		92,650		92,650		43,836
χ^2		1288.9***		1312.37***		670.58***
R ²		7.74%		7.89%		6.46%
	Model 37		Model 38			
	coeff.	s.e.	coeff.	s.e.		
Constant	0.0554***	(0.0061)	0.0309***	(0.0049)		
ASD index	0.0099**	(0.0046)	0.0104***	(0.0038)		
Ownership concentration	-0.0324***	(0.0083)				
Equity-based pay			0.0441***	(0.0061)		
Transaction value	0.0028***	(0.0002)	0.0030***	(0.0002)		
Past return	-0.0768***	(0.0034)	-0.0764***	(0.0034)		
Market-to-book ratio	-0.0009***	(0.0003)	-0.0009***	(0.0003)		
Market capitalization	-0.0109***	(0.0006)	-0.0109***	(0.0006)		
Multiple trades	0.0003	(0.0011)	-0.0001	(0.0011)		
Executive director	0.0024***	(0.0009)	0.0027***	(0.0010)		
# of observations		92,328		86,349		
χ^2		1291.88***		1253.7***		
R ²		7.89%		8.11%		

Figure 1. Cumulative average abnormal returns for insider purchases

This figure presents plots of cumulative average abnormal returns (CAARs) for insider purchases over the window (-20,20) relative to the transaction date. Abnormal returns are market adjusted. The CAARs are calculated for individual countries and the plots are grouped according to the level of *Anti-self-dealing (ASD) index*, a measure of legal protection of minority shareholders against self-dealing by corporate insiders as defined in Djankov et al. (2008). A country is classified as having a high ASD index if its index score is above the cross-country median value, and as having a low ASD index otherwise.

