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Abstract

Using a cross-country setting, we document differences in the relation between earnings quality and the two components of trading volume around earnings announcements, one related to differential interpretation of the earnings signal and the other related to pre-event differential information precision. We find that in countries with stronger investor protection, less corrupt governments, and more liquid stock markets, a noisier earnings signal increases differential interpretation of the earnings signal but decreases investors’ incentive for information acquisition before earnings announcements, leading to lower pre-event differential information precision. However, these trading patterns flip in countries with weaker investor protection, more corrupt governments, and less liquid stock markets. We also find that institutional investors in countries with stronger institutions are likely to benefit more from their superior information processing skills, leading to more information acquisition both at and before earnings announcements. Overall, our study adds to the literature by documenting significant cross-country variations in investors’ trading volume reactions to earnings quality.

Keywords: earnings quality; trading volume; institutional factors; earnings announcements

JEL classification: G12, G14 and G15
1. Introduction

Kim and Verrecchia (1997) demonstrate that trading around public announcements increases with differences in investors’ prior beliefs and their differential interpretation of the announcement, both of which are the results of information acquisition. Our study uses the Kim and Verrecchia (1997) model and an international setting to examine how country-level institutional factors affect the incentives for information acquisition and influence the relation between earnings quality and trading volume reactions to earnings announcements.

Many studies have examined cross-country earnings informativeness and shown that investor response to earnings information varies substantially across countries (Hung 2000; DeFond et al. 2007; Landsman et al. 2012). This line of research has primarily focused on the question of whether investors in different countries react to earnings information differently. However, an underexplored question is how investors react to earnings information and, more importantly, whether and the extent to which country-level institutions shape trading behavior. Our study attempts to fill this void by taking advantage of the rich heterogeneity in country-level institutions to examine the implication of earnings quality for investors' trading behavior.

A key insight of the Kim and Verrecchia (1997) model is that trading volume can be decomposed into event-period and pre-announcement effects: differential interpretations of the news among investors (i.e., event-period disagreements or private information) and updates of investors' preannouncement beliefs (i.e., pre-event differential informedness or differential prior precision). They demonstrate that the first component of trading volume is unrelated to stock price changes whereas the second component is a function of stock price changes. To
derive a more complete view of how country-level factors affect investors' private information acquisition and trading behavior, it is important to consider both components of trading volume.

Our sample comprises 177,264 firm-year annual earnings announcements from 23 countries between 1995 and 2014. We employ three proxies for earnings quality: the absolute value of discretionary accruals from the Jones (1991) model, Dechow and Dichev (2002)'s accruals quality measure, and earnings variability (Dechow et al. 2010). Following the prior literature, we use abnormal trading volume around earnings announcements unrelated to stock returns to measure investors’ differential interpretations of the earnings signal and trading volume related to stock returns as a proxy for investors’ differential precision of pre-announcement private information (Ahmed et al. 2003; Hope et al. 2009; Barron et al. 2018; Abdel-Meguid et al. 2019). Similar to Abdel-Meguid et al. (2019), we find evidence of more announcement-period private information and less pre-announcement differential belief precision for firms with lower earnings quality.¹

Our primary interest lies in the cross-country variations in the relations between the two components of trading volume reaction and earnings quality. We focus on three country-level institutional factors: investor protection, government corruption, and market liquidity. In countries with a more market-oriented legal system that establishes clear ownership rights, investors will find it more rewarding to conduct firm-level equity research (Morck et al. 2000; Chan and Hameed 2006). Facing noisy earnings signals, investors trading in a relatively strong

¹ Abdel-Meguid et al. (2019) investigate the relation between earnings quality and divergent investor opinions during earnings announcements in the U.S. They find a negative relation between earnings quality and abnormal trading volume unrelated to returns. They also find that earnings quality is positively related to abnormal trading volume due to differential prior precision, suggesting that when investors anticipate a noisy earnings signal, they are less motivated to acquire private information before earnings announcements, thus reducing the pre-event differential information precision among investors.
investor protection environment have greater incentives to rely on their own knowledge, skills, and resources to understand and interpret the earnings signals due to higher returns on private information acquisition. Opinion divergence arising from interpreting noisy earnings signals is thus more prominent in countries with stronger investor protection.

Beneish and Vargus (2002) show that insider trading can predict future earnings quality, suggesting that investors may use insider trading information in the pre-event period to unravel earnings management and interpret the earnings signal during an earnings announcement. Insider trading is more prevalent in countries with poor investor protections, more so for firms with strong incentives to manage earnings. Accordingly, investors of these firms may benefit more from pre-announcement information (including insider trading information) acquisition when anticipating an earnings announcement, leading to increased differential prior precision and thus a greater trading volume reaction related to stock price changes.

La Porta et al. (1998) argue that a strong system of legal enforcement could, in principle, substitute for weak rules since an active and well-functioning court system can step in and help investors recover losses caused by management abuse. The rule of law will prevail with a strong and independent court system, which in turn depends on the extent of corruption in the government (Eleswarapu and Venkataraman 2006). Therefore, we focus on corruption in the government and study how the government’s stance toward business affects the incentive to engage in private information acquisition during the announcement period. Because economic fundamentals are further obscured by political factors (Morck et al. 2000; DiRienzo et al. 2007; Chen et al. 2010), noisy earnings signals in more corrupt countries are even more difficult to

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2 The nature of the political system matters as well. Treisman (2000) and Rose-Ackerman (2001) show that countries with longer exposure to democratic structures have lower incidences of corruption.
process and interpret for investors without knowledge of the context of the disclosure, leading to smaller trading volume reactions unrelated to stock price changes. Moreover, low earnings quality disincentivizes investors to uncover potential expropriation of minority shareholders, leading to larger differences in belief precision between uninformed investors and investors with political connections in more corrupt countries. Thus, we hypothesize that, in more corrupt countries, the amount of announcement-period private information for firms with noisy earnings signals is lower, whereas the pre-event differential informedness is higher.

Lastly, we examine the impact of stock market liquidity. Liquid stock prices are more informative of future earnings (Kerr et al. 2020). Liquidity facilitates the price discovery process by reducing the costs of equity analysis and executing arbitrage strategies. With lower trading costs, investors can benefit more from firm-specific research and private information acquisition to better understand and interpret noisy earnings signals. Investors with different skills and analytical tools will interpret the noisy earning signals differently, creating more trading volume unrelated to stock returns. In contrast, a high level of illiquidity poses the risk of high losses for investors, such as the potential significant price volatility from a large transaction. This uncertainty may hold back investment in private information acquisition for investors who aim to balance the costs and benefits of equity research. In illiquid markets, only a small group of skillful investors can overcome the high research cost for firms with noisy earnings signals and the high trading cost. This group of skillful investors will then have more precise prior beliefs than other investors, leading to wider pre-event differential informedness for firms with low earnings quality in illiquid markets.
We find results consistent with our predictions. For announcement-period private information, we find that trading volume reactions independent of stock price changes are more negatively related to earnings quality in countries with stronger investor protection, less corrupt governments, and more liquid stock markets. We find the opposite results for the differential precision of pre-announcement private information. Overall, our results indicate that country-level institutional factors are crucial in shaping investors’ private information acquisitions both before and at earnings announcements.

We shed light on a potential source of differential precision of private information by focusing on the firm’s institutional ownership, as institutional investors have more sophisticated skills and technology to process earnings signals. In the pre-announcement period, institutional investors are also likely to be better informed because they are more active in monitoring the firm’s financial reporting (Chung et al. 2002; Kim et al. 2016). We find that only in countries with strong investor protection does the negative relation between earnings quality and trading volume reaction independent of stock price changes strengthen for firms with more institutional investors. The relation between earnings quality and trading volume reaction related to stock price changes is less positive as institutional ownership increases, but again this result holds only in countries that have stronger investor protection and less corrupt governments. Our results suggest that institutional ownership contributes to differential private beliefs among investors both before and at earnings announcements. Importantly, institutional investors’ incentive to engage in private information acquisition depends on whether they trade in a market-oriented environment with strong enforcement of law.
Our study contributes to the literature in two ways. First, prior cross-country studies document significant investor trading volume reactions to earnings quality (e.g., Bhattacharya et al. 2003; DeFond et al. 2007; Landsman et al. 2012). However, this line of research has been silent on the sources of the trading volume reactions. We decompose trading volume reaction using Kim and Verrecchia (1997)’s framework and provide a more complete picture of how investors across different countries behave in response to different earnings quality. More importantly, we go deeper in an effort to understand the institutional forces behind the observed trading behaviors. The relation between trading volume reaction and earnings quality depends on how investors acquire information and make trading decisions, which in turn depend on factors that likely vary across countries. We find that in countries with strong institutions (such as the U.S.), investors who receive noisy earnings signals engage in more private information acquisition at earnings announcements, whereas in countries with weak institutions, investors who anticipate noisy earnings signals rely more on pre-announcement private information acquisition in forming trading decisions. The contrasting trading patterns that we observe in countries with weak institutions suggest that caution must be exercised when generalizing the results from the U.S. to other countries.

Second, this study contributes to our understanding of institutional trading behavior. Our results suggest that institutional investors’ trading reactions to earnings quality are more sensitive to the country-level institutional infrastructure. As institutional investors account for a lion’s share of trading volume around the world, our study of how country-level factors affect

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3 Similar approaches are adopted by several U.S.-based studies. See, for example, Hope et al. (2009), Barron et al. (2018), Ye and Yu (2018), and Abdel-Meguid et al. (2019).
institutional investors’ information environment and trading behavior has strong implications for policy design and regulatory oversight of trading practices in various countries.

The rest of the paper is organized as follows. The next section provides the research motivation and develops the hypotheses. Section 3 describes the sample, specifies the test variables, and reports descriptive statistics. Section 4 and Section 5 present the main test results and robustness test results, respectively. Section 6 concludes the study.

2. Motivation and Hypothesis Development

A broad empirical literature suggests that trading volume around public announcements can be related to investor disagreement stemming from different interpretation of public news (Ahmed et al. 2003; Bamber et al. 1995; Bamber et al. 1999; Kandel and Pearson 1995) and the gap in prior beliefs arising from differential information precision (Atiase and Bamber 1994; Bamber et al. 1997; Karpoff 1986; Ziebart 1990). To attribute trading volume to different sources, researchers often examine the relationship between volume and price changes for the following reasons. First, incoming news may induce trades if investors have different interpretations of the news content, even in the absence of price changes (Kandel and Pearson 1995; Kim and Verrecchia 1994). Second, price change accompanied by news reflects a change in the average expectation in the market, implying a belief revision for an average investor. When the prior beliefs among investors are more disperse, the same unit of price change will generate more trading because there is a larger change from prior to posterior beliefs for an average investor. That is, there is more reshuffling of beliefs and updates of beliefs are achieved.

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4 Investors also trade for non-information reasons, including transaction cost, portfolio rebalancing, risk sharing, and liquidity, which are not our focus in this study. Trading driven by these idiosyncratic motives is either captured by the residual terms in a regression model or removed by using abnormal volume around earnings announcements.
by rebalancing positions. Therefore, volume related to price changes is associated with pre-event differential information precision (Karpoff 1986; Kim and Verrecchia 1991). With the above reasoning, trading volume can be decomposed into two components: a component unrelated to price changes and a component related to price changes (e.g., Kim and Verrecchia 1997; Garfinkel and Sokobin 2006).

Prior volume studies usually associate investor trading behavior around earnings announcements with investor and firm characteristics. Garfinkel and Sokobin (2006) use volume unexplained by price changes to support a disagreement risk explanation of post-earnings-announcement drift. Abdel-Meguid et al. (2019) find that a noisier earnings signal results in higher volume unrelated to price changes (more differential interpretation) and lower volume related to price changes (lower differential prior precision) at earnings announcement. When investors anticipate a noisy earnings signal, they are less motivated to acquire information, leading to less differential information precision before the event.

Meanwhile, the research on the impact of country-level characteristics on market response to earnings news focuses primarily on price reactions, with total trading volume as an alternative indicator of the relevance of the information (DeFond et al. 2007; Landsman et al. 2012). Although relating total volume reactions to certain institutional features is important, the results only show that investors do respond to certain information but do not address the issue of how investors respond.

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5 Throughout the text, we use differential prior precision and pre-event information difference interchangeably.
6 For example, Ziebart (1990), Atiase and Bamber (1994), Bamber et al. (1995), Utama and Cready (1997), Ahmed et al. (2003), Ali et al. (2008), and Barron et al. (2018).
In addition, investors’ incentives for information acquisition and processing are likely to differ across countries because of the cross-country heterogeneity in institutions, leading to different trading volume dynamics. In what follows, we examine three aspects of country-level factors and develop hypotheses for their impact on investors’ incentive for information acquisition and the resulting impact on different components of trading volume reaction.

First, we examine investor protection. In countries where investors enjoy stronger property rights protection, they are more incentivized to conduct firm-level equity research. In contrast, weak property rights protection discourages informed trading and prevents firm-specific information from being incorporated into stock prices (Morck et al. 2000; Chan and Hameed 2006). Thus, in the presence of a noisy earnings signal, investors in countries with stronger investor protection have a greater incentive to use their knowledge, skills, and resources to understand and interpret the earnings signal.

Moreover, insider trading is more prevalent in countries with weaker investor protection. DeFond et al. (2007) and Griffin et al. (2011) find attenuated price responses to public announcements when insider trading is more pervasive. Beneish and Vargus (2002) show that insider trading is informative of earnings quality. Therefore, in anticipation of a noisy earnings signal, there may be more insider trading in countries with weaker investor protection. Hence, differential prior precision is more prominent in anticipation of a noisy earnings signal in countries with weaker investor protection. The above discussion leads to our first hypothesis:

**H1: The negative (positive) relation between earnings quality and differential interpretations around earnings announcements (differential prior precision) is stronger (i.e., more negative (positive)) for firms in countries with stronger investor protection.**
Second, we argue that country-level corruption will affect the incentive for information production. Corruption creates injustice in the legal system and disincentivizes public scrutiny. Noisy earnings signals in countries with a higher level of corruption may be even more difficult to interpret because economic fundamentals are further obscured by political factors (Morck et al. 2000; DiRienzo et al. 2007; Chen et al. 2010). In other words, it might be more costly for investors to understand and interpret the earnings signal. Thus, we expect that the negative relation between differential interpretations of the earnings signals and earnings quality is weaker (i.e., less negative) for firms in more corrupt countries. Regarding pre-event differential informedness, Chen et al. (2010) find that analysts have more difficulty in predicting earnings for firms with more political connections, and this result is more significant in countries where corruption is relatively high. In more corrupt countries, it is thus more difficult to uncover expropriation of minority shareholders, resulting in larger differences in information between uninformed investors and investors with more political connections and inside information. A noisy earnings signal makes it even more difficult for investors to understand the true economic performance of the firm, thus further disincentivizing equity analysis. As a result, differential prior precision is more pronounced for firms with low earnings quality in countries with higher corruption.\(^7\) The above discussion leads to our second hypothesis:

\textbf{H2:} The negative (positive) relation between earnings quality and differential interpretations around earnings announcements (differential prior precision) is stronger (i.e., more negative (positive)) for firms in countries with a lower level of corruption.

\(^7\) It should be noted that corruption is a measure of the quality of law enforcement (which is different from legal origin) (see La Porta et al. (2000) for a discussion).
Third, we examine the impact of stock market liquidity. Liquid stock prices are more informative of future earnings (Kerr et al. 2020). Liquidity is likely to facilitate the price discovery process by reducing the difficulty of equity analysis and the cost of executing arbitrage strategies. When the cost of trading is lower, investors can benefit more from conducting equity research and have stronger incentives to invest in knowledge, skills, and resources to better understand earnings signals. With different tools, investors facing a noisy earnings signal are likely to interpret it differently and generate different private information at the time when it is released. Therefore, a more liquid stock market will facilitate more private information production at the announcement. However, such a momentary spike in disagreement will dissipate quickly because more liquid stock markets accelerate the convergence of prices to fundamentals (Sadka and Scherbina 2007). On the other hand, an illiquid stock market obscures price discovery and investments in equity analysis, resulting in more mispricing and disagreement in the normal period (Sadka and Scherbina 2007). The anticipation of a noisier signal can further discourage research for investors who cannot recover the illiquidity cost and increased research cost in analyzing a noisy signal from expected trading profits. Only a small group of investors with superior skills are willing to conduct equity research, arrive at precise prior beliefs and take advantage of the noisy signal in the presence of illiquidity. As a result, the wedge of prior belief precisions across investors is larger. The above discussion leads to our third hypothesis:

**H3:** The negative (positive) relation between earnings quality and differential interpretations around earnings announcements (differential prior precision) is stronger (i.e., more negative (positive)) for firms in countries with higher market liquidity.

3. Sample, Test Variables, and Summary Statistics
3.1 Data description

We begin our sample selection with 302,406 firm-year observations from 25 countries between 1995 and 2014 that have sufficient information about daily stock returns, closing prices, number of shares traded, number of shares outstanding, and annual earnings announcement dates in DataStream. We only retain stocks that are the major securities with primary quotes in the sample.\(^8\) We obtain financial data for 245,763 non-financial firm-years from Worldscope. We use this data to calculate the earning quality measures, requiring the number of observations within each industry-year of a specific country to be more than 10. After merging the DataStream sample and the Worldscope data, we are left with 177,264 firm-year annual earnings announcement observations.

We calculate daily turnover as the ratio of number of shares traded to shares outstanding. We define the at-announcement period (at-period) and the control period as the \([-2, 2]\) and \([-47, -8]\) windows, respectively, relative to the reported earnings announcement date. We divide the control period into eight sub-intervals, each five days long, and define the control period turnover as the median value of average turnovers across the sub-intervals. We use the control period turnover to measure trading volume arising from sources unrelated to earnings announcements. This approach to measuring expected volume is commonly adopted in the prior literature (e.g., Bamber et al. 1997; Ahmed and Schneible 2007). The at-period abnormal turnover \((At\_ab\_turn)\) is the difference between average at-period turnover and the control

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\(^8\) We exclude instruments classified as American depositary receipts, profit participation certificates, investment trusts, United States warrants, close-end funds, exchange-traded funds, global depositary receipts, and preferred shares. Moreover, In DataStream, if a stock is delisted or suspended, the series remains in the record but is not updated although the delisting dates may be recorded separately in some cases. We classify a stock as being delisted by identifying the first day that it ceased being traded and when it exhibits no price change for the following two months.
period turnover. To minimize the impact of extreme values and potential recording errors, we winsorize all continuous variables in our regression analyses at the 1% and 99% levels for each country-year.

### 3.2 Proxies for earnings quality

We measure earnings quality using three proxies: discretionary accruals from the Jones (1991) model ($ABSDA$), the Dechow and Dichev (2002) accruals quality measure ($DD2002$), and earnings variability ($EARNVAR$). We also calculate the first principal component ($PC$) of the three measures to capture the common underlying earnings quality.

Firms’ fundamental earnings process will inherently generate accruals. However, reported accruals may be subject to discretion, making them less useful for valuation (Xie 2001). A higher magnitude of discretionary accruals thus represents a lower earnings quality. We use both earnings-increasing and earnings-decreasing discretionary accruals as a measure of managers’ earnings manipulations. We use the Jones (1991) model to separate total accruals into normal and discretionary accruals:

$$ACC_{jt} = \alpha_1 \left[ \frac{1}{TA_{jt}} \right] + \alpha_2 \left[ \frac{\Delta REV_{jt}}{TA_{jt-1}} \right] + \alpha_3 \left[ \frac{PPE_{jt}}{TA_{jt-1}} \right] + e_{jt}$$  \hspace{1cm} (1)

$ACC$ is total accruals, calculated as the change in non-cash working capital less total depreciation expense. $TA$ is total assets, $\Delta REV$ is change in revenue from the previous period, and $PPE$ is gross property, plant and equipment. The subscripts $j$ and $t$ refer to firm and year, respectively. We estimate Equation (1) for each two-digit SIC industry in each country-year. $ABSDA$ is the absolute value of the residual ($e_{jt}$). A higher value of $ABSDA$ indicates lower earnings quality.\(^9\)

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\(^9\) We follow Abdel-Meguid et al. (2019) and measure $ABSDA$ from the Jones model so that our results are comparable to theirs. In untabulated sensitivity analysis, we also measure $ABSDA$ using performance (ROA)-
Dechow and Dichev (2002), on the other hand, focus on the change in working capital (as part of accruals) and relate it to the past, present, and future cashflow from operations:

\[
\Delta WC_{jt} = \delta_0 + \delta_1 CF_{jt-1} + \delta_2 CF_{jt} + \delta_3 CF_{jt+1} + \epsilon_{jt}
\]  

(2)

The idea for the model is that a closer mapping between working capital and cashflow (i.e., smaller estimation error) indicates higher earnings quality. \(\Delta WC\) is change in working capital, \(CF\) is cash flow from operations, and the subscripts \(j\) and \(t\) refer to firm and year, respectively.

We define our second measure, \(DD2002\), as the absolute value of the residual \((\epsilon_{jt})\) from Equation (2) estimated for each two-digit SIC industry in a country-year. A higher value of \(DD2002\) indicates lower earnings quality.

Our third measure of earnings quality is earnings variability (\(EARNVAR\)), defined as the standard deviation of firm-level earnings divided by the standard deviation of cash flow from operations, each estimated over the past five years (Dechow et al. 2010). The insight from the Dechow and Dichev (2002) model is that accruals of firms with lower accruals quality map less closely with cash flow realizations. The estimation errors and subsequent corrections lead to more noise and less persistence in earnings. Therefore, more volatile earnings can indicate lower earnings quality. Empirically, there is a strong positive relation between accruals quality and earnings persistence (Dechow and Dichev 2002) and more volatile earnings present more noise to end users, resulting in larger analyst forecast errors (Dichev and Tang 2009).

### 3.3 Control variables

adjusted discretionary accruals following Kothari et al. (2005). The results are qualitatively the same.

While income smoothing may reflect managers’ purposeful intervention in the financial reporting process (Leuz et al. 2003), Dechow et al. (2010) argue that the overall income smoothing depends on the tradeoff between increased informativeness from reduced noise and decreased informativeness from opportunistic earnings management. It is therefore unclear whether less volatile earnings will definitely represent higher earnings quality. In our sample, \(EARNVAR\) is positively correlated with \(ABSDA\) and \(DD2002\) at firm level, suggesting that a major driver for earnings volatility is increased noise in earnings.
Following Abdel-Meguid et al. (2019), we use several firm-level control variables in our study. $Abs_{ret}$, the absolute return over the event-period, captures the contemporaneous impact of price movement on trading volume. $Size$ is the decile rank of market capitalization within a country-year. $Meanvol$ is the mean trading volume of firms in the sample during the announcement period. It controls for market-wide trading activities. $Logprice$ is the natural logarithm of average stock price (in USD) in the control period. It controls for transaction cost.

Since the international firms in our sample have more heterogeneity, we add more control variables following DeFond et al. (2007). $Nanalys$ is the number of analysts following from the I/B/E/S database within the 6-month period before the actual annual earnings announcement. $Large20$ is a dummy variable indicating one of the 20 firms with the largest market capitalization in a given country. Firms with greater analyst following or larger size have a better firm-specific information environment and may have a different volume-return relationship. $UE$ is unexpected earnings, defined as the change in net profit scaled by price. We include unexpected earnings because the market reaction to earnings announcements depends on earnings surprise (Francis et al. 2002). $Loss$ is a dummy variable that equals one if the reported actual earnings are less than zero. $Loss$ controls for larger market reactions in the case of a loss. $Reportlag$ is the number of days from the fiscal year-end to the earnings announcement date. It controls for different market reactions because longer reporting lags provide greater opportunities for managers to provide guidance and for analysts to update forecasts.

To account for unmodeled heterogeneity across countries, industries, and time, we include country, industry, and year fixed effects in our main tests. As a sensitivity check, we
use firm fixed effects instead of country and industry fixed effects. Additional control variables at the country level include GDP ($GDP$) and capital market development ($TotMktSize$) to account for differences in economic development and financial market development across countries, and investor protection, corruption, and market liquidity, which we describe in detail in the next subsection. In the presence of time-invariant country-level controls, we suppress the country fixed effects.

### 3.4 Country-level factors for hypotheses testing

We are primarily interested in three country-level institutional factors: investor protection, corruption, and market liquidity. We measure investor protection using the legal origin of the country ($Common$), antidirector rights ($Antidirector$), and self-dealing governance ($Antiselfdealing$). The law and finance literatures emphasize the role of legal origin in protecting investors. $Common$ equals one if the legal origin of a country is English common law, and zero otherwise (La Porta et al. 1998). $Antidirector$ is an index that measures how strongly the legal system favors minority shareholders against managers or dominant shareholders on major corporate decisions (La Porta et al. 1998). The index measures shareholder rights from the standpoint of shareholders exercising their power by voting for or against directors or managers. $Antiselfdealing$ is an index of investor protection that measures control of self-dealing (Djankov et al. 2008). It is the average of ex ante private control of self-dealing and ex post private control of self-dealing.

Besides the legal system, government is critical for the enforcement of legal protection for investors. $Corruption$, an indicator of government corruption (La Porta et al. 1998), reflects the governance stance towards business. While investor protection and legal enforcement are
important for investors to trade on information, markets also need to be sufficiently liquid to allow investors to trade. We measure country-level stock market liquidity (*Liquidity*) as the aggregate country-year stock market turnover (DeFond et al. 2007; Levine and Schmukler 2007). Table 1 reports the values of *Common, Antidirector, Corruption, Antiselfdealing*, and *Liquidity* for each country. We provide detailed variable definitions in the Appendix.

### 3.5 Summary statistics

Table 1 presents the (mean) values of our key variables by country. We find significant variations in earnings quality across countries. The mean of *ABSDA* ranges from 0.033 to 0.087. The mean of *DD2002* ranges from 0.019 to 0.074. The mean of *EARNVAR* ranges from 0.636 to 1.143. About 60% of the countries in our sample have a common law system. Belgium, Germany, and Italy have the lowest *Antidirector* indexes, whereas Canada, Hong Kong, India, Pakistan, South Africa, the U.K., and the U.S. have the highest *Antidirector* indexes (strong shareholder protection). As for law enforcement, Canada, Finland, the Netherlands, Norway, and Switzerland have the least corrupt governments. Countries that have the most corrupt governments include Pakistan, India, Thailand, and Korea. *Antiselfdealing* index ranges from 0.20 for the Netherlands to 1 for Singapore. Canada has the most liquid stock market and Malaysia the least liquid stock market. Most markets have higher trading volume during the earnings announcement compared with the control period (i.e., positive at-period abnormal

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11 The cross-country difference may arise from different accounting practices. For example, Hung (2000) documents that U.S. and U.K. accounting practices allow the most extensive use of accrual accounting, whereas Italy and Japan allow the least. The extent of use of accrual accounting will affect the level of accruals and thus discretionary accruals. Gaio and Raposo (2012) also document that Italy, Japan, and Spain have higher earnings quality, which is aggregated from discretionary accruals and other measures, than Australia, Canada, and the U.K. Meanwhile, countries with a high level of accruals such as Australia, Canada, and the U.S. should have higher earnings variability. Other factors such as composition of firms and macroeconomic conditions may also affect earnings variability.
turnover), suggesting that earnings releases are generally informative in the international markets. The average increase in turnover is 0.22% over the announcement period across all countries.

-----Insert Table 1-----

Table 2 presents the Pearson correlations among the key variables. Most of the pairwise correlation coefficients are statistically significant at the 1% level. Our three firm-level earnings quality measures are positively correlated with each other. They are also positively correlated with abnormal trading at announcement, suggesting more trading when earnings quality is lower. For example, the correlation between $ABSDA$ and abnormal trading at announcement ($At_{ab\_turn}$) is 0.018, significant at 1% level. As shown in Panel A, common law countries are associated with stronger investor protection, lower corruption, and higher market liquidity. Country-level variables ($Common$, $Antidirector$, $Corruption$, $Antiselfdealing$, and $Liquidity$) are also positively related to abnormal trading at announcement ($At_{ab\_turn}$). The correlation between $Common$ and $At_{ab\_turn}$ is 0.087, significant at the 1% level. The univariate results suggest that country-level institutions may play an important role in trading activities at earnings announcements. Panel B reports the correlation coefficients among the abnormal trading, earnings quality, and firm-level control variables used in the regression analysis. Most of the correlation coefficients are significant at the 1% level.

-----Insert Table 2-----

4. Main Results

4.1 Earnings quality and at-announcement trading
To test whether firm-level earnings quality increases or decreases trading volume around earnings announcement, we estimate the following model:

$$At_{ab\_turn_{it}} = \beta_1 + \beta_2 EQ_{it} + \left[\beta_3 + \beta_4 EQ_{it}\right] Abs\_ret_{it} + Controls_{it} + \epsilon_{it}$$  \hspace{1cm} (3)

where EQ is ABSDA, DD2002, EARNVAR, or their first principal component (PC).

Equation (3) decomposes event-period trading volume into components with respect to price movement. In particular, the terms inside the bracket \([\beta_3 + \beta_4 EQ_{it}]\) are related to differential information precision before the earnings announcement. \(\beta_4\) captures trading volume related to earnings quality due to differential prior precision. If a decrease in earnings quality (i.e., an increase in EQ) reduces the incentive for information acquisition before earnings announcement, the associated decrease in information difference implies a negative \(\beta_4\). The effect of differential interpretations on trading volume is captured by the coefficient \(\beta_2\), the intercept \(\beta_1\), and country-, year-, and industry-fixed effects. A positive \(\beta_2\) will suggest that differential interpretations during earnings announcement decrease with earnings quality.

-----Insert Table 3-----

Table 3 presents the estimation results of Equation (3). We report standard errors in parentheses adjusted for firm and year clustering. In Columns (1)-(4), we report the estimation results of Equation (3) with country fixed effects but without country-level control variables. In Column (1), we use ABSDA as the earnings quality measure. As expected, the coefficient of contemporaneous absolute returns (Abs_ret) is positive and significant, indicating significant investor belief revision upon receiving the earnings news. The coefficient of ABSDA is significantly positive, consistent with the prediction that differential interpretations during earning announcement decrease with earnings quality. The coefficient of the interaction term
Abs_ret*ABSDA is negative, indicating that investors have less incentive to acquire information for earnings announcements with more discretionary accruals (i.e. lower earnings quality). The reduced differential information precision before the announcement therefore results in less belief revision associated with announcement price change and hence less trade. In Columns (2) and (3), we report the estimation results of Equation (3) for the other two earnings quality measures (i.e., DD2002 and EARNVAR) and observe a similar pattern as for ABSDA in Column (1). Using the first principal component (PC) of ABSDA, DD2002 and EARNVAR in Column (4), we find that the coefficient on PC is significantly positive and the coefficient on the interaction term PC*Abs_ret is significantly negative.

In Columns (5) and (6), we use PC as the measure of earnings quality and check the robustness of the regression results. In Column (5), we omit country- and industry-fixed effects and replace them with firm-fixed effects. Our results are robust to controlling for firm-fixed effects. In Column (6), we control for a number of country-level variables (TotMktSize, GDP, Common, Antidirector, Corruption, Antiselfdealing, and Liquidity) and omit country-fixed effects and find that the coefficients of PC and PC*Abs_ret remain statistically significant. In untabulated results, we estimate Equation (3) using only the U.S. sample and find similar results to Abdel-Meguid et al. (2019). Overall, the results in Table 3 are consistent with the prediction of a negative (positive) relation between earnings quality and differential interpretations around earnings announcements (differential prior precision).

4.2 Results of hypotheses testing

As we discussed in the hypothesis development, institutional factors could influence investors’ incentive to acquire and interpret the information before and at the earning
announcement when they anticipate low earnings quality. Because the primary focus of our study is on the cross-country differences in trading volume reaction to earnings announcements, we partition the sample according to different country-level measures and contrast the cross-group results along the following dimensions: investor protection (proxied by legal origin, anti-director rights, and anti-selfdealing), corruption level (proxied by corruption index), and market liquidity (proxied by liquidity). We partition the sample according to the legal origin or the median value of various country-level factors and estimate regressions for each sub-sample. Table 4 reports the results using PC as the measure of earning quality.

-----Insert Table 4-----

Regarding the investor protection dimension, Columns (1) and (2) of Table 4 show that for Common law countries PC has a significantly positive coefficient of 0.036 and PC*Abs_ret has a significantly negative coefficient of -0.268. In contrast, for Code law countries, the coefficients of PC and PC*Abs_ret are -0.032 and 0.781, respectively, both of which are statistically significant and are of the opposite sign to their counterparts in the Common law country sample. The differences in the coefficients for PC and PC*Abs_ret between Common law and Code law samples are statistically significant, as reported in the last two rows of Table 4. When we partition the sample by Antidirector or Antiselfdealing in Columns (3) to (6), we observe a positive (insignificantly negative) sign for PC and a negative (positive) sign for PC*Abs_ret for the high (low) investor protection group. These results suggest that investors in countries with stronger investor protection have more incentives for processing noisy earnings signals, leading to more differential interpretations at announcement. The greater incentives for information acquisition when anticipating a noisy earnings signal also reduce
belief heterogeneity before announcement. Reported at the bottom of Table 4, the significant cross-group differences for the \( PC \) and \( PC*Abs\_ret \) coefficients suggest different incentives for information processing by investors in countries with high and low investor protection.

Columns (7) to (8) report the results when we partition the sample by country-level corruption (\emph{Corruption}). The results are qualitatively similar to those for the investor protection partitions. Moreover, the cross-group differences for \( PC \) and \( PC*Abs\_ret \) are statistically significant. When we partition the sample by stock market liquidity, the high liquidity group (Column 10) has a positive (negative) coefficient for \( PC (PC*Abs\_ret) \). Although \( PC \) also has a positive coefficient in the low liquidity group (Column 9), it is significantly smaller than that in the high liquidity group as indicated by the \( p \)-value at the bottom of the table. Overall, we find results consistent with our hypotheses regarding investors’ information acquisition incentive conditional on country-level factors.

Some discussion on the coefficients of the control variables is in order. For the group with strong country-level institutions (Columns 2, 4, 6, and 8), \emph{Size} and \emph{Logprice} have positive coefficients. However, for samples with weak country-level institutions (Columns 1, 3, 5, and 7), the coefficients of \emph{Size} and \emph{Logprice} are negative. On firm size and relative informativeness of earnings, Ball and Shivakumar (2008, p997) argue that “one might expect information production to be a convex function of size and the relative informativeness of earnings to be a concave function of size.” Because abnormal volume reaction is a form of relative informativeness, the suggested concave relationship between abnormal volume and size implies that the \emph{Size} coefficient can be positive, negative, or not different from zero, depending on the curvature of the segment on which we have observations. Using a similar logic, the
coefficient of Logprice can be indeterminate because it is highly correlated with Size (correlation coefficient = 0.418) as shown in Table 2. Alternatively, low price stocks can be very costly to trade in normal periods so that prices only move in response to earnings announcements when the news content is sufficiently large to make trading cost beneficial, resulting in high event-period abnormal volume.

4.3 The impact of institutional ownership

Institutional investors are usually perceived as informed traders because they are sophisticated and have better access to information and powerful analytical tools. In the presence of a noisy earnings signal, they should have more incentive to acquire information before the announcement and process announced earnings information because there is more room to profit when the information is noisy. However, such an incentive can be attenuated if institutional investors are in countries with poor institutions where the cost of price discovery may outweigh the benefit. To test whether institutional investors play a role in explaining the relation among country-level institutions, earnings quality, and trading volume around earnings announcement, we estimate the following augmented model.

$$\begin{align*}
\text{At}_{ab\text{ turn}_{i,t}} &= \beta_1 + \beta_2 \text{PC}_{i,t} + [\beta_3 + \beta_4 \text{PC}_{i,t}] \text{Abs}_{ret_{i,t}} + \beta_5 \text{IO}_{i,t} + \beta_6 \text{IO}_{i,t} \ast \text{PC}_{i,t} \\
+ &\beta_7 \text{IO}_{i,t} \ast \text{PC}_{i,t} \ast \text{Abs}_{ret_{i,t}} + \text{Controls}_{i,t} + \varepsilon_{i,t}
\end{align*}$$

(4)

where IO_{i,t} is the percentage of institutional holding obtained from Factset.

Table 5 reports the results of estimating Equation (4) for different sub-samples. IO has significantly positive coefficients across all columns, meaning that institutional investors utilize and trade on earnings news around earnings announcements. The interaction between
PC and IO captures how institutional investors process the earnings-related information in the earnings announcement period, conditional on earnings quality. When interacting with PC, IO has significantly positive coefficients in the high Antidirector, Antiselfdealing and Liquidity groups (Columns 4, 6 and 10, respectively), and positive but insignificant coefficients in Common and low Corruption groups (Columns 2 and 8, respectively). The coefficients for these groups are significantly larger than the coefficients for their respective low groups as shown at the bottom of Table 5. The results for IO*PC support our conjecture that institutional investors prefer to use their information processing skills to interpret noisy earnings signals only when country-level institutions are strong.

The interaction term IO*PC*Abs_ret captures the impact of institutional investors on differential prior beliefs. When interacting with PC*Abs_ret, IO has significantly positive coefficients in the Common, high Antidirector, high Antiselfdealing, low Corruption, and high Liquidity groups (Columns 2, 4, 6, 8 and 10, respectively). That is, the coefficients of the interaction term IO*PC*Abs_ret are all significantly positive for sub-samples with stronger country-level institutions. Although the coefficient of IO*PC*Abs_ret is also significantly positive for the low Liquidity group, it is smaller than, albeit insignificantly different from, that for the high Liquidity group. The results suggest that, in countries with stronger institutions, the heightened information acquisition activities of institutional investors in anticipation of poor earnings signals increase the differential information precision among investors. It should be noted that the results are insignificant for countries with weaker institutions, further supporting our argument of low information acquisition incentive in these countries.

5 Robustness Tests
We perform a battery of robustness tests to check whether our results are sensitive to alternative specifications. First, as discussed in the survey paper by Bamber et al. (2011), it is not clear what is the best event window to capture the volume effect. To check the sensitivity of our results to the choice of event window, we measure abnormal trading volume using an alternative event window [-1, 1]. Untabulated results based on this alternative event window are similar to those reported in Table 3.

Second, we use a different approach to measure the trading volume related to differential prior beliefs and trading volume related to differential interpretations of the earnings signal. Equation (3) is derived based on Kim and Verrecchia (1997)’s suggestion that trading volume can be decomposed into two components: one that is related to price changes and the other that is independent of price changes. However, Equation (3) does not exactly correspond with the model developed by Kim and Verrecchia (1997) because several inputs in their theoretical model are not tractable or observable in archival data. To investigate whether our results still hold under a more general decomposition of volume, we follow Garfinkel and Sokobin (2006) and estimate the expected volume-return relationship using the control period sample. The model is as follows:

\[
SUV_{ij} = \frac{UV_{ij}}{S_{ij}}
\]

\[
UV_{ij} = V - E(V)
\]

\[
E(V) = \hat{\alpha} + \hat{\beta}_1|R^+| + \hat{\beta}_2|R^-|
\]

12 Indeed, Bamber et al. (2011) also mention that "(O)ne concern is that operationalizing differential interpretations as the intercept of a regression of trading volume on the absolute price change and other variables is complicated by the fact that the intercept impounds effects of model misspecification such as omitted variables and nonlinearities."

13 Details of the functional form of the expected volume-return relationship are in the Appendix.
where \( SUV \) is standardized unexpected volume, and \( V \) and \( R \) are trading volume and stock return at the earnings announcement, respectively. \( S_{ij} \) is the standard deviation of the residuals from the estimation regression for \( \hat{\alpha}, \hat{\beta}_1 \) and \( \hat{\beta}_2 \). We calculate \( SUV \) as the unexpected volume around the announcement divided by the standard deviation of residuals of the control period regression. \( SUV \) is the additional volume due to earnings news and corresponds to volume reactions unrelated to price changes.

Standardized expected volume (\( SEV \)) is calculated as

\[
SEV = \frac{E(V)}{S_{ij}} = \frac{\hat{\alpha} + \hat{\beta}_1|R^+| + \hat{\beta}_2|R^-|}{S_{ij}} = \frac{\hat{\alpha}}{S_{ij}} + \frac{\hat{\beta}_1}{S_{ij}}|R^+| + \frac{\hat{\beta}_2}{S_{ij}}|R^-| = \hat{\alpha}' + \hat{\beta}_1'|R^+| + \hat{\beta}_2'|R^-|
\]

where \( \hat{\alpha}', \hat{\beta}_1' \), and \( \hat{\beta}_2' \) are standardized coefficients of \( \hat{\alpha}, \hat{\beta}_1 \) and \( \hat{\beta}_2 \), respectively. \( SEV \) is calculated as the fitted value of volume during the announcement period divided by the standard deviation of residuals from the control period regression. \( SEV \) is the expected volume given the amount of price movement and corresponds to volume related to price changes.

To test whether earnings quality affects \( SUV \) and \( SEV \) differently, we estimate the following regression:

\[
SUV_{i,t} \text{ or } SEV_{i,t} = \beta_1 + \beta_2 PC_{i,t} + \beta_3 Abs\_ret_{i,t} + Controls_{i,t} + \epsilon_{i,t} \tag{5}
\]

where \( PC_{i,t} \) is the first principal component of \( ABSDA, DD2002 \) and \( EARNVAR \). \( Abs\_ret_{i,t} \) is the associated absolute return during the announcement period. Country-, year-, and industry-fixed effects are included, and standard errors are clustered by firm and year. We expect that a negative relation between earnings quality and trading volume unrelated to returns - \( SUV \) (i.e., positive \( \beta_2 \)) and a positive relation between earnings quality and trading volume related to returns - \( SEV \) (i.e., negative \( \beta_2 \)). Table 6 reports the regression estimates for Equation (5).
Overall, the results are consistent with those in Table 3. The coefficient on $PC$ is $-0.007 (0.016)$ and is significant at the 1% level when $SEV (SUV)$ is the dependent variable.

To retest our hypotheses using $SUV$ and $SEV$, we separately estimate Equation (5) conditional on country-level institutional factors. Table 7 reports the results of estimating Equation (5) for subsamples with Common law and Code law, high and low country-level measures of $Antidirector$, $Antiselfdealing$, $Corruption$, and $Liquidity$. When we use $SEV$ as the dependent variable (Panel A), the coefficient on $PC$ is significantly negative only in countries with Common law, high $Antidirector$ index, high $Antiselfdealing$ index, low $Corruption$, and high market $Liquidity$ (i.e., in the even-numbered columns). When we use $SUV$ as the dependent variable (Panel B), the coefficient on $PC$ is more positive in countries with strong institutions (i.e., in the even-numbered columns) than in countries with weak institutions (i.e., in the odd-numbered columns). The cross-group differences are significant in almost all cases as shown at the bottom of each panel. Overall, the results are robust to using Garfinkel and Sokobin (2006)’s decomposition approach.

Finally, we remove the U.S. from our international country list and retest our hypotheses to address the concern that our main results may be driven by the U.S. firms. Table 8 reports the regression results based on non-U.S. firms conditional on country-level institutions. The coefficients on $PC$ are all significantly positive in Common law, high $Antidirector$, high $Antiselfdealing$, low $Corruption$, and high market $Liquidity$ groups (i.e., in the even-numbered columns), while the coefficients on $PC$ are significantly negative in
countries with Code law and high Corruption level. Furthermore, the coefficients of $PC^*\text{Abs}_\text{ret}$ are all significantly negative in Common law, high Antidirector, high Antiselfdealing, low Corruption, and high market Liquidity groups (i.e., in the even-numbered columns). Overall, we conclude that our main results are unlikely to be driven by the U.S. firms.

-----Insert Table 8-----

6 Conclusion

In this study, we investigate trading volume reactions around earnings announcements in an international setting. Following the prior literature (Kim and Verrecchia 1997; Ahmed et al. 2003; Hope et al. 2009; Barron et al. 2018), we decompose trading volume around an earnings announcement into a price-related component and a non-price related component. We show that, on average, a noisier earnings signal increases trading by stimulating differential interpretations, and decreases trading by narrowing the pre-event period information gap among investors. More importantly, when we partition the sample according to measures of investor protection, government corruption, and market liquidity, we find that the above results hold only for countries with strong institutions and are significantly weaker or even flip for countries with weak institutions. Although existing studies also relate total volume reaction to institutions (DeFond et al. 2007; Landsman et al. 2012), our results speak to how country-level factors affect differential information production and precision among investors both at and before earnings announcements. Our findings thus suggest that country-level factors are important determinants of the volume reaction around earnings announcements and contribute to the sparse literature on the trading response to corporate announcements in an international setting.
References
Abdel-Meguid, Ahmed M., Guy D. Fernando, Richard A. Schneible Jr, and SangHyun Suh, 2019. Differential interpretations and earnings quality. *Accounting Horizons* 33, 59-73.
Ahmed, Anwer S., Richard A. Schneible, and Douglas E. Stevens, 2003. An empirical analysis of the effects of online trading on stock price and trading volume reactions to earnings announcements. *Contemporary Accounting Research* 20, 413-439.
Ahmed, Anwer S., and Richard A. Schneible, 2007. The impact of regulation Fair Disclosure on investors’ prior information quality - Evidence from an analysis of changes in trading volume and stock price reactions to earnings announcements. *Journal of Corporate Finance* 13, 282-299.
Ali, Ashiq, Sandy Klasa, and Oliver Zhen Li, 2008. Institutional stakeholdings and better-informed traders at earnings announcements. *Journal of Accounting and Economic* 46, 47-61.
Atiase, Rowland K., and Linda Smith Bamber, 1994. Trading volume reactions to annual accounting earnings announcements: The incremental role of predisclosure information asymmetry. *Journal of Accounting and Economics* 17, 309-29.
Ball, Ray, and Lakshmanan Shivakumar, 2008. How much new information is there in earnings? *Journal of Accounting Research* 46, 975-1016.
Bamber, Linda Smith, and Youngsoon Susan Cheon, 1995. Differential price and volume reactions to accounting earnings announcements. *The Accounting Review* 70, 417-41.
Bamber, Linda Smith, Orie E. Barron, and Thomas L. Stober, 1997. Trading volume and different aspects of disagreement coincident with earnings announcements. *The Accounting Review* 72, 575-97.
Bamber, Linda Smith, Orie E. Barron, and Thomas L. Stober, 1999. Differential interpretations and trading volume. *Journal of Financial and Quantitative Analysis* 34, 369-386.
Bamber, Linda Smith, Orie E. Barron, and Douglas E. Stevens, 2011. Trading volume around earnings announcements and other financial reports: Theory, research design, empirical evidence, and directions for future research. *Contemporary Accounting Research* 28, 431-471.
Barron, Orie E., Richard A. Schneible, and Douglas E. Stevens, 2018. The changing behavior of trading volume reactions to earnings announcements: Evidence of the increasing use of accounting earnings news by investors. *Contemporary Accounting Research* 35, 1651-1674.
Beneish, Messod D., and Mark E. Vargus, 2002. Insider trading, earnings quality, and accrual mispricing. *The Accounting Review* 77, 755-791.
Bhattacharya, Utpal, Hazem Daouk, and Michael Welker, 2003. The world price of earnings opacity. *The Accounting Review* 78, 641-678.
Chan, Kalok, and Allaudeen Hameed, 2006. Stock price synchronicity and analyst coverage in emerging markets. *Journal of Financial Economics* 80, 115-147.
Chen, Charles JP, Yuan Ding, and Chansog Francis Kim, 2010. High-level politically connected firms, corruption, and analyst forecast accuracy around the world. *Journal of International Business Studies* 41, 1505-1524.
Chung, Richard, Michael Firth, and Jeong-Bon Kim, 2002. Institutional monitoring and opportunistic earnings management. *Journal of Corporate Finance* 8, 29-48.
Dechow, Patricia M., and Ilia D. Dichev, 2002. The quality of accruals and earnings: The role of accrual estimation errors. *The Accounting Review* 77, 35-59.
Dechow, Patricia, Weili Ge, and Catherine Schrand, 2010. Understanding earnings quality: A review of the proxies, their determinants and their consequences. *Journal of Accounting and Economics* 50, 344-401.
DeFond, Mark, Mingyi Hung, and Robert Trezevant, 2007. Investor protection and the information content of annual earnings announcements: international evidence. *Journal of Accounting and Economics* 43, 37-67.

Dichev, Ilia D., and Vicki Wei Tang, 2009. Earnings volatility and earnings predictability. *Journal of Accounting and Economics* 47, 160-181.

DiRienzo, Cassandra E., Jayoti Das, Kathryn T. Cort, and John Burbridge, 2007. Corruption and the role of information. *Journal of International Business Studies* 38, 320-332.

Djankov, Simeon, Rafael La Porta, Florencio Lopez-de-Silanes, and Andrei Shleifer, 2008. The law and economics of self-dealing." *Journal of Financial Economics* 88, 430-465.

Eleswarapu, Venkat R., and Kumar Venkataraman, 2006. The impact of legal and political institutions on equity trading costs: A cross-country analysis. *The Review of Financial Studies* 19, 1081-1111.

Francis, Jennifer, Katherine Schipper, and Linda Vincent, 2002. Earnings announcements and competing information. *Journal of Accounting and Economics* 33, 313-342.

Gaio, Cristina, and Clara Raposo, 2011. Earnings quality and firm valuation: international evidence. *Accounting & Finance* 51, 467-499.

Garfinkel, Jon A., and Jonathan Sokobin, 2006. Volume, opinion divergence, and returns: A study of post–earnings announcement drift. *Journal of Accounting Research* 44, 85-112.

Griffin, John M., Nicholas H. Hirschey, and Patrick J. Kelly, 2011. How important is the financial media in global markets? *The Review of Financial Studies* 24, 3941-3992.

Hope, Ole-Kristian, Wayne B. Thomas, and Glyn Winterbotham, 2009. Geographic earnings disclosure and trading volume. *Journal of Accounting and Public Policy* 28, 167-188.

Hung, Mingyi, 2000. Accounting standards and value relevance of earnings: An international analysis. *Journal of Accounting and Economics* 30, 401-420.

Jones, Jennifer J., 1991. Earnings management during import relief investigations. *Journal of Accounting Research* 29, 193-228.

Kandel, Eugene, and Neil D. Pearson, 1995. Differential interpretation of information and trade in speculative markets. *Journal of Political Economy* 103, 831-872.

Karpoff, Jonathan M., 1986. A theory of trading volume. *Journal of Finance* 41, 1069-1087.

Kerr, Jon, Gil Sadka, and Ronnie Sadka, 2020. Illiquidity and price informativeness. *Management Science* 66, 334-351.

Kim, Incheol, Steve Miller, Hong Wan, and Bin Wang, 2016. Drivers behind the monitoring effectiveness of global institutional investors: Evidence from earnings management. *Journal of Corporate Finance* 40, 24-46.

Kim, Oliver, and Robert E. Verrecchia, 1991. Trading volume and price reactions to public announcements. *Journal of Accounting Research* 29, 302-321.

Kim, Oliver, and Robert E. Verrecchia, 1994. Market liquidity and volume around earnings announcements. *Journal of Accounting and Economics* 17, 41-67.

Kim, Oliver, and Robert E., Verrecchia, 1997. Pre-announcement and event-period private information. *Journal of Accounting and Economics* 24, 395-419.

Kothari, S.P., Andrew J. Leone, and Charles, E. Wasley, 2005. Performance matched discretionary accrual measures. *Journal of Accounting and Economics* 39(1), 163-197.

La Porta, Rafael., Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert W. Vishny, 1998. Law and finance. *Journal of Political Economy* 106, 1113-1155.

La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny, 2000. Investor protection and corporate governance. *Journal of Financial Economics* 58, 3-27.

Landsman, Wayne R., Edward L. Maydew, and Jacob R. Thornock, 2012. The information content of annual earnings announcements and mandatory adoption of IFRS. *Journal of Accounting and Economics* 53, 34-54.
Levine, Ross, and Sergio L. Schmukler, 2007. Migration, spillovers, and trade diversion: The impact of internationalization on domestic stock market activity. *Journal of Banking & Finance* 31, 1595-1612.

Leuz, Christian, Dhananjay Nanda, and Peter D. Wysocki, 2003. Earnings management and investor protection: an international comparison. *Journal of Financial Economics* 69, 505-527.

Morck, Randall, Bernard Yeung, and Wayne Yu, 2000. The information content of stock markets: why do emerging markets have synchronous stock price movements? *Journal of Financial Economics* 58, 215-260.

Rose-Ackerman, S., 2001. Political corruption and democratic structures, in A.K. Jain (ed.), *The Political Economy of Corruption*, Routledge Press, New York, 111-141.

Sadka, Ronnie, and Anna Scherbina, 2007. Analyst disagreement, mispricing, and liquidity. *Journal of Finance* 62, 2367-2403.

Treisman, Daniel, 2000. The causes of corruption: a cross-national study. *Journal of Public Economics* 76, 399-457.

Utama, Siddharta, and William M. Cready, 1997. Institutional ownership, differential predisclosure precision and trading volume at announcement dates. *Journal of Accounting and Economics* 24, 129-150.

Xie, Hong, 2001. The mispricing of abnormal accruals. *The Accounting Review* 76, 357-373.

Ye, Chunlai, and Lin-Hui Yu, 2018. The effect of restatements on trading volume reactions to earnings announcements. *Review of Quantitative Finance and Accounting* 50, 129-180.

Ziebart, David A., 1990. The association between consensus of beliefs and trading activity surrounding earnings announcements. *The Accounting Review* 65, 477-88.
## Appendix: Variable definitions

| Variable                          | Definition                                                                                                                                 |
|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| **Main dependent variable**      |                                                                                                                                           |
| Abnormal turnovers \((At\_ab\_turn)\) | The at-abnormal turnovers are the differences of average turnover in the \([-2, 2]\) period and the control period turnover. The control period, \([-47, -8]\), is divided into eight sub-intervals, each of five days length, and the control period turnover is the median value of average turnovers across sub-intervals. |

| **Alternative dependent variables** |                                                                                                                                          |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Standardized unexpected and expected volumes \((SUV and SEV)\) | For each firm-announcement, standardized unexpected volume \((SUV)\) during \([-2, +2]\) is calculated as follows:  
\[
SUV = \frac{UV}{S} \\
UV = V - E(V) \\
E(V) = \hat{\alpha} + \hat{\beta}_1 R^+ + \hat{\beta}_2 |R^-| \\
V and R are volume and return at the announcements.  
S is the standard deviation of residuals in the estimation regression for \(\alpha, \beta_1\) and \(\beta_2\) using data from \([-47, -8]\) for each stock. \(R^+ (R^-)\) equals return if it is positive (negative) and is zero otherwise. Standardized expected volume \((SEV)\) is calculated as \(E(V)/S\). |

| **Earnings quality variables**    |                                                                                                                                           |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| EQ                                | Earnings quality measured by \(ABSDA, DD2022, EARNVAR\), or \(PC\).                                                                     |
| \(ABSDA\)                        | The absolute value of the residuals from the Jones (1991) model: \[ACC_{jt}/TA_{jt} = \alpha_1 [1/(TA_{jt-1})] + \alpha_2 [\Delta REV_{jt}/TA_{jt-1}] + \alpha_3 [PPE_{jt}/TA_{jt-1}] + e_{jt}\].  
The subscripts \(j\) and \(t\) refer to firm and year, respectively. \(ACC\) is the total accruals of the firm, \(TA\) is total assets, \(\Delta REV\) is the change in revenue from the previous period, and \(PPE\) is the property, plant and equipment. The model is run for each two-digit SIC code in each country-year cross-section. |
| \(DD2002\)                       | The absolute value of residuals from the Dechow and Dichev (2002) discretionary accruals model: \[\Delta WC_{jt} = \delta_0 + \delta_1 CF_{jt-1} + \delta_2 CF_{jt} + \delta_3 CF_{jt+1} + \epsilon_{jt}\]. \(\Delta WC\) is the change in working capital. \(CF\) is the cashflow from operations. The subscripts \(j\) and \(t\) refer to firm and year, respectively. The model is run for each two-digit SIC code in each country-year cross-section. |
| \(EARNVAR\)                      | The standard deviation of firm-level earnings divided by the standard deviation of cash flow from operations within the past five years (Dechow et al. 2010) |
| \(PC\)                           | The first principal component from \(ABSDA, DD2002\), and \(EARNVAR\).                                                                  |

| **Firm level variables**         |                                                                                                                                           |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| \(Abs\_ ret\)                   | Absolute return over the event-period of \([-2, 2]\).                                                                                   |
| \(Size\)                         | Decile ranks of market capitalization within a country-year.                                                                            |
| \(Meanvol\)                     | Mean turnover of the firms in the sample for the same time as the announcement period.                                                |
| \(Logprice\)                    | Natural logarithm of average stock price in USD over the control period \([-47, -8]\).                                                      |
| \(Nanalys\)                     | Number of analysts following. Source: I/B/E/S                                                                                           |
| \(Largest20\)                   | A dummy variable equal to one if the firm is one of the largest 20 firms in its country, where size is measured by market value at the beginning of the year according to Worldscope database. |
| \(ADR\)                          | A dummy variable equal to one if the firm is cross-listed. Source: JP Morgan website.                                                   |
| \(Loss\)                         | A dummy variable equal to one if the reported actual earnings are less than zero.                                                      |
| \(UE\)                           | Unexpected earnings from scaled yearly change in income                                                                               |
### Reportlag

The number of days from the fiscal year-end to the earnings announcement date reported by Worldscope.

### Nanalys

Number of analysts following. Source: I/B/E/S

### IO

The latest quarterly percentage institutional holdings reported in Factset.

#### Country level variables

| Variable                  | Description                                                                                                                                                                                                 | Source                        |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| Anti-director index       | An index that aggregates the following components of investor rights: (1) the ability to vote by mail, (2) the ability to gain control of shares during the investors' meeting, (3) the possibility of cumulative voting for directors, (4) the ease of calling an extraordinary investors meeting, (5) the availability of mechanisms allowing minority investors to make legal claims against the directors, and (6) the presence of shareholders' preemptive rights that can be waived only by a shareholders' vote. The antidirector rights measure ranges from 0 to 5, with higher scores for stronger shareholder rights. Data source: La Porta et al. (1998) |
| Legal origin              | Indicator for legal tradition, which is equal to one for common law, zero for code law. Data source: La Porta et al. (1998)                                                                                       |                               |
| Stock market size         | Calculated as the total equity market capitalization divided by GDP of that country. Source: World Development Indicators (2012)                                                                                  |                               |
| Aggregate stock market turnover | The total annual dollar trading volume divided by total market capitalization for a country.                                                                                                              |                               |
| Corruption                | Control of corruption, from La Porta et al. (1998)                                                                                                                                                         |                               |
| Antiselfdealing           | Average of ex-ante and ex-post private control of self-dealing. From Djankov et al. (2008)                                                                                                                 |                               |
Table 1. Summary statistics by country

This table reports country-level means of abnormal turnover around earnings announcements (Abnormal turnover), earnings quality (ABSDA, DD2002, and EARNVAR), and institutional factors (Common, Anti-director, Corruption, Anti-selfdealing, and Liquidity). We perform t-tests to check if the mean of Abnormal turnover is significantly different from zero. § indicates the significance level of 1%. Please refer to the Appendix for variable definitions.

| Country    | #Obs   | Abnormal turnover | ABSDA | DD2002 | EARNVAR | Common | Anti-director | Corruption | Anti-selfdealing | Liquidity |
|------------|--------|-------------------|-------|--------|---------|--------|---------------|------------|-----------------|-----------|
| Australia  | 8,346  | 0.0008§           | 0.087 | 0.074  | 1.027   | 1      | 4             | 8.52       | 0.76            | 0.69      |
| Belgium    | 63     | 0.0007§           | 0.049 | 0.033  | 1.075   | 0      | 0             | 8.82       | 0.54            | 0.41      |
| Canada     | 5,933  | 0.0009§           | 0.075 | 0.061  | 1.078   | 1      | 5             | 10         | 0.64            | 6.05      |
| Finland    | 314    | 0.0028§           | 0.052 | 0.038  | 1.143   | 0      | 3             | 10         | 0.46            | 1.07      |
| France     | 4,292  | 0.0010§           | 0.055 | 0.036  | 0.895   | 0      | 3             | 9.05       | 0.38            | 0.67      |
| Germany    | 4,627  | 0.0002§           | 0.068 | 0.049  | 0.908   | 0      | 1             | 8.93       | 0.28            | 0.06      |
| Greece     | 1,096  | 0.0000§           | 0.057 | 0.035  | 0.636   | 0      | 2             | 7.27       | 0.22            | 0.53      |
| Hong Kong  | 6,550  | 0.0014§           | 0.078 | 0.061  | 0.902   | 1      | 5             | 8.52       | 0.96            | 0.49      |
| India      | 8,142  | 0.0007§           | 0.074 | 0.053  | 0.789   | 1      | 5             | 4.58       | 0.58            | 0.47      |
| Italy      | 814    | 0.0012§           | 0.041 | 0.030  | 0.821   | 0      | 1             | 6.13       | 0.42            | 0.94      |
| Japan      | 47,570 | 0.0011§           | 0.037 | 0.025  | 0.783   | 0      | 4             | 8.52       | 0.50            | 1.05      |
| Korea      | 10,700 | 0.0034§           | 0.067 | 0.049  | 0.851   | 0      | 2             | 5.3        | 0.47            | 2.05      |
| Malaysia   | 6,661  | 0.0007§           | 0.061 | 0.042  | 0.852   | 1      | 4             | 7.38       | 0.95            | 0.37      |
| Netherlands| 227    | 0.0033§           | 0.057 | 0.042  | 0.975   | 0      | 2             | 10         | 0.20            | 1.05      |
| Norway     | 667    | 0.0015§           | 0.057 | 0.039  | 0.999   | 0      | 4             | 10         | 0.42            | 0.87      |
| Pakistan   | 239    | -0.0002           | 0.062 | 0.040  | 0.770   | 1      | 5             | 2.98       | 0.41            | 2.27      |
| Singapore  | 3,844  | 0.0011§           | 0.071 | 0.051  | 0.856   | 1      | 4             | 8.22       | 1.00            | 0.48      |
| South Africa| 598   | 0.0007§           | 0.055 | 0.046  | 0.882   | 1      | 5             | 8.92       | 0.81            | 0.44      |
| Switzerland| 105    | 0.0008§           | 0.033 | 0.019  | 0.728   | 0      | 4             | 10         | 0.37            | 0.74      |
| Spain      | 1,024  | 0.0016§           | 0.038 | 0.030  | 0.899   | 0      | 2             | 7.38       | 0.27            | 0.71      |
| Thailand   | 2,543  | 0.0018§           | 0.063 | 0.043  | 0.825   | 1      | 2             | 5.18       | 0.81            | 0.66      |
| U.K.       | 12,371 | 0.0022§           | 0.064 | 0.051  | 0.911   | 1      | 5             | 9.1        | 0.95            | 0.89      |
| United States| 50,538| 0.0046§           | 0.068 | 0.060  | 1.043   | 1      | 5             | 8.63       | 0.65            | 1.61      |
| Total      | 177,264| 0.0022§           | 0.060 | 0.047  | 0.907   | 0.597  | 4.181         | 7.98       | 0.63            | 1.08      |
Table 2. Correlation matrix among main variables

This table presents the Pearson correlation coefficients among the main variables used in regression tests. The coefficients are bolded (italicized) to indicate statistical significance at 1% (5%) level. Panel A reports the correlation coefficients among abnormal turnover (At_ab_turn), earnings quality measures (ABSDA, DD2002, EARNVAR, and PC), and country-level variables (Common, Antidirector, Corruption, Antiselfdealing, TotMktSize, GDP, and Liquidity). Panel B reports the correlation coefficients among abnormal turnover (At_ab_turn), earnings quality measures (ABSDA, DD2002, EARNVAR, and PC), and control variables (Abs_ret, Size, Meanvol, Logprice, Nanalys, Large20, ADR, Loss, UE, and Reportlag). Please refer to the Appendix for variable definitions.

Panel A.

| Variables      | (1)  | (2)  | (3)  | (4)  | (5)  | (6)  | (7)  | (8)  | (9)  | (10) | (11) | (12) |
|----------------|------|------|------|------|------|------|------|------|------|------|------|------|
| (1) At_ab_turn | 1.000|      |      |      |      |      |      |      |      |      |      |      |
| (2) ABSDA      | 0.018| 1.000|      |      |      |      |      |      |      |      |      |      |
| (3) DD2002     | 0.032| 0.648| 1.000|      |      |      |      |      |      |      |      |      |
| (4) EARNVAR    | 0.034| 0.010| 0.112| 1.000|      |      |      |      |      |      |      |      |
| (5) PC         | 0.036| 0.893| 0.906| 0.171| 1.000|      |      |      |      |      |      |      |
| (6) Common     | 0.087| 0.173| 0.220| 0.080| 0.219| 1.000|      |      |      |      |      |      |
| (7) Antidirector| 0.073| 0.048| 0.094| 0.049| 0.071| 0.659| 1.000|      |      |      |      |      |
| (8) Corruption | 0.015| -0.032| 0.001| 0.043| -0.023| 0.058| 0.340| 1.000|      |      |      |      |
| (9) Antiselfdealing | 0.022| 0.107| 0.129| 0.036| 0.136| 0.761| 0.528| 0.108| 1.000|      |      |      |
| (10) Liquidity | 0.010| 0.004| 0.011| 0.004| 0.005| 0.034| 0.045| 0.053| -0.011| 1.000|      |      |
| (11) TotMktSize | 0.025| 0.090| 0.107| 0.028| 0.117| 0.422| 0.319| 0.158| 0.583| -0.021| 1.000|      |
| (12) GDP       | 0.128| -0.044| 0.001| 0.040| -0.037| -0.032| 0.358| 0.348| -0.355| 0.028| -0.325| 1.000|
### Panel B.

| Variables      | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) |
|----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| (1) At_ab_turn | 1.00|     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| (2) ABSDA      | 0.018|     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| (3) DD2002     | 0.032| 0.648|     |     |     |     |     |     |     |     |     |     |     |     |     |
| (4) EARNVAR    | 0.034| 0.010| 0.112|     |     |     |     |     |     |     |     |     |     |     |     |
| (5) PC         | 0.036| 0.893| 0.906| 0.171|     |     |     |     |     |     |     |     |     |     |     |
| (6) Abs_ret    | 0.260| 0.128| 0.161| 0.075| 0.160|     |     |     |     |     |     |     |     |     |     |
| (7) Size       | 0.061|-0.180|-0.195|-0.062|-0.203|-0.140|     |     |     |     |     |     |     |     |     |
| (8) Meanvol    | 0.216|-0.035|-0.009| 0.041|-0.018| 0.090| 0.195|     |     |     |     |     |     |     |     |
| (9) Logprice   | 0.078|-0.187|-0.199|-0.056|-0.206|-0.120| 0.418| 0.213|     |     |     |     |     |     |     |
| (10) Nanalys   | 0.111|-0.107|-0.104| 0.010|-0.109|-0.040| 0.553| 0.217| 0.328|     |     |     |     |     |     |
| (11) Large20   | -0.015|-0.031|-0.037|-0.005|-0.036|-0.34| 0.174| 0.001| 0.093| 0.330|     |     |     |     |     |
| (12) ADR       | 0.002| 0.002| 0.005| 0.013| 0.005| 0.002| -0.007| 0.006| 0.004| 0.007| -0.003|     |     |     |     |
| (13) Loss      | -0.008| 0.167| 0.226| 0.149| 0.218| 0.147| -0.283| -0.036| -0.304| -0.127| -0.058| 0.005|     |     |     |
| (14) UE        | 0.010| 0.317| 0.411| 0.134| 0.388| 0.183| -0.224| -0.018| -0.258| -0.091| -0.031| 0.004| 0.311|     |     |
| (15) Reportlag | -0.089| 0.172| 0.176| 0.021| 0.182| 0.051| -0.270| -0.271| -0.193| -0.249| -0.044| -0.007| 0.198| 0.176| 1.000 |
Table 3. Earnings quality and abnormal trading volume at earnings announcements

This table reports the panel regression results of Equation (3). The dependent variable is the abnormal turnover (At_ab_turn) over [-2, 2]. All variables are defined in the Appendix. Standard errors adjusted for firm and year clustering are reported in parentheses. Significance levels of 10%, 5%, and 1% of regression coefficients are indicated by *, **, and ***, respectively.

|           | (1)                      | (2)                      | (3)                      | (4)                      | (5)                      | (6)                      |
|-----------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| EQ        | 0.446***                 | 0.617***                 | 0.013***                 | 0.029***                 | 0.023***                 | 0.029***                 |
|           | (0.074)                  | (0.064)                  | (0.003)                  | (0.004)                  | (0.003)                  | (0.004)                  |
| EQ*Abs_ret| -4.413***                | -5.340***                | -0.081*                  | -0.247***                | -0.166***                | -0.245***                |
|           | (1.017)                  | (0.973)                  | (0.045)                  | (0.049)                  | (0.027)                  | (0.049)                  |
| Abs_ret   | 3.057***                 | 3.066***                 | 2.838***                 | 2.896***                 | 2.804***                 | 2.888***                 |
|           | (0.277)                  | (0.264)                  | (0.215)                  | (0.240)                  | (0.062)                  | (0.239)                  |
| Size      | 0.014                    | 0.015                    | 0.013                    | 0.019                    | 0.042                    | 0.018                    |
|           | (0.022)                  | (0.022)                  | (0.022)                  | (0.022)                  | (0.027)                  | (0.023)                  |
| Meanvol   | 0.056***                 | 0.056***                 | 0.056***                 | 0.055***                 | 0.046***                 | 0.065***                 |
|           | (0.004)                  | (0.004)                  | (0.004)                  | (0.004)                  | (0.002)                  | (0.005)                  |
| Logprice  | 0.018***                 | 0.018***                 | 0.018***                 | 0.017***                 | 0.032***                 | 0.014***                 |
|           | (0.003)                  | (0.003)                  | (0.003)                  | (0.003)                  | (0.004)                  | (0.002)                  |
| Nanalys   | 0.009***                 | 0.009***                 | 0.009***                 | 0.009***                 | 0.006***                 | 0.009***                 |
|           | (0.001)                  | (0.001)                  | (0.001)                  | (0.001)                  | (0.001)                  | (0.001)                  |
| Largest20 | -0.244***                | -0.244***                | -0.246***                | -0.243***                | -0.082***                | -0.233***                |
|           | (0.021)                  | (0.021)                  | (0.021)                  | (0.021)                  | (0.019)                  | (0.021)                  |
| ADR       | 0.002                    | 0.001                    | -0.033                   | -0.029                   | 0.144***                 | -0.029                   |
|           | (0.051)                  | (0.051)                  | (0.053)                  | (0.053)                  | (0.055)                  | (0.052)                  |
| Loss      | -0.021***                | -0.022***                | -0.019***                | -0.022***                | -0.035***                | -0.022***                |
|           | (0.007)                  | (0.007)                  | (0.007)                  | (0.007)                  | (0.007)                  | (0.007)                  |
| UE        | -0.060***                | -0.066***                | -0.045***                | -0.046***                | -0.013                   | -0.045***                |
|           | (0.012)                  | (0.012)                  | (0.017)                  | (0.015)                  | (0.018)                  | (0.015)                  |
| Reportlag | -0.001***                | -0.001***                | -0.001***                | -0.001***                | -0.000*                  | -0.001***                |
|           | (0.000)                  | (0.000)                  | (0.000)                  | (0.000)                  | (0.000)                  | (0.000)                  |
| TotMktSize| 0.027***                 |                         |                         |                         |                         |                         |
| GDP       |                         | 0.048***                 |                         |                         |                         |                         |
| Common    |                         |                         | 0.115***                 |                         |                         |                         |
| Antidirector|                         |                         | -0.060***               |                         |                         |                         |
| Corruption|                         |                         | -0.016***               |                         |                         |                         |
| Antiselfdealing |                 |                         | 0.115***                |                         |                         |                         |
| Liquidity |                         |                         | 0.005**                 |                         |                         |                         |
| Industry FE| Yes                     | Yes                     | Yes                     | Yes                     | No                      | Yes                     |
| Country FE| Yes                     | Yes                     | Yes                     | Yes                     | No                      | No                      |
| Firm FE   | No                      | No                      | No                      | No                      | Yes                     | No                      |
| Year FE   | Yes                     | Yes                     | Yes                     | Yes                     | Yes                     | Yes                     |
| Adjusted R^2| 0.129                  | 0.130                   | 0.131                   | 0.133                   | 0.241                   | 0.132                   |
| Obs.      | 177,264                 | 177,264                 | 162,963                 | 162,963                 | 162,963                 | 162,963                 |
Table 4: Samples partitioned based on country-level factors

This table reports the panel regression results of Equation (3) for different subsamples using \( PC \) as a composite measure of earnings quality. Samples are divided according to the legal origin (Columns 1 and 2) or the country-level medians for Antidirector, Antiselfdealing, Corruption, and Liquidity (Columns 3 to 10). The dependent variable is the abnormal turnover \( (At_{ab\_turn}) \) over \([-2, 2]\). Control variables are the same as those in Column 1 of Table 3 and suppressed in this table to save space. All variables are defined in the Appendix. Standard errors adjusted for firm and year clustering are reported in parentheses. Significance levels of 10%, 5%, and 1% of regression coefficients are indicated by *, **, and ***, respectively. The bottom of the table reports the cross-group difference of coefficients with the \( p \)-values in brackets.

|               | Legal Origin | Antidirector | AntiselfDealing | Corruption | Liquidity |
|---------------|--------------|--------------|-----------------|------------|-----------|
|               | Code        | Common       | Low            | High       | Low       | High     | Low | High |
| \( PC \) (a)  | -0.032**    | 0.036***     | -0.018         | 0.030***   | -0.014    | 0.029*** | 0.021** | 0.039*** | 0.012*** | 0.042*** |
|               | (0.013)     | (0.003)      | (0.017)        | (0.003)    | (0.019)   | (0.003)  | (0.010) | (0.003) | (0.004) | (0.005) |
| \( PC \times Abs\_ret \) (b) | 0.781*** | -0.268*** | 0.503* | -0.242*** | 0.493* | -0.242*** | 0.549*** | -0.287*** | 0.018 | -0.371*** |
|               | (0.191)     | (0.044)      | (0.267)        | (0.039)    | (0.273)   | (0.039)  | (0.142) | (0.045) | (0.075) | (0.059) |
| Abs\_ret      | 4.216***    | 2.678***     | 6.857***       | 2.553***   | 6.917***  | 2.572*** | 3.776*** | 2.752*** | 2.097*** | 3.384*** |
|               | (0.364)     | (0.282)      | (0.856)        | (0.225)    | (0.840)   | (0.228)  | (0.275) | (0.284) | (0.276) | (0.282) |
| Controls      | YES         | YES          | YES            | YES        | YES       | YES      | YES    | YES    | YES    | YES     |
| Industry FE   | YES         | YES          | YES            | YES        | YES       | YES      | YES    | YES    | YES    | YES     |
| Country FE    | YES         | YES          | YES            | YES        | YES       | YES      | YES    | YES    | YES    | YES     |
| Year FE       | YES         | YES          | YES            | YES        | YES       | YES      | YES    | YES    | YES    | YES     |
| Adjusted R²   | 0.084       | 0.216        | 0.086          | 0.217      | 0.084     | 0.214    | 0.081   | 0.218   | 0.155   | 0.131   |
| Obs.          | 67,617      | 95,346       | 23,428         | 139,535    | 22,011    | 140,952  | 77,295 | 85,458 | 70,537 | 92,426 |

|               | Difference in (a) | 0.068 [0.000] | 0.048 [0.000] | 0.043 [0.000] | 0.059 [0.000] | 0.030 [0.000] |
|               | Difference in (b) | 1.050 [0.000] | -0.745 [0.000] | -0.745 [0.000] | -0.837 [0.000] | -0.389 [0.000] |
Table 5. Volume reaction to earnings announcements of institutional investors

This table reports the panel regression of estimating the impact of institutional ownership on the relation between the components of trading volume reaction and PC, a composite measure of earnings quality. Samples are divided according to the legal origin (Columns 1 and 2) or the country-level medians for Antidirector, Antiselfdealing, Corruption, and Liquidity (Columns 3 to 10). The dependent variable is the abnormal turnover ($At_{ab\_turn}$) over [-2, 2]. Control variables are the same as those in Column 1 of Table 3 and suppressed in this table to save space. All variables are defined in the Appendix. Standard errors adjusted for firm and year clustering are reported in parentheses. Significance levels of 10%, 5%, and 1% of regression coefficients are indicated by *, **, and ***, respectively. The bottom of the table reports the cross-group difference of coefficients with the $p$-values in brackets.

|                | Legal Origin |           | Antidirector |           | AntiselfDealing |           | Corruption |           | Liquidity |           |
|----------------|--------------|-----------|--------------|-----------|----------------|-----------|------------|-----------|-----------|-----------|
|                | Code Common  | Low       | High         | Low       | High           | High      | Low        | High      | Low       | High      |
| PC             | (1)          | (2)       | (3)          | (4)       | (5)            | (6)       | (7)        | (8)       | (9)       | (10)      |
|                | -0.028*      | 0.029***  | -0.011       | 0.026***  | -0.005         | 0.026***  | -0.018     | 0.032***  | 0.010***  | 0.037***  |
|                | (0.016)      | (0.003)   | (0.020)      | (0.002)   | (0.023)        | (0.002)   | (0.012)    | (0.003)   | (0.003)   | (0.006)   |
| PC×Abs_ret     | (0.216)      | (0.052)   | 0.454        | -0.298*** | 0.416          | -0.297*** | 0.508***   | -0.340*** | -0.077    | -0.409*** |
|                | (0.216)      | (0.052)   | (0.298)      | (0.040)   | (0.308)        | (0.040)   | (0.164)    | (0.054)   | (0.049)   | (0.061)   |
| Abs_ret        | (4.344***    | 2.627***  | 7.189***     | 2.562***  | 7.296***       | 2.581***  | 3.934***   | 2.695***  | 2.015***  | 3.426***  |
|                | (0.354)      | (0.297)   | (0.876)      | (0.245)   | (0.853)        | (0.248)   | (0.274)    | (0.301)   | (0.322)   | (0.285)   |
| IO             | -0.007       | 0.794***  | 0.014        | 0.847***  | 0.033          | 0.854***  | 0.101      | 0.746***  | 0.534***  | 0.924***  |
|                | (0.059)      | (0.044)   | (0.078)      | (0.046)   | (0.081)        | (0.045)   | (0.078)    | (0.043)   | (0.167)   | (0.054)   |
| IO×PC (a)      | -0.041       | 0.041     | -0.106       | 0.051**   | -0.165         | 0.053**   | -0.003     | 0.030     | 0.009     | 0.046*    |
|                | (0.092)      | (0.026)   | (0.112)      | (0.024)   | (0.119)        | (0.024)   | (0.103)    | (0.026)   | (0.025)   | (0.023)   |
| IO×PC×Abs_ret (b) | -1.233      | 1.359***  | -0.913       | 1.313***  | 0.010          | 1.298***  | -0.295     | 1.401***  | 1.253***  | 1.491***  |
|                | (1.562)      | (0.385)   | (2.110)      | (0.364)   | (1.998)        | (0.364)   | (1.906)    | (0.382)   | (0.405)   | (0.394)   |
| Controls       | Yes          | Yes       | Yes          | Yes       | Yes            | Yes       | Yes        | Yes       | Yes       | Yes       |
| Industry FE    | Yes          | Yes       | Yes          | Yes       | Yes            | Yes       | Yes        | Yes       | Yes       | Yes       |
| Country FE     | Yes          | Yes       | Yes          | Yes       | Yes            | Yes       | Yes        | Yes       | Yes       | Yes       |
| Year FE        | Yes          | Yes       | Yes          | Yes       | Yes            | Yes       | Yes        | Yes       | Yes       | Yes       |
| Adjusted $R^2$| 0.086        | 0.242     | 0.089        | 0.243     | 0.087          | 0.240     | 0.082      | 0.243     | 0.158     | 0.144     |
| Obs.           | 59,376       | 87,055    | 22,159       | 124,272   | 20,703         | 125,728   | 69,470     | 125,755   | 54,043    | 92,388    |
| Difference in (a) | 0.083 [0.002] | 0.157 [0.000] | 0.217 [0.000] | 0.033 [0.000] | 0.037 [0.040] |
| Difference in (b) | 2.591 [0.000] | 2.226 [0.000] | 1.288 [0.000] | 1.696 [0.000] | 0.238 [0.150] |
Table 6. An alternative approach to decomposing volume reaction

This table reports the panel regression results for Equation (4). The dependent variables are standardized unexpected volume ($SUV$) in Column 1 and standardized expected volume ($SEV$) in Column 2. All variables are defined in the Appendix. Standard errors adjusted for firm and year clustering are reported in parentheses. Significance levels of 10%, 5%, and 1% of the regression coefficients are indicated by *, **, and ***, respectively.

|          | (1) Dep. Var. = SEV | (2) Dep. Var. = SUV |
|----------|---------------------|---------------------|
| $PC$     | -0.007***           | 0.016***            |
|          | (0.001)             | (0.003)             |
| $Abs_{ret}$ | 1.814***          | 2.456***            |
|          | (0.042)             | (0.320)             |
| $Size$   | 0.482***            | 0.100               |
|          | (0.020)             | (0.069)             |
| $Meanvol$| 0.037***            | 0.155***            |
|          | (0.002)             | (0.009)             |
| $Logprice$ | 0.000              | 0.033***            |
|          | (0.002)             | (0.008)             |
| $Nanalys$| 0.012***            | 0.012***            |
|          | (0.001)             | (0.001)             |
| $Largest20$ | 0.070**        | -0.145***           |
|          | (0.028)             | (0.041)             |
| $ADR$    | 0.014               | 0.105               |
|          | (0.034)             | (0.084)             |
| $Loss$   | -0.024***           | -0.101***           |
|          | (0.004)             | (0.010)             |
| $UE$     | -0.006              | -0.053***           |
|          | (0.005)             | (0.018)             |
| $Reportlag$ | -0.001***    | 0.000               |
|          | (0.000)             | (0.000)             |
| Country FE | Yes                | Yes                |
| Industry FE | Yes              | Yes                |
| Year FE   | Yes                | Yes                |
| Adjusted $R^2$ | 0.465          | 0.157               |
| Obs.      | 162,558            | 162,558             |
Table 7. An alternative approach to decomposing volume reaction: Samples partitioned based on country-level factors

This table reports the subsample regression results for Equation (4). In each panel, the sample is divided according to the legal origin (Columns 1 and 2) or the country-level medians for Antidirector, Antiselfdealing, Corruption, and Liquidity (Columns 3 to 10). Control variables are the same as those in Table 6 and suppressed in this table to save space. All variables are defined in the Appendix. Standard errors adjusted for firm and year clustering are reported in parentheses. Significance levels of 10%, 5%, and 1% of regression coefficients are indicated by *, **, and ***, respectively. The bottom of the table reports the cross-group difference of coefficients with the p-values in brackets.

Panel A. Results using standardized expected volume (SEV) as the dependent variable

| Legal Origin | Antidirector | AntiselfDealing | Corruption | Liquidity |
|--------------|--------------|----------------|------------|-----------|
| Code Common  | Low High     | Low High       | High Low   | Low High   |
| (1)          | (2)          | (3) (4)        | (5) (6)    | (7) (8)    |
| PC (a)       | -0.003 -0.007*** | -0.001 -0.007*** | -0.002 -0.007*** | 0.000 -0.008*** |
| Controls     | Yes Yes      | Yes Yes        | Yes Yes    | Yes Yes    |
| Country FE   | Yes Yes      | Yes Yes        | Yes Yes    | Yes Yes    |
| Industry FE  | Yes Yes      | Yes Yes        | Yes Yes    | Yes Yes    |
| Year FE      | Yes Yes      | Yes Yes        | Yes Yes    | Yes Yes    |
| Adjusted R²  | 0.432 0.496 | 0.451 0.476    | 0.451 0.476 | 0.418 0.494 |
| Obs.         | 67,490 95,068 | 23,313 139,245 | 21,896 140,662 | 77,271 85,077 |
| Difference in (a) | -0.004 [0.000] | -0.006 [0.000] | -0.005 [0.000] | -0.008 [0.000] |

Panel B. Results using standardized unexpected volume (SUV) as the dependent variable

| Legal Origin | Antidirector | AntiselfDealing | Corruption | Liquidity |
|--------------|--------------|----------------|------------|-----------|
| Code Common  | Low High     | Low High       | High Low   | Low High   |
| (1)          | (2)          | (3) (4)        | (5) (6)    | (7) (8)    |
| PC (a)       | 0.012** 0.021*** | 0.013** 0.016*** | 0.012** 0.016*** | 0.008* 0.023*** |
| Controls     | Yes Yes      | Yes Yes        | Yes Yes    | Yes Yes    |
| Country FE   | Yes Yes      | Yes Yes        | Yes Yes    | Yes Yes    |
| Industry FE  | Yes Yes      | Yes Yes        | Yes Yes    | Yes Yes    |
| Year FE      | Yes Yes      | Yes Yes        | Yes Yes    | Yes Yes    |
| Adjusted R²  | 0.172 0.154 | 0.156 0.160    | 0.158 0.160 | 0.161 0.151 |
| Obs.         | 67,490 95,068 | 23,313 139,245 | 21,896 140,662 | 77,271 85,077 |
| Difference in (a) | 0.009 [0.000] | 0.003 [0.006] | 0.004 [0.000] | 0.014 [0.000] |
Table 8. Robustness checks: Excluding the U.S. firms

This table reports the panel regression results of estimating Equation (3) after removing the U.S. firms. Samples are divided according to the legal origin (Columns 1 and 2) or the country-level medians for Antidirector, Antiselfdealing, Corruption, and Liquidity (Columns 3 to 10). The dependent variable is the abnormal turnover \((At_{ab\_turn})\) over \([-2, 2]\). Control variables are the same as those used in Column 1 of Table 3 and suppressed in this table to save space. All variables are defined in the Appendix. Standard errors adjusted for firm and year clustering are reported in parentheses. Significance levels of 10%, 5%, and 1% of regression coefficients are indicated by *, **, and ***, respectively. The bottom of the table reports the cross-group difference of coefficients with the \(p\)-values in brackets.

|                  | Legal Origin | Antidirector | AntiselfDealing | Corruption | Liquidity |
|------------------|-------------|--------------|----------------|------------|-----------|
|                  | Code Common | Low High     | Low High       | High Low   | Low High  |
|                  | (1) (2)     | (3) (4)      | (5) (6)        | (7) (8)    | (9) (10)  |
| \(PC\) (a)       | -0.032**    | 0.005***     | -0.018 0.018***| -0.014 0.016***| -0.021** 0.006***|
| \(PC\times Abs\_ret\) (b) | 0.781*** -0.029* | 0.503* -0.129*** | 0.493* -0.125*** | 0.549*** -0.039*** |
| \(Abs\_ret\)     | 4.216***    | 1.202***     | 6.857*** 1.676*** | 6.917*** 1.723*** | 3.776*** 1.101*** |
| Controls         | YES YES     | YES YES      | YES YES YES YES YES YES |
| Industry FE      | YES YES     | YES YES      | YES YES YES YES YES YES |
| Country FE       | YES YES     | YES YES      | YES YES YES YES YES YES |
| Year FE          | YES YES     | YES YES      | YES YES YES YES YES YES |
| Adjusted \(R^2\) | 0.084 0.130 | 0.086 0.146 | 0.084 0.141 | 0.081 0.160 | 0.096 0.071 |
| Obs.             | 67,617 48,905 | 23,428 93,094 | 22,011 94,511 | 77,295 39,017 | 56,377 60,145 |
| Difference in (a)| 0.037 [0.000] | 0.036 [0.000] | 0.031 [0.000] | 0.026 [0.000] | 0.018 [0.000] |
| Difference in (b)| -0.811 [0.000] | -0.631 [0.000] | -0.618 [0.000] | -0.588 [0.000] | -0.159 [0.000] |