

Aggregate Insider Trading and Market Returns: The Role of Transparency

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Abstract

Using a sample of countries that require timely disclosures of insider trades, I investigate the effect of country-level institutions that promote transparency on the extent to which aggregate insider trades predict market returns. I find that financial information transparency mitigates the predictive content of aggregate insider trades when markets are more likely to deviate from fundamentals (i.e., during market fads), and when there is greater co-movement in stock prices. In contrast, there is some evidence that governance transparency mitigates the association between aggregate insider trades and future earnings surprises. Hence, holding constant the timely disclosures of insider trades, other capital market institutions play complementary roles in mitigating the informational frictions that give rise to the predictive content of aggregate insider trades.

Keywords: Insider Trading; Investor Protection; Transparency; Fundamentals; Market Fads.

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1. Introduction

This study examines the predictive content of aggregate trading by corporate insiders in a large international sample of equity markets. Prior research has found that insiders' net purchasing activity aggregated at the market level is positively associated with subsequent market returns using U.S. data from the 1980s and 1990s (Seyhun 1988, 1992; Lakonishok and Lee 2001; Jiang and Zaman 2010), and more recent data from China (Zhu et al. 2014). This phenomenon arises when corporate insiders trade on information signals that are not strictly idiosyncratic to their firm. Yet, this empirical regularity may seem puzzling in today's capital markets, given the timely dissemination of both information that moves market returns and insider trade disclosures around the globe. Indeed, over the last decade, an increasing number of countries and stock exchanges have been mandating the disclosure and prompt dissemination of corporate insider transactions. However, The U.S. and China differ greatly from each other in terms of present day capital market institutions, and the U.S. has undergone significant changes since the 1990s. Hence, the first question I seek to address is whether country-level institutions affect the extent to which corporate insider trades predict market returns, and if so, which?

U.S. corporate insiders have also been shown to trade in aggregate on superior knowledge of future fundamentals and stock mispricing (Seyhun, 1992; Jiang and Zaman, 2010). The distinction between those two sources of information advantage is far from trivial, due to their different implications for market fairness and efficiency. Institutions that promote the timely incorporation of information in stock prices must balance the incentive alignment and signaling benefits of insider trading with insiders' rent-seeking behavior. My second question is whether market-level institutions affect the extent to which aggregate insider trades reflect fundamentals

or perceived mispricing driven by market sentiment or other frictions (i.e., ‘fads’).¹ Among the countries that now require corporate insiders to disclose their equity transactions, the disclosure requirements for insiders’ equity transactions are homogeneous (e.g., similar timeliness and content).² In and of itself, this convergence suggests a move towards ‘best practice’ in capital market transparency (Martynova and Renneboog 2011), i.e., the availability of information about publicly listed companies to outside investors (Bushman et al. 2004). But those countries otherwise differ along regulatory and informational institutions that are likely to affect the average investor’s ability to infer insiders’ private information in a timely manner. I exploit country-level variations in those institutions to develop hypotheses on the cross-country variation in the predictive content of aggregate insider trades for future fundamentals and market fads.

Prior research documents the effect of firm- and country-level transparency on the informativeness of firm-level insider trades, with most of the evidence based on U.S. data. In brief, insider trades are less informative when firm-level financial transparency is higher (Frankel and Li 2004; Huddart and Ke 2007) or when firms have stronger governance (Dai et al. 2016). Country-level evidence is sparser. Fidrmuc et al. (2013) document a positive (negative) association between investor protection and the informativeness of insider purchases (sales) in a cross-country panel, while Gebka et al. (2017) find that insider trading is more profitable in European countries with

¹ Seyhun (1992) uses the term ‘fads’ in reference to movements in market returns unexplained by observable economic fundamentals (such as aggregate earnings, GPD, etc.) Given the difficulty to fully control for all ‘fundamentals’ that may explain variation in market returns, especially in a cross-country setting, I use the term ‘fad’ more specifically to refer to country-quarters where investor sentiment (as defined in Baker and Wurgler 2006, for example) appears to be abnormally high or low. Empirically, I identify fads using proxies from prior literature (especially Baker et al. 2012).

² I consider the disclosure requirements to be homogenous for this study. That is, while differences remain across countries, they should have no bearing on my inferences, given my research design. For example, the median transaction reporting lag varies from 0 days in the Netherlands to 5 days in France, but since I aggregate trades by quarter, those differences are inconsequential. Likewise, there is some variation across countries in what defines a reporting insider, but – consistent with prior research – I focus on top executives and directors, all of whom are subject to trading requirements in my sample. I also control for aggregate changes in reported institutional ownership in all regressions.

stronger investor protection and enforced regulatory rules. Notwithstanding the limited evidence on firm-level trades, I expect a cross-country analysis of aggregate insider trades to offer a novel perspective. Indeed, the information content of firm-level insider trades is a function of country-, firm-, insider- and transaction-specific factors (e.g., Hillier et al. 2015). In contrast, while it is arguably a coarse signal, aggregate insider trading has the advantage of teasing out idiosyncratic differences in agency frictions, liquidity and portfolio rebalancing needs, etc., and thus should be affected more directly by country-level informational transparency. Furthermore, Gebka et al. (2017) show that insider trades generate no significant alpha in most European countries. This raises the question whether corporate insiders are relatively more likely to trade on correlated instead of purely idiosyncratic signals in those economies.

It stands to reason that market-level financial information transparency could, theoretically, mitigate the predictive content of insider trades both for future cash flows and during market fads. With more timely and reliable access to financial information, market participants can directly infer insiders' information from those alternative sources or react more promptly to insider trade disclosures. Many transparency constructs are designed to reveal non-public information both at the firm- and aggregate level. For example, sell-side analysts' recommendations inform industry and market returns (Kadan et al. 2012; Howe et al. 2009). Likewise, high-quality financial reporting standards and auditors facilitate comparability across firms (Yip and Young 2012; Francis et al. 2013). Ex ante, these transparency mechanisms should preempt the predictive content of aggregate insider trades, whether insiders' trades reflect future fundamentals or if market prices deviate from fundamentals due to forces beyond the scope of corporate insiders' responsibility (e.g., because of investor sentiment).

However, the null hypothesis may not be rejected for several reasons. For one, because prior studies find that aggregate insider trades have predictive content for both returns and fundamentals in the U.S. (Seyhun 1992, Jiang and Zaman 2010) – arguably a high-transparency market. Second, other market characteristics such as the degree of government intervention in the economy may have a first-order effect on the extent to which insiders trade on correlated information. Third, to the extent that insiders trade much more often in countries with greater transparency (such as the U.S. or the U.K.), aggregate insider trades may be a low-power signal in low-transparency countries. Hence, the effect of transparency on the predictive content of aggregate insider trades is an empirical question.

A broader view of transparency includes investor protection and governance provisions such as blackout periods on insider trading prior to earnings announcements. Because governance provisions are put in place more specifically to prevent insiders from taking advantage of their private information about near-term cash flows, they are more likely to mitigate the predictive content of insider trades for future fundamentals than for fads. However, even if designed at the country-level, governance transparency targets firm-level agency costs, consistent with Firdmuc et al. (2013) and Gebka et al. (2017). Hence its effect on aggregate insider trades is likely weaker than that of financial information transparency, if not absent.

Using a dataset of equity transactions compiled in large part by a data vendor (Director Deals) and supplemented by data obtained from individual stock exchanges, I first document that, on average, proxies for net insider purchases aggregated by country and calendar quarter, are positively associated with the next country-quarter stock return. On average, a one-standard deviation increase in aggregate net insider purchases is associated with one-percent higher excess

market returns in the next quarter. Measured separately, purchases and sales have positive and negative predictive content for next quarter's return, respectively.

Next, I examine the effect of transparency. To measure financial information transparency, I use four country-level variables: the adoption of high quality accounting standards, analyst coverage, the proportion of firms audited by Big Four auditors, and earnings quality (Bhattacharya et al. 2003; Leuz et al. 2003). Because those variables are highly correlated with each other, and because they are unlikely to affect insider trades in isolation, I create a financial transparency score by grouping the four variables. I use the same method to create a governance transparency score, based on anti-self-dealing (Djankov et al. 2008), the degree of (perceived) insider trading restriction (Du and Wei 2004), the extent of timing restrictions on corporate insider trades around earnings announcements, and whether the country allows for class-action lawsuits (Leuz 2010).

The main findings are twofold. First, I find that financial information transparency has a significant mitigating effect on the association between aggregate net insider purchases and future market returns. Second, the cross-sectional findings indicate that financial information transparency mitigates the predictive content of aggregate insider trades when investor sentiment is abnormally high or low (i.e., during fads) and when stock prices are more synchronous. In contrast, higher investor protection appears to mitigate the association between aggregate insider trades and future earnings surprises. Collectively, the results suggest that financial information transparency has a first-order effect on aggregate insider trades' predictive content for market fads and in synchronous markets, while governance transparency has a distinct effect on insiders' collective proclivity to trade on near-term fundamentals.

Robustness tests using instrument variables, additional controls for country-level institutions, and the passage of the Sarbanes-Oxley Act (SOX) in the U.S. continue to indicate that

country-level transparency mitigates the predictive content of aggregate insider trades. These results alleviate concerns of endogeneity or omitted capital market frictions driving the observed results, albeit imperfectly.³

This paper makes several contributions to the literature. I extend the work of Seyhun (1988, 1992), Chowdhury et al. (1993), Lakonishok and Lee (2001), Jiang and Zaman (2010) and Zhu et al. (2014) by showing that capital-market institutions have a significant effect on the predictive ability of aggregate insider trades for market returns. This paper offers significant belief revision by showing that the association between aggregate insider trades and market returns in the U.S. is much weaker after the passage of SOX. I attribute this difference to the improved transparency brought about by SOX, including (but not limited to) the significant change in disclosure requirements for insider trades.

This is the first study to document the effect of country-level institutions on the degree to which insider trades reflect information about future fundamentals versus market fads. By showing how country-level governance and financial information transparency affect each channel, the paper offers significant insights beyond single-country studies such as the aforementioned, and others conducted at the firm-level (e.g., Piotroski and Roulstone 2005). Insofar as regulators require the timely disclosure of insider transactions to promote market integrity and efficiency, my results show that similar disclosure requirements across countries need not yield the same outcome when many differences remain in terms of information environment.

³ I examine whether the passage of the Sarbanes-Oxley Act (SOX)—a significant shock to transparency—had an effect on the predictive content of U.S. aggregate insider trades. Using monthly data, I find a significant reduction in the predictive content of U.S. aggregate insider trades around SOX. Results based on a difference-in-difference design with the U.K. as a control sample confirm that the decrease is not due to contemporaneous and unobservable changes in global equity markets. Hence, my results are consistent with prior findings based on pre-SOX data but shed further light on the effect of cross-sectional and time-series variation in transparency on the predictive content of aggregate insider trades.

There are, to date, few papers that examine corporate insider trades in a cross-country setting. Fidrmuc et al. (2013) and Gebka et al. (2017) find that insider purchases (sales) are more (less) informative at the firm level in countries with greater shareholder protection. Gebka et al. (2017) also find more profitable purchases in countries with lower religiosity. My paper complements those two by focusing on aggregate instead of idiosyncratic informed trading, and thereby shedding light on a different mechanism through which country-level institutions affect the association between insider trades and subsequent returns. Indeed, the aggregate association between insider trades and market returns is more likely to reflect information frictions than governance frictions. Consistent with this view, my results confirm that investor protection has no significant bearing on the predictive content of aggregate insider trades for market returns – instead, financial information transparency reduces the aggregate informativeness of both insider purchases and sales, whereas Fidrmuc et al. (2013) and Gebka et al. (2017) find that investor protection has directionally opposite results on purchases and sales.

2. Institutional Background and Hypothesis Development

In this section, I offer a brief overview of insider trading reporting requirements around the world, and I develop my hypothesis.

2.1. Insider Trading Restrictions and Mandatory Disclosure

An increasing number of stock exchanges and market regulators have been requiring the disclosure of corporate insider transactions. Even for jurisdictions where reporting requirements had been in place for decades, the early 2000s brought about regulatory impetus and technological changes that have facilitated the timely dissemination of those disclosures (e.g., Section 403 of the Sarbanes-Oxley Act in the U.S., and the Market Abuse Directive in the E.U.) Indeed, regulators

not only feel compelled to respond to investor demand for information about insider trades, but also view prompter disclosure requirements as a mechanism to further discourage trading on material private information. The theoretical literature, to some extent, supports this view by showing that the requirement to disclose insiders' trades accelerates price discovery and reduces trading profits, relative to the no disclosure regime (Huddart et al. 2001).

2.2. Literature on the Informativeness of Aggregate Insider Trading

There is a vast empirical literature examining stock returns around corporate insider trades. While most papers examine firm-level returns, corporate insider transactions need not be predictive of equity returns only at the firm level. Using U.S. data, Seyhun (1988, 1992) shows that aggregate information about insider transactions successfully explains subsequent market-level returns.⁴ Lakonishok and Lee (2001) and Jiang and Zaman (2010) find similar evidence. This is consistent with insiders collectively trading on information that is not reflected in market prices by the time their trades are publicly disclosed by the SEC.

In a recent paper, Zhu et al. (2014) find similar results using Chinese data from 2007 to 2010. However, among countries with mandated disclosure rules for corporate insider transactions, China and the U.S. differ greatly in terms of other capital market institutions. Does aggregate

⁴ The predictive content of aggregate insider trades does not mean that insiders trade on private information about macroeconomic data. Corporate insiders and outsiders observe macro signals (e.g., changes in oil prices), and the market can respond to those signals directly. However, across industries and companies, executives make different strategic choices in response to observed (and anticipated) macro signals (e.g., for changes in oil prices, car manufacturers' output, airlines' hedging, etc.) While executives buy and sell shares in their company's stock based on the implications for their company's stock price, not all trades will be strictly idiosyncratic. Instead, aggregate insider trades can have predictive power for aggregate returns if insiders' strategic and trading decisions are sufficiently correlated across firms. That is, consider a car manufacturer's CEO who buys shares by anticipating an uptick in demand for sports-utility vehicles, an airline's CFO because of increased capacity utilization, while an oil & gas vice-president sells more shares than usual because (s)he thinks that oil prices will drop further. To the extent that all three trades respond, even partially, to oil price changes, then their aggregated trades can be associated with market returns. I urge readers to refer to Seyhun (1988; 1992) and Zhu et al. (2014) for more details on the conceptual underpinnings of aggregate insider trades' predictive content. My paper builds on their work by adding a layer of cross-country variation in the aggregate insider trading/stock return relationship.

insider trading predict market returns in the same way across countries? My paper seeks to address that question.

2.3. Country-level Transparency and the Predictive Content of Aggregate Insider Trading

The predictive content of insider trades is likely to vary based on country characteristics such as the quality of institutions in place and stock market development (Doidge et al. 2007). Few studies examine cross-country variation in insider transactions. Fidrmuc et al. (2013) show that, in a sample of 15 European countries plus the U.S., insider purchases (sales) exhibit greater (lower) information content in countries with stronger anti-self-dealing protection. They interpret this as evidence of stronger country-level institutions affecting the informativeness of insider trades through a better disclosure environment (hence the effect on director purchases) and a greater credibility-enhancing effect on insiders' claims that they are trading for liquidity reasons (hence the effect on director sales). Gebka et al. (2017) also document a positive association between returns following insider purchases and investor protection in Europe.

If corporate information is more transparent in a market, outsiders can more readily react to public disclosures such as earnings announcements (DeFond et al. 2007), leaving less room for insiders to profit from their private information, and for more ambiguous disclosures such as insider transactions to be price-relevant. Furthermore, if insiders 'camouflage' their private information by taking advantage of a more opaque reporting system, the market will infer their informed trading with a delay, which will lead to a positive association between corporate insider trading and future returns in countries where earnings management is more prevalent, i.e., where financial reporting is of lower quality. This is all the more likely since earnings management is more widespread in countries with low investor protection (Leuz et al. 2003). The above arguments

imply that both information and governance frictions can lead to a negative association between financial reporting quality (i.e., transparency) and the predictive content of insider trading.⁵

Whether that association holds in the aggregate depends on the extent to which transparency mitigates the correlated component of insiders' private information, not just the idiosyncratic component. Prior literature offers some guidance on this question. For example, it is well documented that sell-side analysts contribute to industry-level information being impounded into stock prices (Piotroski and Roulstone 2004; Kadan et al. 2012). Furthermore, firm-level stock recommendations aggregated at the country-level predict future market returns in the U.S. (Howe et al. 2009). Hence, it follows that analysts' information set includes a macro component that likely overlaps with that of insiders. Accordingly, I expect a larger pool of analysts in the country to reduce the predictive content of aggregate insider trades. While the mechanism varies across constructs, most country-level measures of transparency should follow a similar pattern. A key attribute of financial reporting quality is comparability, i.e., the extent to which the same economic event is reported in the same way by different firms. Prior research documents that IFRS adoption

⁵ Failure to reject the null could stem from several factors. Corporate transparency primarily reflects firm- rather than aggregate-level information. Therefore, while higher disclosure quality or greater analyst coverage can reduce the idiosyncratic component of insiders' trading advantage, this may not apply in the aggregate. Furthermore, Piotroski and Roulstone (2004) find that U.S. insider trades are positively associated with the reflection of firm-specific information into stock prices, whereas analyst forecasting activity helps reflect both aggregate information and firm-specific information (Crawford et al. 2012). Hence, even if greater transparency can facilitate the timely reflection of aggregate news, it may not be via an interactive effect with insider trades.

In terms of tension, Fidrmuc et al. (2013) document a greater (lower) information content for insider purchases (sales) in countries with greater shareholder protection. However, this need not carry over to aggregate insider transactions. Indeed, governance aims to mitigate firm-level agency conflicts. As a result, it is unclear whether the correlated component of insider trades should be sensitive to governance at all.

Additionally, insider trades are more frequent in countries with greater transparency, such as the U.S. or the U.K., possibly a reflection of the greater reliance on executive stock-based compensation in those markets. As a result, aggregate insider trades may be a low power signal in countries with relatively lower transparency.

Lastly, holding insiders' propensity to trade on idiosyncratic and correlated information constant, a positive association between aggregate insider trades and stock returns in the next period indicates a delayed reflection of insiders' information. In contrast, a positive association between firm-level insider trades and stock returns immediately following their disclosure indicates the opposite. Hence, transparency can theoretically both enhance the informativeness of firm-level trades and mitigate the predictive content of aggregate trades.

(Yip and Young 2012) and Big 4 auditors (Francis et al. 2013) enhance comparability. If investors can compare firms more easily, then their ability to infer aggregate news from firm-level disclosures will increase. Accordingly, I expect aggregate insider trades to have lower predictive content in countries with higher-quality accounting standards and a greater proportion of firms audited by the Big 4.

In sum, I formulate my first hypothesis as follows:

H1: Aggregate insider trading has more predictive content in countries with lower transparency.

2.4. Fundamentals, Market Fads, and Synchronicity

Prior research documents that insider trades precede abnormal stock returns because of insiders' ability to both (i) predict future cash flows (the fundamentals hypothesis) and (ii) identify mispricing in their own stock (the fads hypothesis). Seyhun (1992) and Piotroski and Roulstone (2005)—both using U.S. data—provide support for both hypotheses in the aggregate and in the cross-section, respectively.

The only paper I am aware of that considers the role of transparency at the aggregate level is He and Hu (2014), who examine the effect of country-level transparency on the association between market returns and aggregate earnings. They posit that in countries with higher transparency, investors have more timely and reliable access to earnings news that enables them to form expectations that are more accurate. Consistent with their hypothesis, they find that a larger portion of current aggregate earnings can be explained by lagged market returns in countries with higher transparency. Hence, higher transparency is associated with fundamentals that are more predictable in the aggregate. *Ceteris paribus*, this reduces the potential for aggregate insider trades to predict future fundamentals.

Prior literature suggests that more timely and accurate financial disclosures are more likely to minimize firm-level mispricing investor sentiment (Firth et al. 2015). Furthermore, Aboody et al. (2005) show that earnings quality reduces insider trading profits from accrual mispricing, while Sawicki and Shrestha (2014) find that managers sustain firm overvaluation (undervaluation) through earnings management to sell (buy) shares more profitably. At the country-level, DeFond et al. (2015) show that IFRS adoption decreases crash risk among industrial firms, especially in firms with poor information environment, while Brochet et al. (2013) find that returns following U.K. insider purchases decreased after IFRS adoption. Collectively, these studies inform my own hypothesis by showing that financial information transparency is likely to have a negative effect on the incidence of fads and the predictive content of insider trading during fads.

Can this occur at the aggregate level? Although there is no direct evidence in the literature to suggest so or otherwise, one can expect country-level transparency to mitigate aggregate insider trades' predictive content during fads. Consider a situation where investor sentiment is high because investors are overreacting to recent good news. If several insiders observe and trade upon negative signals that pertain to their firms, and those signals are partially correlated with each other, then their trades will potentially predict future returns. However, in a relatively more transparent environment, competing sources of information are more likely to preempt the insider trades, or at least reveal the trading insiders' collective information sooner. This can happen even if the insiders who trade also withhold some of that information, as long as other firms are more transparent. Hence, I expect country-level transparency to mitigate the predictive content of aggregate insider trades during market fads.

Overall, though, in the absence of theoretical or empirical evidence, I state the following hypotheses in null form:

H2a(b): Country-level transparency has no incidence on the predictive content of aggregate insider trading for future fundamentals (market fads).

Lastly, there is a vast literature that documents cross-country variation in synchronicity, i.e., the extent to which the average firm's returns co-move with industry or country-level returns. If stock returns are more highly correlated across firms because there is generally less firm-specific information available in the market (Dang et al. 2015) and investors trade in portfolios rather than individual stocks (Karolyi et al. 2012), then insider trades should also be more highly correlated. That is, both insiders and outsiders trade on signals correlated across firms. In that case, aggregate insider trades should have greater predictive content in countries with higher synchronicity.

However, Piotroski and Roulstone (2004) find that insider trading activity is associated with lower return co-movement at the firm-level. If insiders control the flow of firm-specific information for their own trading activity, then disclosed insider trades may reflect firm-specific rather than market-level information. That is, insider trade disclosures would act as a substitute mechanism (reflecting firm-level information) for other sources of information (reflecting market-level information). On balance, though, it is unlikely that returns would still be synchronous if insiders traded primarily on firm-idiosyncratic information. Accordingly, I formulate the hypothesis as directional:

H3: The predictive content of aggregate insider trading is higher in countries with higher synchronicity.

Since Morck et al. (2000), the literature has shown that economies with less developed capital markets tend to experience greater co-movement, on average. Synchronicity has generally been described as a symptom or outcome of lack of transparency (Jin and Myers 2006; Hutton et al. 2009), although competing theories and evidence exist (Dasgupta et al. 2010). However, an

open question is whether the hypothesized effects of transparency (H1) and synchronicity (H3) on the predictive content of aggregate insider trades are distinct from one another. There is little evidence in the prior literature to inform this question. Fernandes and Ferreira (2008) find that stock price informativeness increases after first-time insider trading enforcement in developed but not emerging markets. Since transparency is generally lower in emerging markets, this suggests that the association between insider trading and synchronicity varies with transparency. However, the setting is quite different, because Fernandes and Ferreira (2008) examine enforcement against illegal insider trading pre-2003, at a time when fewer countries mandated insider trade disclosures. Hence, I leave the interactive effect of transparency and synchronicity on the predictive content of aggregate insider trading as an empirical question:

H4: Country-level synchronicity does not affect the mitigating effect of country-level transparency on the predictive content of aggregate insider trading.

The remaining question is whether synchronicity also affects the degree to which aggregate insider trades' predictive content reflects fundamentals vs. fads. Barberis et al. (2005) find evidence that return co-movement is more likely due to market frictions or investor sentiment rather than fundamentals. More recently, Dang et al. (2015) find no significant association between return on asset co-movement and news commonality or stock return co-movement. Drake et al. (2017) find that co-movement in investor attention is positively associated with excess co-movement in stock returns. I examine synchronicity as a partitioning variable because evidence suggests it is correlated with both transparency and fads. However, I do not formulate a hypothesis as to whether it affects the predictive content of aggregate insider trades with respect to fundamentals or fads.

3. Sample and Research Design

3.1. Sample Selection

I obtain insider transaction data from several sources. I use Thomson Reuters' Insider Filing Data Feed for U.S. data. The primary source for non-U.S. insider transactions is Director Deals, a data vendor that collects data from stock exchanges and formats it in a way that is consistent across countries. The main information available for a given transaction is the name of the insider, his or her position in the firm, the transaction type (e.g., purchase, sale, option exercise, option grant, etc.), the number of shares transacted and the average transaction price, the total trade value (in British Pounds, Euros and US Dollars), the insider's post-trade holdings,⁶ the transaction date and the reporting date. Director Deals also includes firm identifiers such as ISIN and SEDOL, firm name, and the country in which the transaction was announced. While the sample is very broad in the cross section, there is limited time-series for most countries. To supplement the Director Deals data, I contacted stock exchanges and securities regulators to obtain more time-series. I also hand collected information directly from their websites when available. I obtained data from Australia, Canada, China, Hong Kong, India and Sweden. I keep only open market purchases and sales of common shares (including sales immediately following stock option exercises) by senior executives and directors.⁷

⁶ While it would be ideal to control for insiders' stock holdings, those are not consistently reported across countries. I lose half of the sample if I require data on insider holdings and cannot compute net aggregate insider trades scaled by total insider holdings, since I do not observe non-trading insiders' holdings.

⁷ Prior research shows that not all trades (especially sales) are driven by private information. By focusing on open market transactions, I exclude a significant number of transactions that are not at the insider's discretion. However, non-information-driven trades are still likely to be included, such as pre-scheduled stock sales of vested options. In untabulated tests, I re-run the analyses by separating 'strict' insider sales from those coinciding with option exercises. Descriptively, I find that some countries have few option-related sales (sometimes none), especially the less transparent ones. In regression analyses, all the main results on transparency and fads hold if I exclude option-related sales from the calculation of aggregate net insider purchases. Taken separately, aggregate option-related sales have no robust association with future market returns.

Table 1 summarizes the sample composition, data sources, number of transactions, and average reporting lag per country. Countries vary substantially in terms of sample period, trading frequency and incidence of purchases relative to sales.⁸ A large portion of the sample consists of European countries, a reflection of the E.U-wide disclosure requirement for insider trades promulgated in 2005. Many Asian countries also appear to have thousands of transactions, especially Hong Kong and China, for which I could obtain more time series. Other parts of the world are represented as well (e.g., Australia, Israel, South Africa), but the major economy that is missing is Japan, where insider trades are not reported.⁹ Trades are reported promptly in all countries, with a median reporting lag between zero and five days.

I obtain stock market and macroeconomic data from Datastream and MSCI, financial data from WorldScope, analyst forecast data from I/B/E/S, management guidance data from Capital IQ, institutional ownership data from Thomson Reuters, and earnings announcement dates from Bloomberg. Even though insider trading data is available prior to 2004 for a few countries, I report the main results from 2004 onwards, because Capital IQ did not collect management guidance data prior to that date. Including data prior to 2004 without controlling for management guidance yields very similar results (not tabulated).

3.2. Regression Design

The baseline model consists of the following pooled time-series and cross-sectional regression, where the unit of observation is a country-quarter, and all variables are measured in US dollars, whenever applicable:

⁸ One concern with the sample is the effect of individual countries (especially the U.S.) and/or specific time periods (especially the financial crisis) on the overall results. As a sensitivity test, I re-run the analysis by excluding the U.S. and the crisis period (2008 and 2009). The results support the conclusions based on the full sample (not tabulated).

⁹ Director Deals also includes data from Bangladesh, the Czech Republic, Iceland, Lithuania, Luxembourg, Sri Lanka, and Vietnam during my sample period. I exclude those countries because of insufficient trades per quarter or missing data on country-level investor protection or information transparency.

$$Market\ Return_{t+1} = \beta_1 Aggregate\ IT_t + \sum \beta_k Control_k + \sum \beta_i Country_i + \varepsilon \quad (1)$$

The dependent variable is the country-level index return measured over quarter $t+1$, adjusted both for the country-specific risk-free rate and the contemporaneous MSCI World Index return. The main variable of interest is *Aggregate IT*, which is computed in several ways. The first one is the insider purchase ratio, which is the sum of the number of firms whose senior executives and directors bought shares in the country during quarter t , scaled by the number of firms whose senior executives and directors bought or sold shares. To mitigate concerns of a purchase ratio based on a small number of transactions, I eliminate country-quarters with less than ten transactions. If aggregate net insider purchases are predictive of *Market Return* in quarter $t+1$, β_1 should be significantly positive. As an alternative measure, I define net insider purchases as the difference between the total dollar value of insider purchases and that of sales, scaled by the aggregate market capitalization of listed companies in the country at the beginning of the year (as per WorldScope). Furthermore, I standardize the purchase ratio and net purchases at the country-level, so that coefficients on those variables do not merely reflect structural differences across countries in the extent to which insiders buy or sell shares. I also allow the coefficients on purchases and sales to differ, since the predictive content of each aggregate measure may differ. Lastly, I create a categorical variable as follows. *Buy–Sell* is equal to -1 if either the purchase ratio or net purchases is in the bottom quartile of the country-level distribution (-2 if both are), 1 if either is in the top quartile (2 if both are), and zero otherwise.¹⁰

¹⁰ Note that, unlike Fidrmuc et al. (2013) and other studies that examine firm-level returns following individual insider purchases and sales, there is no single “event” that I can identify in the aggregate. Instead, I compute net insider purchasing activity across firms and over a sufficiently long period of time. The coefficient on *Aggregate IT* captures the incremental stock returns per unit of net insider buying. Relatedly, one cannot say whether aggregate insider trading is “profitable” or not. This is different from the average returns following an insider purchase or sale (and therefore limits comparability with Fidrmuc et al. 2013 and other studies that use an event approach), but similar to studies that also aggregate insider trades at the firm-level, typically over a month, quarter or year.

There are two sets of control variables. The first set is a group of market factors that is likely to explain variation in future market returns. Following Griffin (2002), I use country-level factors, with the exception of *World Return*, which is the quarterly return on the MSCI All-Country World Index. Contemporaneous and lagged quarterly country-level market returns (*Market Return*) proxy for momentum and should be negatively correlated with aggregate net insider purchases, because insiders tend to be contrarians (Chowdhury et al. 1993). I also include market size (*Market Cap*), the aggregate country-level market-to-book ratio (*M/B Ratio*), share turnover (*Turnover*), and other macroeconomic variables that have been shown to explain variation in stock returns and the information environment: *Dividend Yield* is the end-of-quarter country-level dividend yield calculated by Datastream, while *Inflation* is the quarterly change in consumer price index.

The last set of control variables includes other potential signals of sentiment from institutional investors, analysts, and disclosures. Δ *Institutional Holdings* is the aggregate net change in the proportion of shares held by institutional investors, as per Thomson Reuters' Ownership database. I also include two control variables based on firm- and analyst-provided earnings forecasts, following Anilowski et al. (2007) and Howe et al. (2009), respectively. *Net Guidance* is the number of positive minus negative revisions in management forecasts issued by all companies during the quarter at the country-level, scaled by the number of companies.¹¹ *Net Forecasts* is the number of positive minus negative current-year EPS forecast revisions by sell-

¹¹ I classify management forecasts as positive (negative) when Capital IQ labels them as "Corporate Guidance – Raised" ("Corporate Guidance – Lowered"). This classification excludes many disclosures classified as "New/Confirmed." Given that guidance is not the primary focus of the paper and that it would be very costly to manually check whether those disclosures are in fact positive or negative, I rely solely on Capital IQ's classification.

side analysts, scaled by the number of companies in the country-quarter. Finally, to account for differences in market performance across countries, I include country fixed effects.¹²

3.3. Partitions: Fads and Synchronicity

To examine whether the predictive content of insider trades, if any, is attributable to fundamentals- or fads-driven returns across countries, I re-run Model 1 by partitioning the sample based on a proxy for whether market conditions are indicative of fads or not. To identify country-quarters as fads, I use several variables. I compute country-year level price-to-earnings and market-to-book value of equity ratios, and standardize them by country. In addition, I compute the aggregate dollar value of IPOs, SEOs, and stock repurchases per country-quarter (scaled by aggregate market capitalization), the volatility premium (see appendix and Baker et al. 2012 for more details), and aggregate share turnover, also standardized by country. I then run a principal component analysis of absolute P/E (0.43), absolute M/B (0.63), aggregate stock issuances and repurchases (0.24), aggregate turnover (0.43), and the absolute value of the volatility premium (-0.06), where the numbers in parentheses indicate standardized loadings for the first factor. I classify country-quarters where the fad factor is positive as ‘high fad’, and the rest as ‘low fad’.¹³

Second, I partition the sample based on country-level synchronicity. I follow Morck et al. (2000) to compute country-year level synchronicity as the mean log transformed R^2 (i.e., $\log[R^2/(1+R^2)]$) of a regression of firm-specific weekly returns on country-level returns, lagged firm-level returns, and U.S. returns. Observations above (below) the sample median are labeled as high (low) synchronicity.

¹² The inclusion of country fixed effects has the advantage of controlling for other time-invariant country factors. However, several of the transparency factors do not vary over time. Nevertheless, after re-running all the tests without country fixed effects, I find that my conclusions remain unaffected (not tabulated).

¹³ While some of the constructs underlying the fad factor, such as stock issuances or repurchases, are within managers’ control, I assume that fads are largely beyond their influence. Managerial discretion is captured by the transparency factors, especially via earnings quality.

3.4. Descriptive Statistics

Table 2 reports univariate statistics and correlations for the main variables used throughout the regression tests. In Panel A, the mean and median purchase ratios are only slightly above 0.5, suggesting that around the world, corporate insiders buy more frequently than they sell stock in their own firm. However, mean net purchases are negative (-0.62% of market value), suggesting that sales tend to exceed purchases in aggregate value, a pattern attributable to insiders liquidating their holdings over time, and to portfolio rebalancing and liquidity needs for executives compensated in stock (Gebka et al. 2017). In the subsequent regressions, those two variables are standardized to have a mean of zero and a standard deviation of one at the country-level. In Panel B, the correlation matrix indicates that in the univariate, insider trading signals are positively correlated with future market returns, and negatively correlated with lagged and contemporaneous returns. This suggests that, in aggregate, insiders trade as contrarians. Similarly, the negative correlations between the purchase ratio and net analyst forecast revisions suggests that insider signals tend to go against analyst forecasts in the aggregate. However, there is no negative correlation with country-level market-to-book ratio. Other untabulated results also indicate no significant correlation with proxies for fads (i.e., investor sentiment). Hence, there is no prima facie evidence that insiders trade with or against investor sentiment in the aggregate. However, this does not speak to whether the predictive content of their trades is correlated with fads, which I examine in Section 4.

3.5. Country-Level Transparency Measures

I use several proxies for country-level transparency, based on prior literature. IFRS and U.S. GAAP (*International GAAP*) proxy for high-quality sets of accounting standards (e.g., Barth et al. 2012). I measure *Earnings Quality* following the method described in Leuz et al. (2003) and

updated for my sample period. *Big 4 Auditors* is the proportion of firms in Worldscope audited by one of the Big 4 firms. Those first three variables measure the degree to which financial statements are likely to subsume insider trades as a source of timely and reliable disclosure to reflect insiders' collective information. The first variable is a top-down measure, whereas the other two are bottom-up measures. Consistent with Lang et al. (2012), I use *Big 4 Auditors* as a proxy for auditor quality. Lastly, I calculate the ratio of unique analysts in I/B/E/S/ divided by the number of listed companies in a country-quarter (*Analyst Following*). I expect analysts to capture—through their information search and macro/industry expertise—relatively more of the information that would otherwise be conveyed by insider trades.¹⁴

Next, I control for another four proxies that fall under the umbrella of investor protection or governance-related transparency. The *Anti-Self-Dealing* index measures legal protection of minority shareholders against expropriation by corporate insiders (Djankov et al. 2008). The degree of (perceived) *Insider Trading Restriction* (Denis and Xu 2013) measures investor confidence in the integrity of capital markets. I infer the extent of *Blackout Periods* on insider trades by comparing the proportion of all insider transactions that occur within a month after to within a month before an earnings announcement. The higher the difference, the more likely corporate insider trades are subject to timing restrictions, which are mandated in some countries, but also imposed at the firm-level in others. While there is mixed evidence on the profitability of trades made within or outside trading windows in the U.S. (see Bettis et al. 2000; Hillier and Marshall 2002; Roulstone 2003), restricted trading windows—along with mandated disclosures of

¹⁴ Many of those proxies may also affect the ability of insiders to trade on firm-specific information. For example, within a country, insiders from a firm with high analyst coverage could trade less profitably than insiders from a firm with low analyst coverage. However, the combined information gathering and dissemination by analysts covering all firms in the country can still affect the degree to which the combined trading activity of insiders predicts market returns. Idiosyncratic- and correlated informed trading are not necessarily mutually exclusive but I chose to focus on the latter.

insider trades—epitomize governance transparency aimed at curbing informed insider trading. If insiders must wait until after earnings announcements to trade, their collective information is more likely to be captured by said earnings announcements and other sources of information. Lastly, I obtain the indicator *Class Action* from Leuz (2010) and update it where needed to proxy for the litigation risk faced by managers who engage in opportunistic insider trading (Cheng et al. 2016). The variables capture the ability of outsiders to monitor and hold insiders accountable, should the latter engage in unwanted informed insider trading. The precise mechanisms through which this effect will hold depends on whether the measures address agency conflicts ex ante (e.g., blackout periods), ex post (e.g., class action lawsuits), or both ex ante and ex post (e.g., anti-self-dealing).

3.6. Country-Level Market Frictions

To ensure that the effect of transparency on the predictive content of aggregate insider trading is not merely the by-product of other market frictions, I include controls for transaction costs and illiquidity. *Bid-Ask Spread* is the difference between the ask and bid quotes, divided by the midpoint. *Zero Returns* is the proportion of trading days with no change in price (Bekaert et al. 2007). *Amihud Illiquidity* is the average daily ratio of absolute stock return to trading volume, as described in Amihud (2002). These three variables are averaged at the country-year level and weighted by average market capitalization. If transaction costs and/or illiquidity prevent outsiders from incorporating insiders' collective information into market prices in a timely fashion, then the predictive content of aggregate insider trades should be lower when the average bid-ask spread and Amihud illiquidity measures are lower, and when there are fewer zero-return trading days.

3.7. Summary Measures of Transparency and Investor Protection

To examine the effect of country-level transparency and investor protection on aggregate insider trading's predictive content, I aggregate the individual proxies into two factors. I replace

each variable (except *International GAAP* and *Class Action*) with its quartile ranking. I then sum the rankings of *Earnings Quality*, *Big 4 Auditors*, *Analyst Following* and the *International GAAP* indicator to create a financial information transparency factor. Similarly, I sum the quartile rankings of *Anti-Self-Dealing*, *Insider Trading Restriction*, *Blackout Periods*, and *Class Action* to create an investor protection and governance transparency factor.¹⁵

Table 3 reports country-level mean institutional characteristics (for brevity, I do not report variables which I reproduce from other papers), and the corresponding factors. Countries with low transparency include China or India, whereas high transparency countries primarily consist of Anglo-Saxon ones (Australia, Canada, New Zealand, U.K., U.S.) and Nordic ones (Denmark, Sweden).¹⁶

4. Empirical Results

This section reports empirical results. First, I examine the baseline association between aggregate insider trades and market returns, then I introduce transparency.

4.1. Regression Results: Baseline and H3

Table 4 reports regression results for the OLS estimation of Model 1. Panel A reports results where aggregate net insider purchases are measured using the *Purchase Ratio*. Column 1 reports results for the full sample. The coefficient on *Purchase Ratio* is positive (1.05%) and

¹⁵ I acknowledge the level of arbitrariness involved in creating those factors. In robustness tests, I “let the data speak” using two popular techniques, i.e., principal component analysis (PCA) and cluster analysis. The downside of PCA in this case is that the factors are difficult to interpret because they blend governance and financial information transparency variables, and include a few negative coefficients. If I force the PCA to create two separate factors for governance and financial information, the factors turn out to be very highly correlated. With cluster analysis, I find that aggregate insider trades have predictive content in the low transparency cluster, which consists of China, Egypt, Greece, Hong Kong, India, South Korea, Malaysia, Philippines, Poland, Portugal, South Africa, Thailand, and Turkey (untabulated).

¹⁶ To control for market frictions such as transaction costs and illiquidity, I create a factor using the corresponding country-level measures. The friction factor loads positively on country-level bid-ask spread (0.56), zero-return trading days (0.57) and Amihud illiquidity (0.49).

significant ($p < 0.01$).¹⁷ Among the market factors, the coefficients on lagged market returns and country-level market capitalization have a significantly negative sign. Dividend yield (inflation) is positively (negatively) associated with future returns. Column 2 reports results where the sample is limited to observations where the fad factor is negative. The coefficient on *Purchase Ratio* is positive (0.39) but not significant. Column 3 reports results where the sample is limited to observations where the fad factor is positive. The coefficient on *Purchase Ratio* is positive (1.47) and significant ($p < 0.05$). Column 4 reports results where the sample is limited to observations where synchronicity is below the sample median. The coefficient on *Purchase Ratio* is positive (0.83) and significant ($p < 0.10$). In column 5, the sample is limited to observations where synchronicity is above the sample median. The coefficient on *Purchase Ratio* is positive (1.30) and significant ($p < 0.10$).

Panels B, C, and D repeat the same analyses as in Panel A, except that aggregate net insider purchases are measured by *Net Purchases*, *Buy–Sell*, and *Purchases and Sales*, respectively. For brevity, only coefficients on *Aggregate IT* are tabulated. The results in Panels B and C are qualitatively similar to those in Panel A. The coefficients on *Net Purchases* are positive and significant in all regressions, except for the low fad partition. In terms of economic significance, a one-standard deviation in *Net Purchases* is associated with 0.95% higher market return in the next quarter, as per column 1 in Panel B. The coefficients on *Buy–Sell* are also positive, but not statistically significant in the low-fad and low-synchronicity partitions. The results in Panel D indicate that both aggregate purchases and sales have predictive content for future market returns: in column 1, the coefficient on purchases is significantly positive, and the one on sales significantly

¹⁷ In untabulated tests, I also examine the purchase ratio calculated with the number of insider buys divided by insider buys plus sales. The results are qualitatively similar, though statistically weaker. The same holds once I introduce transparency.

negative, both with comparable magnitudes. The significance of the coefficient on sales is consistent with Seyhun (1992) and Zhu et al. (2014). Interestingly, the coefficient on sales is significant throughout the sample partitions, whereas the one on purchases is only significant in the high fad and high synchronicity partitions.

Overall, the results in Table 4 indicate that net insider purchases aggregated at the country-quarter level have statistically and economically significant predictive content for next quarter market returns in the full sample. Furthermore, the results are more robust in sub-samples where markets may deviate from fundamentals, or when they are more synchronous (consistent with H3).

4.2. Univariate Results – H1

I next examine the role of transparency and investor protection. Table 5 reports differences between mean and median excess market returns for country-quarters where *Buy-Sell* is strictly positive (*Buy*) and negative (*Sell*), separately for high and low transparency. In Panel A, the sample is split between high and low financial information transparency countries (i.e., above and below 5, the sample median). Returns following buy signals are significantly higher than those following sell signals for high and low transparency countries, with a difference of 1.35% and 2.13%, respectively. The difference in medians are also positive (0.59% for high transparency, 1.21% for low transparency), but not statistically significant. In Panel B, the sample is split by governance transparency (above and below 5, the sample median). Among high transparency countries, there is no significant difference between quarterly excess returns following aggregate buy and sell signals. In contrast, among low transparency countries, both mean and median excess market returns are significantly higher following buy signals than sell signals. With a mean difference of 3.23% and a median difference of 2.54%, the gap is economically significant. Overall, the

univariate results in Table 5 suggest that aggregate net insider purchases have more predictive content in lower transparency countries.

4.3. Regression Results – H1

Table 6 reports regression results where I interact *Aggregate IT* with transparency factors to test H1. If investor protection and transparency mitigate the predictive content of aggregate insider trading, the coefficients on the interaction terms between *Aggregate IT* and (i) governance and (ii) financial information should be negative. Additionally, *Aggregate IT* is also interacted with the market friction factor, to ensure that any mitigating effect of transparency is not subsumed by market frictions. The transparency scores and market friction factor are also added without interaction terms because they vary over time. In each column, *Aggregate IT* is measured with a different proxy: the purchase ratio, net purchases, *Buy-Sell*, and purchases and sales separately, from column 1 to 4, respectively. In columns 1 to 3, the coefficients on *Aggregate IT*Financial Information* are negative and statistically significant: the predictive content of aggregate insider trades is significantly lower when country-level financial information transparency is higher. The coefficients on *Aggregate IT*Governance* are also negative, but not significant. In column 4, the positive and significant coefficient on *Sales*Financial Information* indicates that financial information transparency mitigates the predictive content of insider sales (the coefficient on *Purchases*Financial Information* is of the same magnitude, but not significant at conventional levels). Overall, financial information transparency is associated with lower predictive content of aggregate insider trading, consistent with H1.¹⁸

¹⁸ In untabulated tests, I interact *Aggregate IT* with each transparency measure, one at a time. Among the governance transparency measures, insider trading restrictions have a statistically significant mitigating effect on the predictive content of *Aggregate IT*, while blackout windows have a marginally significant effect. Among the financial information transparency measures, both earnings quality and Big 4 auditors have a significant effect, whereas international GAAP and analyst coverage have only a marginally significant effect.

4.4. Univariate Results – H2 and H4

Table 7 reports differences between mean excess market returns for country-quarters where *Buy-Sell* is strictly positive (*Buy*) and negative (*Sell*), separately for low and high fads (Panels A and B) and low and high synchronicity (Panels C and D), and separately for high and low transparency within each panel. Panel A reports the results for low fads (i.e., country-quarters with a negative fad factor). Regardless of the level of transparency, there is no significant difference between mean market returns following buy and sell signals. Panel B reports the results for high fads (i.e., country-quarters with a positive fad factor). When transparency is low (both in terms of financial information and governance), mean market return following insider buy signals is significantly higher than that following insider sell signals (by 4.06% for financial information and 3.58% for governance). The results are directionally similar for high transparency countries, but the magnitudes are smaller and the differences not statistically significant. Hence, it appears that aggregate insider trades have predictive content when country-level transparency is low and during market fads. Panels C and D report results for low and high synchronicity, respectively, i.e., below and above sample median. The predictive content of aggregate insider trades is driven by low transparency and high synchronicity, as per the last row of Panel D. Mean market returns following insider buy signals exceed those following insider sell signals by 4.37% (3.62%) when financial information (governance) transparency is low, and the difference is statistically significant, unlike any other partition in Panels C and D. Overall, the univariate results indicate that aggregate insider trades have predictive content for market returns during high fads or high synchronicity and when transparency is low.

4.5. Regression Results – H2 and H4

Table 8 reports test results for H2, which states that transparency affects the predictive content of aggregate insider trades both during (H2b) and outside (H2a) market fads. In Panel A, the sample is split based on the fad factor. In the first, second, and third pair of columns, aggregate insider trades is measured by the purchase ratio, net purchases, and *Buy-Sell*, respectively. In all regressions except for *Buy-Sell* in the low fad sample, the coefficient on *Aggregate IT* is positive. It is also significant in all high fad partitions, but not in low fad partitions. The coefficients on *Aggregate IT*Governance* are insignificant in all regressions. With all aggregate insider trading proxies, the coefficients on *Aggregate IT*Financial Information* are negative and significant in the high fad sample. This suggests that greater financial information transparency is associated with lower predictive content of aggregate insider trades during market fads. On balance, the results in Panel A reject the null of H2b for financial information transparency, but fail to reject the null of H2a.

In Panel B, the sample is split based on whether country-level synchronicity is below or above the sample median, as in the last two columns of each panel in Table 4. In all regressions, the coefficient on *Aggregate IT* is positive, though only significantly in the high-synchronicity partitions. The coefficients on *Aggregate IT*Governance* are negative with all aggregate insider trading measures, but only significant with net purchases in the low-synchronicity sample. In the high-synchronicity sample, the coefficients on *Aggregate IT*Financial Information* are negative and significant with all aggregate insider trading measures. Hence, financial information transparency is associated with lower predictive content of aggregate insider trades when synchronicity is relatively high. That is, the data reject the null of H4 for financial information transparency.

4.6. Aggregate Insider Trading, Fundamentals, and Transparency: More Direct Evidence

Thus far, I infer insiders' propensity to trade on future fundamentals from market returns in the absence of fads. To examine the fundamentals hypothesis more directly, I run the following model:

$$Fundamental_{t+1,t+n} = \beta_1 Insider\ Sentiment_t + \sum \beta_k Control_k + \sum \beta_i Country_i + \varepsilon \quad (2)$$

The dependent variable is either future growth in corporate earnings, measured over the next four quarters, or analyst forecast error for next year EPS at the beginning of quarters $t+1$ and $t+2$, both aggregated at the country-level. For earnings growth, since some countries only require annual reporting, a four-quarter window ensures that I capture a full cycle of earnings reports. For analyst forecast errors, I choose a two-quarter window because one quarter may not be sufficient to capture insiders' information. The control variables are the same as in Model 1, with the following additions: If earnings growth (analyst forecast error) is the dependent variable, I include current country-level earnings (current-quarter forecast error) scaled by market capitalization, to control for possible mean reversion (serial correlation).

Table 8 reports OLS estimates of Model (2). In Panel A, the dependent variable is future earnings growth in column 1, and analyst forecast error in column 2. The proxy for aggregate net insider purchases is the purchase ratio (I obtain qualitatively similar results with other proxies). In both columns, the coefficient on the purchase ratio is insignificant. Hence, on average, insiders do not appear to trade on near-term earnings growth, consistent with what Ke et al. (2003) document at the firm level. In Panel B, the dependent variable is earnings growth, and column headers indicate which aggregate insider trading proxy is used. Most of the coefficients are insignificant, suggesting that transparency has no effect on the association between aggregate insider trades and near-term earnings. In Panel C, the dependent variable is future analyst forecast error. The coefficients on *Aggregate IT* are positive and significant in all three columns, whereas the

coefficients on *Aggregate IT*Governance* are negative, and significantly so in columns 1 and 3. The coefficients on *Aggregate IT* Financial Information* are not significant. Hence, there is some evidence that governance transparency (i.e., investor protection) mitigates the association between aggregate insider trades and near-term earnings surprises (i.e., fundamentals).¹⁹

5. Additional and Robustness Tests

5.1. Robustness Tests

5.1.1. Instrument Variable Approach

In the cross-country tests, it is difficult to rule out the possibility that unobserved country characteristics simultaneously affect transparency and the collective information advantage of insiders, and to establish causation. To address identification, I perform a variety of additional tests, one of which is reported in Table 10.

I use an instrument variable (IV) two-stage regression model to address the possible endogeneity of transparency and insiders' information advantage. In the first stage models, I regress financial information and governance transparency, respectively, on a set of exogenous determinants, including an instrument that is expected to affect transparency, but not to be correlated with the error term in the second stage (i.e., Model 1). Following other papers in the law and finance literature, I use variables that have been shown to shape transparency institutions. I select the language distance between English and the dominant language in the country, as per Lewis (2009), as instrument for financial information transparency. I expect countries that are linguistically more distant to English to have relatively lower financial transparency. In addition,

¹⁹ Prior research also documents a mitigating effect of financial information transparency on the positive association between aggregate earnings and contemporaneous market returns (He and Hu 2014). In untabulated tests, I also interact current earnings with transparency, and continue to find robust results.

I control for language fractionalization (Adesina et al. 2003) to account for linguistic diversity in the country. The instrument I select for governance transparency is the country's legal system's origin (English, French, German, Scandinavian, or Socialist). Legal origin has been extensively shown to affect investor protection and has been used as an instrument in similar settings (Dang et al. 2015). I use indicators for English, French, German and Scandinavian legal origins, while socialist origin is absorbed by the intercept.^{20,21}

As reported in Table 10, Panel A, the coefficient on language distance is negative and significant (-0.32, $p < 0.01$) when the dependent variable is financial information transparency, after including all the non-fixed effect controls from Model (1), and language fractionalization, which also exhibits a negative and significant association with transparency. In the other first-stage model, investor protection loads significantly and positively on English, French and Scandinavian legal origin, although the coefficient on French legal origin is of smaller magnitude than the other two. In addition to the instruments, the country-level market capitalization is positively and significantly associated with both financial information and governance transparency (not tabulated).

²⁰ There are several other candidates for instruments, including variations on language, geography, and culture. I generally obtain similar results, but some combinations of instruments lead to levels of correlations between fitted financial information and governance transparency that result in multicollinearity in the second stage. Also, one may legitimately worry about the instruments—especially legal origin—meeting the exclusion restriction criterion. Indeed, the predictive content of aggregate insider trading could plausibly vary directly as a function of legal origin. Accordingly, the IV results should be interpreted with caution. Nevertheless, when I run Model (1) by interacting aggregate insider trading with indicators for each type of legal regime, I find no significant pattern suggesting that legal origin has a direct effect on the predictive content of aggregate insider trading (not tabulated).

²¹ To further address concerns that market frictions correlated with transparency may drive the observed results, I re-run the main tests by also interacting net guidance issuance and analyst forecast revisions with transparency and illiquidity. The goal of this test is to ensure that (a) the mitigating effect of transparency on aggregate insider trading is robust to the addition of those interaction terms and (b) the effect is unique to aggregate insider trading. With respect to (a), I find that the mitigating effect of transparency remains unaffected by the addition of interaction terms between aggregate analyst or management forecasts and transparency. With respect to (b), I find no evidence that financial information transparency mitigates the predictive content of aggregate analyst or management forecasts (not tabulated).

In the second stage regressions, I re-run the results from Tables 4 and 7, but with the predicted financial information and governance transparency levels estimated in the first-stage models. For brevity, I only tabulate results using the purchase ratio in Table 10, Panel B. The results are generally consistent with the OLS ones. That is, (predicted) financial information transparency mitigates the predictive content of aggregate insider trades. While the results are statistically marginal in the full sample (column 1), they are robust in the high fad partition (column 3). The results are qualitatively similar using the other aggregate insider trading proxies.

5.1.2. Other Country-Level Institutions

Gebka et al. (2017) examine several potential country-level determinants of abnormal returns following insider trades. They find that investor protection and enforcement, religiosity and trade reporting deadlines matter. First, for comparability purposes, I test whether those variables affect the predictive content of aggregate insider trades. In untabulated tests, I find no evidence of the Market Abuse Directive supervisory powers and enforcement action proxies (both from Christensen et al. 2016) being associated with the predictive content of aggregate insider trades. Note that the sample is limited to European countries for that test. I find marginally significant evidence that religiosity (obtained from Gallup polls) is associated with greater predictive content. Lastly, I find no effect of insider trade reporting speed (measured as the country-level median number of business days between transaction and reporting date) on aggregate insider trades' predictive content. This is not surprising, given that it only varies from 0 to 5 days in the sample whereas I aggregate trades by quarter. Furthermore, when I control for transparency, governance and market frictions, I find that none of the aforementioned variables has any incremental effect on aggregate insider trades' predictive content. The contrast between my findings and those from Gebka et al. (2017) further suggest that the predictive content of

aggregate insider trades is due to information rather than agency frictions, and therefore varies primarily with country-level proxies for financial information transparency rather than governance-related transparency.²²

However, this raises the broader question of whether other proxies for transparency could or should be included in my analyses. Recent work by Isidro et al. (2016) suggests that cross-country studies on capital market institutions fail to account for the high correlations among proxies for transparency, governance, culture, legal origin, etc. Isidro et al. (2016) perform a principal component analysis of more than 70 variables examined in prior studies and collapse them into four factors. I re-run my tests by replacing the transparency and governance scores with the four factors from Isidro et al. (2016). Two noteworthy patterns emerge from these untabulated results. First, I find that their first (second) factor is highly correlated with my transparency (governance) factor (correlations of 0.71 and 0.66, respectively). Second, I find robust evidence that their first factor mitigates the predictive content of aggregate insider trades for future returns, and additional evidence that their second factor mitigates the predictive content of aggregate insider trades for future earnings. In other words, the results are very similar across the two specifications. The Isidro et al. (2016) factors are a function of many more variables than the scores I examine. At the very least, this suggests that the reader should be cautious about attributing my results specifically to any of the variables underlying the scores. Transparency mechanisms such as auditors and analysts do not happen in a vacuum. Their effect on the predictive content of aggregate insider trades is likely co-determined with the country's broader institutional ecosystem.

²² Fidrmuc et al. (2006) document that ownership structure is a significant determinant of the information content of insider trade disclosures of U.K. firms. Countries with more diffuse ownership have greater demand for transparency to reduce information asymmetries. Indeed, ownership diffusion at the country level varies with financial information and governance transparency (untabulated correlations of 0.33 and 0.66, respectively). In unreported tests, I find that country-level ownership diffusion is associated with lower predictive content for aggregate insider trades, but the effect weakens or disappears once I control for transparency.

5.2. Additional Tests

5.2.1. Longer Horizons

Since Seyhun (1988) documents that aggregate insider trades have significant predictive content over horizons of up to 12 months in the U.S., I re-run my main tests by looking at the association between aggregate net insider purchases and market returns aggregated up to four quarters ahead and splitting the sample between high and low transparency observations, based on governance and financial information, respectively. Consistent with the one-quarter results, I find that financial information transparency mitigates the predictive content of aggregate insider trades for market returns measured over the next two and four quarters (untabulated).²³

5.2.2. U.S. Time-Series Analysis

The results thus far indicate that aggregate insider trades have little to no predictive content in countries with high transparency. As the U.S. have capital markets with some of the highest levels of transparency, the result seems to contradict prior findings based on U.S. data. However, those prior findings are based on pre-SOX data. As SOX brought about a series of changes to governance and financial transparency, including a significant increase in the timeliness of insider trade disclosures per Section 403, I test whether the predictive content of aggregate insider trades changed after the passage of SOX.

²³ Two issues arise with the longer window analysis. First, the level of aggregation of insider trades and subsequent returns is inconsistent, which potentially weakens the test. In untabulated tests, I find that aggregate insider trading proxies aggregated over a two- or four-quarter window (i.e., $t-1,t$ or $t-3,t$) have more robust predictive content for future returns. Second, risk measurement becomes more critical. It is possible that insider trades be correlated with risk in the aggregate. Using country-specific betas based on regressions of daily country returns on the MSCI ACWI index, I find that the association between aggregate net insider purchases and future market returns is stronger when countries experience an absolute change in their beta above the sample median, although the incremental effect is statistically marginal. More importantly, I find that the mitigating effect of financial information transparency on aggregate insider trades' predictive content during market fads is robust to controlling for a risk explanation (not tabulated).

Table 11 reports the results. Consistent with prior literature, I compute the *Net Purchase Ratio* (buys minus sells divided by buys plus sells) on a two-month rolling basis, and test its association with next month value-weighted CRSP index, net of the contemporaneous return on the 13-week Treasury bill. I use data from 1996 to 2012. Panel A reports results based on a vector autoregression (VAR) model. The first two rows reports coefficient estimates where the net purchase ratio is the dependent variable. The results indicate that the net purchase ratio is serially correlated, and insiders trade as contrarians (as per the negative coefficient on market return) to the same extent pre- and post-SOX. The third row indicates that two-month net purchase ratio is positively and significantly associated with next-month market return in the U.S. However, once the sample is split between pre- and post-SOX (post-SOX starting in September 2002 included), the coefficient is much larger in the pre-SOX (0.13) than in the post-SOX (0.01) period. This is indicative of a weaker association between aggregate insider trades and market returns after SOX.

Panel B reports regression estimates of a model with contemporaneous and lagged market returns as controls, as well as year and calendar month fixed effects. I add the U.K. as a control sample, where a pseudo-SOX dummy is applied after August 2002. The U.K. is the best control I can use because it is close to the U.S. in terms of transparency, but it did not experience a shock in 2002 (U.K. director dealing disclosures were already timely prior to 2002 – see Fidrmuc et al. 2006). Also, I only have enough non-U.S. pre-SOX data for the U.K. (starting in 1999). In the first column of Panel B, the sample is limited to the U.S., and the results confirm the VAR ones from Panel A. In the second column, the sample is limited to the U.K. The coefficient on the net purchase ratio is positive and significant, suggesting that monthly aggregate insider trades have predictive content in the U.K. There is, however, no change after August 2002. Lastly, in column 3, the difference-in-difference results indicate that the coefficient on the interaction term between the net

purchase ratio and post-SOX is negative and significant after controlling for the interaction term between the net purchase ratio and post-August 2002, consistent with the post-SOX effect in the U.S. not being driven by contemporaneous changes in global markets (although, of course, the results need not be attributable to SOX or specific provisions thereof per se). All told, these additional results reconcile my findings with those of prior research on U.S. data, but also show that a significant increase in transparency can coincide with a drop in aggregate insider trades' predictive content at the country level.

6. Conclusion

This study analyzes the effect of country-level institutions on the predictive content of aggregate corporate insider trading for market returns in a cross-country setting, holding constant the timely disclosure regime of insider trades. In particular, I examine the role of transparency vis-à-vis insiders' propensity to trade on returns driven by future fundamentals and market fads.

Using data from 32 countries, I first find that aggregate net insider purchases are more significantly associated with future market returns in countries with less transparent financial information environments (as captured primarily by high-quality accounting information and greater analyst coverage). Second, I find that financial information transparency mitigates the predictive content of aggregate insider trades during market fads and when markets are more synchronous. Third, I find some evidence that governance transparency mitigates the predictive content of aggregate insider trades for future earnings surprises (i.e., for fundamentals).

Collectively, the results suggest two major mechanisms at play. Financial information transparency facilitates outsiders' ability to infer insiders' aggregate information signal from timely and reliable disclosures, thereby reducing the likelihood that aggregate insider trades will

precede abnormal returns in times of deviations from fundamentals or when markets tend to co-move. In contrast, greater governance transparency appears to reduce the likelihood that insiders will trade collectively on foreknowledge of near-term material news such as future earnings. This suggests complementarity between governance and financial information transparency in mitigating the predictive content of aggregate insider trades.

Overall, the evidence indicates that, despite homogeneous regulatory initiatives that require the timely disclosure of corporate insider transactions across countries, the predictive content of aggregate insider trades varies based on the broader capital market infrastructure in place. The results should be informative to scholars who examine the dissemination of information in global capital markets, to investors who wish to take insider transactions into account as part of their portfolio allocation, and to regulators who are considering further amendments to the insider trading laws that apply in their jurisdictions. It is unlikely that regulators' goal is to eliminate informed trading, especially at the macro level. Rather, if insider trades convey some information on average in equilibrium (at the firm- or aggregate level), market participants prefer capital market institutions that enable that information to be reflected in a timely manner.

Two caveats apply. First, while I control for a variety of country-level economic, market and institutional factors, and use several robustness tests, the evidence does not irrefutably support a causal effect of transparency. It is possible that fundamental country characteristics that give rise to transparency or market inefficiencies drive the results. Second, because I choose to hold a specific disclosure regime constant (that of insider trades) and vary the transparency ecosystem around it, I define and measure transparency broadly. Accordingly, the results are meant to provide a roadmap for more targeted studies on the effect of specific transparency measures on insider trading's capital market effects.

References

- Aboody, D., J. Hughes, and J. Liu. 2005. Earnings quality, insider trading, and cost of capital. *Journal of Accounting Research* 43(5): 651–673.
- Alesina, A., Devleeschauwer, A., Easterly, W., Kurlat, S., and R. Wacziarg. 2003. Fractionalization. *Journal of Economic Growth* 8(2): 155–194.
- Amihud, Y., 2002. Illiquidity and stock returns: cross-section and time-series effects. *Journal of Financial Markets* 5(1): 31–56.
- Anilowski, C., M. Feng, and D. Skinner. 2007. Does earnings guidance affect market returns? The nature and information content of aggregate earnings guidance. *Journal of Accounting and Economics* 44(1-2): 36–63.
- Baker, M., J. Wurgler, and Y. Yuan. 2012. Global, local, and contagious investor sentiment. *Journal of Financial Economics* 104(2): 272–287.
- Barberis, N., Shleifer, A., and J. Wurgler. 2005. Comovement. *Journal of Financial Economics* 75: 283–317.
- Barth, M., Landsman, W., Lang, M., and C. Williams. 2012. Are IFRS-based and US GAAP-based accounting amounts comparable? *Journal of Accounting & Economics* 54(1): 68–93.
- Bekaert, G., Harvey, C., and C. Lundblad. 2007. Liquidity and expected returns: Lessons from emerging markets. *Review of Financial Studies* 20(6): 1783–1831.
- Bettis, J., Coles, J., and M. Lemmon. 2000. Corporate policies restricting trading by insiders. *Journal of Financial Economics* 57(2): 191–220.
- Bhattacharya, U., H. Daouk, and M. Welker. 2003. The world price of earnings opacity. *The Accounting Review* 78(3): 641–678.
- Brochet, F., Jagolinzer, A., and E. Riedl. 2013. Mandatory IFRS adoption and financial statement comparability. *Contemporary Accounting Research* 30(4): 1373–1400.
- Bushman, R., J. Piotroski, and A. Smith. 2004. What determines corporate transparency? *Journal of Accounting Research* 42(2): 207–252.
- Cheng, A., Huang, H., and Y. Li. 2016. Does shareholder litigation deter insider trading? *Journal of Law, Finance, and Accounting* 1(2): 275–318.
- Chowdhury, M., J. Howe, and J.C. Lin. 1993. The relation between aggregate insider transactions and stock market returns. *Journal of Financial and Quantitative Analysis* 28(3): 431–437.
- Crawford, S., Roulstone, D., and E. So. 2012. Analyst initiations of coverage and stock return synchronicity. *The Accounting Review* 87(5): 1527–1553.

- Dai, L., Fu, R., Kang, J.-K., and I. Lee. 2016. Corporate governance and the profitability of insider trading. *Journal of Corporate Finance* 40: 235–253.
- Dang, T.L., Moshirian, F., and B. Zhang. 2015. Commonality in news around the world. *Journal of Financial Economics* 116(1): 82–110.
- Dasgupta, S., Gan, J., and N. Gao. 2010. Transparency, price informativeness, and stock return synchronicity: theory and evidence. *Journal of Financial and Quantitative Analysis* 45(5): 1189–1220.
- DeFond, M., N. Hung, and R. Trezevant. 2007. Investor protection and the information content of annual earnings announcements: International evidence. *Journal of Accounting and Economics* 43: 37–67.
- DeFond, M., Hung, M., Li, S., and Y. Li. 2015. Does mandatory IFRS adoption affect crash risk? *The Accounting Review* 90(1): 265–299.
- Denis, D., and J. Xu. 2013. Insider trading restrictions and top executive compensation. *Journal of Accounting and Economics* 56(1): 91–112.
- Djankov, S., R. La Porta, F. Lopez-de-Salines, and A. Shleifer. 2008. The law and economics of self-dealing. *Journal of Financial Economics* 88: 430–465.
- Doidge, C., A. Karolyi, and R. Stulz. 2007. Why do countries matter so much for corporate governance? *Journal of Financial Economics* 86: 1–39.
- Drake, M., Jennings, J., Roulstone, D., and J. Thornock. 2017. The comovement of investor attention. *Management Science* 63(9): 2847–2867.
- Du, J., and S.-J. Wei. 2004. Does insider trading raise market volatility? *The Economic Journal* 114: 916–942.
- Fidrmuc, J., M. Goergen, and L. Rennooog. 2006. Insider trading, news releases and ownership concentration. *Journal of Finance* 61: 2931–2973.
- Fidrmuc, J., A. Korczak, and P. Korczak. 2013. Why does shareholder protection matter for abnormal returns after reported insider purchases and sales? *Journal of Banking and Finance* 37(6): 1915–1935.
- Firth, M., K. Wang, and S. Wong. 2015. Corporate transparency and the impact of investor sentiment on stock prices. *Management Science* 61(7): 1630–1647.
- Francis, J., Pinnuck, M., and O. Watanabe. 2013. Auditor style and financial statement comparability. *The Accounting Review* 89(2): 605–633.
- Gebka, B., Korczak, A., Korczak, P., and J. Traczykowski. Profitability of insider trading in Europe: A performance evaluation approach. *Journal of Empirical Finance* 44: 66–90.

- Griffin, J. 2002. Are the Fama and French factors global or country specific? *Review of Financial Studies* 15(3): 783–803.
- He, W., and M. Hu. 2014. Aggregate earnings and market returns: international evidence. *Journal of Financial and Quantitative Analysis* 49(4): 879–901.
- Hillier, D., and A. Marshall. 2002. Are trading bans effective? Exchange regulation and corporate insider transactions around earnings announcements. *Journal of Corporate Finance* 8: 393–410.
- Hillier, D., Korczak, A., and P. Korczak. 2015. The impact of personal attributes on corporate insider trading. *Journal of Corporate Finance* 30: 150–167.
- Howe, J., E. Unlu, and X. Yan. 2009. The predictive content of aggregate analyst recommendations. *Journal of Accounting Research* 47(3): 799–821.
- Huddart, S., J. Hughes, and C. Levine. 2001. Public disclosure and dissimulation of insider trades. *Econometrica* 69(3): 665–681.
- Hutton, A., Marcus, A., and H. Tehranian. 2006. Opaque financial reports, R^2 , and crash risk. *Journal of Financial Economics* 94(1): 67–86.
- Isidro, H., Nanda, D.J., and P. Wysocki. 2016. Financial reporting differences around the world: what matters? Working paper, Available at SSRN: <https://ssrn.com/abstract=2788741>.
- Jiang, X., and M. Zaman. 2010. Aggregate insider trading: contrarian beliefs or superior information? *Journal of Banking and Finance* 34: 1225–1236.
- Jin, L., and S. Myers. 2006. R^2 around the world: New theory and new tests. *Journal of Financial Economics* 79: 257–292.
- Kadan, O., Madureira, L., Wang, R., and T. Zach. 2012. Analysts' Industry Expertise. *Journal of Accounting and Economics* 54(2-3): 95–120.
- Karolyi, A., Lee, K.-H., and M. van Dijk. 2012. Understanding commonality in liquidity around the world. *Journal of Financial Economics* 105: 82–112.
- Ke, B., S. Huddart, and K. Petroni. 2003. What insiders know about future earnings and how they use it: Evidence from insider trades. *Journal of Accounting and Economics* 35 (3): 315–346.
- Lakonishok, J., and I. Lee. 2001. Are insiders' trades informative? *Review of Financial Studies* 14: 79–111.
- Lang, M., K. Lins, and M. Maffett. 2012. Transparency, liquidity, and valuation: International evidence on when transparency matters most. *Journal of Accounting Research* 50(3): 729–774.

- La Porta, R., F., Lopez-de-Silanes, A. Shleifer, and R. Vishny. 1999. The quality of government. *Journal of Law, Economics and Organization* 15(1): 222–279.
- Leuz, C., D. Nanda, and P. Wysocki. 2003. Earnings management and investor protection: an international comparison. *Journal of Financial Economics* 69: 505–527.
- Leuz, C. 2010. Different approaches to corporate reporting regulation: how jurisdictions differ and why. *Accounting and Business Research* 40(3): 229–256.
- Lewis, P. M. 2009. *Ethnologue: Languages of the World*. 16th edition. Dallas, TX: SIL International.
- Martynova, M., and L. Renneboog. 2011. Evidence on the international evolution and convergence of corporate governance regulations. *Journal of Corporate Finance* 17(5): 1531–1557.
- Morck, R., B. Yeung, and W. Yu. 2000. The information content of stock markets: why do emerging markets have synchronous stock price movements? *Journal of Financial Economics* 58: 215–260.
- Piotroski, J., and D. Roulstone. 2004. The influence of analysts, institutional investors, and insiders on the incorporation of market, industry and firm-specific information into stock prices. *The Accounting Review* 79: 1119–1151.
- Piotroski, J., and D. Roulstone. 2005. Do insider trades reflect both contrarian beliefs and superior knowledge about future cash-flow realizations? *Journal of Accounting and Economics* 39 (1): 55–82.
- Roulstone, D. 2003. The relation between insider-trading restrictions and executive compensation. *Journal of Accounting Research* 41(3): 525–551.
- Sawicki, J., and K. Shrestha. 2014. Misvaluation and Insider Trading Incentives for Accrual-based and Real Earnings Management. *Journal of Business Finance & Accounting* 41(7-8): 926-949.
- Seyhun, H.N. 1988. The information content of aggregate insider trading. *Journal of Business* 61: 1–24.
- Seyhun, H.N. 1992. Why does aggregate insider trading predict future stock returns? *Quarterly Journal of Economics* 107 (4): 1303–1331.
- Yip, R., and D. Young. 2012. Does mandatory IFRS adoption improve information comparability? *The Accounting Review* 87(5): 1767–1789.
- Zhu, C., Wang, L., and T. Yang. 2014. “Swimming ducks forecast the coming of spring” – The predictability of aggregate insider trading on future market returns in the Chinese market. *China Journal of Accounting Research* 7(3): 179–201.

Appendix: Variable Definitions

Variable	Definition
<i>Market Return</i>	Country-level buy-and-hold return compounded over a calendar quarter, from Datastream country indices in US dollars, minus the return on the country-specific risk-free rate and the MSCI World Index. Suffixes t-1, t, and t+1 indicate past, contemporaneous and future returns.
<i>Purchase Ratio</i>	Country-quarter average of the ratio of insider purchases to insider purchases and sales based on the number of unique companies from which at least one insider trades. Only open market purchases and sales of common shares by senior executives or directors are included.
<i>Net Purchases</i>	Total value of insider purchases minus insider sales aggregated at the country-quarter level, scaled by country-level market capitalization. Only open market purchases or sales of common shares by senior executives or directors are included.
<i>Buy–Sell</i>	Categorical variable equal to -1 if either the purchase ratio or net purchases is in the bottom quartile of the country-level distribution (-2 if both are), 1 if either is in the top quartile (2 if both are), and zero otherwise.
<i>World Return</i>	Quarterly buy-and-hold return on the MSCI All-Country World Index.
<i>M/B (P/E) Ratio</i>	Country-level market capitalization divided by country-level total shareholder equity (earnings), i.e., summed across all firms listed in the country with data available in WorldScope, based on the most recent annual accounting data available.
<i>Market Cap</i>	Logged country-level market capitalization (summed across all listed firms in the country with data available in WorldScope), as of the end of the most recent calendar year.
<i>Turnover</i>	Total shares traded during the quarter across all listed firms in the country, scaled by total shares outstanding (Datastream).
<i>Dividend Yield</i>	Average country-level dividend yield during the calendar quarter (Datastream).
<i>Inflation</i>	Quarterly change in the country's consumer price index (Datastream).
<i>Δ Inst. Hold.</i>	Quarterly change in shares held by institutional investors scaled by shares outstanding at the country-level, as reported in Thomson Reuters Ownership.
<i>Net Guidance</i>	Number of positive minus number of negative management forecast revisions (Capital IQ) at the country-quarter level, scaled by the number of companies in the country.
<i>Net Forecasts</i>	Number of positive minus number of negative analyst forecast revisions (I/B/E/S) at the country-quarter level, scaled by the number of companies in the country.
<i>Δ Earnings*</i>	Country-level net income summed across all firms in WorldScope with a fiscal year ending over the next twelve months starting at the end of the next quarter, minus the last twelve months (ending at the end of the current quarter).
<i>ROE*</i>	Country-level net income reported for all firms in WorldScope with a fiscal year ending over the last twelve months preceding the current quarter.
<i>Analyst Forecast Error*</i>	Country-level difference between actual earnings and analyst consensus as of the beginning of quarters t+1 and t+2 (both from IBES).

* Scaled by market capitalization

Appendix (cont'd)

Variable	Definition
<i>International GAAP</i>	Indicator variable equal to one for all quarters in a country after it has fully adopted U.S. GAAP or International Financial Reporting Standards, and zero otherwise.
<i>Earnings Quality</i>	First factor from a PCA of the four earnings quality metrics described in Leuz et al. (2003), i.e., ratio of standard deviation of earnings to that of cash flow, ratio of absolute value of accruals to cash flow, correlation between changes in accruals and changes in cash flow, and ratio of small losses to small gains, averaged across non-financial firm-years by country from 2004 to 2012.
<i>Big 4 Auditors</i>	Proportion of firms audited by one of the Big 4 firms by country (based on 2012 WorldScope data).
<i>Analyst Coverage</i>	Total number of analysts covering firms in the country-quarter, divided by the number of firms in the country-quarter (with or without analyst coverage).
<i>Financial Information</i>	Sum of the quartile ranks of <i>Earnings Quality</i> , <i>Big 4 Auditors</i> , and <i>Analyst Coverage</i> , and of <i>International GAAP</i> .
<i>Anti-Self-Dealing Index</i>	Country's anti-self-dealing index as per Djankov et al. (2008), from Rafael La Porta's website.
<i>Insider Trading Restriction</i>	Country's insider trading regulation score as per Du and Wei (2004).
<i>Blackout Period</i>	Difference between the percentage of insider trades that occur within one month after an earnings announcement and month before, aggregated by country-quarter.
<i>Class Action</i>	Indicates whether shareholders can resort to a class-action lawsuits against securities fraud. Data primarily obtained from Leuz (2010) and updated where needed.
<i>Governance</i>	Sum of the quartile ranks of <i>Anti-Self-Dealing Index</i> , <i>Insider Trading Restriction</i> and <i>Blackout Period</i> , and of <i>Class Action</i> .

Appendix (cont'd)

Variable	Definition
<i>Bid-Ask Spread</i>	Country-year average of the mean ask minus bid scaled by quote midpoint per firm-year, weighted by average market capitalization (Datastream).
<i>Zero Return</i>	Country-year average of the proportion of trading days with zero return (in local currency) per firm-year, weighted by average market capitalization (Datastream).
<i>Amihud Illiquidity</i>	Country-year average of the mean daily ratio of absolute stock return to trading volume per firm-year, weighted by average market capitalization (Datastream).
<i>Market Friction</i>	First factor from a principal component analysis of bid-ask spread, zero return, and Amihud illiquidity.
<i>Volatility Premium</i>	Year-end log of the ratio of the value-weighted mean market-to-book ratio of high volatility stocks to that of low volatility stocks (Datastream and Worldscope). High (low) volatility include the top (bottom) three deciles per country-year in terms of the beta-adjusted idiosyncratic variance of monthly stock returns. See Baker et al. (2012) for details.
<i>Equity Transactions</i>	Aggregate country-quarter value of IPOs, SEOs, and stock repurchases, scaled by country-level market capitalization, as per SDC Platinum.
<i>Fad Factor</i>	First factor from a principal component analysis of equity transactions and the absolute values of the volatility premium and standardized <i>Turnover</i> , <i>P/E</i> and <i>M/B Ratio</i> .
<i>Return Synchronicity</i>	Log transformed country-year average R^2 of firm-year regressions of weekly stock returns on lagged and contemporaneous market returns, and contemporaneous U.S. returns.
<i>Language Distance</i>	Distance between English and the main language of each country studied, based on a five-point scale classification system. See Lewis (2009) for details at http://www.ethnologue.com/web.asp .
<i>Fractionalization</i>	Probability that two randomly selected individuals from a population speak different languages. Data obtained from Table A1 in Alesina et al. (2003).
<i>Legal Origin</i>	Set of indicator variables for English, French, German, and Scandinavian legal origins. Data obtained from Andrei Schleifer's webpage at https://scholar.harvard.edu/shleifer/publications/quality-government . Socialist legal origin is captured by the intercept.

Notes: Unless otherwise specified, variables are measured over the 2004-2012 period.

Table 1: Sample Composition and Insider Trading Data

Country	Start Date	Supplemental Source(s)	Number of Purchases	Number of Sales	Median Reporting Lag
Australia	01/2003	ASX	8154	1772	1
Austria	10/2008		674	149	4
Belgium	05/2006		742	1117	4
Canada	06/2003	SEDI	96160	124406	2
China	01/2006	Shanghai and Shenzhen Stock Exchanges	11377	21257	1
Denmark	01/2007		1701	702	1
Egypt	01/2009		1041	1282	2
France	04/2006		4821	6010	5
Germany	07/2002		8431	5501	3
Greece	01/2008		7427	1240	2
Hong Kong	01/2003	HKEx	34520	12572	2
India	07/2006	National Stock Exchange	7209	9418	2
Ireland	01/1999		308	191	1
Israel	01/2010		1844	1005	1
Italy	01/2003		6496	5045	3
Malaysia	01/2009		5607	4046	1
Netherlands	01/1999		2331	3794	0
New Zealand	10/2008		338	200	3
Norway	01/2007		2208	1006	1
Philippines	01/2009		1299	1948	3
Poland	01/2010		1679	1199	3
Portugal	01/2009		288	126	3
Singapore	01/2009		2708	636	1
South Africa	12/2008		1643	2680	1
South Korea	09/2011		1752	1290	2
Spain	09/2006		2425	669	4
Sweden	01/2001	Swedish Financial Supervisory Authority	17408	9742	3
Switzerland	02/2007		4190	4478	2
Thailand	01/2009		3595	4389	2
Turkey	01/2010		1495	1052	1
United Kingdom	01/1999		23860	14540	1
United States	01/1996	Thomson Reuters	101574	217687	2*

This table presents country-level sample start dates, data sources (besides Director Deals) and number of transactions reported by senior directors and officers, separately for purchases and sales. Also reported is the median number of trading days between the date a transaction occurs and the date it is reported to the authorities, as per Director Deals (and other sources when available).

* For the U.S., the reporting lag is only calculated for the 2004-2012 period.

Table 2: Descriptive Statistics

Panel A: Descriptive Statistics

Variable	Mean	Std. dev.	Lower quartile	Median	Upper quartile
Market Return $t+1$	0.0030	0.0754	-0.0404	0.0040	0.0452
Market Return t	0.0058	0.0746	-0.0367	0.0070	0.0472
Market Return $t-1$	0.0037	0.0747	-0.0380	0.0038	0.0444
Purchase Ratio	0.5809	0.1673	0.4736	0.5872	0.6984
Net Purchases	-0.0062	0.0451	-0.0153	-0.0024	0.0032
World Return	0.0130	0.1034	-0.0236	0.0266	0.0672
M/B Ratio	1.6717	0.6046	1.2221	1.6170	2.0791
Market Capitalization	13.3158	1.3982	12.3170	13.3500	14.1718
Turnover	0.0608	0.0530	0.0282	0.0488	0.0780
Dividend Yield	0.0314	0.0142	0.0221	0.0293	0.0370
Inflation	0.0062	0.0096	0.0011	0.0054	0.0104
Δ Institutional Holdings	0.0006	0.0037	0.0000	0.0001	0.0006
Net Guidance	0.0034	0.0188	-0.0011	0.0000	0.0050
Net Forecasts	-0.0058	0.2047	-0.0680	0.0000	0.0734
Δ Earnings $t+1,t+4$ *	0.0093	0.0336	-0.0136	0.0117	0.0339
Analyst Forecast Error $t+1$ *	-0.0357	0.2003	-0.0252	-0.0047	0.0000
ROE $t-3,t$ *	0.0471	0.0893	0.0549	0.0700	0.1763
Analyst Forecast Error t *	-0.0369	0.2096	-0.0245	-0.0037	0.0005

*Winsorized at 1% each tail.

Table 2 (cont'd)

Panel B: Correlations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Market Return $t+1$ (1)														
Market Return t (2)	0.08													
Market Return $t-1$ (3)	-0.03	0.10												
Purchase Ratio (4)	0.14	-0.17	-0.16											
Net Purchases (5)	0.12	-0.07	-0.03	0.15										
World Return (6)	-0.02	0.26	0.19	-0.39	-0.17									
M/B ratio (7)	-0.05	-0.11	-0.04	-0.02	0.16	-0.19								
Market Capitalization (8)	-0.02	-0.05	-0.00	0.03	0.03	-0.07	0.51							
Turnover (9)	0.04	0.09	0.10	-0.04	0.01	0.01	0.06	0.13						
Dividend Yield (10)	0.03	-0.14	-0.22	0.26	0.00	-0.24	-0.26	-0.24	-0.17					
Inflation (11)	-0.12	-0.02	0.01	-0.08	-0.05	0.17	0.03	-0.03	0.07	-0.19				
Δ Inst. Holdings (12)	0.03	0.04	0.02	-0.06	-0.06	0.10	-0.05	-0.10	-0.02	0.01	0.02			
Net Guidance (13)	-0.04	0.01	0.13	-0.12	0.05	0.12	0.06	-0.01	0.02	-0.21	0.08	-0.01		
Net Forecasts (14)	-0.05	0.21	0.13	-0.37	-0.11	0.39	-0.02	-0.04	0.04	-0.32	0.22	0.03	0.27	

Notes: This table reports descriptive statistics and correlations for the main variables used in subsequent regressions analyses. The sample consists of 32 countries for which disclosed corporate insider trading data are available. The sample period is 2004-2012. All variables are defined in detail in the Appendix. In Panel B, correlations in bold font are significantly different from zero at the 0.10 level.

Table 3: Transparency Data

Country	Analyst Coverage	Big 4 Auditors	Earnings Quality	Financial Information Score	Blackout Period	Class Action	Governance Score	Friction Factor	Fad Factor	Synchroneity
Australia	0.21	0.46	2.82	3.88	0.25	1	7.50	0.36	-0.07	-2.61
Austria	1.79	0.73	-0.65	6.00	0.20	0	1.80	0.93	-0.19	-2.25
Belgium	1.45	0.55	-0.51	4.67	0.23	0	5.41	0.45	-0.09	-2.13
Canada	0.42	0.50	3.48	5.17	0.18	1	5.63	0.23	-0.24	-2.66
China	0.22	0.16	-1.14	0.07	0.20	0	3.89	0.55	-0.05	-1.27
Denmark	1.08	0.71	0.20	7.08	0.30	0	6.00	0.39	-0.07	-2.26
Egypt	0.48	0.38	-0.55	0.88	0.17	0	0.25	0.69	-0.19	-1.62
France	1.13	0.44	-0.16	4.07	0.21	0	4.86	-0.28	0.16	-2.34
Germany	0.95	0.47	0.10	2.89	0.20	0	1.22	0.33	-0.03	-2.49
Greece	0.34	0.24	-0.50	1.66	0.16	0	0.00	-0.10	0.01	-1.84
Hong Kong	0.59	0.60	-0.08	6.19	0.23	0	5.78	-0.48	-0.11	-2.36
India	0.49	0.10	-0.87	1.08	0.15	1	3.00	1.06	0.07	-1.66
Ireland	1.66	0.78	-0.42	3.00	0.33	0	3.00	0.51	0.07	-2.08
Israel	0.06	0.72	1.08	3.00	0.18	1	2.00	1.16	0.36	-2.08
Italy	1.35	0.80	-0.38	7.25	0.17	1 (as of 2010)	2.00	0.30	0.10	-1.82
Malaysia	0.20	0.53	-0.47	2.23	0.20	1	4.47	-0.42	-0.07	-2.54
Netherlands	2.21	0.82	-0.26	7.89	0.26	1	5.00	-0.72	0.23	-1.81
New Zealand	0.37	0.73	0.37	5.78	0.27	1	8.00	-1.36	-0.01	-2.57
Norway	1.51	0.81	0.05	8.74	0.24	0	4.00	0.21	0.07	-2.05
Philippines	0.15	0.73	0.17	5.00	0.16	0	1.00	-2.37	0.03	-2.33
Poland	0.29	0.28	-0.26	2.29	0.21	0	1.14	0.92	-0.01	-2.22
Portugal	1.88	0.57	-1.22	5.00	0.17	1	3.11	0.73	-0.11	-2.00
Singapore	0.39	0.67	-0.15	4.81	0.24	0	8.00	0.19	-0.22	-2.05
South Africa	0.41	0.55	0.43	5.00	0.27	0	5.00	0.24	0.01	-2.69
South Korea	0.31	0.54	-0.35	2.00	0.19	0	3.40	0.35	-0.23	-1.93
Spain	2.35	0.80	-0.89	7.00	0.17	1	3.00	-0.50	-0.07	-1.75
Sweden	0.97	0.77	1.20	8.89	0.25	0	6.00	-0.24	0.08	-2.16
Switzerland	1.80	0.86	0.01	9.00	0.24	0	3.00	0.38	0.20	-1.98
Thailand	0.27	0.50	-0.46	2.00	0.18	0	3.00	-2.54	-0.11	-2.07
Turkey	0.00	0.40	-0.54	1.00	0.14	0	1.00	0.19	0.11	-1.61
United Kingdom	0.54	0.50	0.86	6.00	0.28	1	9.00	-0.92	0.15	-2.61
United States	0.47	0.63	1.58	6.00	0.48	1	9.00	0.45	0.01	-2.43

This table reports mean country-level characteristics and factors. See detailed variable definitions in the Appendix.

Table 4: Aggregate Insider Trades and Future Returns

Panel A: Purchase Ratio as Aggregate Insider Trading Proxy

Market Return $t+1$	Full Sample (1)	Low Fad (2)	High Fad (3)	Low-Synch (4)	High-Synch (5)
<i>Insider Trading Signal</i>					
Purchase Ratio	1.05*** (2.62)	0.39 (0.73)	1.47** (2.21)	0.83* (1.85)	1.30* (1.87)
<i>Market Factors</i>					
Market Return t	-0.01 (-0.28)	-0.00 (-0.02)	-0.05 (-1.01)	-0.03 (-0.45)	-0.05 (-0.82)
Market Return $t-1$	-0.12*** (-4.15)	-0.11* (-1.82)	-0.16*** (-2.75)	-0.19*** (-4.04)	-0.11*** (-2.81)
World Return t	0.03 (1.37)	0.04 (0.86)	-0.02 (-0.36)	-0.02 (-0.60)	0.08** (2.22)
M/B Ratio	0.02 (1.59)	0.03*** (2.76)	-0.01 (-0.44)	-0.01 (-1.13)	0.03 (1.46)
Market Capitalization	-0.05*** (-4.53)	-0.07*** (-4.54)	-0.02 (-0.63)	-0.03* (-1.98)	-0.06** (-2.49)
Turnover	0.10 (0.57)	-0.07 (-0.30)	0.22 (0.95)	0.24 (1.00)	0.10 (0.41)
<i>Other Signals and Controls</i>					
Dividend Yield	0.65** (2.13)	1.35* (1.98)	-0.01 (-0.01)	0.09 (0.14)	0.88* (1.99)
Inflation	-0.73 (-1.69)	-0.77 (-0.99)	-0.51 (-1.04)	-0.49 (-1.41)	-0.84 (-1.48)
Δ Institutional Holdings	0.49 (1.23)	-0.27 (-0.61)	1.67** (2.29)	0.13 (0.40)	4.75 (1.57)
Net Guidance	0.00 (0.03)	-0.42 (-0.75)	0.48 (1.32)	0.10 (0.32)	-0.30 (-0.50)
Net Forecasts	0.17 (0.69)	0.37 (0.99)	0.00 (0.00)	0.14 (0.44)	0.09 (0.22)
Fixed Effects	Country	Country	Country	Country	Country
Observations	759	396	363	372	387
R ²	11.57%	8.57%	13.31%	12.51%	10.71%

Table 4 (cont'd)

Panel B: Net Purchases as Aggregate Insider Trading Proxy

Market Return $t+1$	Full Sample (1)	Low Fad (2)	High Fad (3)	Low-Synch (4)	High-Synch (5)
Net Purchases	0.95*** (3.34)	0.67 (1.55)	1.17** (2.13)	1.00** (2.58)	1.02** (2.26)
Controls and Country FEs	Included	Included	Included	Included	Included
Observations	759	396	363	372	387
R ²	12.29%	9.13%	12.76%	13.62%	10.42%

Panel C: Net Buy minus Sell indicators as Aggregate Insider Trading Proxy

Market Return $t+1$	Full Sample (1)	Low Fad (2)	High Fad (3)	Low-Synch (4)	High-Synch (5)
Buy – Sell	0.85** (2.97)	0.44 (1.10)	1.04* (1.80)	0.34 (0.91)	1.39** (3.23)
Controls and Country FEs	Included	Included	Included	Included	Included
Observations	759	396	363	372	387
R ²	11.21%	8.68%	12.14%	11.36%	11.24%

Panel D: Purchases and Sales as Aggregate Insider Trading Proxy

Market Return $t+1$	Full Sample (1)	Low Fad (2)	High Fad (3)	Low-Synch (4)	High-Synch (5)
Purchases	1.00** (2.34)	0.04 (0.06)	1.67** (2.22)	0.63 (1.04)	1.34* (2.01)
Sales	-0.99*** (-3.67)	-0.92* (-2.01)	-1.03* (-1.90)	-1.10*** (-3.10)	-0.99** (-2.27)
Controls and Country FEs	Included	Included	Included	Included	Included
Observations	759	396	363	372	387
R ²	12.30%	9.40%	12.95%	13.64%	10.40%

Notes: This table reports regression results where the dependent variable is future stock return measured at the country-quarter level. The independent variables include country-level aggregate measures of insider trading, contemporaneous market-level factors (world factor, momentum, aggregate market-to-book ratio, country-level market cap and share turnover) and additional country-level signals (dividend yield, inflation, change in institutional holdings, number of positive minus negative earnings forecast revisions issued by firms and analysts). Panel titles indicate how aggregate insider trading is measured (purchase ratio, net purchases, buy-sell, and purchases and sales, respectively). Variables are defined in greater detail in the Appendix. In each Panel, in columns 2 and 3, the sample is split between country-quarters classified as low and high fad. Country-quarters are classified as high (low) fad if the fad factor is above (below) zero, where the fad factor is the first factor from a principal component analysis of country-level absolute price-to-earnings ratio, market-to-book ratio, share turnover, the absolute volatility premium, and the sum of IPOs, SEOs, and share repurchases, scaled by market capitalization. In columns 4 and 5, the sample is split between country-quarters classified as low- and high synchronicity (i.e., below or above sample median), where synchronicity is measured as in Morck et al. (2000). All regressions include country fixed effects. The sample period is 2004-2012. Coefficients and t-statistics based on standard errors clustered by country are reported. ***, ** and * indicate significance at the 0.01, 0.05 and 0.10 level, respectively.

Table 5: Aggregate Insider Trades and Transparency - Univariate Results

Panel A: By Financial Information Transparency

Means (%)		Buy	Sell	Buy – Sell	Medians (%)		Buy	Sell	Buy – Sell
		N=112	N=158	(<i>p-value</i>)			N=112	N=158	(<i>p-value</i>)
High Transparency	Market Return _{t+1}	0.96	0.39	1.35* (0.08)	Market Return _{t+1}	0.74	0.15	0.59 (0.81)	
		N=146	N=158			N=146	N=158		
Low Transparency	Market Return _{t+1}	2.12	0.01	2.13** (0.05)	Market Return _{t+1}	1.90	0.69	1.21 (0.36)	

Panel B: By Governance Transparency

Means (%)		Buy	Sell	Buy – Sell	Medians (%)		Buy	Sell	Buy – Sell
		N=121	N=163	(<i>p-value</i>)			N=121	N=163	(<i>p-value</i>)
High Transparency	Market Return _{t+1}	0.92	0.58	0.34	Market Return _{t+1}	0.38	1.01	-0.63	
		(0.48)				(0.78)			
		N=137	N=153				N=137	N=153	
Low Transparency	Market Return _{t+1}	2.23	-1.00	3.23***	Market Return _{t+1}	2.07	-0.47	2.54*	
		(0.01)				(0.08)			

This table reports univariate country-quarter stock returns, adjusted for country risk-free rates and contemporaneous MSCI world index returns. The returns are reported separately (a) for high and low transparency country-quarters and (b) for country-quarters where aggregate net insider purchases are in the top quartile of the sample distribution as measured by standardized country-level purchase ratio or net purchases (buy) or in the bottom quartile (sell). In Panel A, high and low transparency indicate above- and below-median financial information transparency, respectively. In Panel B, high and low transparency indicate above- and below-median governance transparency, respectively. The sample period is 2004-2012. Variables are defined in greater detail in the Appendix. ***, ** and * indicate significance at the 0.01, 0.05 and 0.10 level, respectively.

Table 6: Aggregate Insider Trades and Transparency – Regression Results

Market Return $t+1$	Expected Sign	Purchase Ratio	Net Purchases	Buy – Sell	Purchases
Aggregate IT	+	2.73** (2.50)	2.91*** (3.90)	2.28*** (3.64)	2.89** (2.38)
Aggregate IT *Financial Info	–	–0.32** (–2.25)	–0.23** (–2.72)	–0.24** (–2.35)	–0.23 (–1.52)
Aggregate IT *Governance	–	0.00 (0.02)	–0.15 (–1.47)	–0.04 (–0.41)	–0.14 (–0.82)
Aggregate IT *Market Friction*(-1)	–	0.26 (0.73)	–0.01 (–0.06)	0.16 (0.70)	–0.05 (–0.15)
Insider Sales	–				–2.81*** (–3.85)
Insider Sales *Financial Info	+				0.21** (2.41)
Insider Sales *Governance	+				0.14 (1.37)
Insider Sales *Market Friction*(-1)	+				–0.07 (–0.23)
Control Variables and Fixed Effects		Included	Included	Included	Included
Observations		759	759	759	759
R ²		12.46%	12.28%	11.62%	11.82%

Notes: This table reports regression results where the dependent variable is future stock return measured at the country-quarter level. The independent variables include country-quarter aggregate insider trading proxies (the purchase ratio, net purchases, buy–sell, and purchases and sales separately), country-level factors derived from a principal component analysis, contemporaneous market-level factors (world factor, momentum, aggregate market-to-book ratio, country-level market cap and share turnover) and additional country-level signals (dividend yield, inflation, change in institutional holdings, number of positive minus negative earnings forecast revisions issued by firms and analysts). Only coefficients on the interactions between aggregate insider trading proxies and the country-level factors are reported. All regressions include country fixed effects. The sample period is 2004-2012. Variables are defined in greater detail in the Appendix. Coefficients and t-statistics based on standard errors clustered by country are reported. ***, ** and * indicate significance at the 0.01, 0.05 and 0.10 level, respectively.

Table 7: Aggregate Insider Trades, Transparency and Fads - Univariate Results

Panel A: Mean Returns by Transparency and Low Fads

	Buy	Sell	Buy – Sell		Buy	Sell	Buy – Sell
	N=61	N=77	(<i>p-value</i>)		N=49	N=59	(<i>p-value</i>)
High Financial Information Transparency	0.44	-0.97	1.41 (0.17)	High Governance Transparency	-0.16	0.41	-0.57 (0.57)
Low Financial Information Transparency	1.35	0.97	0.38 (0.77)	Low Governance Transparency	1.57	-0.13	1.70 (0.17)

Panel B: Mean Returns by Transparency and High Fads

	Buy	Sell	Buy – Sell		Buy	Sell	Buy – Sell
	N=51	N=81	(<i>p-value</i>)		N=45	N=65	(<i>p-value</i>)
High Financial Information Transparency	1.58	0.16	1.42 (0.22)	High Governance Transparency	2.50	0.68	1.82 (0.14)
Low Financial Information Transparency	2.85	-1.21	4.06** (0.01)	Low Governance Transparency	2.24	-1.34	3.58** (0.02)

Panel C: Mean Returns by Transparency and Low Synchronicity

	Buy	Sell	Buy – Sell		Buy	Sell	Buy – Sell
	N=51	N=76	(<i>p-value</i>)		N=62	N=84	(<i>p-value</i>)
High Financial Information Transparency	1.15	0.06	1.09 (0.25)	High Governance Transparency	0.76	0.74	0.02 (0.98)
Low Financial Information Transparency	1.31	1.66	-0.35 (0.73)	Low Governance Transparency	1.83	1.05	0.78 (0.53)

Panel D: Mean Returns by Transparency and High Synchronicity

	Buy	Sell	Buy – Sell		Buy	Sell	Buy – Sell
	N=61	N=82	(<i>p-value</i>)		N=32	N=40	(<i>p-value</i>)
High Financial Information Transparency	0.80	-0.80	1.60 (0.18)	High Governance Transparency	1.80	0.16	1.64 (0.37)
Low Financial Information Transparency	2.70	-1.67	4.37** (0.01)	Low Governance Transparency	1.93	-1.69	3.62*** (0.01)

This table reports univariate country-quarter stock returns, adjusted for country risk-free rates and contemporaneous MSCI world index returns. The returns are reported separately (a) for high and low financial information and governance transparency country-quarters, and (b) for country-quarters where standardized country-level purchase ratio or net purchases is in the top quartile of the sample distribution (buy) or in the bottom quartile (sell). In Panel A (B), the sample consists of observations for which the fad factor is below (above) zero, where the fad factor is the first factor from a principal component analysis of country-level absolute price-to-earnings ratio, market-to-book ratio, share turnover, the absolute volatility premium, and the sum of IPOs, SEOs, and share repurchases, scaled by market capitalization. In Panel C (D), the sample consists of below (above) sample median synchronicity, where synchronicity is measured as in Morck et al. (2000). The sample period is 2004-2012. Variables are defined in greater detail in the Appendix. ***, ** and * indicate significance at the 0.01, 0.05 and 0.10 level, respectively.

Table 8: Aggregate Insider Trades, Stock Market Fads, Synchronicity, and Transparency – Regression Results

Panel A: Fads

Market Return $t+1$	Purchase Ratio		Net Purchases		Buy – Sell	
	Low Fad (1)	High Fad (2)	Low Fad (1)	High Fad (2)	Low Fad (1)	High Fad (2)
Aggregate IT	1.10 (0.55)	4.01** (2.16)	1.54 (0.83)	4.78*** (2.91)	0.55 (0.37)	3.64** (2.59)
Aggregate IT *Financial Information	0.04 (0.19)	-0.66*** (-3.08)	0.06 (0.25)	-0.50*** (-2.88)	0.04 (0.20)	-0.52** (-2.60)
Aggregate IT *Governance	-0.19 (-0.77)	0.18 (0.73)	-0.26 (-1.50)	-0.19 (-1.04)	-0.06 (-0.36)	-0.02 (-0.12)
Aggregate IT * Market Friction*(-1)	-0.21 (-0.59)	0.93 (1.17)	-0.17 (-0.51)	-0.23 (-0.46)	-0.00 (-0.02)	0.27 (0.56)
Control Variables	Included	Included	Included	Included	Included	Included
Fixed Effects	Country	Country	Country	Country	Country	Country
Observations	396	363	396	363	396	363
R ²	7.63%	17.95%	8.49%	14.85%	7.47%	14.86%

Table 8 (cont'd)

Panel B: Synchronicity

Market Return $t+1$	Purchase Ratio		Net Purchases		Buy – Sell	
	Low Synch (1)	High Synch (2)	Low Synch (3)	High Synch (4)	Low Synch (5)	High Synch (6)
Aggregate IT	2.94* (1.96)	3.04** (2.16)	2.42 (1.29)	3.70*** (3.80)	1.06 (0.77)	2.99*** (4.92)
Aggregate IT *Financial Information	-0.15 (-0.83)	-0.35* (-2.00)	0.02 (0.06)	-0.28*** (-2.95)	0.06 (0.29)	-0.29*** (-3.19)
Aggregate IT *Governance	-0.24 (-1.36)	-0.00 (-0.01)	-0.27** (-2.08)	-0.29 (-1.19)	-0.19 (-1.39)	-0.06 (-0.34)
Aggregate IT * Market Friction*(-1)	0.04 (0.19)	0.26 (0.41)	-0.20 (-0.78)	-0.13 (-0.40)	-0.01 (-0.06)	0.09 (0.24)
Control Variables	Included	Included	Included	Included	Included	Included
Fixed Effects	Country	Country	Country	Country	Country	Country
Observations	372	387	372	387	372	387
R ²	12.47%	11.96%	13.27%	12.09%	10.55%	12.06%

Notes: This table reports regression results where the dependent variable is future stock return measured at the country-quarter level. The independent variables are the same as in Table 6. Only coefficients on the interactions between aggregate insider trading proxies and the country-level factors are reported. In Panel A, the sample is split between observations for which the fad factor is above zero (high fad), and zero or below (low fad), where the fad factor is the first factor from a principal component analysis of country-level absolute price-to-earnings ratio, market-to-book ratio, share turnover, the absolute volatility premium, and the sum of IPOs, SEOs, and share repurchases, scaled by market capitalization. In Panel B, the sample is split between country-quarters classified as low- and high synchronicity (i.e., below or above sample median), where synchronicity is measured as in Morck et al. (2000). All regressions include country fixed effects. The sample period is 2004-2012. Variables are defined in greater detail in the Appendix. Coefficients and t-statistics based on standard errors clustered by country are reported. ***, ** and * indicate significance at the 0.01, 0.05 and 0.10 level, respectively.

Table 9: Aggregate Insider Trades, Future Fundamentals and Transparency

Panel A: Baseline Regression with Purchase Ratio

	Earnings Growth $t+1,t+4$	Forecast Error $t+1,t+2$
	(1)	(2)
<i>Insider Trading Signals</i>		
Purchase Ratio	0.05 (0.45)	-0.80 (-0.72)
<i>Market Factors</i>		
Market Return t	0.02 (1.60)	-0.10 (-0.77)
Market Return $t-1$	0.02 (1.37)	-0.05 (-0.64)
World Return t	0.01 (1.09)	-0.05 (-0.68)
M/B Ratio	-0.55 (-1.26)	0.38 (0.25)
Market Capitalization	-1.13* (-1.95)	-0.05 (-1.58)
Turnover	0.03 (0.91)	0.39 (1.56)
<i>Other Signals and Controls</i>		
Dividend Yield	-0.27 (-1.58)	0.51 (0.74)
Inflation	-0.50*** (-3.42)	-1.37* (-1.90)
Δ Institutional Holdings	0.05 (0.30)	-0.48 (-0.37)
Net Guidance	0.21** (2.28)	-1.50 (-1.58)
Net Forecasts	0.56*** (4.99)	0.82* (1.75)
ROE (Forecast Error t)	-0.71*** (-6.31)	0.41 (1.31)
Fixed Effects	Country	Country
Observations	759	759
R ²	45.99%	35.70%

Table 9 (cont'd)**Panel B: Earnings Growth and Transparency**

	Purchase Ratio	Net Purchases	Buy – Sell
Aggregate IT	0.27 (0.71)	0.06 (1.36)	-0.18 (-0.62)
Aggregate IT *Financial Information	-0.02 (-0.49)	0.13 (1.35)	0.06* (1.87)
Aggregate IT *Governance	-0.02 (-0.40)	-0.09 (-1.10)	-0.04 (-0.99)
Aggregate IT * Market Friction*(-1)	0.17* (1.70)	0.02 (0.17)	0.12* (2.00)
Control Variables and Country FEs	Included	Included	Included
Observations	759	759	759
R ²	46.07%	46.19%	46.12%

Panel C: Analyst Forecast Error and Transparency

	Purchase Ratio	Net Purchases	Buy – Sell
Aggregate IT	6.43** (2.44)	2.73* (1.71)	4.76** (2.47)
Aggregate IT *Financial Information	0.12 (0.36)	-0.33 (-1.52)	-0.07 (-0.26)
Aggregate IT *Governance	-1.69* (-1.86)	-0.06 (-0.21)	-1.07* (-1.70)
Aggregate IT * Market Friction*(-1)	0.32 (0.24)	-1.26* (-1.99)	0.12 (0.12)
Control Variables and Country FEs	Included	Included	Included
Observations	759	759	759
R ²	38.74%	35.86%	36.86%

Notes: This table reports regression results where the dependent variable is future four-quarter aggregate earnings growth (column 1 of Panel A, and Panel B) or analyst forecast error for next year EPS as of the beginning of the next two quarters (column 2 of Panel A, and Panel C), both at the country-level. The independent variables include country-quarter aggregate insider trading proxies (the purchase ratio, net purchases, buy-sell), country-level transparency factors (only in Panels B and C), contemporaneous market-level factors (world factor, momentum, aggregate market-to-book ratio, country-level market cap and share turnover), additional country-level signals (dividend yield, inflation, change in institutional holdings, number of positive minus negative earnings forecast revisions issued by firms and analysts), current aggregate earnings (column 1 of Panel A, and Panel B), and current analyst forecast error (column 2 of Panel A, and Panel C). In all regressions, earnings, growth thereof, and analyst forecast errors are scaled by country-level market capitalization. In Panels B and C, only coefficients on the interactions between aggregate insider trade proxies and the country-level factors are reported. All regressions include country fixed effects. The sample period is 2004-2012. Variables are defined in greater detail in the Appendix. Coefficients and t-statistics based on standard errors clustered by country are reported. ***, ** and * indicate significance at the 0.01, 0.05 and 0.10 level, respectively.

Table 10: Aggregate Insider Trades, Market Returns, and Instrumented Transparency**Panel A: First Stage**

	Financial Information	Governance
Language Distance	−0.32*** (−5.22)	
Language Fractionalization	−1.13*** (−3.12)	
Legal Origin English		3.36*** (12.06)
Legal Origin French		0.51* (1.77)
Legal Origin German		−0.36 (−1.17)
Legal Origin Scandinavian		3.11*** (9.98)
Control Variables	Included	Included
Observations	759	759
R ²	16.93%	59.37%

Panel B: Second Stage with Instrumented Transparency

	Full Sample	Low Fad	High Fad
Aggregate IT	1.42 (0.98)	−1.61 (−0.82)	3.69* (1.72)
Aggregate IT *Financial Information IV	−0.38 (−1.19)	0.24 (0.59)	−0.90** (−2.26)
Aggregate IT *Governance IV	0.36 (1.64)	0.17 (0.52)	0.52 (1.60)
Aggregate IT * Market Friction*(-1)	0.32 (0.86)	0.02 (0.06)	0.92 (1.17)
Control Variables and Country FEs	Included	Included	Included
Observations	759	396	363
R ²	11.89%	7.99%	15.63%

Notes: This table reports two-stage regression results where the first-stage dependent variable is country-level financial information transparency (column 1 of Panel A) or governance transparency (column 2 of Panel A), and the second-stage dependent variable future stock return measured at the country-quarter level. In Panel A, the instrument variables for financial information transparency are the language distance between English and the dominant language in the country and language fractionalization. The instrument variables for governance transparency are indicators for the country's legal origin (English, French, German or Scandinavian). In Panel B, the purchase ratio is used as proxy for aggregate insider trades, and country-level transparency factors are replaced with the predicted values from the first stage. In both panels, non-tabulated control variables include contemporaneous market-level factors (world factor, momentum, aggregate market-to-book ratio, country-level market cap and share turnover), additional country-level signals (dividend yield, inflation, change in institutional holdings, number of positive minus negative earnings forecast revisions issued by firms and analysts). All regressions include country fixed effects. The sample period is 2004-2012. Variables are defined in greater detail in the Appendix. Coefficients and t-statistics based on standard errors clustered by country are reported. ***, ** and * indicate significance at the 0.01, 0.05 and 0.10 level, respectively.

**Table 11: Aggregate Insider Trades and Future Returns
Pre- and Post-Sarbanes-Oxley in the U.S.**

Panel A: Vector Autoregression

		Full Sample	Pre SOX	Post SOX
		(1)	(2)	(3)
Net Purchase Ratio $t, t-1$	Net Purchase Ratio $t-1, t-2$	1.01*** (99.14)	1.00*** (23.21)	1.01*** (101.50)
	Market Return $t-1$	-0.73*** (-6.81)	-0.55*** (-3.00)	-0.87*** (-6.16)
Market Return t	Net Purchase Ratio $t-1, t-2$	0.02*** (3.28)	0.13*** (5.18)	0.01** (2.22)
	Market Return $t-1$	0.28*** (4.15)	0.11 (0.99)	0.25*** (2.90)
Observations		198	76	122

Panel B: UK as benchmark

	U.S. only	U.K. only	U.S. and U.K.
	(1)	(2)	(3)
Market Return $t+1$			
Net Purchase Ratio $t, t-1$	10.30*** (3.06)	3.77** (2.05)	10.30*** (3.05)
Net Purchase Ratio $t, t-1$ * Post SOX	-8.97** (-2.21)		-8.76* (-1.71)
Net Purchase Ratio $t, t-1$ * U.K.			-6.53* (-1.70)
Net Purchase Ratio $t, t-1$ * Post August 2002		-0.21 (-0.07)	-0.21 (-0.07)
Control Variables and Fixed Effects	Included	Included	Included
Observations	198	163	361
R ²	30.82%	14.92%	24.29%

Notes: This table reports regression results for the predictive content of aggregate insider trades in the U.S. The sample period is 1996 to 2012. Insider trades are aggregated over a two-month period into a net purchase ratio, consistent with Seyhun (1988, 1992). In Panel A, the regression specification is VAR. In the second and third columns, the sample is split between observations before (column 2) and after (column 3) August 2002. In Panel B, the sample also includes the U.K. as control group. The dependent variable is one-month-ahead market returns (net of the country-specific T-Bill rate and the MSCI ACWI return), and the regression specification is OLS.