

Insider Trading, Informativeness, and Price Efficiency Around the World

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Abstract

This paper examines insider trading activities and their informativeness across 44 countries with varying levels of insider trading regulations. While insider trades, particularly insider purchases, earn abnormal profits in most of the markets we study, insider trading is significantly less informative in countries without active enforcement of insider trading regulations. Examining insider trading around corporate earnings announcements, we find that insiders trade more before earnings announcements and that stock prices react less to earnings news in countries without active enforcement than in those with active enforcement. Based on the first comparison of insider trading activities under different regulation regimes, our results support the view that effective insider trading regulation promotes price efficiency. Without active enforcement, insider trading not only crowds out market information acquisition and reduces stock price efficiency, but also renders insider trading itself less informative.

Keywords: Insider Trading, Market Efficiency, Regulation Enforcement, Earnings Announcements

JEL Classification Number: G11, G23, G32

1 Introduction

Insider trading regulation has been the subject of a long-standing debate among researchers and policy makers. Opponents of insider trading regulation contend that allowing insiders to benefit from their information advantage in trading promotes more informationally efficient financial markets (e.g., Manne, 1966; Carlton and Fischel, 1983; Leland, 1992; George and Seyhun, 2002). Proponents of insider trading regulation, however, argue that unrestricted insider trading can adversely affect the incentives of outside investors to acquire and produce information, hence making stock prices less informationally efficient (e.g., Fishman and Hagerty, 1992; Khanna, Slezak, and Bradley, 1994). Existing studies on insider trading typically focus on insider trading activities within a single country and under a uniform regulation regime. Thus, these studies provide no direct evidence on the informativeness of insider trades under different regulation regimes, the potential tradeoff between the informational benefit of insider trading and the cost of reduced information acquisition, and the overall impact of insider trading regulation on price efficiency.

In this paper, we exploit a newly available global dataset on insider trading activity to offer insights on the debate of insider trading regulation. Specifically, we study insider trading activities and their informativeness of 24,135 firms in 44 countries with varying degrees of effectiveness of insider trading regulations. We examine whether and how enforcement of insider trading regulation affects insider trading activities, the informativeness of insider trades, and stock price efficiency. The results show that insider trades are generally informative across the markets we study, but they are significantly less informative in countries without active enforcement of insider trading regulations. Studying insider trading around corporate earnings announcements, we find that insiders trade more before earnings announcements and stock prices react less to earnings announcements in countries without active insider trading enforcement. Moreover, insider trades before earnings announcements do not help to incorporate earnings-related information into stock prices. The evidence shows that, without effective insider trading regulation, insider trading not only crowds out market information acquisition and reduces the efficiency of stock prices, but also renders

insider trading itself less informative.

Our study represents the first to directly evaluate and compare the information contents of insider trading activities under different regulation and enforcement regimes. We employ a new dataset on global insider transactions available through Director Deals that covers share transactions of senior corporate executives and corporate directors from 44 countries over the period of 2007 to 2013. By examining insider trading activities in this large number of countries with varying levels of insider trading enforcement, we seek to provide the first comprehensive evidence on insider trading activities and their informativeness across different markets, to understand the role of insider trading regulation in determining insider trade informativeness, and to assess the relation between insider trading regulation and stock price efficiency.

We first examine insider trading activities and their informativeness under different insider trading regulation regimes. All 44 countries in our sample have insider trading laws, but enforcement of insider trading laws varies widely across these countries. To measure the extent to which a country enforces its insider trading regulation consistently and rigorously, we construct a variable that is based on the prosecution of insider trading in a country during the period of 2007-2013. We define countries with at least one insider trading prosecution case during our sample period as countries with active enforcement of insider trading regulation and countries without any insider trading prosecution as countries without active enforcement. We measure the informativeness of insider trades based on abnormal stock returns subsequent to insider transactions. For each country, we compute the average cumulative returns of stocks traded by insiders for buys and sells, separately, in excess of the country index return for varying periods of 5 to 120 days following the day of insider trades.

Several results emerge from the comparison of the large number of insider trades across the countries. First, corporate insiders trade actively, and their trades, particularly their buy transactions, are informative in most countries. The results show strong evidence of positive abnormal returns associated with insider buy transactions over the different periods subsequent to insider transaction dates, while those associated with sell transactions show no robust evidence. These findings

are largely consistent with the evidence shown by studies of insider trading activities within single countries. Second, insider trading regulations do not seem to affect insider trading activities. There is no significant difference in overall insider trading activities (scaled by a country's stock market capitalization) between countries with and without active enforcement of insider trading regulations.

Third, the informativeness of insider trades differs across the countries in the sample. Insider trading is significantly more informative in countries with active enforcement of insider trading regulations than in countries without active enforcement. The results hold for insider trading informativeness measured over shorter time periods of 5 to 10 days to longer periods of 60 to 120 days. Our results also show that insider trading informativeness is related to various country-level economic and legal characteristics, but the legal characteristic variables such as the rule of law, the general effectiveness of law enforcement, investor protection, and the quality of government do not substitute for the effects of enforcement of insider trading regulation.

Why does active insider trading regulation result in more, not less, informative insider trades? How does insider trading regulation affect stock price efficiency? To answer these questions, we examine insider trading activities around corporate earnings announcements and the relation between insider trading regulation, insider trading activity, and the market reaction to earnings news. Our analysis yields the following results. First, in countries with active enforcement of insider trading regulations, insiders trade less actively before corporate earnings announcements. The results suggest that active enforcement of insider trading regulation deters insiders from exploiting non-public material corporate information in their trading. We also find that active enforcement of insider trading regulation, not insider trading regulation itself (for e.g., the explicit restriction on insider trading before earnings announcement), determines insider trading activity around earnings announcements. Insiders trade actively before earnings announcements in countries with lockout period requirements for insider trading, but without active enforcement.

Second, stock price reactions to corporate earnings news are stronger in countries with active insider trading regulation enforcement, indicating more informative earnings announcements in

these countries. Furthermore, consistent with the results on insider trading activity, stock price reactions to corporate earnings news are stronger in countries where insiders are less likely to trade before earnings announcements. These results are robust after controlling for various country, market, and institutional characteristics.

The results based on corporate earnings announcements suggest that active insider trading regulation enforcement is associated with less insider trading before earnings announcements but with greater stock price reactions to earnings news. But how does insider trading regulation affect the informativeness of insider trades and the overall stock price efficiency? Do insider trading activities before earnings announcements reduce stock price informativeness without advancing price discovery, or do insider trades help to incorporate earnings-related information into stock prices before announcements, thus weakening stock price reactions to earnings announcements? We find that independent of whether or not countries are rigorously enforced, the informativeness of insider trades is not significantly different before and after earnings announcements, and that insider trades before announcements are not more informative in countries without active enforcement than in countries with active enforcement. The results suggest that insider trading activities before earnings announcements reduce stock price informativeness without helping to incorporate earnings information into stock prices before announcements.

In summary, our results on both insider trading activities in general and insider trading around earnings announcements reveal that effective insider trading regulation leads to more informative insider trades and greater stock price efficiency. While insiders from countries with weak or no insider trading regulation could exploit their information advantage, such as corporate earnings information in their trades, market reactions to corporate news become weaker, resulting in noisier stock prices. Interestingly, the noisier stock prices, in turn, reduce the potential information advantage of insiders and hence lower the informativeness of insider trades.

Our study makes several contributions to the literature. First, the newly available insider trading database from a broad spectrum of countries affords us the opportunity to empirically examine and compare insider trading activities and the informativeness of insider trading under

different regulation regimes. Our analysis not only expands the extensive literature that focuses mainly on insider trading in a single country or in a small group of countries, but also provides the first direct comparison of insider trading activities and their informativeness across countries. These comparisons allow us to assess the effects of insider trading regulations on insider trading activities and the informativeness of insider trades.

Second, our findings offer important insights on the opposing views regarding the effects of insider trading regulation on price informativeness and market efficiency. We present the first and direct evidence that insider trading regulation improves both the informativeness of insider trades and the efficiency of stock prices. The evidence provides support to the argument that insider trading regulation improves stock price efficiency. Several previous studies show that insider trading restrictions lead to greater information acquisition efforts (Bushman, Piotroski, and Smith, 2005) and that the first enforcement of insider trading laws improves stock price informativeness (Fernandes and Ferreira, 2009). Our results are consistent with the findings of the two studies, but we provide direct evidence on the mechanism of how insider trading regulation can improve the informativeness of stock prices. Specifically, we show that allowing insiders to freely exploit their information advantage over the investor public has substantial adverse effects that can easily overwhelm any informational benefits from insider trading. Such adverse effects not only lead to noisier and less informative stock prices, but also reduce the informativeness of insider trades (and hence their information advantage).

Our study thus fills the gap of existing findings on insider trading regulation and stock price efficiency in different countries. Bhattacharya et al. (2000) examine shares trading on the Bolsa Mexicana de Valores and find that share prices do not react to company news in the Mexico stock market. They argue that because insider trades may have already transmitted such information to the market, company announcements do not add new information. Such arguments implicitly assume that insider trades in unregulated markets are informative and that stock prices, if fully reflecting insider information, could be efficient even if they do not respond to company announcements. While our sample does not include Mexico, our evidence suggests that insider trades in

Mexico may not convey much information because their stock prices may not fully respond to any corporate news, either through corporate announcements or insider trades.

The remainder of the paper is organized as follows. In the next section, we provide a brief discussion of the related literature. Section 3 describes the data, and Section 4 evaluates the informativeness of insider trades and the impact of insider trading regulation on insider trade informativeness. Section 5 employs a corporate event – corporate earnings announcements – to examine the impact of insider trading regulation on stock price efficiency, and the final section concludes.

2 Related Literature

Over the past few decades, the economics of insider trading has remained a highly controversial topic among securities authorities and academics. The main issue is whether insider trading is economically inefficient and hence, ought to be subject to regulation. Critics of insider trading regulation argue that without regulation, inside information will be efficiently allocated to investors who value the information the most, and that the benefit of more efficient prices is a more efficient allocation of resources (for example, Coase, 1960; Manne, 1966). Carlton and Fischel (1983) further argue that increased price efficiency can reduce investor uncertainty and better protect corporation information. Subsequent theoretical models (such as Dye, 1984; Leland, 1992; Shin, 1996; Noe, 1997) also suggest that insider trading makes stock prices more responsive to changes in the market. In other words, unimpeded insider trading facilitates the incorporation of information into stock prices, thereby improving price informativeness.

Proponents of insider trading regulation, however, argue that under certain circumstances, the adverse effects of insider trading could lead to less efficient stock prices. Manove (1989) shows that insider trading increases trading costs of liquidity traders and hence, discourages liquidity trading and decreases market liquidity. This liquidity discount can be incorporated into the firm's stock price, thereby increasing the firm's cost of capital. Fishman and Hagerty (1992) put forth two

adverse effects of insider trading. First, insider trading discourages non-insiders from obtaining information and trading, and this reduces the number of informed investors in the market. Second, in the presence of better informed insiders, the information gets unevenly distributed across investors in the market. As a result, the market becomes less competitive and stock prices become less efficient.

It is worth pointing out that both the opponents and proponents of insider trading regulation hold the view that unrestricted insider trading is more informative than regulated insider trading. For the opponents, more informed insider trading leads to more efficient prices. For the proponents, the highly informed insider trading, through its adverse effects on other market participants, leads to less efficient prices.

There is an extensive empirical literature that examines the informational value of insider trading. Given the widely available US insider trades data, many of existing, especially earlier, studies focus on US markets and find that insider trades are informative (Finnerty, 1976; Jaffe, 1974; Seyhun, 1988; Lakonishok and Lee, 2001; George and Seyhun, 2002; Brochet, 2010). Non-US studies also reach the same conclusion for Canada (Baesel and Stein, 1979), the UK (Pope, Morris, and Peel, 1990), Hong Kong (Wong, Cheung, and Wu, 2000), Germany (Betzer and Theissen, 2009), Switzerland (Zingg, Lang, Wyttenbach, 2007), Australia (Hotson, Kaur, and Singh, 2007), Thailand (Budsaratragoon, Hillier, and Lhaopadchan, 2012), the Netherlands (Degryse, de Jong, and Lefebvre, 2014), and European countries (Fidrmuc, Korczak, and Korczak, 2012). But other studies find that insider purchases contain no informational value in Norway (Eckbo and Smith, 1998), Spain (Del Brio, Miguel, and Perote, 2002), and Australia (Brown, Foo, and Watson, 2003).

These empirical studies are primarily based on a single country or a small group of countries within a region. The findings do not offer systematic evidence on the informativeness of insider trades across countries, and these studies do not attempt to compare and explain the differences in the informativeness of insider trades across the countries. Because these studies typically investigate insider trading under the same regulatory regime, they also do not address the core question of the debate on insider trading regulation, i.e., whether or not insider trading regulation helps to

improve stock price efficiency.

Several recent studies have examined some aspects of the effects of insider trading regulation on the financial market. For example, Bushman, Piotroski, and Smith (2005) show that restriction of insider trading leads to greater information acquisition efforts by financial analysts. Bhattacharya and Daouk (2002) provide the first cross-country analysis of insider trading laws and enforcement across 103 countries. They find that the first legal prosecution of insider trading, while not the establishment of insider trading laws, helps reduce a country's cost of equity, presumably because of improved information efficiency. Studying the effects of the first enforcement of insider trading laws, Denis and Xu (2009) find similar results for executive compensation, and Chen et al. (2014) show similar effects for corporate investment. Fernandes and Ferreira (2008) examine the impact of first enforcement of insider trading laws on the informativeness of stock markets. They find that price informativeness is substantially improved after the first enforcement of insider trading laws in developed markets.

These recent studies provide some evidence on the potential effects of insider trading regulation on stock price efficiency. However, none of these studies examine the effects of insider trading regulation on insider trading activities and the informativeness of insider trades. Without such direct evidence, we cannot study the mechanism through which insider trading regulation affects stock prices and address the core question of the debate on insider trading regulation. The purpose of our study is to address these issues.

3 Data and Summary Information

3.1 Insider transactions

Our global insider transactions data are obtained from Director Deals, a specialist global market data company that monitors and analyzes share transactions made by directors and top executives of firms. Director Deals gathers information of share transactions by insiders of about 40,000 firms from 56 countries globally. The source of their data comes from company announcements made

public under disclosure regulations and from stock exchanges. For a given transaction, this dataset includes stock identifiers (ISIN and SEDOL), market capitalization at the time of the transaction in US dollars, company information, the country where the trade took place, ticker symbol, personal information of the insiders (name, title, date of birth), transaction type (award, buy, sell, transfer, exercise, given away, etc.), transaction date, price and number of shares traded, total value of transaction (in British pounds, euros and US dollars), and the date an insider trade was announced or reported.

Our sample focuses on insider transactions in the home country where the firm's headquarter is located and where the transaction occurred and announced.¹ We exclude countries with fewer than five firms with reported insider transactions for the entire sample period, and also exclude one major developed market, Japan, where insider trades are not required to be reported by law. Furthermore, our analysis is restricted to open-market insider buys and sells as other types of transactions are more likely attributable to liquidity and portfolio diversification considerations (Ofek and Yermack, 2000; Carpenter and Remmers, 2001). As a result, our final sample consists of 44 countries with varying start years when information on insider transactions becomes available. In Director Deals, the UK, Ireland, and the Netherlands have the longest sample period from 1999 to 2013, whereas most emerging markets (such as Brazil, Chile, Indonesia, and Pakistan) have data starting from 2013. As a result, our sample period is from 2007 to 2013.

Table 1 presents the sample period for each country. The table reports the number of unique firms with reported insider transactions, average annual number of transactions, average annual value of transactions (in US dollars) and average annual number of shares traded. The number of unique firms with reported insider transactions varies from 5 in Czech Republic to 6,501 in the US, and the total number of unique firms employed in this study is 24,135. The average annual number of transactions ranges from 20 for Hungary to 45,558 for the US. The average ratio of the annual total value of transactions relative to total market capitalization varies from 0.005% for Brazil to 1.723% for Greece. The mean annual total number of shares traded is from 0.29 million for Croatia

¹These transactions include the vast majority of insider trades in the database.

to 29,451.26 millions for Hong Kong.

3.2 Insider trading laws

Table 1 reports the year in which insider trading laws came into existence in a country and the year of first insider trading prosecution under insider trading laws. Information on the enactment of insider trading laws is obtained from Bhattacharya and Daouk (2002). All countries in our sample have adopted insider trading laws starting from 1934 (the US) to 1999 (Cyprus). Bhattacharya and Daouk also provide information on the first insider trading prosecution in a country up to 1998. We use the same source and supplement the first enforcement information for our sample of countries. The year that the initial prosecution under insider trading laws took place is between 1961 and 2012, and only two countries in the sample have not enforced their insider trading laws. With the exception of Egypt (2009) and Estonia (2012), the first enforcement of insider trading laws in most countries occurred much earlier than our sample period; we choose not to use the first-time enforcement variable for our analysis.

In this paper, we develop a new measure of insider trading regulation based on how rigorously and actively one country enforces insider trading laws. Even though most countries in our sample have had at least one insider trading prosecution (for example, the initial prosecution), many countries do not pursue such cases rigorously. During our sample period of 2007-2013, there was not a single case of insider trading litigation in 15 countries in the sample. We thus define a variable “Active Enforcement” to measure the extent to which a country enforces its insider trading regulation consistently and rigorously. “Active Enforcement” is a dummy variable that equals 1 if the country has a prosecution event under insider trading laws within the sample period, 0 otherwise. We collect information on such prosecution events from three major data sources: (1) the market regulator’s official announcements and direct communication with the regulatory authorities; (2) news search; and (3) Capital IQ Key Development database. Capital IQ provides corporate events internationally, and we manually check the events that have a key word of insider(s) to ensure that the reported event is an insider trading prosecution event. The results are shown in

Table 1. Among the 44 countries in our sample, 29 have recent enforcement of insider trading laws over the sample period, while 15 countries do not have any active enforcement events.

3.3 Other variables

Our analysis includes several country-level variables relating to legal, institutional, and economic development characteristics of the sample of countries. These variables could affect insider trading regulation and the enforcements, or could potentially serve as substitutes to the more specific insider trading regulation enforcement variable we constructed above. The country-level characteristic variables we employ in our empirical analysis are listed in Appendix Table 1.

Legal Origin is a binary indicator that takes the value of 1 if the origin of the country's legal system is common law and 0 otherwise, and such information is from Table II of La Porta et al. (1998). Anti-self-dealing is obtained from Djankov et al. (2008) and is a measure of investor protection against expropriation by corporate insiders.² The table also presents time-series averages of three law or regulation enforcement variables, namely the rule of law (Rule of Law), government effectiveness (Effectiveness), and regulatory quality (RegQuality), from 1999 to 2013. These three variables are obtained from the Worldwide Governance Indicators (WGI) project, 2014 Update. These aggregate indicators combine views and survey results and intend to measure governance quality at the country level. Rule of law reflects the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement and property rights. Government effectiveness reflects the quality of public services, the quality of the civil service, and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. RegQuality reflects the ability of the government to formulate and implement policies and regulations. The value of all these variables ranges from -2.5 to 2.5. As shown in the table, Pakistan has the lowest governance indicators: -0.851 for Rule of Law, -0.574 for Effectiveness,

²The anti-self-dealing index was constructed to measure minority shareholder protection based on private enforcement mechanisms, such as disclosure and litigation, that govern a hypothetical self-dealing transaction. It does not cover insider trading. See Djankov et al. (2008) for detailed description on the construction of the index.

and -0.636 for RegQuality. Finland, on the other hand, has the highest Rule of Law (1.946) and Effectiveness (2.152), while Singapore maintains the highest RegQuality of 1.927.

The sample of countries are divided into developed and developing countries based on World Bank classifications. We use the ratio of country-level stock market capitalization to annual GDP to measure the level of stock market development in a country. Our data source for the time-series annual GDP is the World Bank's World Development Indicators (WDI) database. The stock market development variable and the developed country status serve as additional control variables in our empirical analysis.

4 Regulation Enforcement and Insider Trading

In this section, we study insider trading activities across 44 countries and evaluate their informational contents. We first document insider trading profits of varying time horizons in the sample of countries and then examine whether insider trading regulation enforcement has any influence on both insider trading activities and the informativeness of insider trades around the world.

4.1 Insider trading profits

We obtain daily stock prices from Compustat Global and North America, and further supplement stock return information from DataStream to compute insider trading profits. Drawn from the existing literature, for each country, we measure insider trading profits for insider buys and sells, separately, and we compute the profits based on the cumulative returns of the traded stocks in excess of the country index return over 5, 10, 20, 30, 60, 90, and 120 days after insider transaction dates.³ To conserve space, Table 2 reports the overall results on insider trading profits estimated over 5, 10, 20, 60, and 120 days after transaction dates by country.

As Table 2 indicates, average cumulative excess returns associated with insider buys are mainly positive and those related to insider sells are primarily negative. For example, the 5-day cumulative

³The reporting requirements of insider trading differ across countries. For our sample period, the majority of the countries require reporting within two days of transaction.

excess returns for insider buys are positive in 38 countries, and 29 of them are statistically significant at the 5% level. On the other hand, 32 of the 44 countries yield negative 5-day average cumulative excess returns for insider sells, and about half of these returns are statistically significant at the 5% level. For insider buys, average cumulative excess returns range from -0.759% in Luxembourg to 1.530% in Ireland, and for insider sells, they are between -0.954% in Hungary and 1.550% in Czech Republic. Similar patterns are observed in cumulative returns computed over longer horizons up to 120 days. Insider profits are higher for most countries when measured over longer horizons, but they also vary vastly across the countries.

Our findings are broadly consistent with the results of most prior studies based on some of the individual countries, but they contradict the evidence shown in a few studies. For example, our findings of profitable insider purchases are in accord with the findings of numerous studies on insider purchases, such as Seyhun (1988), Lakonishok and Lee (2001) and Jeng, Metrick, and Zeckhauser (2003) on US firms, Baesel and Stein (1979) on Canadian firms, Pope, Morris, and Peel (1990) on UK firms, Wong, Cheung, and Wu (2000) on Hong Kong firms, Betzer and Theissen (2009) on German firms, Zingg, Lang, Wyttenbach (2007) on Swiss firms, Hotson, Kaur, and Singh (2007) on Australian firms, Budsaratragoon, Hillier, and Lhaopadchan (2012) on Thai firms, and Degryse, de Jong, and Lefebvre (2014) on Dutch firms. Our finding is also in line with Del Brio, Miguel, and Perote (2002) on Spanish firms; the authors find no profitability in insider purchases or sales in Spain.

Our evidence differs from the findings of a few studies, such as Eckbo and Smith (1998) on Norwegian firms and Brown, Foo, and Watson (2003) on Australian firms. Using a similar methodology, Eckbo and Smith (1998) find insider sales but not purchases, are profitable, whereas our analysis delivers the opposite results. Eckbo and Smith's study is based on insider trades of stocks in 197 companies from 1985 to 1992, whereas ours looks at insider trades of 262 Norwegian stocks between 2007 and 2013. Brown, Foo, and Watson find that directors' sales, but not purchases, are profitable during the 1996-2000 period. On the contrary, our analysis shows that insider purchases are profitable over the 2007-2013 period.

In summary, the above results broadly suggest that insider trades, particularly insider buys, are informative in the global stock markets. Insiders exploit their information advantage and profit from their trades. There also seem to be substantial variations in the profits of insider trades across the countries, as well as over different time horizons. We next turn to the analysis on the determinants of the informativeness of insider trades by exploiting the different insider trading regulation enforcement regimes and the different institutional characteristics across our sample of 44 countries.

4.2 Active enforcement and insider trading profits

In this subsection, we investigate whether insider trading enforcement influences insider trading activities and their informativeness as measured by insider trading profits over varying horizons. We also examine how insider trading regulation enforcement relates to the legal environments in a country and whether any enforcement effects on informativeness and insider trades are driven by country-specific characteristics and the general regulatory environments.

In our analysis, we estimate the following multivariate panel regression with various combinations of the country-specific variables that are described above.

$$\begin{aligned}
 \text{IT Profits}_{i,t} = & \beta_1 + \beta_2 \text{Active Enforcement}_{i,t} + \beta_3 \text{Legal Origin}_{i,t} + \beta_4 \text{Rule of Law}_{i,t} \\
 & + \beta_5 \text{Effectiveness}_{i,t} + \beta_6 \text{RegQuality}_{i,t} + \beta_7 \text{Anti-Self-Dealing}_{i,t} + \beta_8 \text{Stock Dev}_{i,t} \\
 & + \beta_9 \text{Dev}_{i,t} + \epsilon_{i,t},
 \end{aligned} \tag{1}$$

where IT Profits denote profits associated with insider transactions in year t . We first compute insider trading profits separately for insider buys and insider sells over different time horizons. For each country and each year, we then compute the average insider trading profits for buy and sell transactions for the different horizons.

Active Enforcement is the indicator variable that equals 1 if there is at least one legal insider trading prosecution within our sample period of 2007-2013, and 0 otherwise. In our discussion below, we use active enforcement and enforcement interchangeably if the context is clear. We

include several legal environment variables in the analysis to see whether insider trading regulation enforcement plays any unique role in different legal environments. These legal environment variables are more broadly defined and they could encompass the effects of insider trading regulation enforcement. The three variables, Rule of Law, Effectiveness and RegQuality are defined in the previous section. Anti-Self-Dealing is a proxy for investor protection against corporate insider self-dealing in business decisions. As shown in Appendix 2, the three law and regulation variables are highly correlated. The high correlation is not surprising as the three variables substantially measure similar quality of a country's regulatory environment. Hence, in our subsequent analyses, our regression model only incorporates these variables one at a time.

Additionally, we include several broad country-level characteristics in our baseline model. Legal Origin equals to 1 if the country has a common law origin, 0 otherwise. Stock Dev is defined as the ratio of a country's stock market capitalization to its annual GDP, and proxies for the level of stock market development. The countries in the sample are divided into developed and developing countries, and we include a developed dummy (Dev) in the regressions.

We estimate model (1) using insider trading profits measured over varying horizons as separate dependent variables. To conserve space, Table 3 reports results based on insider trading profits measured over 5, 10, 20, and 120 day intervals for insider buys and sells, separately. Our unreported results, based on other time horizons, are qualitatively similar to those reported in Table 3.

Several results emerge from the table. First, the results show strong evidence that informativeness of insider buys measured over both short (5-day, 10-day, 20-day) and long horizons (120-day) correlates highly with active enforcement of insider trading regulation. The coefficients of Active Enforcement are robustly significant across the model specifications in columns (1)-(9) and across the four panels spanning the different time horizons. In contrast, the results for insider trading profits based on sell transactions in columns (10)-(18) produce significantly weaker evidence of informativeness in insider sells. For example, in Panel A, the Active Enforcement coefficient is fairly stable at 0.003 with a t-value greater than 2 for buy transactions across varying horizons. In comparison, not all of the Active Enforcement coefficients associated with sell transactions are

statistically significant. We find some significant, though weaker, results for insider sells for the short-horizon of 5 days. However, moving beyond the 5-day horizon, the insider buy results remain consistently significant at conventional levels, but the significant insider-sell results disappear completely. The different results for buy and sell transactions are not surprising, given the well-documented evidence in the literature that insider buy transactions are informative while insider sell transactions are not. In general, the evidence reveals that active insider trading regulation enforcement is associated with more, not less, informative insider trading.

Second, the results show that other variables that measure the broad legal environments do not subsume the effects of insider trading regulation enforcement. Because of the high correlation among the three legal environments variables, we include them separately, along with Active Enforcement in the regressions. Rule of Law, Effectiveness, and RegQuality are significantly related to insider trading profits in a small number of specifications for the short horizons, but neither of these variables substitutes the effects of Active Enforcement. Other broad measures of country characteristics, such as the Dev dummy and stock market development (Stock Dev), also do not materially alter the significance of the Active Enforcement effects. Our findings highlight the unique role of insider trading regulation and suggest that the main determinant of insider trading profits is the effectiveness of insider trading regulation and not the overall effectiveness of the legal system in a country.

We also examine the potential effects of insider trading regulation on overall insider trading activities. It is possible that a lax insider trading regulation could lead to rampant insider trading, thereby resulting in, on average, less informed insider trading. It is also possible that differences in the effectiveness of insider trading regulation may lead to differences in legal vs. illegal insider trading and to differences in reported and unreported insider trading across the countries. We estimate regressions similar to those specified in model (1) with the dependent variable of insider trading activity, defined as insider buy and sell transactions in dollar value scaled by the firm's market capitalization. Regression results for insider buys and sells are presented separately in Table 4. We exclude the specifications with the two variables of Effectiveness and RegQuality

from the table as these two variables are highly correlated with Rule of Law, and the results are qualitatively similar.

As shown in Table 4, insider trading regulation is not significantly related to reported insider trading activities in the database. For both insider buys and sells, the coefficients on our main variable of interest, Active Enforcement, are not statistically significant across all the 12 models. None of the other country characteristics are consistently and significantly associated with insider trading activities. The results suggest that, insiders in countries without active regulation enforcement do not trade more actively than those in countries with active enforcement. While the analysis here does not rule out the possibility that there could be systematic differences in insider trading reports, the evidence and particularly our analysis on insider trading activity before corporate earnings announcements in the next section indicate that such differences, if any, are unlikely to lead to systematic bias in our results.

To sum up, the results in this section show that total insider trading activities, based on the value of insider transactions to market capitalization, do not differ significantly across countries. But insider trades are more informative in countries that actively enforce insider trading laws. The results are surprising. If insiders could exploit less from their information advantage, they should earn greater profits in their trades, all other things being equal. Opponents of insider trading regulation also stress that allowing insiders to freely use their information leads to more informative insider trading and consequently promotes market price efficiency. Our results contradict these views. In the next section, we investigate how active insider trading regulation enforcement leads to more, not less, informative insider trading and more informative prices.

5 Regulation Enforcement and Insider Trading around Earnings Announcements

In the preceding section, we have established that informativeness of insider trades varies across countries with different insider trading regulation regimes. Specifically, insider trading informativeness is more pronounced in countries with active enforcement of insider trading laws. In this

section, we offer insights into why rigorous insider trading regulations could result in more informative insider trades and how insider trading regulations affect stock price efficiency. We employ a research design that focuses on insider trading activities around a major corporate news event, corporate earnings announcements. Studying insider trading around such an event allows us to assess the effects of insider trading regulation on insider trading activities, the informativeness of insider trading, and how insider trading activities under different regulation regimes affect price efficiency.

We choose earnings announcements as a major corporate event to validate our previous findings and to further test the impact of insider trading regulation and insider trading activity on price efficiency. Corporate earnings announcements are regularly scheduled official statements of a firm's operating results and contain both current and forward-looking information on firm performance. Corporate earnings announcements are among the most important corporate information disclosures that typically generate significant market reactions. It is widely believed that top corporate executives have advance access to the (preliminary) quarterly or annual earnings information and hence, possess substantial information advantage relative to the investor public. Therefore, analyzing insider trading activities permits us to determine the extent to which insiders exploit their information advantage under different regulatory environments and how these activities affect stock price efficiency.

Several prior studies investigate stock returns around earnings announcements and examine the information content of earnings announcements across countries. For example, DeFond, Hung, and Trezevant (2007) find that earnings announcements are more informative in countries with higher earnings quality, stronger investor protection, or in countries that have implemented enforcement of their insider trading laws for the first time. Our research contributes to this strand of literature by examining how insiders behave around earnings announcements across countries with varying degrees of enforcement in insider trading.

5.1 Insider trading around earnings announcements

The global earnings announcement data are obtained from the I/B/E/S database, which provides extensive coverage on analyst recommendations and forecasts from brokerage firms across the world. I/B/E/S contains earnings announcement dates of firms covered by analysts, firm names, analyst earnings forecasts, and actual earnings.

Our analysis examines insider buying and selling activities surrounding quarterly earnings announcement dates. In particular, we compute 10-day, 20-day, and 30-day insider buying and selling activities before and after earnings announcement dates. For an N-day trading activity around earnings announcements, we calculate the Pre-Buy (Pre-Sell) ratio as follows. The Pre-Buy (Pre-Sell) ratio is the amount of insider buys (sells) over N days prior to an earnings announcement date divided by insider buys (sells) over N days before and N days after the announcement date. We measure insider buys (sells) based on the number of shares, or based on the share value traded. For example, the 10-day Pre-Buy ratio is the ratio of insider buy transactions in the 10-day period before earnings announcements to the sum of insider buy transactions in the 10-day period before and 10-day period after earnings announcements. Due to data availability in the I/B/E/S database, we are able to compute Pre-Buy or Pre-Sell ratios for 40 countries only.

Table 5 reports Pre-Buy and Pre-Sell ratios over varying lengths of windows around earnings announcements and also highlights the Pre-Buy (Sell) ratios that are significantly different from 0.5 at the 5% level by using an asterisk. We compute measures of insider buys and sells, separately, for 10-day, 20-day, and 30-day windows. The table shows that insiders tend to buy (or sell) less prior to than after earnings announcements. Across all countries, their Pre-Buy and Pre-Sell ratios are mostly lower than 0.5. Based on the ratios computed over a 10-day period, 35 of the Pre-Buy ratios are statistically significant, whereas 30 of the Pre-Sell ratios are statistically significant at the 5% level. The 10-day Pre-Buy ratio based on shares ranges from 0 (Hungary) to 0.445 (Greece), while the 10-day Pre-Sell ratio varies between 0 (Czech Republic, Ireland, and Luxembourg) and 0.598 (Hungary). In comparison, they are 0.072 and 0.165, respectively, for the US. It is noted

that for the few Pre-Buy and Pre-Sell ratios that are greater than 0.5, none of them is statistically significant at conventional levels.

The results on insider trading reveal that insider trading regulation has substantial effects on insider trading activities around earnings announcements. The lower trading activity prior to earnings announcements could possibly indicate the joint effects of general insider trading regulation, insider trading lockout periods before earnings announcement imposed at the country level, and/or corporate internal policies prohibiting any insider from trading prior to earnings announcements.⁴ On average, such regulations or policies deter insiders from trading on any material information contained in the earnings reports prior to the release of such information to the public. However, we do observe considerable insider trading activities, even during the short 10-day window before earnings announcements, in most of the countries. Also, insider trading activities vary substantially across the countries. Based on the 10-day results, insiders in Sweden and the UK rarely trade before earnings announcements (with ratios of 0.038 and 0.042, respectively), but insiders in Greece and the Philippines trade almost as much before earnings announcements as after (with ratios of 0.445 and 0.439, respectively).

We now perform the following multivariate regression to examine whether insider trading behavior around earnings announcements is related to insider trading regulation enforcement.

$$\text{Pre-Buy}_{i,t} \text{ (or Pre-Sell}_{i,t}) = \beta_1 + \beta_2 \text{Active Enforcement}_{i,t} + \text{Control Variables} + \epsilon_{i,t}, \quad (2)$$

where Pre-Buy and Pre-Sell are country-year observations. Active Enforcement, together with the control variables, are defined earlier. In this multivariate regression, we also include year fixed effects and report adjusted standard errors clustered at the country level. Table 6 reports regression results using Pre-Buy ratios calculated over 10 days, 20 days, or 30 days around earnings announcement dates as the dependent variable and also, presents the same for Pre-Sell ratios.

The multivariate regression results corroborate the univariate results shown in Table 5. Corporate insiders tend to buy less before earnings announcements in countries that actively enforce

⁴We examine the issue of lock-up periods in a following subsection.

their insider trading laws. Enforcement actions deter insiders from trading prior to earnings announcements. For example, the coefficient of Active Enforcement in columns (1)-(6) of Panel A is consistently negative and statistically significant at the 5% level, even after controlling for the country's legal origin, rule of law, anti-self dealing, and stock market development. The Active Enforcement coefficient varies between -0.066 ($t = -2.18$) and -0.103 ($t = -2.43$). In contrast, for insider sells, almost all of the Active Enforcement coefficients are statistically insignificant, suggesting that insider trading regulation affects only insider buys but not sells. One possible explanation for the insider sell results is that in many countries insiders could schedule their transactions, mostly sell transactions, in advance and conduct transactions based on such schedules. These transactions are not affected by corporate events and are largely immune to concerns of illegal insider trading.

Furthermore, the variables, Legal Origin and Rule of Law, have a consistently negative impact on both Pre-Buy and Pre-Sell ratios computed over varying windows, and their coefficients are mainly statistically significant. Compared to the civil law origin, the common law origin provides stronger investor protection and effectiveness of a country's overall legal system. Similarly, the Rule of Law controls for the quality of law and enforcement. Thus, their negative effects on Pre-Buy suggest that in countries with strong investor protection and better law and order, insiders tend to buy significantly less before earnings announcements. We find similar results for Anti-self-dealing regulations.

In summary, the results show that insiders from countries without rigorous enforcement of insider trading regulation are far more likely to exploit material corporate information in their trading decisions than insiders from countries with rigorous enforcement. Even though corporate earnings announcements are high profile events that are closely followed and observed by investors and regulators alike, the substantial differences in reported insider trading activities across the countries suggest that insiders in countries without active enforcement not only conduct but also disclose their trades before earnings announcements. The results further suggest that different reporting requirements across countries, if any, or non-reporting by insiders for sensitive trades are unlikely to systematically affect our findings in the paper.

5.2 Insider trading and price reaction to earnings news

The extant literature has shown that earnings announcements generate significant price reactions. Recent studies also find that market reactions to corporate news, including corporate earnings news, differ across markets (see, e.g., Bhattacharya et al, 2000; DeFond, Hung, and Trezevant, 2007). We examine market price reactions to earnings announcements in our sample of countries and investigate the association between price reactions and insider trading regulations and between price reactions and insider trading activities before earnings announcements.

We compute three different measures of price reactions, namely the cumulative return difference, return difference standard deviation, and abnormal return variance. Consistent with existing studies, we focus on the price reaction of the $[-1, 1]$ event window, which is arguably less noisy. These three measures are defined as follows.

- (i) *Abnormal return variance*: Following DeFond, Hung, and Trezevant (2007), the abnormal return variance is the stock return variance over the event window $[-1, 1]$, scaled by stock return variance over the estimation window $[-120, -21]$. Stock return variance over the event window is the average of squared prediction errors from the market model during the event window $[-1, 1]$, whereas the stock return variance over the estimation window is the variance of residuals from the market model estimated over the estimation period $[-120, -21]$.
- (ii) *Cumulative return difference*: The absolute value of cumulative stock returns in excess of the country index return over the event window $[-1, 1]$.
- (iii) *Return difference standard deviation*: Standard deviation of stock returns in excess of the country index return over the event window $[-1, 1]$.

All the price reaction measures are computed first by taking an average of the variables for each firm and then averaging within each country.

Table 7 presents results of the three measures of price reactions. These measures indicate that price reactions around earnings announcements vary widely across the sample of countries.

The cumulative return difference ranges between 3.562% (Chile) and 11.430% (Indonesia), return difference standard deviation is between 1.394% (Chile) and 5.746% (Indonesia), and abnormal return difference varies from 1.214% (Hungary) to 4.554% (UK). And the average price reaction is 6.758% for cumulative return difference, 2.728% for return difference standard deviation, and 2.317 for abnormal return variance. Similar to DeFond, Hung, and Trezevant (2007), developed countries such as the US and UK typically have stronger price reaction, and emerging countries such as Chile and the Philippines have the weakest.

We now examine whether and how each measure of the price reactions is related to insider trading regulation and insider trading activities. We first regress price reactions on Active Enforcement, along with the control variables, and the results are shown in Table 8. We find a consistently positive relation between active insider trading regulation enforcement and market price reactions to earnings news. Independent of the price reaction measure employed, Active Enforcement has a positive and statistically significant effect on market price reaction. The coefficients on Active Enforcement are all positive and statistically significant mostly at the 5% level. These results are consistent with our earlier findings that active enforcement of insider trading laws enhances price informativeness. In countries that rigorously enforce insider trading regulation, corporate earnings announcements contain substantial information and stock price reacts strongly to earnings news.

We next examine the link between insider trading activities and price reactions around earnings announcements. We have documented that insiders actively trade around earnings announcements. In countries without active regulation enforcement, insiders in fact trade actively before earnings announcements. A natural question to ask is whether such trading activities have any substantial influence on price reactions to earnings announcements. We therefore estimate the following regression model.

$$\text{Price Reaction}_{i,t} = \beta_0 + \beta_1 \text{BuyS}_{i,t} \text{ (or BuyV}_{i,t}) + \text{Control Variables} + \epsilon_{i,t}, \quad (3)$$

where Price Reaction is again measured by the abnormal return variance, cumulative return difference, and standard deviation of return difference. BuyV (BuyS) is the ratio of the total dollar

value (the number of shares) of insider buys before earnings announcement dates to the sum of the total dollar value (the number of shares) of insider buys before and after earnings announcement dates. Both the price reactions and insider trading variables are country-year averages. We choose to focus on insider buys as a measure of insider trading intensity before earnings announcements in the regression, because insider buys are generally more informative and also, insider buy ratios before earnings announcements are closely related to insider trading regulation.

Table 9 provides evidence on the relation between insider trading activity around earnings announcement (over a 10-day window) and market price reaction to earnings news. The main variables of interest are BuyS in columns (1)-(6) and BuyV in columns (7)-(12) with varying combinations of control variables. We find the coefficients of BuyS and BuyV to be consistently negative and highly significant across different measures of price reactions. Results based on insider trading activities over different event windows (20-day and 30-day), reported in the Online Appendix, show similar results. The results indicate that insider trading activities before earnings announcements significantly dampen market price reaction to earnings news. Stock prices on average react less to earnings news when insiders trade actively before earnings announcements. These findings are consistent with our earlier evidence documented above: enforcement of insider trading regulation affects insider trading activity before earnings announcements, and such enforcements are also strongly associated with price reactions to earnings news.

5.3 Lockout periods, insider trading, and price reaction

As part of insider trading regulation, some countries explicitly impose lockout periods around earnings announcement dates. While some countries do not explicitly impose such restrictions, it is generally understood that insiders should refrain from trading on non-public material information, including corporate earnings information. Additionally, for some countries, corporations impose their own internal lockout periods for high level corporate executives and board directors (see, e.g., Bettis et al, 2000). During an explicit lockout period, corporate insiders are not allowed to buy or sell their shares before or shortly after the earnings announcement date. One may argue

that countries that actively enforce their insider trading laws could be more likely to adopt explicit lockout periods. Hence, the relatively lower insider trading activity prior to earnings announcement dates in those countries and the relation between insider regulation and insider trading activity might be due to lockup restrictions. If this is the case, such lockout restrictions might potentially affect our key findings. In this subsection, we examine whether incorporating lockout periods into our analysis would alter our main results.

We collect information on lockout periods of our sample of 40 countries from publications of the countries' security regulatory agencies and/or by direct communications with the agencies. Appendix Table 3 presents the information about their policies on lockout periods. Our information indicates that only 18 of the countries have lockout periods with varying lengths. For example, in Austria, insiders are not allowed to trade three weeks before the release of quarterly financial reports and six weeks before the annual financial report release. In the Philippines, however, insiders are prohibited from trading during the period within which a material non-public information is obtained and up to two trading days after the sensitive information is being released. However, despite these legally imposed lockout periods in place, none of these countries appear to enforce their lockout periods. As shown in Table 5, insiders from these 18 countries still continue to trade during the announcement period, although their trading activity is lower before than after the announcement date. In addition, we find no evidence that the existence of lockup periods in a country is significantly correlated with the enforcement of insider trading regulation. We further examine whether there is any difference in the Pre-Buy or Pre-Sell ratio between countries with lockout periods and those without. As shown in the Online Appendix, our test results find no statistical difference in the ratios of the two groups of countries, and that the evidence is robust across the Pre-Buy and Pre-Sell ratios computed over varying intervals.

To further address the concern that lockup period adoption could affect our findings, we replicate our results reported in Tables 6, 8, and 9 by including a lockout indicator, which takes the value of 1 if the country has a lockout period and 0 otherwise, in the regression. Our regression analysis also includes an interaction variable of the lockout indicator and Active Enforcement to evaluate any

joint effects of the two variables. These results are reported in Table 10. Briefly, the lockup period variable and the interaction term exhibit no effect on the documented relation between Active Enforcement and insider trading activities before earnings announcements (columns 1-4). While the lockup period and interaction variables are significant in some specifications (columns 5-6), they do not materially change the significant relation between Active Enforcement and price reaction. Nor do they alter the significant relation between insider trading activity and price reaction in columns 9 to 12.

5.4 Regulation enforcement, insider trading, and price efficiency

We have presented evidence on the link between enforcement of insider trading regulation, insider trading activities, and price reactions around earnings announcements. Our results show that insiders trade significantly less before corporate earnings announcements in countries with active enforcement of insider trading regulations and that these insiders are less inclined to exploit material corporate information in their trading decisions. In countries with more rigorous insider trading enforcement, stock price reactions to corporate earnings announcements are also stronger. These results imply that insider trading regulation enforcement restrains insiders from trading on material information and leads to stronger stock price reactions to corporate earnings announcements.

We now examine the potential mechanism through which insider trading regulation affects insider trading and price efficiency. Do insider trading activities before earnings announcements reduce stock price informativeness without advancing price discovery, or do insider trades help incorporate earnings-related information into stock prices prior to the announcements, thus reducing stock price reactions to earnings announcements? In the former case, insider trades lead to less informative prices, as the trades themselves add little information to the market. In the latter, insider trades could affect when and what information gets impounded into stock prices, but may not affect the overall stock price efficiency.

In Table 11, we examine and compare insider trading gains before and after earnings announcements in countries with and without active regulation enforcement. We measure insider trading

gains based on insider buy transactions as insider sell transactions are generally less informative. Table 11 reports results based on insider buy transactions that occur during the 10-day period before and 10-day period after earnings announcements. We use two variables to measure pre-announcement insider trading gains: insider trading gains over the period up to one day *before* earnings announcement and insider trading gains over the period up to one day *after* earnings announcement. The first variable measures the informativeness of insider trading excluding the public announcement of earnings information, and the second variable measures the informativeness of insider trading including the earnings information. For example, if an insider trade occurs on day -10 (where day 0 is the earnings announcement day), we compute the insider's trading profits from day -9 to day -2 by summing up the stock return in excess of the country return from day -9 to day -2. Then, we take the average of the profits of all insider transactions that occur within each year for each country. This represents the insider trading profits excluding earnings announcement returns. For profits including earnings announcement returns, we would compute the insider's trading profits from day -9 to day 1 by summing up the stock return in excess of the country return from day -9 to day 1. If an insider trade occurs on day 1, we compute the insider's trading profits from day 2 to day 11 by summing up the stock return in excess of the country return during this period, and then compute the average of the profits of all insider transactions that occur within each year for each country. All insider trading gains after earnings announcements are measured over the 10-day period after the transaction. We employ a "Before" dummy to denote insider trading gains from pre-announcement trading activities. The first six models use insider trading gains excluding earnings announcement abnormal returns. Such gains measure insider trading profits before earnings information becomes public.

The results show that insider trading around earnings announcements is more informative in countries with active enforcement of insider trading regulation. The "Before" dummy, as well as the interaction of the Active Enforcement and "Before" dummies, is insignificant, indicating that there is no significant difference in the pre- and post-announcement insider trading gains and in countries with and without active enforcement. The next six models use insider trading gains that

include earnings announcement abnormal returns. The insider trading gains thus capture profits that are generated from material, non-public information. The results again show that insider trading around earnings announcements is more informative in countries with active enforcement. However, while the “Before” dummy is negative, albeit insignificant, the interaction of the Active Enforcement and “Before” dummies is positive and marginally significant. These findings suggest that independent of whether or not we include the 3-day stock returns around earnings announcements, we find that insider trades in countries with active enforcement are more informative. Furthermore, in countries without active enforcement pre-announcement insider trades are not more informative than post-announcement insider trades. Our results are consistent with the interpretation that in countries with lax regulatory environments, active insider trading before earnings announcements reduces stock price informativeness without advancing earnings news or helping to incorporate earnings information into stock prices.

It should be noted that the analysis here is based on reported insider trades around earnings announcements. Because of the potential litigation concerns, even in countries without active enforcement, insiders may refrain from trading based on highly profitable non-public information before earnings announcements. For example, Huddart et al. (2007) find that US insiders avoid profitable trades before quarterly earnings are announced. It is likely that such litigation concerns have a greater impact on insider trading in countries with active enforcement than in countries without active enforcement. Even with this potential caveat, insider trades are more profitable in countries with active enforcement than in countries without active enforcement.

To summarize, our results suggest that active enforcement of insider trading regulations leads to more informative insider trading and greater stock price efficiency. Even though insiders from countries with weak insider trading regulations could exploit their information advantage, such as corporate earnings news, in their trades, market reactions to corporate news are weaker, resulting in noisier stock prices. At the same time, the noisier stock prices reduce the potential information advantage of insiders and hence, lower the informativeness of insider trades.

6 Conclusion

Based on a new dataset on global insider transactions of 24,135 firms from 44 countries across the globe for the 2007-2013 period, our study expands the extensive insider trading literature that focuses mainly on insider trades in a single country by providing the first direct comparison of insider trading activities and their informativeness across countries. Our study offers direct evidence that active insider trading enforcement engenders more, and not less, informative insider trades. These findings are in stark contrast to the arguments that insider trading regulation reduces the informativeness of insider trades and hinders price efficiency. These results remain robust after controlling for various country-level institutional characteristics that include the rule of law and the general effectiveness of law enforcement.

Our analysis of insider trading activities around corporate earnings announcements provides insights on why active insider trading enforcement results in more informative insider trades and more efficient stock prices. In countries with active enforcement of insider trading regulations, (i) insiders trade significantly less prior to corporate earnings announcements over the 10-, 20-, and 30-day intervals we examine; (ii) insiders tend to refrain from trading on material non-public information; and (iii) stock price reactions to corporate earnings announcements are stronger. In countries without active insider trading enforcement, insiders trade more before earnings announcements, but their trades do not help to incorporate earnings-related information into stock prices, and stock prices also react less to earnings announcements.

Perhaps the most striking result from this study is that enforcement of insider trading regulation leads to both more informative insider trading and greater stock price efficiency. Opponents of insider trading regulation argue that unrestricted insider trading leads to more informed trading and to more efficient prices; however, our results show no support for this argument. While proponents of insider trading regulation contend that unrestricted insider trading could lead to less informationally efficient stock prices, they also tend to hold the view that such insider trades can be highly informative. Our results show that the less informative prices render the insider trades

to be less informative. The evidence suggests that informativeness of insider trades and stock price efficiency are simultaneously determined, parallel results.

Our research has additional public policy implications. Enforcement of insider trading laws, not the establishment of the insider trading laws, facilitates stock market efficiency and promotes informative insider trading. Bhattacharya and Daouk (2002) and several subsequent studies find that initial enforcement of insider trading regulation could significantly affect price efficiency. Our study shows that continuous and active enforcement of insider trading regulation could help to achieve regulators' primary goal of monitoring insider trading activities and improving stock market efficiency.

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Table 1
Insider Trading Activity, Regulation, and Enforcement Around the World

This table provides by country, the market type (developed (DEV) or emerging (EMG)), start year of insider trades at Director Deals, number of unique firms that report insider trades, average annual number of insider trades, average value of trades in millions \$, average annual trade value relative to market capitalization in %, the year the insider trading (IT) law was established, the year IT law was first enforced, and a dummy variable (Active Enforcement) that equals 1 if insider trading prosecution occurred during the sample period, and 0 otherwise.

Country	Market Type	Start Year	# of Firms	# of Trades	Insider Trades		IT Laws Existence	First Enforcement	Active Enforcement
					Value (mil \$)	Value (%)			
Australia	DEV	2008	1723	3044	1116.36	0.085	1991	1996	1
Austria	DEV	2008	63	181	319.03	0.331	1993	2000	1
Belgium	DEV	2007	116	352	751.88	0.229	1990	1994	0
Brazil	EMG	2013	103	421	463.26	0.005	1976	1978	1
Canada	DEV	2009	2517	14440	4609.26	0.218	1966	1976	1
Chile	EMG	2013	60	394	636.26	0.240	1981	1996	0
China	EMG	2010	1228	3750	3670.44	0.098	1993	2000	1
Croatia	EMG	2008	24	76	10.75	0.046	1995	no	0
Cyprus	EMG	2008	25	42	13.10	0.184	1999	2000	0
Czech Republic	EMG	2007	5	25	9.28	0.016	1992	1993	0
Denmark	DEV	2007	177	429	330.12	0.108	1991	1996	1
Egypt	EMG	2009	75	283	68.03	0.113	1992	2012	1
Estonia	EMG	2007	18	54	26.90	0.824	1996	2009	1
Finland	DEV	2013	54	379	335.84	0.111	1989	1993	0
France	DEV	2007	582	2026	4548.90	0.210	1967	1975	1
Germany	DEV	2007	516	1261	1658.31	0.031	1994	1995	1
Greece	DEV	2008	193	2941	1386.44	1.723	1988	1996	0
Hong Kong	DEV	2009	848	3254	5714.20	0.197	1991	1994	1
Hungary	EMG	2009	11	20	10.66	0.047	1994	1995	1
India	EMG	2008	1363	3759	865.09	0.067	1992	1998	1
Indonesia	EMG	2013	28	130	113.30	0.033	1991	1996	0
Ireland	DEV	2007	47	69	99.37	0.100	1990	2000	1
Israel	EMG	2010	247	716	280.84	0.151	1981	1989	1
Italy	DEV	2007	281	1656	1667.62	0.184	1991	1996	1
Luxembourg	DEV	2010	7	31	15.31	0.007	1991	2000	0
Malaysia	EMG	2009	832	4270	1574.94	0.361	1973	1996	1
Netherlands	DEV	2007	116	281	245.89	0.023	1989	1994	1
New Zealand	DEV	2008	105	199	95.10	0.033	1988	2000	0
Norway	DEV	2007	262	737	748.27	0.277	1985	1990	1
Pakistan	EMG	2013	57	414	26.33	0.045	1995	no	0
Philippines	EMG	2009	167	979	1132.32	0.614	1982	1994	1
Poland	EMG	2010	374	1086	756.27	0.322	1991	1993	1
Portugal	EMG	2009	38	226	819.94	0.502	1986	2000	0
Singapore	DEV	2008	542	1268	807.30	0.093	1973	1978	1
South Africa	EMG	2008	308	942	570.57	0.068	1989	2000	1
South Korea	EMG	2011	1197	2650	1968.77	0.166	1976	1988	1
Spain	DEV	2007	132	719	2009.44	0.206	1994	1998	0
Sri Lanka	EMG	2010	154	397	89.71	0.474	1987	1996	0
Sweden	DEV	2007	289	1573	1302.90	0.196	1971	1990	1
Switzerland	DEV	2007	228	1529	1854.53	0.155	1988	1995	1
Thailand	EMG	2010	378	2299	867.61	0.101	1984	1993	0
Turkey	EMG	2010	160	1064	682.89	0.268	1981	1996	1
United Kingdom	DEV	2007	1984	3630	2316.78	0.046	1980	1981	1
United States	DEV	2007	6501	45588	44812.71	0.044	1934	1961	1

Table 2
Insider Trading Profits Over 5 to 120 Days from Transaction Dates

This table reports insider trading profits for insider buys (Buy) and sells (Sell), separately, over varying periods from the transaction dates. Insider trading profits are the average cumulative excess return (i.e., the return of a stock in excess of its country-level index) over 5 days, 10 days, 20 days, 60 days and 120 days after the insider transaction date. Insider trading profits are expressed in percentage with their statistical significance at the 5% level denoted by an *.

Country	5-Day		10-Day		20-Day		60-Day		120-Day	
	Buy	Sell	Buy	Sell	Buy	Sell	Buy	Sell	Buy	Sell
	CAR	CAR	CAR	CAR	CAR	CAR	CAR	CAR	CAR	CAR
Australia	0.613*	-0.160	0.718*	-0.185	0.573*	0.114	0.728*	1.079*	2.646*	1.359*
Austria	0.727*	0.262	0.899*	-0.465	1.603*	-0.217	3.805*	1.640	7.708*	5.833*
Belgium	0.671*	-0.237	0.934*	-0.062	0.958*	-0.227	1.822*	-0.063	1.608*	-0.415
Brazil	-0.021	-0.531*	0.462	-0.930*	-0.606	-1.780*	-1.898	-2.232*	-4.167	-6.050*
Canada	0.664*	0.061	1.109*	0.232*	1.985*	0.705*	4.000*	2.014*	6.944*	3.416*
Chile	0.583*	-0.087	0.837*	-0.984*	1.463*	-0.903	2.999*	-2.997	-2.077	-7.759*
China	0.455*	-0.652*	0.892*	-0.643*	1.138*	-0.433*	3.070*	1.147*	4.871*	3.167*
Croatia	0.023	0.116	0.066	-0.556	-0.298	-1.098	-1.124*	-1.025	-1.910*	-1.812
Cyprus	0.799	0.744	0.121	-1.280	-1.214	-2.745*	4.195	-6.905*	4.897	-7.742*
Czech Republic	1.434	1.550*	1.414	0.144	0.863	-0.625	1.706	-1.255	5.222*	3.786
Denmark	0.586*	0.277	0.798*	0.429	0.473	0.859*	0.341	1.445*	3.515*	1.762
Egypt	0.049	-0.430*	-0.017	-0.724*	-0.602	-0.920*	-0.060	-3.414*	1.348	-0.555
Estonia	0.624	-0.559	0.600	-0.558	2.034*	-0.981	0.603	-2.557	0.080	-3.969
Finland	0.099	-0.520*	-0.527	-0.599	-1.481*	-1.894*	-4.528*	-5.533*	-5.283*	-6.061*
France	0.247*	-0.263*	0.434*	-0.358*	0.675*	-0.499*	1.170*	-0.818*	1.138*	-1.472*
Germany	1.319*	-0.386*	1.818*	-0.439*	2.150*	-0.500*	3.010*	-0.926*	4.232*	-0.370
Greece	0.326*	-0.208	0.644*	-0.296	1.217*	-0.924*	2.314*	-3.713*	4.641*	-5.238*
Hong Kong	0.566*	-0.277*	0.843*	-0.283	1.009*	-0.020	1.644*	0.184	3.446*	2.159*
Hungary	1.139	-0.954*	2.922	-1.132*	3.591	-1.443*	2.939	-2.105*	5.534	-1.541
India	0.120*	-0.110*	0.186*	-0.094	0.345*	0.352*	0.861*	1.179*	1.420*	2.376*
Indonesia	-3.333	0.202	-4.054	2.744	0.476	3.036	2.911*	2.679	-2.697*	6.756
Ireland	1.530*	0.490	1.466*	0.302	1.432*	0.360	1.927	4.361*	-0.152	4.559
Israel	0.779*	0.022	0.977*	0.651*	1.217*	0.317	2.283*	1.177	0.229	1.742
Italy	0.220*	-0.237*	0.432*	-0.418*	0.523*	-0.679*	0.334	-1.786*	0.510*	-3.413*
Luxembourg	-0.759*	-0.209	-1.186*	0.555	-0.927	0.488	-4.292*	2.590	-5.192*	-0.551
Malaysia	0.187*	-0.374*	0.405*	-0.554*	0.868*	-0.863*	2.225*	-1.108*	3.918*	-2.928*
Netherlands	-0.162	-0.578*	0.112	-0.605*	-0.099	-0.797*	-0.657	-3.783*	0.485	-5.160*
New Zealand	0.610*	0.594*	0.712*	0.445	1.029*	0.365	0.941	0.517	4.876*	4.868*
Norway	0.911*	-0.308	1.017*	0.100	0.835*	0.494	0.888*	0.954	1.520*	1.948
Pakistan	0.301	0.664	1.124	0.698	-0.183	0.452	1.028	2.358*	-7.652*	-0.432
Philippines	0.198	-0.106	0.293	-0.304*	0.635*	-0.592*	1.212*	-0.948*	1.647*	-0.262
Poland	0.430*	-0.144	0.527*	-0.501*	0.893*	-0.641*	0.951*	-0.975*	-0.137	-4.093*
Portugal	-0.006	-0.583	-0.016	-0.763	-0.102	-1.320*	-0.493	0.444	0.352	-2.202
Singapore	0.245*	-0.292	0.538*	-0.729*	0.799*	-0.653*	2.117*	1.068*	3.021*	2.693*
South Africa	0.614*	-0.142	0.777*	-0.200	1.135*	0.076	2.277*	0.007	6.382*	2.490*
South Korea	0.787*	-0.322*	1.270*	-0.233	2.789*	-0.135	4.187*	1.806*	8.540*	5.750*
Spain	-0.002	-0.261*	-0.174	-0.751*	-0.396*	-1.547*	-0.925*	-2.870*	-3.130*	-7.819*
Sri Lanka	1.302*	-0.187	1.050*	-1.103	2.314*	-0.613	2.977*	-1.019	5.594*	2.228
Sweden	0.337*	-0.323*	0.452*	-0.461*	0.558*	-0.745*	1.086*	-0.517	1.489*	-1.184*
Switzerland	0.040	-0.009	-0.028	-0.002	-0.029	-0.106	-0.165	-0.987*	-0.336	-2.312*
Thailand	0.303*	-0.102	0.541*	0.102	0.454*	0.128	1.002*	0.452	-0.917	0.863
Turkey	0.323*	-0.946*	0.718*	-1.041*	1.073*	-1.392*	1.172*	-4.260*	-1.350*	-9.266*
UK	1.146*	0.064	1.327*	0.039	1.297*	-0.111	1.578*	0.390	2.291*	1.407*
US	1.384*	-0.037*	1.796*	0.092*	2.449*	0.397*	5.062*	1.189*	8.695*	2.424*

Table 3
Insider Trading Regulation Enforcement and Insider Trading Profits

This table presents panel regressions of aggregate insider trading profits (IT Profits) on Active Enforcement and country-level control variables, as well as year-fixed effects for insider buys and sells, separately. IT profits are computed by first cumulating stock returns in excess of country-level indexes over N days and then taking an average of the profits within each year for each country. Active Enforcement is a dummy variable that equals 1 if there is an IT law prosecution event within the sample period of the countries in our sample, 0 otherwise. Legal Origin identifies the legal origin of the company law or commercial code of each country (common law or civil law). It equals to 1 if the law origin of a country is common law and 0 otherwise. Rule of Law reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement and property rights. Effectiveness reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. RegQuality reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. The definition of these three variables are obtained from the *2014 Worldwide Governance Indicators*. Anti-Self-Dealing is a proxy for investor protection and is obtained from Djankov et al. (2008). Stock Dev is defined as the ratio of country-level stock market capitalization to GDP and is a proxy for stock market development. Dev dummy equals 1 if the country is developed, 0 otherwise. t-statistics, based on clustered standard errors at the country level, are reported in parentheses. Statistical significance is denoted by *, **, and *** at the 10%, 5%, and 1% levels, respectively.

Variable	Panel A: 5-Day IT Profits																		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	
	Insider Buys									Insider Sells									
Active Enforcement	0.005*** (2.73)	0.004** (2.60)	0.003** (2.16)	0.004** (2.30)	0.004** (2.22)	0.004** (2.19)	0.003** (2.18)	0.003** (2.24)	0.003** (2.28)	-0.002 (-1.46)	-0.002 (-1.63)	-0.003** (-2.10)	-0.003** (-2.01)	-0.003** (-2.11)	-0.002 (-1.30)	-0.003* (-2.00)	-0.003** (-2.21)	-0.003** (-2.08)	
Legal Origin	0.004*** (2.93)	0.004*** (3.03)	0.004*** (2.87)	0.004*** (2.92)	0.004*** (2.92)	0.005 (1.49)	0.004*** (2.95)	0.004*** (3.11)	0.004*** (3.06)	0.002** (2.36)	0.002** (2.50)	0.002** (2.38)	0.002** (2.44)	0.002** (2.44)	0.004** (2.53)	0.003*** (3.07)	0.002** (2.41)	0.003*** (2.78)	
Rule of Law			0.002** (2.33)				0.002** (2.35)	0.001 (0.43)	0.001 (0.43)			0.001* (1.78)				0.001* (2.02)	0.002* (1.73)	0.002* (1.78)	
Effectiveness				0.002* (1.80)								0.001 (1.66)							
RegQuality					0.002* (1.69)									0.002** (2.24)					
Anti-Self-Dealing						-0.001 (-0.23)									-0.004 (-0.97)				
Stock Dev							0.000 (0.01)		-0.000 (-0.40)							-0.000** (-2.21)		-0.000* (-1.79)	
Dev								0.003 (1.33)	0.003 (1.37)								-0.001 (-0.66)	-0.001 (-0.43)	
N	226	226	226	226	226	213	226	226	226	225	225	225	225	225	214	225	225	225	225
Adjusted R ²	0.052	0.079	0.089	0.085	0.083	0.088	0.085	0.091	0.087	0.000	0.012	0.018	0.014	0.020	0.013	0.019	0.015	0.016	0.016
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 3 - Continued
Insider Trading Regulation Enforcement and Insider Trading Profits

		Panel A: 10-Day IT Profits																	
		Insider Buys									Insider Sells								
Variable		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Active Enforcement		0.004** (2.32)	0.004** (2.16)	0.004* (1.88)	0.004* (1.88)	0.004* (1.85)	0.004* (1.71)	0.004* (1.85)	0.004* (1.87)	0.004* (1.84)	-0.000 (-0.14)	-0.001 (-0.23)	-0.001 (-0.55)	-0.001 (-0.46)	-0.001 (-0.57)	-0.002 (-0.98)	-0.001 (-0.59)	-0.002 (-0.63)	-0.002 (-0.64)
Legal Origin		0.003** (2.17)	0.003** (2.18)	0.003** (2.13)	0.003** (2.13)	0.003** (2.15)	0.003** (1.69)	0.003* (1.79)	0.003** (2.23)	0.003* (1.83)	0.002 (1.21)	0.002 (1.21)	0.002 (1.21)	0.002 (1.19)	0.002 (1.16)	0.003 (0.82)	0.002 (0.93)	0.002 (1.34)	0.002 (1.15)
Rule of Law		0.001 (0.89)	0.001 (0.89)	0.001 (0.89)	0.001 (0.81)	0.001 (0.81)	0.001 (0.53)	0.001 (0.53)	0.001 (0.53)	0.001 (0.53)	0.002** (2.14)	0.002** (2.14)	0.002** (2.14)	0.002** (2.14)	0.002** (2.14)	0.002** (2.14)	0.002** (2.14)	0.002** (2.14)	0.002** (2.14)
Effectiveness		0.001 (0.75)	0.001 (0.75)	0.001 (0.75)	0.001 (0.75)	0.001 (0.75)	0.001 (0.75)	0.001 (0.75)	0.001 (0.75)	0.001 (0.75)	0.001 (0.75)	0.001 (0.75)	0.001 (0.75)	0.001 (0.75)	0.001 (0.75)	0.001 (0.75)	0.001 (0.75)	0.001 (0.75)	0.001 (0.75)
RegQuality		0.001 (0.78)	0.001 (0.78)	0.001 (0.78)	0.001 (0.78)	0.001 (0.78)	0.001 (0.78)	0.001 (0.78)	0.001 (0.78)	0.001 (0.78)	0.001 (0.78)	0.001 (0.78)	0.001 (0.78)	0.001 (0.78)	0.001 (0.78)	0.001 (0.78)	0.001 (0.78)	0.001 (0.78)	0.001 (0.78)
Anti-Self-Dealing		-0.003 (-0.42)	-0.003 (-0.42)	-0.003 (-0.42)	-0.003 (-0.42)	-0.003 (-0.42)	-0.003 (-0.42)	-0.003 (-0.42)	-0.003 (-0.42)	-0.003 (-0.42)	-0.003 (-0.42)	-0.003 (-0.42)	-0.003 (-0.42)	-0.003 (-0.42)	-0.003 (-0.42)	-0.003 (-0.42)	-0.003 (-0.42)	-0.003 (-0.42)	-0.003 (-0.42)
Stock Dev		0.000 (0.36)	0.000 (0.36)	0.000 (0.36)	0.000 (0.36)	0.000 (0.36)	0.000 (0.36)	0.000 (0.36)	0.000 (0.36)	0.000 (0.36)	0.000 (0.36)	0.000 (0.36)	0.000 (0.36)	0.000 (0.36)	0.000 (0.36)	0.000 (0.36)	0.000 (0.36)	0.000 (0.36)	0.000 (0.36)
Dev		0.001 (0.32)	0.001 (0.32)	0.001 (0.32)	0.001 (0.32)	0.001 (0.32)	0.001 (0.32)	0.001 (0.32)	0.001 (0.32)	0.001 (0.32)	0.001 (0.32)	0.001 (0.32)	0.001 (0.32)	0.001 (0.32)	0.001 (0.32)	0.001 (0.32)	0.001 (0.32)	0.001 (0.32)	0.001 (0.32)
N		226	226	226	226	226	213	226	226	226	225	225	225	225	225	214	225	225	225
Adjusted R ²		0.049	0.056	0.054	0.053	0.053	0.052	0.050	0.050	0.046	0.013	0.016	0.021	0.017	0.020	0.018	0.016	0.028	0.023
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 3 - Continued
Insider Trading Regulation Enforcement and Insider Trading Profits

		Panel A: 20-Day IT Profits																	
Variable		Insider Buys									Insider Sells								
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Active Enforcement	0.008** (2.63)	0.008** (2.42)	0.007* (2.01)	0.007** (2.03)	0.007** (1.96)	0.006** (2.08)	0.006** (2.05)	0.007** (2.06)	0.006** (2.08)	0.003 (0.77)	0.003 (0.64)	0.001 (0.31)	0.002 (0.39)	0.001 (0.28)	0.001 (0.23)	0.001 (0.29)	0.001 (0.26)	0.001 (0.26)	
Legal Origin	0.003 (1.28)	0.003 (1.27)	0.003 (1.25)	0.003 (1.25)	0.003 (1.26)	0.008* (1.80)	0.003 (0.84)	0.004 (1.36)	0.003 (0.92)	0.004 (1.48)	0.004 (1.45)	0.004 (1.44)	0.004 (1.38)	0.004 (1.47)	0.004 (1.12)	0.004 (1.59)	0.004 (1.35)	0.004 (1.35)	
Rule of Law	0.002 (1.13)	0.002 (1.13)	0.002 (1.13)	0.002 (1.13)	0.001 (0.89)	0.001 (0.89)	0.001 (0.29)	0.001 (0.29)	0.001 (0.29)	0.003* (1.96)	0.003* (1.96)	0.003* (1.96)	0.003* (1.96)	0.003* (1.96)	0.002* (1.69)	0.002* (1.69)	0.000 (-0.12)	0.000 (-0.12)	
Effectiveness				0.001 (0.57)								0.002 (1.21)							
RegQuality				0.002 (0.82)									0.003* (1.71)						
Anti-Self-Dealing									-0.007 (-0.82)									-0.002 (-0.27)	
Stock Dev								0.001 (0.89)	0.000 (0.82)						0.000 (0.50)	0.000 (0.11)			
Dev									0.002 (0.58)	0.002 (0.45)						0.006 (1.11)	0.006 (1.12)		
N	226	226	226	226	226	213	226	226	226	225	225	225	225	225	214	225	225	225	225
Adjusted R ²	0.045	0.046	0.045	0.043	0.044	0.036	0.042	0.042	0.038	0.023	0.027	0.029	0.026	0.029	0.012	0.025	0.033	0.028	0.028
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 3 - Continued
Insider Trading Regulation Enforcement and Insider Trading Profits

Variable	Panel A: 120-Day IT Profits																			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)		
	Insider Buys								Insider Sells											
Active Enforcement	0.035*** (3.45)	0.034*** (3.20)	0.034*** (3.12)	0.034*** (3.05)	0.037*** (3.21)	0.028*** (3.24)	0.034*** (3.16)	0.034*** (3.25)	0.033*** (3.25)	0.028 (1.52)	0.026 (1.34)	0.021 (0.99)	0.022 (1.01)	0.022 (1.03)	0.014 (1.07)	0.020 (1.00)	0.020 (0.97)	0.020 (0.98)		
Legal Origin	0.013 (1.65)	0.013 (1.65)	0.013 (1.65)	0.013 (1.65)	0.013* (1.74)	0.023 (1.66)	0.011 (1.28)	0.014* (1.78)	0.012 (1.44)	0.020 (1.37)	0.019 (1.35)	0.019 (1.33)	0.019 (1.33)	0.019 (1.45)	0.020 (1.04)	0.018 (1.43)	0.020 (1.17)	0.019 (1.17)		
Rule of Law	-0.000 (-0.09)	-0.000 (-0.09)	-0.001 (-0.23)	-0.005 (-0.57)	-0.005 (-0.57)	-0.005 (-0.57)	-0.001 (-0.23)	-0.005 (-0.57)	-0.005 (-0.57)	0.010* (1.72)	0.010* (1.72)	0.010* (1.72)	0.010* (1.72)	0.010* (1.72)	0.010* (1.72)	0.010* (1.72)	0.010* (1.72)	0.010* (1.72)	0.010* (1.72)	
Effectiveness				-0.000 (-0.02)						0.009 (1.16)										
RegQuality					-0.006 (-1.01)													0.008 (0.99)		
Anti-Self-Dealing										-0.013 (-0.51)								0.017 (0.65)		
Stock Dev									0.001 (0.75)									0.001 (0.34)	0.000 (0.18)	
Dev									0.009 (0.72)									0.015 (0.49)	0.015 (0.49)	
N	226	226	226	226	226	213	226	226	226	226	225	225	225	225	214	225	225	225	225	225
Adjusted R ²	0.041	0.043	0.039	0.039	0.041	0.079	0.035	0.035	0.035	0.031	0.009	0.017	0.020	0.017	0.016	0.029	0.016	0.019	0.014	0.014
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 4

Insider Trading Regulation Enforcement and Aggregate Insider Trading Activities

This table presents panel regressions of aggregate insider trade values on Active Enforcement and country-level control variables as well as year-fixed effects for insider buys and sells, separately. IT Value is computed by first summing up insider transaction values within each year scaled by country-level stock market capitalization. Active Enforcement is a dummy variable that equals 1 if there is an IT law prosecution event within the sample period of the countries in our sample, 0 otherwise. Legal Origin identifies the legal origin of the company law or commercial code of each country (common law or civil law). It equals to 1 if the law origin of a country is common law and 0 otherwise. Rule of Law reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement and property rights. The definition of Rule of Law is obtained from the *2014 Worldwide Governance Indicators*. Anti-Self-Dealing is a proxy for investor protection and is obtained from Djankov et al. (2008). Stock Dev is defined as the ratio of country-level stock market capitalization to GDP and is a proxy for stock market development. Dev dummy equals 1 if the country is developed, 0 otherwise. t-statistics, based on clustered standard errors at the country level, are reported in parentheses. Statistical significance is denoted by *, **, and *** at the 10%, 5%, and 1% levels, respectively.

Variable	Insider Buys						Insider Sells					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Active Enforcement	-1.027 (-1.10)	-0.979 (-1.09)	-0.931 (-1.07)	-1.142 (-1.20)	-0.923 (-1.05)	-0.972 (-1.10)	-0.195 (-0.33)	-0.144 (-0.25)	-0.029 (-0.05)	-0.306 (-0.53)	-0.006 (-0.01)	-0.023 (-0.04)
Legal Origin		-0.630 (-1.46)	-0.622 (-1.47)	0.452 (0.88)	-0.588 (-1.31)	-0.583 (-1.49)		-0.649* (-1.85)	-0.622* (-1.91)	-0.028 (-0.08)	-0.527 (-1.61)	-0.628* (-1.90)
Rule of Law			-0.194 (-0.97)		-0.180 (-0.88)	-0.645 (-0.79)			-0.460* (-1.81)		-0.423 (-1.62)	-0.378 (-0.58)
Anti-Self-Dealing				-2.119 (-1.25)						-1.019 (-0.85)		
Stock Dev					-0.023 (-0.27)						-0.062 (-0.85)	
Dev						0.940 (0.64)						-0.171 (-0.14)
N	230	230	230	230	230	230	227	227	227	227	227	227
Adjusted R ²	0.037	0.046	0.045	0.056	0.041	0.053	0.011	0.009	0.034	0.006	0.033	0.030
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 5
Insider Trading Activities Around Earnings Announcements

This table reports insider trading activities around earnings announcement dates by country. Pre-Buy (Pre-Sell) Ratios are computed over 10-day, 20-day, and 30-day insider buy (insider sell) activities surrounding earnings announcement dates (EA). For an N-day trading activity around earnings announcement dates, the Pre-Buy (Pre-Sell) Ratio is the insider buys (sells) over N-days prior to the announcement date divided by insider buys (sells) over N days before and N days after the announcement date. We measure insider buys (sells) based on the number of shares traded (Share), or on the share value traded (Value). * denotes a significant difference in insider buys (sells) between pre- and post-earnings announcement dates.

	10 Days Around EA				20 Days Around EA				30 Days Around EA			
	Pre-Buy Ratio		Pre-Sell Ratio		Pre-Buy Ratio		Pre-Sell Ratio		Pre-Buy Ratio		Pre-Sell Ratio	
	Share	Value	Share	Value	Share	Value	Share	Value	Share	Value	Share	Value
Australia	0.091*	0.091*	0.153*	0.152*	0.127*	0.129*	0.183*	0.182*	0.159*	0.385*	0.290*	0.290*
Austria	0.179*	0.173*	0.100*	0.100*	0.302*	0.305*	0.244*	0.244*	0.383*	0.159*	0.221*	0.220*
Belgium	0.172*	0.173*	0.125*	0.126*	0.208*	0.209*	0.220*	0.219*	0.299*	0.297*	0.361*	0.359*
Brazil	0.140*	0.140*	0.196*	0.197*	0.261*	0.263*	0.369*	0.369*	0.323*	0.325*	0.357*	0.357*
Canada	0.176*	0.173*	0.190*	0.187*	0.238*	0.233*	0.241*	0.237*	0.301*	0.298*	0.304*	0.300*
Chile	0.169*	0.169*	0.433	0.433	0.214*	0.215*	0.519	0.520	0.312*	0.216*	0.191*	0.190*
China	0.283*	0.283*	0.135*	0.135*	0.299*	0.298*	0.161*	0.161*	0.384*	0.313*	0.553	0.555
Czech Republic	0.217	0.217	0.000	0.000	0.185*	0.187*	0.255*	0.256*	0.253	0.385*	0.310*	0.311*
Denmark	0.061*	0.061*	0.103*	0.103*	0.076*	0.077*	0.132*	0.132*	0.140*	0.255	0.262	0.262
Finland	0.162*	0.162*	0.176*	0.176*	0.174*	0.174*	0.268*	0.267*	0.218*	0.394*	0.397*	0.393*
France	0.179*	0.177*	0.191*	0.190*	0.293*	0.293*	0.284*	0.283*	0.368*	0.141*	0.154*	0.154*
Germany	0.276*	0.276*	0.319*	0.319*	0.346*	0.349*	0.322*	0.322*	0.393*	0.432*	0.425	0.428
Greece	0.445	0.444	0.371*	0.368*	0.432*	0.432*	0.492	0.489	0.480	0.223*	0.342*	0.345*
Hong Kong	0.080*	0.079*	0.138*	0.138*	0.088*	0.088*	0.114*	0.114*	0.159*	0.372*	0.356*	0.352*
Hungary	0.000	0.000	0.598	0.600	0.070*	0.069*	0.647	0.647	0.142*	0.066*	0.076*	0.076*
India	0.254*	0.253*	0.218*	0.216*	0.349*	0.347*	0.356*	0.356*	0.373*	0.485	0.507	0.508
Indonesia	0.093*	0.097*	0.500	0.500	0.166*	0.170*	0.197*	0.196*	0.313	0.156*	0.216*	0.213*
Ireland	0.039*	0.039*	0.000	0.000	0.041*	0.042*	0.022*	0.022*	0.055*	0.142*	0.437	0.436
Israel	0.247*	0.247*	0.109*	0.109*	0.311*	0.311*	0.155*	0.156*	0.329*	0.321	0.156*	0.156*
Italy	0.223*	0.218*	0.252*	0.253*	0.373*	0.372*	0.391*	0.389*	0.441*	0.055*	0.011*	0.011*
Luxembourg	0.042*	0.042*	0.000	0.000	0.103*	0.103*	0.100*	0.100*	0.256*	0.327*	0.267*	0.267*
Malaysia	0.162*	0.163*	0.251*	0.246*	0.166*	0.164*	0.235*	0.234*	0.284*	0.374*	0.402*	0.404*
Netherlands	0.151*	0.150*	0.158*	0.159*	0.183*	0.187*	0.174*	0.175*	0.253*	0.438*	0.443*	0.438*
New Zealand	0.097*	0.097*	0.083*	0.083*	0.095*	0.095*	0.105*	0.106*	0.115*	0.458*	0.498	0.493
Norway	0.092*	0.093*	0.094*	0.094*	0.161*	0.161*	0.196*	0.196*	0.220*	0.377*	0.396	0.399
Pakistan	0.333	0.333	0.195	0.193	0.549	0.550	0.347	0.345	0.531	0.256*	0.100*	0.100*
Philippines	0.439	0.432	0.373*	0.371*	0.452	0.450	0.438	0.436	0.438	0.283*	0.369*	0.368*
Poland	0.182*	0.182*	0.189*	0.187*	0.268*	0.270*	0.320*	0.319*	0.343*	0.255*	0.238*	0.238*
Portugal	0.261*	0.261*	0.162*	0.165*	0.400	0.401	0.263*	0.258*	0.457	0.219*	0.230*	0.231*
Singapore	0.038*	0.038*	0.019*	0.015*	0.168*	0.167*	0.208*	0.204*	0.269*	0.116*	0.149*	0.149*
South Africa	0.056*	0.056*	0.089*	0.089*	0.056*	0.056*	0.102*	0.099*	0.073*	0.436	0.488	0.484
South Korea	0.421*	0.422*	0.488	0.488	0.441*	0.443*	0.490	0.488	0.453*	0.534	0.320	0.319
Spain	0.243*	0.242*	0.319*	0.320*	0.350*	0.351*	0.415*	0.417*	0.431*	0.355*	0.362*	0.366*
Sri Lanka	0.264*	0.263*	0.381	0.381	0.355*	0.357*	0.377	0.374	0.376*	0.455	0.321*	0.315*
Sweden	0.038*	0.038*	0.057*	0.057*	0.055*	0.055*	0.097*	0.096*	0.200*	0.201*	0.213*	0.210*
Switzerland	0.142*	0.141*	0.106*	0.105*	0.169*	0.168*	0.149*	0.147*	0.214*	0.268*	0.331*	0.327*
Thailand	0.241*	0.239*	0.298*	0.290*	0.235*	0.229*	0.339*	0.337*	0.310*	0.302*	0.411*	0.410*
Turkey	0.325*	0.325*	0.443	0.443	0.334*	0.338*	0.455	0.451	0.365*	0.369*	0.511	0.505
UK	0.042*	0.042*	0.038*	0.038*	0.048*	0.048*	0.046*	0.045*	0.065*	0.156*	0.227*	0.223*
US	0.072*	0.071*	0.165*	0.163*	0.106*	0.105*	0.184*	0.181*	0.156*	0.072*	0.121*	0.119*

Table 6
Insider Trading Regulation Enforcement and Insider Trading Activities Around Earnings Announcements

This table presents panel regressions of aggregate N-day insider trading activities around earnings announcements (Pre-Buy or Pre-Sell) on Active Enforcement and country-level control variables as well as year-fixed effects for insider buys and sells, separately. Pre-Buy is defined as insider buy ratio before earnings announcements and is computed by taking the ratio of the total number of insider buy (in shares) before an earnings announcement to the sum of the total number insider buy (in shares) before and after earnings announcements. Active Enforcement is a dummy variable that equals 1 if there is an insider trading prosecution under the laws during our sample period, 0 if otherwise. Legal Origin identifies the legal origin of the company law or commercial code of each country (common law or civil law). It equals to 1 if the law origin of a country is common law and 0 otherwise. Rule of Law reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement and property rights. The definition of Rule of Law is obtained from the *2014 Worldwide Governance Indicators*. Anti-Self-Dealing is a proxy for investor protection and is obtained from Djankov et al. (2008). Stock Dev is defined as the ratio of country-level stock market capitalization to GDP and is a proxy for stock market development. Dev dummy equals 1 if the country is developed, 0 otherwise. The regression model is performed using 10-day, 20-day, and 30-day insider trading activities before earnings announcement for buy and sell, separately. t-statistics, based standard errors clustered at country level, are reported in parentheses. Statistical significance is denoted by *, **, and *** at the 10%, 5%, and 1% levels, respectively.

Panel A: 10-Day Insider Trading Activities Around Earnings Announcements												
Variable	Insider Buys						Insider Sells					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Active Enforcement	-0.103** (-2.43)	-0.093** (-2.27)	-0.067** (-2.19)	-0.094** (-2.53)	-0.066** (-2.18)	-0.067** (-2.21)	-0.013 (-0.31)	-0.005 (-0.10)	0.022 (0.62)	-0.006 (-0.15)	0.022 (0.61)	0.021 (0.57)
Legal Origin		-0.067** (-2.09)	-0.074*** (-3.08)	0.018 (0.32)	-0.065** (-2.50)	-0.075*** (-3.08)		-0.066* (-1.75)	-0.071** (-2.36)	0.033 (0.72)	-0.072** (-2.25)	-0.072** (-2.27)
Rule of Law			-0.093*** (-5.11)		-0.090*** (-4.84)	-0.089*** (-2.83)			-0.096*** (-4.39)		-0.096*** (-4.35)	-0.085** (-2.50)
Anti-Self-Dealing				-0.195* (-1.79)						-0.233** (-2.18)		
Stock Dev					-0.006 (-1.15)						0.001 (0.11)	
Dev						-0.010 (-0.17)						-0.024 (-0.36)
N	199	199	199	199	199	199	200	200	200	200	200	200
Adjusted R ²	0.077	0.122	0.340	0.153	0.342	0.337	0.024	0.010	0.203	0.050	0.199	0.201
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 6 - Continued
Insider Trading Regulation Enforcement and Insider Trading Activities Around Earnings Announcements

Variable	Panel B: 20-Day Insider Trading Activities Around Earnings Announcements											
	Insider Buys						Insider Sells					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Active Enforcement	-0.100** (-2.57)	-0.085** (-2.33)	-0.063** (-2.49)	-0.085*** (-2.72)	-0.062** (-2.47)	-0.063** (-2.47)	-0.059 (-1.23)	-0.044 (-0.94)	-0.018 (-0.49)	-0.045 (-1.14)	-0.017 (-0.47)	-0.019 (-0.52)
Legal Origin	-0.098*** (-2.89)	-0.105*** (-4.07)	0.007 (0.14)	0.007 (0.14)	-0.096*** (-3.47)	-0.105*** (-4.04)	-0.106** (-2.57)	-0.106** (-2.57)	-0.111*** (-3.42)	0.034 (0.72)	-0.104*** (-3.14)	-0.112*** (-3.33)
Rule of Law			-0.087*** (-4.48)		-0.084*** (-4.18)	-0.092*** (-3.50)			-0.100*** (-3.91)		-0.097*** (-3.76)	-0.093** (-2.62)
Anti-Self-Dealing				-0.243*** (-2.72)						-0.322*** (-2.71)		
Stock Dev					-0.005 (-1.25)						-0.005 (-1.03)	
Dev						0.010 (0.24)						-0.016 (-0.25)
N	208	208	208	208	208	208	208	206	206	206	206	206
Adjusted R^2	0.054	0.147	0.321	0.197	0.322	0.318	0.009	0.100	0.297	0.176	0.296	0.294
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Panel C: 30-Day Insider Trading Activities Around Earnings Announcements												
Active Enforcement	-0.102** (-2.30)	-0.084** (-2.16)	-0.065** (-2.27)	-0.084** (-2.39)	-0.064** (-2.23)	-0.065** (-2.24)	-0.081* (-1.76)	-0.064 (-1.51)	-0.040 (-1.29)	-0.064 (-1.63)	-0.039 (-1.27)	-0.040 (-1.29)
Legal Origin	-0.115*** (-3.18)	-0.121*** (-4.11)	-0.037 (-0.76)	-0.037 (-0.76)	-0.116*** (-3.65)	-0.120*** (-4.08)	-0.111*** (-2.73)	-0.111*** (-2.73)	-0.116*** (-3.69)	-0.026 (-0.53)	-0.115*** (-3.24)	-0.117*** (-3.69)
Rule of Law			-0.076*** (-3.88)		-0.074*** (-3.64)	-0.080*** (-3.02)			-0.094*** (-3.92)		-0.094*** (-3.81)	-0.086*** (-2.96)
Anti-Self-Dealing				-0.179* (-1.85)						-0.193* (-1.78)		
Stock Dev					-0.003 (-0.66)						-0.001 (-0.16)	
Dev						0.007 (0.16)						-0.018 (-0.42)
N	209	209	209	209	209	209	209	209	209	209	209	209
Adjusted R^2	0.059	0.182	0.308	0.206	0.306	0.305	0.054	0.149	0.312	0.172	0.309	0.309
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 7
Market Price Reactions to Earnings Announcements

This table reports price reaction around earnings announcements over the event window of $[-1, 1]$ for the sample period from 2007 to 2013. Price reaction is measured in three ways: abnormal return variance, cumulative absolute return difference, and return difference standard deviation. Abnormal return variance is the stock return variance over the event window $[-1, 1]$, scaled by the stock return variance over the estimation window $[-120, -21]$. Cumulative absolute return difference is computed by cumulating the absolute value of stock return in excess of country-level indexes over the event window $[-1, 1]$. Return difference standard deviation is defined as the standard deviation of stock return in excess of country-level indexes over the event window $[-1, 1]$. Stock return variance over the event window is the average of squared prediction errors from the market model during the event window $[-1, 1]$. The stock return variance over the estimation window is the variance of residuals from the market model estimated over the estimation period $[-120, -21]$. All the price reaction measures are computed first by taking an average of the measures for each firm and then average within each country. Cumulative absolute return differences and return difference standard deviation are expressed in percentage.

Country	Price Reactions		
	Abnormal Return Variance	Cumulative Return Difference in (%)	Return Difference Standard Deviation in (%)
Australia	2.636	8.747	3.441
Austria	2.093	6.053	2.311
Belgium	2.635	6.216	2.515
Brazil	1.630	6.826	2.774
Canada	2.204	6.417	2.563
Chile	1.399	3.562	1.394
China	1.561	6.184	2.326
Czech Republic	1.634	5.069	2.080
Denmark	2.965	7.827	3.175
Finland	3.624	7.988	3.156
France	3.024	6.577	2.661
Germany	2.115	10.327	4.667
Greece	1.512	6.375	2.452
Hong Kong	3.003	7.956	3.157
Hungary	1.214	5.824	2.146
India	2.163	7.371	2.825
Indonesia	1.969	11.430	5.746
Ireland	2.623	9.207	3.679
Israel	1.878	5.554	2.123
Italy	1.980	5.821	2.259
Luxembourg	2.439	7.284	2.870
Malaysia	1.750	5.466	2.244
Netherlands	4.236	6.985	2.754
New Zealand	2.830	5.327	2.176
Norway	2.584	8.771	3.539
Pakistan	1.661	5.226	1.823
Philippines	1.228	4.009	1.596
Poland	1.690	6.637	2.600
Portugal	1.676	5.136	2.045
Singapore	1.914	6.107	2.413
South Africa	2.314	5.743	2.264
South Korea	1.591	9.057	3.893
Spain	1.873	5.488	2.126
Sri Lanka	1.844	7.387	3.196
Sweden	3.870	8.973	3.591
Switzerland	3.052	6.060	2.381
Thailand	2.126	5.359	2.154
Turkey	1.611	5.275	2.016
United Kingdom	4.554	8.530	3.427
United States	3.994	6.158	2.546
Average	2.317	6.758	2.728

Table 8
Insider Trading Regulation Enforcement and Price Reactions to Earnings Announcements

This table presents panel regressions of earnings announcement price reaction on insider trading Active Enforcement and country-level control variables as well as year-fixed effects. Price reaction is measured in three ways: abnormal return variance, cumulative absolute return difference, and return difference standard deviation. Abnormal return variance is the stock return variance over the event window [-1, 1], scaled by the stock return variance over the estimation window [-120, -21]. Cumulative absolute return difference is computed by cumulating the absolute value of stock return in excess of country-level index return over the event window [-1, 1]. Standard deviation of return difference is defined as the standard deviation of stock return in excess of country-level index return over the event window [-1, 1]. Stock return variance over the estimation window is the average of squared prediction errors from the market model during the event window [-1, 1]. The stock return variance over the estimation window is the variance of residuals from the market model estimated over the estimation period [-120, -21]. The price reaction measures are computed first by taking an average of the measures for each firm and then average within each country. Active Enforcement is a dummy variable that equals 1 if there is an insider trading prosecution under the laws during our sample period, 0 if otherwise. Legal Origin identifies the legal origin of the company law or commercial code of each country (common law or civil law). It equals to 1 if the law origin of a country is common law and 0 otherwise. Rule of Law reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement and property rights. The definition of Rule of Law is obtained from the *2014 Worldwide Governance Indicators*. Anti-Self-Dealing is a proxy for investor protection and is obtained from Djankov et al. (2008). Stock Dev is defined as the ratio of country-level stock market capitalization to GDP and is a proxy for stock market development. Dev dummy equals 1 if the country is developed, 0 otherwise. t-statistics, based standard errors clustered at country level, are reported in parentheses. Statistical significance is denoted by *, **, and *** at the 10%, 5%, and 1% levels, respectively.

Variable	Abnormal Return Variance				Cumulative Return Difference				Return Difference Standard Deviation									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Active Enforcement	0.688** (2.65)	0.650** (2.53)	0.483** (2.53)	0.650** (2.56)	0.469** (2.41)	0.493** (2.65)	0.009** (2.33)	0.010** (2.44)	0.008** (1.94)	0.010** (2.46)	0.008* (1.98)	0.008** (2.06)	0.004** (2.13)	0.004** (2.17)	0.003* (1.79)	0.004** (2.18)	0.003* (1.83)	0.003* (1.86)
Legal Origin	0.242 (0.82)	0.289 (1.17)	0.289 (1.17)	0.188 (0.44)	0.198 (0.79)	0.313 (1.28)	0.003 (0.63)	-0.003 (-0.63)	-0.002 (-0.56)	-0.001 (-0.20)	-0.001 (-0.20)	-0.002 (-0.50)	-0.001 (-0.50)	-0.001 (-0.63)	-0.001 (-0.58)	-0.001 (-0.26)	-0.001 (-0.26)	-0.001 (-0.53)
Rule of Law	0.656** (5.59)	0.656** (5.59)	0.656** (5.59)	0.621*** (5.14)	0.621*** (5.14)	0.346** (2.31)	0.007** (2.40)	0.007** (2.40)	0.007** (2.40)	0.007** (2.54)	0.007** (2.54)	0.003 (0.75)	0.003 (0.75)	0.003** (2.17)	0.003** (2.17)	0.003** (2.31)	0.003** (2.31)	0.001 (0.69)
Anti-Self-Dealing				0.123 (0.12)						-0.004 (-0.28)						-0.001 (-0.17)		
Stock Dev				0.055 (1.03)							-0.001 (-1.03)					-0.000 (-0.98)		
Dev						0.646*** (2.74)						0.008 (1.58)						0.003 (1.34)
N	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210
Adjusted R ²	0.181	0.189	0.396	0.186	0.403	0.425	0.208	0.210	0.272	0.207	0.276	0.283	0.137	0.138	0.185	0.134	0.186	0.192
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 9
Earnings Announcement Price Reactions and Insider Trading Activity

This table presents panel regressions of earnings announcement price reaction on insider buy activities 10 days before earnings announcement dates and country-level control variables as well as year-fixed effects. Price Reaction is measured in three ways: abnormal return variance, cumulative return difference and standard deviation of return difference. BuyS is defined as the insider buy ratio before earnings announcement dates in shares and is computed by taking the ratio of the total number insider buy (in shares) before earnings announcement dates to the sum of the total number insider buy (in shares) before and after earnings announcement dates. BuyV is defined as insider buy ratio before earnings announcement dates in dollar value and is computed by taking the ratio of the total insider buy (in dollar value) before earnings announcement dates to the sum of the total insider buy (in dollar value) before and after earnings announcement dates. Legal Origin identifies the legal origin of the company law or commercial code of each country (common law or civil law). It equals to 1 if the law origin of a country is common law and 0 otherwise. Rule of Law reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement and property rights. The definition of Rule of Law is obtained from the *2014 Worldwide Governance Indicators*. Anti-Self-Dealing is a proxy for investor protection and is obtained from Djankov et al. (2008). Stock Dev is defined as the ratio of country-level stock market capitalization to GDP and is a proxy for stock market development. Dev dummy equals 1 if the country is developed, 0 otherwise. The regression model is performed using 10-day insider buying activities before earnings announcement dates. t-statistics, based standard errors clustered at country level, are reported in parentheses. Statistical significance is denoted by *, **, and *** at the 10%, 5%, and 1% levels, respectively.

Variable	Panel A: Dependent Variable: Abnormal Return Variance											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
BuyS	-3.746*** (-5.55)	-3.724*** (-5.61)	-2.185*** (-3.58)	-3.867*** (-5.44)	-2.110*** (-3.45)	-2.297*** (-3.89)						
BuyV							-3.729*** (-5.49)	-3.708*** (-5.54)	-2.169*** (-3.55)	-3.848*** (-5.39)	-2.093*** (-3.42)	-2.293*** (-3.94)
Legal Origin		0.022 (0.09)	0.160 (0.64)	0.303 (0.90)	0.085 (0.33)	0.185 (0.76)	0.020 (0.08)	0.296 (0.88)	0.159 (0.64)	0.296 (0.88)	0.084 (0.33)	0.183 (0.75)
Rule of Law			0.455*** (3.88)		0.431*** (3.77)	0.149 (0.99)			0.456*** (3.88)		0.433*** (3.77)	0.147 (0.96)
Anti-Self-Dealing				-0.673 (-0.75)						-0.663 (-0.73)		
Stock Dev					0.047 (0.92)						0.047 (0.92)	
Dev						0.632*** (2.81)						0.637*** (2.83)
N	198	198	198	198	198	198	198	198	198	198	198	198
Adjusted R ²	0.358	0.355	0.420	0.359	0.424	0.445	0.357	0.353	0.419	0.358	0.424	0.445
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 9 - Continued
Earnings Announcement Price Reactions and Insider Trading Activity

Panel B: Dependent Variable: Cumulative Return Difference												
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
BuyS	-0.030*	-0.035**	-0.014	-0.037**	-0.015	-0.015						
	(-1.92)	(-2.30)	(-0.77)	(-2.45)	(-0.85)	(-0.85)						
BuyV							-0.030*	-0.034**	-0.013	-0.036**	-0.014	-0.014
							(-1.84)	(-2.21)	(-0.70)	(-2.34)	(-0.78)	(-0.80)
Legal Origin		-0.005	-0.003	-0.001	-0.001	-0.002		-0.005	-0.003	-0.001	-0.001	-0.002
		(-0.96)	(-0.55)	(-0.11)	(-0.23)	(-0.48)		(-0.95)	(-0.53)	(-0.12)	(-0.22)	(-0.47)
Rule of Law			0.006*		0.007*	0.002			0.006*		0.007*	0.002
			(1.81)		(1.89)	(0.49)			(1.84)		(1.92)	(0.51)
Anti-Self-Dealing				-0.009						-0.009		
				(-0.73)						(-0.71)		
Stock Dev					-0.001						-0.001	
					(-0.96)						(-0.95)	
Dev						0.008						0.008
						(1.29)						(1.29)
N	198	198	198	198	198	198	198	198	198	198	198	198
Adjusted R ²	0.202	0.210	0.245	0.211	0.249	0.255	0.200	0.208	0.244	0.208	0.248	0.254
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Panel C: Dependent Variable: Return Difference Standard Deviation												
BuyS	-0.011*	-0.013**	-0.004	-0.014**	-0.005	-0.005						
	(-1.69)	(-2.03)	(-0.53)	(-2.13)	(-0.59)	(-0.59)						
BuyV							-0.011	-0.013*	-0.004	-0.013**	-0.004	-0.005
							(-1.63)	(-1.96)	(-0.48)	(-2.05)	(-0.54)	(-0.54)
Legal Origin		-0.002	-0.001	-0.001	-0.001	-0.001		-0.002	-0.001	-0.001	-0.001	-0.001
		(-0.91)	(-0.52)	(-0.22)	(-0.25)	(-0.46)		(-0.90)	(-0.50)	(-0.23)	(-0.23)	(-0.45)
Rule of Law			0.003		0.003	0.001			0.003		0.003	0.001
			(1.57)		(1.64)	(0.46)			(1.60)		(1.67)	(0.48)
Anti-Self-Dealing				-0.003						-0.003		
				(-0.49)						(-0.48)		
Stock Dev					-0.000						-0.000	
					(-0.86)						(-0.86)	
Dev						0.003						0.003
						(1.12)						(1.12)
N	198	198	198	198	198	198	198	198	198	198	198	198
Adjusted R ²	0.125	0.131	0.159	0.128	0.159	0.165	0.124	0.129	0.158	0.127	0.159	0.164
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 10
Lockout Periods, Enforcement, and Insider Trading

This table replicates models in columns (1) and (5) of Table 6, Panel B, models in columns (13) and (17) of Table 8, and models in (1) and (5) of Table 9. Pre-Buy is defined as the insider buy ratio before earnings announcements and is computed by taking the ratio of the total number of insider buy (in shares) before an earnings announcement to the sum of the total number insider buy (in shares) before and after earnings announcements. Price reaction is measured using the abnormal return variance which is the stock return variance over the event window $[-1, 1]$, scaled by the stock return variance over the estimation window $[-120, -21]$. Stock return variance over the event window is the average of squared prediction errors from the market model during the event window $[-1, 1]$. The stock return variance over the estimation window is the variance of residuals from the market model estimated over the estimation period $[-120, -21]$. Active Enforcement is a dummy variable that equals 1 if there is an insider trading prosecution under the laws during our sample period, 0 if otherwise. Lockout dummy equals to 1 if there is a lockout period in the country and zero if otherwise. Legal Origin identifies the legal origin of the company law or commercial code of each country (common law or civil law). It equals to 1 if the law origin of a country is common law and 0 otherwise. Rule of Law reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement and property rights. The definition of Rule of Law is obtained from the *2014 Worldwide Governance Indicators*. Anti-Self-Dealing is a proxy for investor protection and is obtained from Djankov et al. (2008). Stock Dev is defined as the ratio of country-level stock market capitalization to GDP and is a proxy for stock market development. The regression model is performed using 10-day insider trading activities around earnings announcements and earnings announcement price reaction. t-statistics, based standard errors clustered at country level, are reported in parentheses. Statistical significance is denoted by *, **, and *** at the 10%, 5%, and 1% levels, respectively.

	Price Reactions												
	Insider Buys						Dependent Variable: Abnormal Return Variance						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
Active Enforce	-0.100** (-2.41)	-0.117** (-2.41)	-0.053* (-1.77)	-0.066* (-1.87)	0.703** (2.11)	0.931** (2.68)	0.418 (1.63)	0.612** (2.20)					
BuyS									-3.696*** (-5.59)	-3.884*** (-4.97)	-1.954*** (-3.27)	-2.307*** (-3.30)	
Lockout	-0.006 (-0.17)	-0.067 (-1.35)	-0.027 (-1.05)	-0.073** (-2.33)	-0.033 (-0.09)	0.851*** (4.12)	0.106 (0.35)	0.841*** (7.02)	0.118 (0.49)	0.055 (0.13)	0.186 (0.75)	0.055 (0.14)	
Active Enforce *Lockout		0.073 (1.15)		0.055 (1.35)		-1.047** (-2.43)		-0.877** (-2.54)					
BuyS*Lockout										0.397 (0.29)		0.851 (0.68)	
Legal Origin				-0.068** (-2.65)			0.211 (0.80)	0.210 (0.78)			0.107 (0.41)		0.130 (0.51)
Rule of Law				-0.092*** (-5.02)	-0.091*** (-5.02)		0.631*** (5.00)	0.610*** (4.67)			0.455*** (3.80)		0.466*** (3.95)
Stock Dev				-0.005 (-1.00)	-0.005 (-1.05)		0.053 (0.91)	0.058 (1.05)			0.043 (0.74)		0.042 (0.75)
N	199	199	199	199	210	210	210	210	198	198	198	198	198
Adjusted R ²	0.073	0.075	0.345	0.346	0.177	0.201	0.402	0.418	0.358	0.355	0.429	0.428	0.428
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 11
Enforcement and Insider Transaction Profits Around Earnings Announcements

This table presents panel regressions of insider trading profits for trading activities 10 days before and 10 days after earnings announcements on Active Enforcement and country-level control variables as well as year-fixed effects for insider buys including and excluding earnings announcement profits, separately. Insider trading profits (including earnings announcement profits, Include EA Profits) are computed by first cumulating stock returns of each insider trading transaction that occurs between 10 days before and 10 days after earnings announcements in excess of country-level indexes, including the return on the day of the earnings announcement, and then taking an average of the profits within each year for each country. Insider trading profits (excluding earnings announcement profits, Exclude EA Profits) are computed by first cumulating stock returns of insider trading transactions 10 days before and 10 days after earnings announcements in excess of country-level indexes, but excluding the return on the day of the earnings announcement, and then taking an average of the profits within each year for each country. Active Enforcement is a dummy variable that equals 1 if there is an insider trading prosecution under the laws during our sample period, 0 if otherwise. Before dummy equals 1 if the profit is before earnings announcements, 0 otherwise. Legal Origin identifies the legal origin of the company law or commercial code of each country (common law or civil law). It equals to 1 if the law origin of a country is common law and 0 otherwise. Rule of Law reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement and property rights. The definition of Rule of Law is obtained from the *2014 Worldwide Governance Indicators*. Anti-Self-Dealing is a proxy for investor protection and is obtained from Djankov et al. (2008). Stock Dev is defined as the ratio of country-level stock market capitalization to GDP and is a proxy for stock market development. Dev dummy equals 1 if the country is developed, 0 otherwise. The regression model is performed using 10-day insider trading activities before earnings announcements. t-statistics, based standard errors clustered at country level, are reported in parentheses. Statistical significance is denoted by *, **, and *** at the 10%, 5%, and 1% levels, respectively.

Variable	Insider Buys (Exclude EA Profits)					Insider Buys (Include EA Profits)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Active Enforcement	0.006** (2.57)	0.006** (2.45)	0.005** (2.08)	0.006** (2.45)	0.005* (1.87)	0.005* (1.96)	0.006** (2.70)	0.006** (2.78)	0.005** (2.42)	0.006*** (2.83)	0.005** (2.11)	0.006** (2.45)
Before	0.000 (0.10)	0.000 (0.10)	0.001 (0.17)	0.000 (0.05)	0.001 (0.22)	0.001 (0.18)	-0.005 (-1.29)	-0.005 (-1.29)	-0.004 (-1.24)	-0.005 (-1.31)	-0.004 (-1.15)	-0.004 (-1.24)
Active Enforcement*Before	0.000 (0.04)	0.000 (0.02)	-0.000 (-0.01)	0.000 (0.07)	-0.000 (-0.07)	-0.000 (-0.02)	0.007* (1.72)	0.008* (1.73)	0.007* (1.71)	0.008* (1.76)	0.007 (1.58)	0.007* (1.71)
Legal Origin		-0.001 (-0.43)	-0.001 (-0.37)	-0.007* (-1.94)	-0.003 (-0.94)	-0.001 (-0.45)		0.003 (0.79)	0.003 (0.85)	-0.002 (-0.71)	0.001 (0.19)	0.003 (0.86)
Rule of Law			0.002 (1.11)		0.002 (0.83)	0.004 (1.67)			0.002 (1.00)		0.001 (0.56)	0.001 (0.63)
Anti-Self-Dealing				0.013* (1.84)						0.012 (1.68)		
Stock Dev					0.001*** (3.07)						0.001** (2.25)	
Dev						-0.003 (-1.65)						0.001 (0.30)
N	353	353	353	353	353	353	365	365	365	365	365	365
Adjusted R ²	0.003	0.001	0.004	0.004	0.006	0.002	0.038	0.038	0.038	0.041	0.045	0.036
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Appendix Table 1
Summary of Country Characteristics

This table provides country variables used in our study. Legal Origin is obtained from La Porta et al. (1998), and Anti-Self-Dealing is obtained from Djankov et al. (2008). The remaining variables are the average values from 1999 to 2013 and are obtained from *The Worldwide Governance Indicators, 2014 Update*.

Country	Legal Origin	Anti-Self-Dealing	Rule of Law	Government Effectiveness	Regulatory Quality
Australia	Common	0.76	1.749	1.739	1.649
Austria	Civil	0.21	1.849	1.812	1.512
Belgium	Civil	0.54	1.305	1.726	1.255
Brazil	Civil	0.27	-0.279	-0.058	0.179
Canada	Common	0.64	1.736	1.872	1.603
Chile	Civil	0.63	1.261	1.198	1.457
China	Civil	0.76	-0.424	0.009	-0.258
Croatia	Civil	0.25	0.018	0.450	0.335
Cyprus	Common		1.020	1.304	1.224
Czech Republic	Civil	0.33	0.850	0.859	1.073
Denmark	Civil	0.46	1.898	2.126	1.805
Egypt	Civil	0.20	-0.123	-0.378	-0.385
Estonia	Civil		0.913	0.915	1.353
Finland	Civil	0.46	1.946	2.152	1.777
France	Civil	0.38	1.405	1.575	1.114
Germany	Civil	0.28	1.643	1.653	1.490
Greece	Civil	0.22	0.714	0.633	0.774
Hong Kong	Common	0.96	1.354	1.608	1.904
Hungary	Civil	0.18	0.813	0.818	1.091
India	Common	0.58	0.091	-0.074	-0.333
Indonesia	Civil	0.65	-0.716	-0.348	-0.376
Ireland	Common	0.79	1.638	1.573	1.703
Israel	Common	0.73	0.919	1.223	1.083
Italy	Civil	0.42	0.538	0.571	0.876
Luxembourg	Civil	0.28	1.801	1.808	1.732
Malaysia	Common	0.95	0.471	1.061	0.529
Netherlands	Civil	0.20	1.761	1.902	1.815
New Zealand	Common	0.95	1.846	1.747	1.788
Norway	Civil	0.42	1.914	1.916	1.388
Pakistan	Common	0.41	-0.851	-0.574	-0.636
Philippines	Civil	0.22	-0.431	-0.024	-0.029
Poland	Civil	0.29	0.597	0.563	0.819
Portugal	Civil	0.44	1.119	1.068	1.021
Singapore	Common	1.00	1.568	2.146	1.927
South Africa	Common	0.81	0.104	0.547	0.487
South Korea	Civil	0.47	0.894	0.943	0.751
Spain	Civil	0.37	1.187	1.346	1.196
Sri Lanka	Common	0.39	0.071	-0.238	-0.050
Sweden	Civil	0.33	1.869	1.983	1.579
Switzerland	Civil	0.27	1.857	1.976	1.666
Thailand	Common	0.81	0.104	0.260	0.265
Turkey	Civil	0.43	0.034	0.138	0.308
UK	Common	0.95	1.677	1.720	1.773
US	Common	0.65	1.556	1.649	1.539

Appendix Table 2
Correlation Matrix

This table displays the correlation matrix of the variables used in the regression analysis. Active Enforcement is a dummy variable that equals 1 if there is an insider trading law prosecution event within the sample period of the countries in our sample, 0 otherwise. Legal Origin identifies the legal origin of the company law or commercial code of each country (common law or civil law). It equals to 1 if the law origin of a country is common law and 0 otherwise. Rule of Law reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement and property rights. Effectiveness reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. RegQuality reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. The definition of these three variables are obtained from the *2014 Worldwide Governance Indicators*. Anti-Self-Dealing is a proxy for investor protection and is obtained from Djankov et al. (2008). Stock Dev is defined as the ratio of country-level stock market capitalization to GDP and is a proxy for stock market development. Dev dummy equals 1 if the country is developed, 0 otherwise.

	Legal Origin	Rule of Law	Effectiveness	RegQuality	Anti-Self-Dealing	Stock Dev	Dev
Active Enforcement	0.05665 0.3967	0.30132 <.0001	0.30208 <.0001	0.33435 <.0001	0.20052 0.0033	0.16874 0.0111	0.26493 <.0001
Legal Origin		0.01741 0.7947	0.05209 0.4358	0.04102 0.5395	0.82622 <.0001	0.36469 <.0001	-0.04064 0.5433
Rule of Law			0.95464 <.0001	0.9533 <.0001	0.10727 0.1186	0.23313 0.0004	0.76631 <.0001
Effectiveness				0.93658 <.0001	0.1864 0.0064	0.27563 <.0001	0.69793 <.0001
RegQuality					0.17005 0.0129	0.2828 <.0001	0.72157 <.0001
Anti-Self-Dealing						0.39641 <.0001	0.05043 0.4641
Stock Dev							0.27622 <.0001

Appendix Table 3
Lockout Periods Around Earnings Announcements

This table summarizes lockout periods around earnings announcements for 40 countries. A lockout period refers to the period in which insiders are banned from trading before and after financial report releases. The lockout period information is obtained directly from either the security exchange's official website of a country or contacting the country's regulation authorities.

Country	Lockout Period	Details of Lockout Periods
Australia	No	
Austria	Yes	3 weeks before quarterly financial report release, 6 weeks before annual financial report release
Belgium	Yes	15 days
Brazil	No	
Canada	No	
Chile	No	
China	Yes	10 days before earnings pre-announcements and 30 days before the formal financial report is issued
Czech Republic	No	
Denmark	No	
Finland	No	
France	Yes	2 weeks prior to the publication of its half-yearly or annual financial statements
Germany	Yes	Insiders are prohibited from trading with their securities from the moment of the origin of the inside information up to its announcement
Greece	No	
Hong Kong	Yes	30 to 60 days
Hungary	Yes	15 days
India	Yes	No retail trading for the period between the 20th trading day prior to the last day of any financial period for which results are required to be announced by the issuer of the securities and the second trading day after the disclosure of such financial results
Indonesia	No	
Ireland	Yes	30 days before quarterly financial report release, 60 days before annual financial report release
Israel	No	
Italy	No	
Luxembourg	No	
Malaysia	No	
Netherlands	No	
New Zealand	No	
Norway	No	
Pakistan	Yes	The closed period shall start from the day when any document statement, which forms the basis of price sensitive information, is sent to the board of directors and terminate after the information is made public
Philippines	Yes	During the period within which a material nonpublic information is obtained and up to two trading days after the sensitive information
Poland	Yes	2 weeks before quarterly financial report release, 1 month before annual financial report release, 2 months before annual financial report release
Portugal	No	
Singapore	Yes	Two weeks before the announcement of the company's financial statements for the first three quarters of its financial year, or one month before the half-year or financial year end
South Africa	Yes	In the case of reporting on a quarterly basis, the date from the end of the quarter up to the date of the publication of the quarterly results
South Korea	No	
Spain	No	
Sri Lanka	No	
Sweden	Yes	30 days before publishing of interim reports
Switzerland	Yes	10 days prior to financial report release
Thailand	No	
Turkey	Yes	Insiders cannot make any transaction from the end of the financial period till the announcement day of the financial reports. For annual reports banned period begins on January 1st and ends with the announcement of a firm's report. For semi-annual reports banned period begins on July 1st and ends with the announcement of the firm's report
UK	Yes	2 months before publication of full year results, one month before publication of interims
US	No	