The power of oversight: Institutional investors as moderators of the earnings quality-information asymmetry nexus in Europe

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Abstract

Purpose – While there is some evidence of a relationship between earnings quality and information asymmetry, there is limited evidence on the moderating role of institutional investors in this relationship. To fill this gap, this study aims to examine how institutional ownership affects the relationship between earnings quality and information asymmetry, with a focus on the impact of different investment horizons.

Design/methodology/approach – This study employs a sample of listed European firms from 2000 to 2022. Earnings quality is measured using the McNichols (2002) modification of the Dechow and Dichev (2002) model. The analysis examines the moderating effect of institutional ownership on the relationship between earnings quality and information asymmetry.

Findings – We find that the relationship between earnings quality and information asymmetry is more pronounced in firms with a higher percentage of institutional ownership. We find that the monitoring role of long-term institutional investors is more effective than that of short-term institutional investors. The study also finds that the influence of institutional investors is more significant in firms with incentives to engage in earnings management.

Practical implications – Our findings provide evidence suggesting that institutional investors are an important class of investors in terms of exercising an effective monitoring role to mitigate information asymmetry and demand higher earnings quality from their investee firms. These findings are informative for many financial reporting participants, including investors, analysts, regulators, and managers.

Originality/value – Our study extends the existing research examining the relationship between earnings quality and information asymmetry (e.g., Affleck-Graves et al., 2002; Ascioglu et al., 2012; Bhattacharya et al., 2013; Jayaraman, 2008; Liu and Elayan, 2015) by examining the moderating effect of institutional ownership on this relationship. It further contributes to the literature by distinguishing between long-term and short-term institutional investors and their respective monitoring roles. Additionally, the study broadens the geographical scope of the research by using cross-country data from European firms, providing evidence that country-specific factors do not uniformly affect the relationship between earnings quality and information asymmetry.

Keywords

Earnings quality; information asymmetry; institutional investors; investment horizon, Europe

1. Introduction

This study aims to investigate the effect of institutional ownership on the relationship between earnings quality and information asymmetry. Earnings quality is widely recognised as a crucial measure of financial reporting quality, influencing capital market resource allocation (Li Eng and Lin, 2013; Lim et al., 2015; Dayanandan et al., 2016; Song, 2016). High earnings quality provides reliable financial information that helps investors make informed decisions, thus promoting efficient market functioning (Francis et al., 2006; Bhattacharya et al., 2013; Eliwa et al., 2016; Isidro and Dias, 2017; Deng et al., 2017; Eliwa et al., 2019). Information asymmetry, on the other hand, is a critical factor in assessing the presence of private insider information among investors, potentially leading to adverse selection in stock markets (Easley et al., 2002; Iatridis, 2011; Tartaroglu and Imhof, 2017). The presence of information asymmetry can distort asset prices and hinder the efficient allocation of capital.

Theoretical models posit that high quality accounting information reduces information asymmetry among market participants, thereby enhancing asset allocation efficiency (e.g., Diamond and Verrecchia, 1991; Easley and O'hara, 2004; Lambert et al., 2012). This relationship is empirically supported by studies showing a negative association between earnings quality and information asymmetry (e.g., Affleck-Graves et al., 2002; Jayaraman, 2008; Ascioglu et al., 2012; Bhattacharya et al., 2013; Liu and Elayan, 2015). By providing accurate and timely financial information, high-quality earnings help mitigate the adverse effects of asymmetric information, thereby fostering investor confidence and market stability.

Building on these studies, our study explores the role of institutional investors—an influential group due to their substantial asset management capabilities—in moderating the relationship between earnings quality and information asymmetry. Institutional investors are pivotal in corporate governance because of their significant shareholdings and enhanced ability to oversee and influence managerial decisions (Chung et al., 2002; Bushee and Goodman, 2007; Tahat et al., 2022). Despite the established importance of institutional investors in monitoring and influencing corporate governance, the extent to which they affect the earnings quality-information asymmetry nexus remains underexplored, especially in a cross-country context.

The impact of institutional ownership on the earnings quality-information asymmetry nexus is theoretically ambiguous. On the one hand, active monitoring by institutional investors can mitigate agency problems. Institutional investors are better equipped than retail investors to engage in efficient monitoring since they hold a larger number of shares and possess superior

information-gathering capabilities. Their position leads to strong incentives to monitor effectively (e.g., Shleifer and Vishny, 1986), which has been linked to reducing managerial opportunistic behaviour and improving transparency and quality of accounting information (Chung et al., 2002; Ajinkya et al., 2005; Cornett et al., 2007; Boone and White, 2015; Khafid and Arief, 2017; Kim et al., 2018). This view aligns with the trading hypothesis, which posits that institutional trading enhances market liquidity and reduces information asymmetry (Ajina et al., 2015). On the other hand, institutional investors could be myopic and passive in relation to the corporate governance of their investee firms, prioritising short-term gains over long-term value creation (McConnell and Servaes, 1990). This is consistent with the adverse selection hypothesis, which is premised on institutional investors as informed investors with access to private information, resulting in increasing information asymmetry (Ajinkya et al., 2005; Comerton-Forde and Rydge, 2006; LaFond and Watts, 2008; Boehmer and Kelley, 2009; Aslan et al., 2011; Ramalingegowda and Yu, 2012; Blume and Keim, 2012).

To address this complexity, our study first investigates how institutional ownership influences the relationship between earnings quality and information asymmetry. Our analysis reveals that the negative relationship between earnings quality and information asymmetry is more pronounced in firms with higher institutional ownership. This finding supports the view that institutional investors engage in more substantive monitoring than retail investors. Through their substantial shareholdings and close relationships with firms, institutional investors are better equipped to gather information and monitor management, thus mitigating adverse selection risks and decreasing information asymmetry. This aligns with the trading hypothesis, suggesting that the presence of institutional investors enhances market efficiency by improving transparency and reducing the information gap between informed and uninformed investors.

We further extend our analysis by examining the impact of the investment horizon of institutional investors on their monitoring effectiveness. Prior studies highlight the heterogeneity among institutional investors, which plays a crucial role in shaping corporate governance and influencing corporate outcomes (Borochin and Yang, 2017; Alvarez et al., 2018; Harford et al., 2018; Kim et al., 2019; Boubaker et al., 2019; Ghaly et al., 2020; Cremers et al., 2020; Döring et al., 2021). According to this literature, long-term institutional investors are associated with enhanced governance practices, as they have a vested interest in the long-term success of the firms they invest in. Conversely, short-term institutional investors may exert pressure on corporate managers to prioritise short-term gains over long-term value,

potentially undermining governance and increasing information asymmetry (Jones, 1991; Porter, 1992; Laverty, 1996; Bushee, 2001; Jiang and Anandarajan, 2009).

Building on these insights, our study explores whether the investment horizon of institutional investors significantly affects the relationship between earnings quality and information asymmetry. We classify institutional investors into long-term and short-term categories and hypothesise that long-term institutional investors have stronger incentives to promote robust governance practices. This promotion is expected to manifest in higher earnings quality and lower information asymmetry. Our empirical findings support this hypothesis, demonstrating a stronger negative relationship between earnings quality and information asymmetry in firms with high long-term institutional ownership compared to those with predominantly short-term institutional investors. These results corroborate the notion that long-term institutional investors prioritise sustainable corporate governance, thereby enhancing financial reporting quality and reducing the potential for information asymmetry.

In contrast, short-term institutional investors appear more focused on immediate financial performance, which may result in managerial actions that compromise long-term value creation. This focus can lead to weaker corporate governance, lower earnings quality, and higher information asymmetry, as suggested by previous studies (Porter, 1992; Demirag, 1998). Thus, our study contributes to the ongoing debate on the role of institutional investors in corporate governance by highlighting the importance of their investment horizon.

Our study makes three key contributions to the existing body of literature. Firstly, it extends the existing research examining the relationship between earnings quality and information asymmetry (e.g., Affleck-Graves et al., 2002; Jayaraman, 2008; Ascioglu et al., 2012; Bhattacharya et al., 2013; Liu and Elayan, 2015) by introducing the moderating effect of institutional ownership on this relationship. Prior studies primarily focused on the direct effects of earnings quality on information asymmetry without considering the role of institutional investors. Our study provides empirical evidence that institutional investors can positively influence this relationship, effectively exercising a monitoring role that mitigates information asymmetry and demands higher earnings quality from their investee firms. This finding enhances our understanding of the governance mechanisms that institutional investors employ to safeguard their investments and promote transparency.

Secondly, our study contributes to the literature on the heterogeneity of institutional investors, particularly in terms of their investment horizons (long-term versus short-term). We identify significant differences between long-term and short-term institutional ownership in both their

direct relationship with information asymmetry and their moderating effect on the relationship between earnings quality and information asymmetry. Specifically, our findings demonstrate that long-term institutional ownership is associated with a significant reduction in information asymmetry, supporting the notion that these investors have a vested interest in promoting sustainable corporate governance practices. This aligns with the principles of the trading hypothesis and agency theory, suggesting that long-term investors prioritise the overall health and transparency of firms. In contrast, short-term institutional ownership is found to have a positive relationship with both earnings quality and information asymmetry, resonating with the adverse selection hypothesis. This suggests that short-term investors may focus on short-term gains, potentially at the expense of long-term value creation and transparency.

Finally, our study broadens the geographical scope of this research area, which has predominantly focused on single-country contexts, particularly the United States (e.g., Affleck-Graves et al., 2002; Jayaraman, 2008; Ascioglu et al., 2012; Bhattacharya et al., 2013; Liu and Elayan, 2015). By utilising cross-country data from European firms, our research highlights the importance of considering country-specific factors in understanding the dynamics of earnings quality and information asymmetry. We provide evidence that country characteristics, such as legal frameworks, market structures, and corporate governance norms, do not uniformly affect these variables. This finding aligns with a growing body of literature that explores the interaction between accounting information quality and country-level factors (e.g., Ball et al., 2003; Leuz, 2003; Ball and Shivakumar, 2005; Burgstahler et al., 2006; Van der Meulen et al., 2007; Nobes, 2013; Kvaal and Nobes, 2010). By examining a diverse set of European countries, our study provides valuable insights into how different regulatory and market environments shape the role of institutional investors and the quality of financial reporting.

The remainder of this paper is structured as follows. Section 2 provides a review of relevant literature and establishes hypotheses. Section 3 outlines the research design employed. Section 4 presents the main tests conducted and the corresponding results. Section 5 examines the robustness of the findings and presents additional tests. Finally, section 6 offers concluding remarks.

2. Literature Review and Hypothesis Development

Prior theoretical studies argue that high quality accounting information decreases information asymmetry by mitigating information risk and vice versa – hence, less-informed investors are

disadvantaged in portfolio allocation adjustments (Diamond, 1985; Diamond and Verrecchia, 1991; Easley and O'hara, 2004). Supporting this view, there is empirical evidence to indicate a significant relationship between earnings quality and information asymmetry (e.g., Affleck-Graves et al., 2002; Jayaraman, 2008; Ascioglu et al., 2012; Bhattacharya et al., 2013; Liu and Elayan, 2015).

Given the substantial assets managed by institutional investors, they have the potential to influence managerial decision-making (Chung et al., 2002; Bushee and Goodman, 2007; Ajina et al., 2015; OECD, 2020; Tahat et al., 2022). Prior studies demonstrate that institutional investors can generally improve financial reporting quality. For example, Boone and White (2015) find that institutional investors demand higher quality voluntary disclosures, thereby enhancing the transparency and reliability of financial reports. Kim et al. (2018) report that accounting comparability improves earnings informativeness when institutional ownership is high, highlighting the role of institutional investors in fostering high-quality financial disclosures. Furthermore, Koh (2007) shows that institutional investors, especially long-term institutional investors, are effective in restraining earnings management, thereby improving earnings quality.

Despite these findings, there remains a gap in the literature regarding the specific role of institutional investors in moderating the relationship between earnings quality and information asymmetry. Drawing on the wider corporate governance literature we examine two views that can provide insights into how institutional investors can potentially influence this relationship.

On the one hand, the adverse selection hypothesis assumes a positive relationship between institutional ownership and information asymmetry. Institutional investors are considered informed agents and have special access to private information (Fehle, 2004). There is a growing body of literature indicating that institutional investors can engage in lucrative trades by utilising private information. For example, Bushee and Goodman (2007) find that the rise in institutional ownership aligns with trading activities that rely on private information. Similarly, Aslan et al. (2011) find that firms with increased institutional ownership have shares, with respect to which there is a higher probability of informed trading. Rhee and Wang (2009) also provide evidence of the negative liquidity impact of institutional ownership.

On the other hand, both the trading hypothesis and agency theory posit that institutional shareholders, due to their greater resources, can bear higher monitoring costs and effectively oversee management. As a result, institutional investors act as a control mechanism, reducing

agency costs for stakeholders, enhancing information transparency and decreasing earnings management, thereby mitigating information asymmetry (Ajina et al., 2015). Several prior studies provide evidence supporting this notion (Chung et al., 2015; Zhong et al., 2017; Ward et al., 2020). For example, Dennis and Weston (2001) show that liquidity is positively influenced by institutional investors, while Ajina et al. (2015) find that increases in the proportion of institutional investors are significantly associated with lower information asymmetry and market liquidity. O'Neill and Swisher (2003) find that stocks with higher institutional ownership exhibit reduced levels of informed trading and lower information asymmetry costs.

These findings indicate that institutional investors can have an effect on both earnings quality and information asymmetry. However, the direction and magnitude of their effect on the relationship between these two factors remain ambiguous. Therefore, we posit the following hypothesis:

H_1: *Institutional ownership significantly affects the relationship between earnings quality and information asymmetry.*

A growing body of recent studies indicates that different types of institutional investors can have varying effects on corporate decision-making. This means that institutional investors should not be viewed as one homogenous group without distinguishing between the different types of their investment behaviour. One crucial factor that is used to distinguish institutional investors is their investment horizon, based on which institutional investors can be classified into either long-term or short-term (Attig et al., 2012; Attig et al., 2013; Harford et al., 2018; Ghaly et al., 2020; Döring et al., 2021).

Instead of selling their interests, institutional investors with long-term investment horizons aim to build enduring relationships with firm managers, acquire a more comprehensive understanding of the company, and make informed interventions, thereby achieving the long-term advantages of monitoring and intervention (Burkart et al., 1997; Gaspar et al., 2005; Chen et al., 2007; McCahery et al., 2016). Prior studies indicate that these investors are more motivated to gather information, oversee management activities, and advocate for enhanced performance (Jiang and Anandarajan, 2009; Ramalingegowda and Yu, 2012). This would discourage the opportunistic behaviour of corporate managers to manage reported earnings. For example, Chung et al. (2002) demonstrate that substantial collective ownership of shares by investment institutions serves as a preventive measure against managers engaging in opportunistic earnings management, particularly through discretionary accrual choices.

In contrast, institutional investors with a short-term investment horizon possess less incentives to actively monitor corporate managers as they are interested in short-term earnings even if it comes at the expense of the long-term prosperity of the firm (Jiang and Anandarajan, 2009; Gaspar et al., 2013). According to Froot et al. (1992), short-term institutional investors hinder the ability of corporate managers to impose long-term managerial discipline. Consistent with this view, prior studies argue that institutional investors pressurise corporate managers to make decisions that serve their short-term objectives at the expense of the long-term value of the business if they are more interested in the short-term economic profit of the firm (Jones, 1991; Porter, 1992; Laverty, 1996; Bushee, 2001; Jiang and Anandarajan, 2009).

We argue that the moderating effect of institutional investors on the relationship between earnings quality and information asymmetry is largely dependent on their investment horizon. Therefore, we posit the following hypothesis:

H_2: *The moderating role of institutional investors on the relationship between earnings quality and information asymmetry depends on the investment horizon of institutional investors.*

3. Research Design

3.1 Data and sample

Our initial sample incorporates all listed companies from 25 European countries over the period 2000-2022. We include both active and dead firms to avoid any survivorship bias. We also exclude financial firms from the sample because of the high leverage that is normal for these firms. This process generates a sample of 31,976 firm-year observations. Panel A of Table 1 displays the distribution of firm-year observations according to each country represented in the sample, with the UK representing 37% of the total sample. To determine whether the results are biased due to the high representation of UK firms in the sample, a robustness test is performed by removing the UK from the sample. Panel A further reveals that Estonia and Luxembourg have the smallest representation in the sample (0.1% of the total sample size). Panel B of Table 1 shows the number of companies for each industry included in the sample. Approximately 25% are from the consumer discretionary sector, and 22% are from the manufacturing sector. The *LSEG (*previously called *Refinitiv) DataStream* is used to obtain data on all variables.

[Insert Table 1 here]

3.2 Variables measurement

3.2.1 Earnings quality (EQ)

We measure earnings quality (*EQ*) using accruals quality, measured based on the model of Dechow and Dichev (2002), after taking into consideration the modification of McNichols (2002). The latter modification is based on the time-series standard deviation (SD) of residuals in regressions of current accruals on previous, current, and next cash flows from operations, adding the change in sales and property, plant and equipment (McNichols, 2002) (See Equation 1). This equation is calculated annually on a cross-sectional basis at the industry level. Higher standard deviations of residuals are indicative of poor accruals quality as a consequence of the less precise mapping of current accruals into cash flow from operations in previous, current, and future periods. So, we multiplied by -1, so high values reflect high earnings quality.

$$\frac{TCA_{i.t}}{Assets_{i,t}} = \alpha_j + \beta_{1,j}\frac{CFO_{j,t-1}}{Assets_{i,t}} + \beta_{2,j}\frac{CFO_{i,t}}{Assets_{i,t}} + \beta_{3,j}\frac{CFO_{i,t+1}}{Assets_{i,t}} + \beta_{4,j}\frac{\Delta Sales_{i,t}}{Assets_{i,t}} + \beta_{5,j}\frac{PPE_{i,t}}{Assets_{i,t}} + v_{i,t} \quad (1)$$

In the aforementioned model, the subscripts *i* and *t* represent the firm and year, respectively. Comprehensive definitions of the variables are included in Appendix A.

The Dechow and Dichev (2002) model, with McNichols' (2002) modifications, was selected due to its comprehensive nature in assessing accruals quality. This model is widely recognised in the literature for its ability to capture the noise in accruals that arises from measurement error and managerial discretion. The inclusion of additional variables like sales changes and PPE improves the model's robustness in reflecting the economic reality of a firm's operations (Dechow et al., 2010; Eliwa et al., 2016; Eliwa et al., 2019).

To ensure the robustness of our findings, we also utilised the performance-adjusted discretionary accruals model (Kothari et al., 2005) as a robustness check. This model adjusts for firm performance and provides an additional layer of analysis. Moreover, we ranked firms based on accruals quality each year, creating deciles to further validate the consistency of our results across different levels of earnings quality (Francis et al., 2004; Francis et al., 2005; Eliwa et al., 2016). Finally, we replaced accruals quality with earnings smoothing (*Smooth*). *Smooth* is measured as the ratio of the standard deviation of net income before extraordinary items of a firm, to its standard deviation of cash flows from operations, both divided by total

assets at the beginning of the period (Pincus and Rajgopal, 2002; Leuz et al., 2003; Francis et al., 2004; Wang, 2014).

3.2.2 Information asymmetry (InfoAsym)

Information asymmetry is measured using microstructure measures, i.e., the percentage quoted bid-ask spread and the percentage effective spread (Huang and Stoll, 1996; Chen et al., 2003). In particular, the percentage quoted bid-ask spread is measured as the natural logarithm of the raw spread divided by the midpoint of the bid and ask quotes. As a robustness check, the percentage effective spread proxy (*EffectSpread*) is additionally utilised as a measure of information asymmetry. This multiplies the absolute value of the price by two and then subtracts the midpoint of the bid and ask quotes divided by the midpoint of the bid and ask quotes (see equation 3).

$$PercentageEffectiveSpread_{i,t} = \frac{2\,(Price_{i,t} - MidPointSpread_{i,t})}{MidPointSpread_{i,t}} \quad (3)$$

Where:

Price is the price of a firm's stock in year *t*.

MidPointSpread is the midpoint of the bid and ask quotes in year *t.*

This study focuses on investigating the relationship between earnings quality and information asymmetry more generally instead of at a specific date. This is because there is no specific date during the year when it is appropriate to inquire into the most substantive effects of earnings quality on investor behaviour. In this study, we employ the closing day share prices, along with bid and ask quotes, to determine the daily percentage quoted and effective spreads. Subsequently, we compute the monthly average percentage quoted and effective spreads based on these daily values instead of deriving a yearly average percentage and effective spread using the data from all twelve months of the fiscal year.

3.2.3 Institutional investors (InsInvestors)

Institutional investors are considered a widely used measure of corporate governance. To test the moderating influence of institutional investors (*InsInvestors*) on the interplay between earnings quality and information asymmetry, we adopt a measure of *InsInvestors* as the

percentage of a firm's ownership of 5% or more held by institutional investors, which is aligned with prior studies (e.g., Ajinkya et al., 2005; Jiang et al., 2005; Ajina et al., 2015).

3.2.4 The investment horizon of institutional investors

We classify the investment horizon of institutional investors into long-term institutional investors (*Long-InsInvestors*) and short-term institutional investors (*Short-InsInvestors*) based on their holding patterns over a one-year period. Specifically, for each firm, *Long-InsInvestors* are those institutional investors who exhibit stable holding patterns, characterised by an average quarterly turnover rate below 25%, calculated across the four quarters (Gaspar et al., 2005). Specifically, for each investor, we calculate the quarterly turnover rate by taking the proportion of shares traded relative to their total holdings in the firm. We then average this turnover rate across four quarters. Institutional investors with an average quarterly turnover rate below 25% are categorised as long-term investors, reflecting a commitment to the firm's long-term value creation. *Short-InsInvestors*, on the other hand, are those institutional investors who have an average quarterly turnover rate above 75% calculated across the four quarters. This higher turnover reflects frequent trading activity and a focus on short-term gains, suggesting a short-term investment strategy (Gaspar et al., 2005; Yan and Zhang, 2009; Huang and Petkevich, 2016; Attig et al., 2013; Ghaly et al., 2020).

3.2.5 Control variables

Based on previous studies, there are three primary firm variables expected to be linked with information asymmetry in addition to earnings quality and institutional ownership. These are the firm size (*Size*), trading volume (*Volume*), and the SD of stock returns (*σReturn*). We expect a negative relationship between *InfoAsym* and *Size* and *Volume,* as large firms are expected to have lower *InfoAsym.* Also, firms with larger *Volume* are expected to have lower *InfoAsym*. *σReturn* measures the probability that informed investors are less active in firms with lower financial uncertainty. So, a positive relationship between *InfoAsym* and *σReturn* is expected, as firms with higher *σReturn* have higher *InfoAsym* (Leuz and Verrecchia, 2000; Leuz, 2003; Bhattacharya et al., 2013).

We also added, to the main model, the financial crisis (*Crisis*), the adoption of IFRS (*IFRS*), the Worldwide Governance Indicators (*WGI*) and COVID-19 (*COVID*). *Crisis* is measured as a dummy variable, set equal to 1 if the years are 2007 and 2008 and zero otherwise. *IFRS* is a dummy variable equals 1 if a firm adopts IFRS in year *t* and zero otherwise. *COVID* is measured as a dummy variable, set equal to 1 if the years are 2020, 2021 and 2022 and zero

otherwise. *WGI* is an aggregate score that covers six dimensions of governance: voice and accountability, absence of violence and political stability, government effectiveness, quality of regulations, the rule of law, and control of corruption. These aggregate factors merge the views of many organisations, individuals, and expert survey respondents in every country (World Bank, 2021). We expect to find a negative relationship between *WGI* and *InfoAsym* as firms located in countries with high-quality corporate governance systems benefit on average from a lower level of information asymmetry. To mitigate the influence of these extreme values, we applied winsorization at the 1% level. Winsorization involves capping the extreme values by setting the values below the 1st percentile to the value at the 1st percentile and the values above the 99th percentile to the value at the 99th percentile.

4. Main Tests and Results

Following Frankel et al. (2011), we employ firm clustered standard errors pooled regression to test the moderating effect of *InsInvestors* on the relationship between *InfoAsym* and *EQ* after adding control variables that are systematically linked to *InfoAsym* in the literature. Also, country, industry and year dummies are included to control for the country and industry differences, as well as for addressing time-series correlation (see equation 4).

$$\begin{aligned} InfoAsym_{i,t} = {} & \alpha + \beta_1 EQ_{i,t} + \beta_2 InsInvestors_{i,t} + \beta_3 EQ_{i,t}*InsInvestors_{i,t} + \beta_4 Size_{i,t} + \\ & \beta_5 Volume_{i,t} + \beta_6 \sigma Return_{i,t} + \beta_7 Crisis_t + \beta_8 IFRS_{i,t} + \beta_9 WGI_{i,t} + \beta_{10} \\ & COVID_t + \beta_{11} YearFixedEffect_t + \beta_{12} IndustryFixedEffect_i + \beta_{13} \\ & CountryEffect_i + \varepsilon_{i,t} \end{aligned} \quad (4)$$

Detailed variables definitions are provided in Appendix A.

4.1 Descriptive Statistics

Table 2 presents descriptive statistics of information asymmetry, earnings quality, institutional investors and firm characteristics for the whole sample. For *InfoAsym,* Table 2 reports the mean and median*,* which are 0.055 and 0.018, respectively. Table 2 also reports the mean and median of *EQ* as -0.094 (-0.059), respectively. For comparison, the study of Francis et al. (2004) report mean and median values of *EQ* as 0.028 and 0.020, respectively. This result gives preliminary evidence that *EQ* in Europe is lower than in the US. This could suggest regional differences between US and Europe in financial reporting quality, influenced by varying accounting standards or market dynamics. Also, it shows the mean and median of *InsInvestors* to be 45%

and 46%, respectively. Finally, Table 2 shows the mean (median) value of a number of firm characteristics variables such as the market capitalisaton of firms at 1,092 (104.5) million, total assets at £2,300 (£190) million, sales revenues at £2,125 (£180) million, *Volume* at 115 (5.6).

[Insert Table 2 here]

Table 3 presents the correlations among *InfoAsym*, *EQ*, *InsInvestors*, and control variables. In this regard, the results indicate that *EQ* has a significant negative correlation coefficient with *InfoAsym,* which is consistent with prior studies (e.g., Bhattacharya et al., 2013; Ascioglu et al., 2012). We also find a negative correlation between *InfoAsym* and *InsInvestors*, and a positive correlation between *InsInvestors* and *EQ*, supporting the notion that institutional investors are more sophisticated (Chan and Lakonishok, 1995; Walther, 1997; Sias et al., 2006) and, therefore, are more capable of demanding higher earnings quality from managers, thereby reducing *InfoAsym*. Table 3 also reveals strong negative correlations between *InfoAsym* and both *Size* and *Volume*. These results are consistent with previous studies (e.g., Bhattacharya et al., 2013; Ascioglu et al., 2012). However, we find a positive correlation between *InfoAsym* and *σReturn*. Moreover, Table 3 shows strong negative correlations between *InfoAsym* and both *IFRS* and *WGI.* This preliminary evidence supports the positive role of IFRS and *WGI* in the capital markets, which is consistent with prior studies that find IFRS is more capital market-oriented (e.g., Ding et al., 2007; Chen et al., 2010; Zéghal et al., 2011; Houqe et al., 2014; Houqe and Monem, 2016; Trimble, 2018). There is a positive correlation between *InfoAsym* and both *Crisis* and *COVID*, consistent with prior studies that find a negative effect of the financial crisis on the capital market aspects (e.g., Iatridis and Dimitras, 2013; Filip and Raffournier, 2014; Davis-Friday et al., 2006; Arthur et al., 2015). Finally, the results show that correlation coefficients between earnings quality (*EQ*) and the control variables vary from 1% to 33%. This suggests no substantive multicollinearity between the independent variables.

[Insert Table 3 here]

4.2 Multivariate tests: Results and discussions

In this section, we present our main findings about the moderating effect of institutional ownership on the relationship between earnings quality and information asymmetry. We, further, extend our analysis by categorising institutional investors into two main groups according to their investment horizon; long-term and short-term institutional investors, and test their impact on the said relationship.

4.2.1 The moderating effect of institutional ownership

To examine the moderating effect of institutional ownership, we first explore the direct relationships between earnings quality (*EQ*), information asymmetry (*InfoAsym*), and institutional ownership (*InsInvestors*). The results, presented in column 1 of Table 4, show a significant negative relationship between *EQ* and *InfoAsym*, independent of institutional ownership. This suggests that firms with higher earnings quality generally experience lower levels of information asymmetry, which aligns with the theoretical framework of Easley and O'hara (2004). This indicates that firms with high-quality earnings reduce the informational advantage typically enjoyed by informed investors.

Additionally, column 1 reveals a significant negative relationship between *InsInvestors* and *InfoAsym*, suggesting that firms with higher institutional ownership tend to have lower levels of information asymmetry. This supports the view that institutional investors play a critical monitoring role, potentially reducing adverse selection risks and enhancing transparency through their active oversight.

Further, we test the moderating effect of *InsInvestors* on the relationship between *EQ* and *InfoAsym* (H_1) by adding the interaction term *EQ*InsInvestors* to Equation (4). The results, reported in column 2 of Table 4, show that the interaction term is significant (coefficient = -0.0041, *t*-statistic = -1.80), indicating that the negative relationship between *EQ* and *InfoAsym* is more pronounced in firms with higher levels of institutional ownership. This finding suggests that firms with high institutional ownership have a stronger relationship between earnings quality and information asymmetry compared to other firms. In such firms, institutional investors likely enhance the role of high-quality earnings by engaging in monitoring activities that promote better information transparency, thereby levelling the informational playing field for all market participants.

In terms of control variables, we find a significant positive relationship between *InfoAsym* and both *Crisis* and *COVID*, which is consistent with the notion that *Crisis* leads to a lack of liquidity and a higher cost of capital for European firms (e.g., Iatridis and Dimitras, 2013; Filip and Raffournier, 2014). We also find a negative relationship between *InfoAsym* and *σReturn* and *Size*, which is consistent with prior studies (Cohen, 2008; Bhattacharya et al., 2013), suggesting that larger firms and those with more stable returns tend to have lower information asymmetry. Furthermore, the results show a negative relationship between *InfoAsym* and *IFRS,* which supports the view that IFRS is more capital market-oriented (e.g., Ding et al., 2007; Chen et al., 2010). Lastly, the results show that *WGI* has a significant negative relationship

with *InfoAsym.* This indicates that firms in countries with strong governance indicators exhibit lower information asymmetry compared to those firms in countries with weaker governance.

In summary, our results affirm the first hypothesis (H_1) that institutional ownership significantly shapes the relationship between earnings quality and information asymmetry. Firms with lower institutional ownership face higher adverse effects associated with poor earnings quality compared to their counterparts with robust institutional backing. This supports the prediction of Lambert et al. (2012) that adverse consequences of information asymmetry rely on the investors competition level in a stock. Also, it supports the view that institutional investors accomplish a more substantive monitoring role than retail investors through their close relationships with firms, and then mitigate the adverse selection risk and decrease information asymmetry. Thus, we find evidence in favour of the first hypothesis (H1).

[Insert Table 4 here]

4.2.2 The investment horizon of institutional ownership

In our main analysis, we find that *InsInvestors* has a significant moderating effect on the relationship between *EQ* and *InfoAsym*, indicating an effective role in monitoring, disciplining, and influencing corporate managers. However, it is not clear whether this monitoring role is a function of the investment horizon of institutional investors. Prior studies provide evidence that institutional investors with long-term investment horizons exhibit stronger motivations to gather information, monitor managerial actions, and advocate for improved performance (Chung et al., 2009; Jiang and Anandarajan, 2009; Ramalingegowda and Yu, 2012; Driss et al., 2021). This would discourage the opportunistic behaviour of corporate managers to manage reported earnings. In contrast, institutional investors with a short-term investment horizon have less incentives to monitor corporate managers as they are interested in short-term earnings even if it comes at the expense of the long-term prosperity of the firm (Chung et al., 2009; Jiang and Anandarajan, 2009; Driss et al., 2021).

We assume that institutional investors oriented towards long-term investments are strongly motivated to actively oversee and influence corporate management, in contrast to their short-term counterparts, who are likely to have less incentive for such engagement. Results for *Long-InsInvestors* are reported in Table 4 Columns 3 and 4, and results for *Short-InsInvestors* are reported in Table 4 Columns 5 and 6. Our findings reveal a negative relationship between *Long-InsInvestors* and *InfoAsym*, and a positive relationship between *Short-InsInvestors* and *InfoAsym*. This aligns with the trading hypothesis for *Long-InsInvestors*, which suggests that

long-term investors enhance market transparency and reduce information asymmetry. Conversely, the adverse selection hypothesis applies to *Short-InsInvestors*, indicating that short-term investors may exacerbate information asymmetry due to their focus on short-term gains.

To further investigate whether the negative relationship between earnings quality and information asymmetry differs for long-term and short-term investors, we incorporate the interaction terms *EQ*Long-InsInvestors* and *EQ*Short-InsInvestors* into our main model (Equation 4). The results, as shown in Table 4, Columns 4 and 6, demonstrate that the relationship between earnings quality and information asymmetry is more pronounced for firms with high *Long-InsInvestors* compared to those with high *Short-InsInvestors*. These findings point out the importance of differentiating between long-term and short-term investors when examining the monitoring role of institutional investors. They also caution against treating institutional investors as a homogeneous group, as prior studies may have oversimplified the complex dynamics at play. Our results are consistent with previous studies, which have shown that short-term institutional investors are primarily focused on short-term earnings (Porter, 1992; Bushee, 2001).

5. Robustness and Additional Tests

In this section, we report additional and robustness tests of whether our main findings on the moderating effect of institutional ownership on the relationship between earnings quality and information asymmetry are robust to alternative models' specifications and assumptions.

5.1 Testing for endogeneity concerns

To obviate the potential problem of endogeneity, we use two approaches to provide evidence on the direction of causality between institutional ownership, earnings quality and information asymmetry. Firstly, we rerun our main analysis using lagged values of earnings quality (*EQ*) and institutional ownership (*InsInvestors*) to mitigate potential reverse causality issues. By using lagged independent variables, we aimed to ensure that the observed effects on information asymmetry (*InfoAsym*) are not merely reflecting simultaneous causality. Our findings, presented in Table 5, column 1, show a significant negative relationship between lagged earnings quality (*Lagged EQ*) and information asymmetry, as well as a negative relationship between lagged institutional ownership and information asymmetry. Specifically, the interaction term between *Lagged EQ* and *InfoAsym* yielded a coefficient of -0.0046 (t-

statistic = -1.91), indicating that higher levels of institutional ownership amplify the negative effect of earnings quality on information asymmetry.

Further analysis in columns 3 and 4 for lagged long-term institutional investors (*Lagged Long-InsInvestors*) shows a consistent pattern, with a significant negative coefficient for the interaction term, reinforcing the idea that long-term investors play a substantial role in monitoring and improving financial reporting quality. In contrast, the results in columns 5 and 6 for lagged short-term institutional investors (*Lagged Short-InsInvestors*) reveal a positive coefficient for the interaction term, indicating that the presence of short-term investors may not effectively mitigate information asymmetry, and may, in some cases, exacerbate it.

[Insert Table 5 here]

Secondly, we assume that earnings quality affects the observed level of information asymmetry in all our hypotheses. In spite of this, it is possible that the effect of earnings quality on information asymmetry is driven by variables that have been omitted and are correlated with both earnings quality and information asymmetry (see Waddock and Graves, 1997). Given the aforementioned challenges, interpreting the causal relationship between earnings quality and information asymmetry can be challenging. To address potential endogeneity concerns, we employ an instrumental variable two-stage least squares (IV-2SLS) methodology. This approach allows us to establish a more robust and reliable causal inference. We selected the following instrumental variables (IVs): the standard deviation of sales (*σSales*), industry-average earnings quality (*IndEQ*), and analyst following (*Following*). These IVs are theoretically and empirically relevant to earnings quality but are not expected to directly influence information asymmetry, making them suitable instruments. *σSales* captures the volatility in a firm's sales, which can affect the stability and predictability of earnings. While it is related to earnings quality, it is unlikely to directly impact information asymmetry. *IndEQ* reflects the typical level of earnings quality within a firm's industry. It provides a benchmark for assessing a firm's earnings quality relative to its peers, without directly influencing information asymmetry at the firm level (Eliwa et al., 2021). *Following* can influence the level of scrutiny and demand for high-quality financial reporting. While higher analyst coverage can affect market efficiency, it primarily impacts the information environment through its association with earnings quality, rather than directly affecting information asymmetry.

The results from the IV-2SLS analysis, reported in Table 6 panel A, include separate analyses for *InsInvestors*, *Long-InsInvestors* and *Short-InsInvestors*, which are consistent with our primary findings. The validity tests for our instruments—including tests for weak instruments

and over-identification—support their appropriateness and robustness. These findings indicate that our results are not driven by omitted variable bias and reinforce the significance of institutional investor heterogeneity in shaping the relationship between earnings quality and information asymmetry.

Additionally, we employed a dynamic panel system Generalized Method of Moments (GMM) approach, as proposed by Blundell and Bond (1998), to further mitigate reverse causality concerns. This method controls for potential endogeneity by using lagged variables as instruments and accounts for unobserved heterogeneity. The GMM results, consistent with our primary findings, further support the robustness of our conclusions. Our main results, reported in Table 6 Panel B, remained stable, indicating a persistent negative relationship between earnings quality and information asymmetry, particularly in the presence of higher institutional ownership.

[Insert Table 6 here]

Finally, we conducted a change analysis to further address potential endogeneity concerns. This analysis focuses on examining the relationship between changes in institutional ownership, earnings quality, and information asymmetry, thereby mitigating the influence of time-invariant unobserved factors. Specifically, we calculated the first differences for the key variables, including *InfoAsym*, *EQ*, and *InsInvestors*. By regressing the changes in *InfoAsym* on the changes in *EQ* and *InsInvestors*, along with other control variables, we aimed to isolate the impact of shifts in these variables on information asymmetry. The unreported results of the change analysis are consistent with our main findings, indicating a significant association between changes in institutional ownership and changes in information asymmetry. Specifically, an increase in institutional ownership is associated with a decrease in information asymmetry, highlighting the role of institutional investors in enhancing market transparency. Similarly, changes in earnings quality are significantly related to changes in information asymmetry, with higher earnings quality corresponding to lower information asymmetry. These results provide additional evidence supporting the causal interpretation of our findings, reinforcing the robustness and validity of the study.

5.2 Managers' incentives for earnings management

We predict that the monitoring role of institutional investors in improving earnings quality and reducing information asymmetry will be more obvious when they believe that corporate

managers have incentives to engage in earnings management since the institutions can review the accounting procedures and price stocks appropriately (Chung et al., 2002).

We follow a similar approach used by Fudenberg and Tirole (1995) and Chung et al. (2002) to create two sub-samples: (1) firms that lack incentives to engage in earnings management and (2) firms that possess incentives to engage in earnings management, presented Table 7 columns 1 and 2 respectively. Managers have an incentive to engage in earnings management in two situations; first, when current performance is poor but expected future performance is strong. In this scenario, managers might "borrow" earnings from future periods through income-increasing accruals. Conversely, when current performance is robust, but future performance is expected to decline, managers may "save" earnings for future periods by using income-decreasing accruals. These incentives are identified by comparing current and future operating cash flows (*CFO*) deflated by lagged total assets to industry medians. (2) Firms where both current and future *CFO* align above or below the median are presumed to have no specific earnings management incentives (Fudenberg and Tirole, 1995; Chung et al., 2002).

We use the Seemingly estimation test (Zellner, 1962) to check for significant differences between the two coefficients. Chi^2 reported in column 3 of Table 7 indicates that the moderating effect of institutional ownership on the relationship between earnings quality and information asymmetry is more significant for firms that have incentives to engage in earnings management than firms with no incentives to engage in earnings management.

[Insert Table 7 here]

5.3 Alternative measures of earnings quality

We replace the raw values of *EQ* with the decile rank of *EQ*. The results show a significant negative relationship between *EQ* and *InfoAsym,* which is consistent with the main results, and this relationship is more pronounced for firms with high institutional ownership (see Table 8).

Earnings smoothness (*Smooth*) is utilised as an alternative proxy for earnings quality. It reflects the extent to which firms manage their earnings to present a stable income stream. *Smooth* is measured as the ratio of the standard deviation of net income before extraordinary items of a firm, to its standard deviation of cash flows from operations, both divided by total assets at the beginning of the period (Pincus and Rajgopal, 2002; Leuz et al., 2003; Francis et al., 2004; Wang, 2014). A lower standard deviation indicates a smoother earnings profile, which may suggest high earnings quality. The results show a significant positive relationship between *EQ*

measured by *Smooth* and *InfoAsym,* which is consistent with the main results, and this relationship is more pronounced for firms with high institutional ownership (results are reported in Table 8 columns 7-8).

To further enhance the robustness of our findings, we extend our analysis to include real earnings management (REM) as an alternative proxy for earnings quality. While our main analysis focuses on accrual-based earnings management, it is essential to consider real activity manipulation, as firms may engage in both types of earnings management strategies. As Graham et al. (2005) and Zang (2012) highlight, real earnings management, which involves manipulating actual business operations, can serve as a substitute or complement to accrual manipulation. Following the study of Roychowdhury (2006) and Cohen and Zarowin (2010), we construct an aggregate measure of REM by examining deviations from normal levels of business activities, specifically in the areas of cash flow from operations (*CFO*), production costs (*Prod*), and discretionary expenses (*DiscExp*). The *REM* proxy is calculated using the following equation:

$$REM = (-1\ x\ Abn\_CFO) + Abn\_Prod\ + (-1\ x\ Abn\_DiscExp) \qquad (5)$$

Our findings reveal a significant positive relationship between REM and information asymmetry. This result suggests that firms engaging in higher levels of real activity manipulation exhibit greater information asymmetry, reinforcing the notion that institutional investors play a critical monitoring role in curbing both accrual-based and real earnings management. The results reported in Table 9 indicate that the relationship between *REM* and information asymmetry is more pronounced for firms with high institutional ownership. This is consistent with the hypothesis that institutional investors monitor managerial behaviour, thereby mitigating the adverse effects of earnings management on information asymmetry.

Discretionary accruals provide another approach to detecting earnings management. We measure discretionary accruals using the model proposed by Kothari et al. (2005), which incorporates return on assets (*ROA*) as a control variable to improve the accuracy of the discretionary accruals estimation. Specifically, this model includes *ROA* to account for the impact of firm performance on accruals. Our findings indicate that the presence of institutional investors is associated with lower levels of discretionary accruals which leads to lower information asymmetry, suggesting a monitoring effect that constrains opportunistic earnings management. Also, there is a significant negative relationship between institutional ownership and information asymmetry (results are not reported).

[Insert Tables 8 and 9 here]

5.4 Alternative measures of information asymmetry

To ensure the robustness of our findings, we replaced our primary measure of information asymmetry (*InfoAsym*) with two alternative proxies: the log of the percentage quoted spread (*LnQSpread*) and the percentage effective spread (*EffectSpread*). These alternative measures offer additional insight into the dynamics of information asymmetry within our sample. The results, presented in Table 10, are consistent with our main findings. In Table 10, we present the results in two panels to account for the stratified analysis. Panel A displays results for *LnQSpread*, while Panel B shows results for *EffectSpread.* Our findings show a similar pattern across both alternative measures of information asymmetry.

Specifically, in Panel A, the negative association between *EQ* and *LnQSpread* is more pronounced for firms with higher levels of institutional ownership. This effect is particularly strong for long-term institutional investors, suggesting that they play a significant role in reducing information asymmetry through enhanced monitoring and oversight. The results for short-term institutional investors indicate a weaker relationship between *EQ* and *LnQSpread*, consistent with our primary analysis.

In Panel B, which examines *EffectSpread*, the results reinforce the previous findings. Long-term institutional investors demonstrate a stronger moderating effect on the relationship between *EQ* and *EffectSpread* compared to short-term institutional investors. This further supports the notion that long-term institutional investors contribute more substantially to reducing information asymmetry, while short-term institutional investors exhibit a more limited impact.

[Insert Table 10 here]

5.5 Alternative model specifications

We replaced the firm clustered standard error pooled regression with the fixed effects panel model. The fixed effects model is used to control for unobservable characteristics of firms that may influence the dependent variable, ensuring that the analysis captures within-firm variations over time (Wooldridge, 2010). The results, as presented in Table 11, indicate a significant negative relationship between *EQ* and *InfoAsym*, with this relationship being more pronounced in firms with high levels of long-term institutional ownership. Conversely, the results for short-term institutional investors show a weaker effect of EQ on *InfoAsym*, which is consistent with their limited incentive to undertake sustained monitoring efforts.

[Insert Table 11 here]

6. Conclusion

This study extends the literature on financial reporting quality by investigating the interplay between earnings quality and information asymmetry, with a particular focus on the moderating role of institutional investors. The importance of financial reporting quality in capital market resource allocation has been well-documented(Francis et al., 2006; Bhattacharya et al., 2013; Eliwa et al., 2016; Isidro and Dias, 2017; Eliwa et al., 2021). However, the influence of institutional investors, particularly concerning their investment horizon, on this relationship has remained unexplored. Our research addresses this gap, providing new insights into how institutional ownership can impact the relationship between earnings quality and information asymmetry.

In line with the theoretical framework proposed by Easley and O'hara (2004), we find a significant negative relationship between earnings quality and information asymmetry and this relationship is stronger for firms with higher institutional ownership. This provides support to the positive monitoring role institutional investors play in the relationship between earnings quality and information asymmetry. We further examine whether the relationship between earnings quality and information asymmetry is contingent upon the investment horizon of institutional investors. Our findings reveal that the relationship between earnings quality and information asymmetry is more distinct in firms with a higher percentage of long-term institutional investors than in those with a larger share of short-term institutional investors. This highlights the significance of distinguishing between long-term and short-term institutional investors in understanding the dynamics between the quality of accounting information and information asymmetry.

The findings of this study could be informative for many financial reporting participants such as investors, analysts, regulators and managers. Among the capital market participants, retail investors appear to be the most impacted by poor earnings quality. A greater effort should be made to provide tools to help those investors calculate earnings quality for the firms in which they invest and benchmark this earnings quality scores against other firms. For regulators and policymakers, our findings advocate for encouraging greater institutional investor participation in corporate governance, as a means to promote transparency and integrity in financial reporting. For firms managers and boards. The demonstrated negative relationship between earnings quality and information asymmetry, especially in the context of effective institutional

oversight, implies that corporate strategies focusing on enhancing financial reporting quality can lead to more favourable market perceptions and lower capital costs.

While we have taken substantial steps to infer causality through the use of IV-2SLS and GMM methodologies, we acknowledge that fully addressing endogeneity concerns in observational studies remains challenging. Our analysis provides strong evidence of associations, but due to the potential presence of unobserved confounders and the limitations of the instruments used, the results should be interpreted with caution. The chosen instrumental variables—standard deviation of sales, industry-average earnings quality, and analyst following—were carefully selected and tested, but like all instruments, they are not perfect proxies.

Furthermore, the scope of our study is limited to European firms, and while this provides valuable insights into the role of institutional investors in this region, the findings may not be fully generalizable to other contexts. Future research could explore similar relationships in different geographic and regulatory environments, as well as consider other dimensions of institutional investor heterogeneity, such as investment strategy or engagement level. Another limitation is the use of a uniform 5% ownership threshold to classify institutional investors as either long-term or short-term. This threshold, while commonly employed in the literature, may have different implications across various European markets due to differences in ownership concentration and corporate governance practices. For instance, a 5% stake may confer significant influence in markets with dispersed ownership, such as the UK, but may be less impactful in markets with concentrated ownership structures, such as France, Spain, or Italy.

Additionally, future research could extend this study by examining the moderating effect of managerial ownership on the relationship between earnings quality and information asymmetry. The impact of managerial ownership on the conflict of interest between managers and shareholders and hence information asymmetry is still not clear. According to the managerial entrenchment hypothesis, the tendency for managers to utilize corporate resources to serve their personal interests rather than those of shareholders is likely to increase in the presence of managerial ownership. This is due to the greater challenges faced in implementing effective monitoring mechanisms (Niu, 2006). On the other hand, based on the interest alignment hypothesis, managerial ownership could motivate managers to perform in the interest of shareholders (Hambrick and Jackson, 2000).

Declaration

Conflict of interest: The authors declare that they have no conflict of interest.

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Appendix A: Variables definition

Variable	Definition
Panel A: Information asymmetry (dependent variable)	
The percentage quoted spread	The natural logarithm of the raw spread divided by the midpoint of the bid and ask quotes in year *t*.
The percentage effective spread	This multiplies the absolute value of the price by two and then subtracts the midpoint of the bid and ask quotes divided by the midpoint of the bid and ask quotes
Panel B: Earnings quality proxies (independent variable)	
EQ	Earnings quality, calculated using the accruals quality of a firm in year t, employing the methodology of Dechow and Dichev (2002) as applied by McNichols (2002) and Francis et al. (2005). Then we multiplied all values by -1 to high values reflect high earnings quality.
Panel C: Institutional ownership (moderating variable)	
InsInvestors	Institutional ownership, measured as the percentage of a firm's ownership that is related to institutional investors;
Long-InsInvestors	Long-term institutional ownership, measured as the percentage of shareholdings held by institutional investors who exhibit a stable holding pattern, is characterised by an average quarterly turnover rate below 25%, over four quarters.
Short-InsInvestors	Short-term institutional ownership, measured as the percentage of shareholdings held by institutional investors with an average quarterly turnover rate above 75%, calculated over four quarters.
Panel D: Other variables	
Assets	Average total assets of a firm in years *t* and *t*-1.
Size	The natural logarithm of market capitalisation in year *t.*
Volume	The trading volume of a firm in year *t.*
σReturn	The SD of share returns of a firm, calculated through the previous ten years.
IFRS	International Financial Reporting Standards: a dummy variable equals to 1 if the firm adopts IFRS and zero otherwise;
Crisis	Financial crisis: a dummy variable equals to 1 if the year is 2007 or 2008 and 0 otherwise.
WGI	Worldwide Governance Indicators is an aggregate score covers six dimensions of governance; Voice and Accountability, Political Stability and Absence of Violence, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption.
CFO	The firm's operating cash flow of in year *t*.
Earn	The firm's net income before extraordinary items in year *t*.
NegEarn	The number of years within a ten-year period during which a firm incurred a net loss.
OperCycle	The natural logarithm of a firm's operating cycle in year *t.*

PPE	The firm's gross Property, Plant, and Equipment (PPE) in year *t*.
ROE	The firm's return on equity in year *t.*
σCFO	The SD of a firm's operating cash flow, computed using a rolling ten-year window.
σROE	The SD of a firm's returns on equity, determined over rolling ten-year windows.
σSales	The SD of a firm's net revenue, measured using rolling ten-year windows.
SURP	Earnings surprise, computed as the absolute value of the discrepancy between earnings per share for years t and *t*-1, adjusted by the stock price at the start of year *t*.
TCA	Total current accruals of a firm in year *t. TCA*= ΔCA- ΔCL - $\Delta Cash$ + $\Delta CDEBT$
Δ CA	Change in a firm's current assets between years *t*-1 and *t*.
Δ Cash	Change in a firm's cash between years *t*-1 and *t*.
ΔCDEBT	Change in the debt component of a firm's current liabilities of between years *t*-1 and *t*.
Δ Sales	Change in a firm's revenues of between years *t*-1 and *t*.
Abn_CFO	Abnormal cash flow from operations, measured as deviations in cash flow from expected levels based on industry norms and a firm's characteristics. Calculated using Roychowdhury's (2006) model, where lower than expected *CFO* suggests manipulation through increased sales or reduced operating costs.
Abn_Prod	Abnormal production costs, measured as deviations in production costs from expected levels, which could indicate overproduction to reduce the cost of goods sold and inflate earnings (Roychowdhury, 2006).
Abn_DiscExp	Abnormal discretionary expenses, measured as deviations from expected levels of discretionary expenditures, which include items such as R&D, advertising, and SG&A (Roychowdhury, 2006). A decrease in these expenses below expected levels may suggest earnings manipulation.
REM	Real earnings management, calculated using Calculated using Roychowdhury's (2006) model: (−1×*Abn_CFO*) +*Abn_Prod*+ (−1×*Abn_DiscExp*). This aggregate metric captures overall earnings management through operational decisions rather than accrual-based adjustments.

Table 1: Country and industry distribution of firm-year observations

Panel A: Total number of firm-year observations per country

Country	Number of firm-year observations	Percent	Average *InsInvestors %*
Austria	69	0.22	40.33
Belgium	1,070	3.35	25.76
Bulgaria	271	0.85	39.38
Croatia	326	1.02	49.18
Cyprus	60	0.19	0
Denmark	458	1.43	28.10
Estonia	32	0.1	46.62
Finland	504	1.58	21.09
France	6,776	21.19	19.81
Germany	3,048	9.53	21.57
Greece	643	2.01	19.52
Hungary	126	0.39	34.78
Ireland	1,115	3.49	18.60
Italy	765	2.39	20.37
Latvia	53	0.17	52.23
Lithuania	56	0.18	54.43
Luxembourg	31	0.1	0.31
Netherlands	1,609	5.03	18.14
Poland	719	2.25	28.23
Portugal	512	1.6	34.83
Romania	116	0.36	55.46
Slovenia	53	0.17	56.75
Spain	785	2.45	23.68
Sweden	919	2.87	18.17
United Kingdom	11,860	37.09	15.08
Total	**31,976**	**100**	**22.03**

Panel B: Total number of firm-year observations per Industry

Industry	Freq.	Percent	Average *InsInvestors %*
Basic Materials	2,530	7.91	21.62
Consumer Discretionary	7,969	24.92	19.91
Consumer Staples	3,005	9.4	22.78
Energy	1,711	5.35	22.39
Health Care	2,951	9.23	15.95
Industrials	7,037	22.01	20.72
Technology	5,523	17.27	15.78
Telecommunications	1,250	3.91	20.68
Total	**31,976**	**100**	**22.03**

Note: This table displays the distribution of firm-year observations by country and industry. The final sample comprises 31,976 firm-year observations spanning from 2000 to 2022, across 8 industries. Detailed definitions and data sources for all variables are provided in Appendix A.

Table 2: Descriptive statistics of earnings quality, information asymmetry, institutional investors, and firm characteristics

	Mean	S.D.	25%	Median	75%
InfoAsym	0.0546	0.124	0.0048	0.0184	0.0533
EQ	-0.0936	-0.0936	-0.106	-0.0587	-0.0331
InsInvestors	45.77	24.53	25	46	65
Market Capitalisation (£mils)	1,092	2599	24.28	104.5	508.6
Size	12.15	2.244	10.79	12.15	13.71
Total Assets (£mils)	2,300	6,330	49	190	900
Total sales (£mils)	2,125	5,035	38	180	900
σReturn	0.602	0.492	0.306	0.447	0.678
Volume (£000)	115	305	0.64	5.6	46
σCFO	0.0928	0.0975	0.0344	0.0565	0.0985
σSales	0.239	0.234	0.0963	0.169	0.294
NegEarn	2.723	2.733	0	2	4
OperCycle	4.932	0.707	4.533	4.934	5.328

Note: This table displays the descriptive statistics. The sample comprises 31,976 firm-year observations spanning from 2000 to 2022, across 8 industries. Detailed definitions and data sources for all variables are provided in Appendix A.

Table 3: Pearson correlation matrix

	InfoAsym	*EQ*	*InsInvestors*	*Size*	*Volume*	*σReturn*	*Crisis*	*IFRS*
InfoAsym	1.000							
EQ	-0.098***	1.000						
InsInvestors	-0.067***	0.065***	1.000					
Size	-0.305***	0.318***	-0.056***	1.000				
Volume	-0.076***	0.020***	0.253***	0.351***	1.000			
σReturn	0.068***	-0.211***	-0.125***	-0.253***	0.023***	1.000		
Crisis	0.063***	-0.040***	-0.020***	-0.051***	0.010*	0.016**	1.000	
IFRS	-0.046***	0.015**	0.062***	0.128***	0.003	-0.026***	0.115***	1.000
WGI	-0.094***	-0.034***	0.295***	-0.048***	0.052***	0.029***	0.070***	-0.225***

Note: This table presents correlation coefficients for the variables employed in our primary analysis. The sample comprises 31,976 firm-year observations spanning from 2000 to 2022, across 8 industries. Values with asterisks *, **, and *** correspond to significance at the 10%, 5%, and 1% levels, respectively. Detailed definitions and data sources for all variables are provided in Appendix A.

Table 4: The relationship between information asymmetry, earnings quality, institutional ownership, and control variables

	InsInvestors and accruals quality analysis		*Long-InsInvestors and accruals quality analysis*		*Short-InsInvestors and accruals quality analysis*	
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
	InfoAsym	*InfoAsym*	*InfoAsym*	*InfoAsym*	*InfoAsym*	*InfoAsym*
EQ	-0.027***	-0.013	-0.019**	-0.015	-0.028***	-0.017
	(-2.85)	*(-0.65)*	*(-2.08)*	*(-1.31)*	*(-2.99)*	*(-1.13)*
InsInvestors	-0.00042***	-0.00039***	-0.00061***	-0.00068***	0.00048***	0.00045***
	(-14.4)	*(-9.01)*	*(-10.1)*	*(-8.06)*	*(17.4)*	*(12.0)*
*EQ*InsInvestors*		-0.0041*		-0.0095**		-0.0035*
		(-1.80)		*(-1.98)*		*(-1.80)*
Size	-0.015***	-0.015***	-0.016***	-0.016***	-0.015***	-0.015***
	(-32.6)	*(-32.8)*	*(-36.2)*	*(-36.2)*	*(-32.1)*	*(-32.3)*
Volume	0.000013***	0.000013***	0.0000057**	0.0000057**	0.000014***	0.000014***
	(5.00)	*(4.97)*	*(2.43)*	*(2.44)*	*(5.23)*	*(5.21)*
σReturn	-0.0050***	-0.0049***	-0.0053***	-0.0052***	-0.0051***	-0.0051***
	(-3.01)	*(-2.96)*	*(-3.05)*	*(-3.02)*	*(-3.11)*	*(-3.08)*
IFRS	-0.014***	-0.014***	-0.014***	-0.014***	-0.014***	-0.014***
	(-4.13)	*(-4.14)*	*(-4.09)*	*(-4.11)*	*(-3.99)*	*(-3.99)*
Crisis	0.050***	0.050***	0.049***	0.049***	0.049***	0.049***
	(6.80)	*(6.81)*	*(6.88)*	*(6.89)*	*(6.66)*	*(6.67)*
WGI	-0.056***	-0.056***	-0.042***	-0.042***	-0.055***	-0.055***
	(-4.79)	*(-4.79)*	*(-3.49)*	*(-3.49)*	*(-4.69)*	*(-4.69)*
COVID	0.015**	0.015**	0.010*	0.010*	0.015***	0.015***
	(2.56)	*(2.55)*	*(1.70)*	*(1.69)*	*(2.65)*	*(2.64)*
Constant	0.31***	0.31***	0.32***	0.32***	0.30***	0.30***
	(14.2)	*(14.3)*	*(15.0)*	*(15.1)*	*(13.8)*	*(13.9)*
N	31,976	31,976	31,976	31,976	31,976	31,976
adj. R^2	0.194	0.194	0.205	0.205	0.198	0.198
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes

`Note: This table presents the results of clustered pooled regressions of information asymmetry on earnings quality, the interaction between earnings quality and institutional investors, and control variables. The main findings on the moderating effect of institutional ownership on the relationship between earnings quality and information asymmetry (H_1) are exhibited in columns 1 and 2. The results of the type of institutional investors (long-term vs short-term) are exhibited in Columns 3-6. The sample comprises 31,976 firm-year observations spanning from 2000 to 2012, across 8 industries. Values with asterisks *, **, and *** correspond to significance at the 10%, 5%, and 1% levels, respectively. Detailed definitions and data sources for all variables are provided in Appendix A.

Table 5: The relationship between information asymmetry, lagged earnings quality, lagged institutional ownership, and control variables

	Lagged InsInvestors and Lagged accruals quality analysis		*Lagged Long-InsInvestors and Lagged accruals quality analysis*		*Lagged Short-InsInvestors and Lagged accruals quality analysis*	
	InfoAsym	*InfoAsym*	*InfoAsym*	*InfoAsym*	*InfoAsym*	*InfoAsym*
	(1)	(2)	(3)	(4)	(5)	(6)
Lagged EQ	-0.015*	0.0021	-0.012*	-0.0099	-0.016*	0.0039
	(-1.87)	*(0.11)*	*(-1.82)*	*(-0.86)*	*(-1.82)*	*(0.29)*
Lagged InsInvestors	-0.00037***	-0.00033***	-0.00060***	-0.00058***	0.00044***	0.00038***
	(-12.0)	*(-7.81)*	*(-9.39)*	*(-7.41)*	*(15.1)*	*(10.1)*
*Lagged EQ*Lagged InsInvestors*		-0.0046*		-0.00041*		-0.00059*
		(-1.91)		*(-1.88)*		*(-1.67)*
Size	-0.015***	-0.015***	-0.016***	-0.016***	-0.015***	-0.015***
	(-31.8)	*(-31.9)*	*(-33.6)*	*(-33.6)*	*(-31.4)*	*(-31.5)*
Volume	0.000011***	0.000011***	0.0000049**	0.0000049**	0.000012***	0.000012***
	(4.39)	*(4.38)*	*(1.98)*	*(1.98)*	*(4.69)*	*(4.67)*
σReturn	-0.0049***	-0.0048***	-0.0064***	-0.0064***	-0.0051***	-0.0050***
	(-2.90)	*(-2.84)*	*(-3.95)*	*(-3.95)*	*(-3.00)*	*(-2.95)*
IFRS	-0.014***	-0.014***	-0.012***	-0.012***	-0.014***	-0.014***
	(-3.94)	*(-3.94)*	*(-3.50)*	*(-3.50)*	*(-3.81)*	*(-3.79)*
Crisis	0.048***	0.048***	0.048***	0.048***	0.047***	0.047***
	(5.76)	*(5.76)*	*(6.10)*	*(6.10)*	*(5.74)*	*(5.73)*
WGI	-0.063***	-0.063***	-0.051***	-0.051***	-0.062***	-0.062***
	(-4.99)	*(-5.00)*	*(-4.08)*	*(-4.08)*	*(-4.92)*	*(-4.93)*
COVID	-0.013*	-0.013*	-0.012*	-0.012*	-0.013*	-0.013*
	(-1.79)	*(-1.79)*	*(-1.74)*	*(-1.74)*	*(-1.76)*	*(-1.77)*
Constant	0.32***	0.32***	0.33***	0.33***	0.31***	0.31***
	(13.1)	*(13.3)*	*(14.3)*	*(14.3)*	*(12.8)*	*(12.9)*
N	30,626	30,626	30,626	30,626	30,626	30,626
adj. R^2	0.190	0.190	0.183	0.183	0.194	0.194
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes

Note: This table reports the results of clustered pooled regressions of information asymmetry on lagged earnings quality, the interaction between lagged earnings quality and lagged institutional investors, and control variables. The main findings on the moderating effect of institutional ownership on the relationship between earnings quality and information asymmetry (H_1) are reported in columns 1 and 2. Columns 3-6 report the results related to the type of institutional investors (lagged long-term vs lagged short-term). The sample comprises 30,626 firm-year observations spanning from 2000 to 2022, across 8 industries. Values with asterisks *, **, and *** correspond to significance at the 10%, 5%, and 1% levels, respectively. Detailed definitions and data sources for all variables are provided in Appendix A.

Table 6: Addressing endogeneity concerns

Panel A: IV-2SLS approach

	Instrumental variable two-stage least squares (IV-2SLS) approach *InsInvestors*		Instrumental variable two-stage least squares (IV-2SLS) approach *Long-InsInvestors*		Instrumental variable two-stage least squares (IV-2SLS) approach *Short-InsInvestors*	
	Stage 1	*Stage 2*	*Stage 1*	*Stage 2*	*Stage 1*	*Stage 2*
σSales	-0.048***		-0.0450***		-0.0483***	
	(-12.51)		*(-12.32)*		*(-12.57)*	
AVGEQ	0.727***		0.764***		0.7284***	
	(19.94)		*(21.11)*		*(19.95)*	
Following	0.00093***		0.0011***		0.0010***	
	(7.60)		*(9.52)*		*(7.70)*	
EQ		-0.054**		-0.049**		-0.053**
		(-2.10)		*(-1.98)*		*(-2.08)*
InsInvestors	0.00018***	-0.00019***	0.00019***	-0.00022***	0.00016***	0.00023***
	(5.46)	*(-8.93)*	*(5.49)*	*(-5.07)*	*(5.51)*	*(11.0)*
Size	0.0134***	-0.0088***	0.0142***	-0.0091***	0.0134***	-0.0088***
	(21.89)	*(-20.1)*	*(24.05)*	*(-21.0)*	*(21.90)*	*(-20.2)*
Volume	-0.000013	0.0000055**	-0.000017***	0.0000018	-0.000013***	0.0000059**
	(-6.43)	*(2.33)*	*(-8.90)*	*(0.87)*	*(-6.47)*	*(2.47)*
σReturn	-0.021***	-0.0056***	-0.0208***	-0.0058***	-0.0212***	-0.0057***
	(-10.79)	*(-4.55)*	*(-11.15)*	*(-4.91)*	*(-10.89)*	*(-4.67)*
IFRS	-0.0056	-0.0035	-.00179	-0.0018	-0.0056	-0.0034
	(-1.59)	*(-1.31)*	*(-0.51)*	*(-0.72)*	*(-1.57)*	*(-1.27)*
Crisis	0.014**	0.038***	0.0158***	0.037***	0.0140***	0.038***
	(2.56)	*(8.73)*	*(3.04)*	*(8.55)*	*(2.63)*	*(8.70)*
WGI	0.025**	-0.043***	0.0200*	-0.039***	0.0254**	-0.043***
	(2.24)	*(-5.03)*	*(1.87)*	*(-4.85)*	*(2.27)*	*(-5.01)*
COVID	0.0078	-0.013*	0.0018	-0.0026	0.0018	-0.0026
	(1.45)	*(-1.79)*	*(1.00)*	*(-1.29)*	*(1.00)*	*(-1.29)*
Constant	-0.082***	0.18***	-0.191***	0.19***	-0.1954***	0.18***
	(-4.59)	*(12.3)*	*(-9.88)*	*(13.4)*	*(-9.68)*	*(12.2)*
N	31,976	31,976		31,976	31,976	31,976
Partial R2	0.225		0.233		0.225	
adj. R^2		0.186		0.179		0.188
F-statistics	64.78***		55.22***		208.41***	
Cragg-Donald Wald F-statistic (Weak identification test)	207.42		238.50		358.81	

Stock and Yogo (2005) ID test for critical values: 10% maximal IV	9.07		9.08		9.08	
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes

Panel B: GMM approach

	GMM *InsInvestors*	GMM *Long-InsInvestors*	GMM *Short-InsInvestors*
	InfoAsym	*InfoAsym*	*InfoAsym*
EQ	-0.072*	-0.15**	-0.069*
	(-1.69)	*(-2.55)*	*(-1.68)*
InsInvestors	-0.0035***	-0.0030***	0.0035***
	(-6.42)	*(-2.94)*	*(7.08)*
Size	-0.16***	-0.16***	-0.16***
	(-17.7)	*(-18.4)*	*(-17.6)*
Volume	-0.00035***	-0.00049***	-0.00034***
	(-3.35)	*(-5.17)*	*(-3.28)*
σReturn	-0.033	-0.030	-0.032
	(-1.47)	*(-1.48)*	*(-1.46)*
IFRS	-0.059**	-0.077***	-0.058**
	(-2.37)	*(-3.27)*	*(-2.35)*
Crisis	0.49***	0.50***	0.49***
	(13.6)	*(14.0)*	*(13.5)*
WGI	-0.055	-0.31***	-0.028
	(-1.18)	*(-8.01)*	*(-0.59)*
COVID	0.031	0.065	0.036
	(0.72)	*(1.63)*	*(0.84)*
Lagged InfoAsym	0.51***	0.54***	0.51***
	(37.0)	*(42.6)*	*(37.0)*
Constant	0.44***	1.05***	0.41***
	(3.39)	*(10.2)*	*(3.12)*
N	30,626	30,626	30,626

Note: This table reports the results of the robustness tests conducted to address potential endogeneity concerns related to omitted variable bias in our main findings for H_1 and H_2. Panel A employs the IV-2SLS approach, while Panel B utilises the GMM approach. The sample ranges between 30,626 and 31,976 firm-year observations spanning from 2000 to 2022, across 8 industries. Values with asterisks *, **, and *** correspond to significance at the 10%, 5%, and 1% levels, respectively Detailed definitions and data sources for all variables are provided in Appendix A.

Table 7: The relationship between information asymmetry, earnings quality, institutional ownership, and control variables based on managers' incentives for earnings management

	InfoAsym No earnings management incentive	*InfoAsym* Earnings management incentive	*Chi²*
	(1)	(2)	(3)
EQ	-0.0071	-0.076**	
	(-0.54)	*(-2.42)*	
InsInvestors	-0.00028***	-0.00057***	
	(-7.19)	*(-7.06)*	
*EQ*InsInvestors*	-0.00074***	-0.0014**	4.72***
	(-2.74)	*(-2.33)*	
Size	-0.014***	-0.016***	
	(-35.6)	*(-19.6)*	
Volume	0.000011***	0.000020***	
	(4.48)	*(2.98)*	
σReturn	-0.0074***	-0.0042	
	(-5.04)	*(-1.46)*	
IFRS	-0.013***	-0.019***	
	(-4.46)	*(-3.46)*	
Crisis	0.034***	0.069***	
	(5.30)	*(5.95)*	
WGI	-0.060***	-0.037	
	(-4.70)	*(-1.50)*	
COVID	-0.020***	-0.0045	
	(-2.77)	*(-0.32)*	
Constant	0.30***	0.29***	
	(11.8)	*(5.84)*	
N	23,864	8,112	
adj. R^2	0.193	0.229	
Year dummies	Yes	Yes	
Industry dummies	Yes	Yes	
Country dummies	Yes	Yes	

Note: This table presents the results of the robustness test of our main findings on the moderating effect of institutional ownership on the relationship between earnings quality and information asymmetry (H1) after distinguishing between firms that have no incentives to engage in earnings management (results reported in column 1) and firms that have incentives to engage in earnings management (results reported in column 2). The sample ranges between 8,112 and 23,864 firm-year observations spanning from 2000 to 2022, across 8 industries. Values with asterisks *, **, and *** correspond to significance at the 10%, 5%, and 1% levels, respectively. Detailed definitions and data sources for all variables are provided in Appendix A. Column 3 reports Chi^2 of the Seemingly estimation test (Zellner, 1962) to check for significant differences between the two coefficients of the interaction term *EQ*InsInvestors*.

Table 8: The relationship between information asymmetry, earnings quality calculated using decile ranking, institutional ownership, and control variables

	InsInvestors and accruals quality analysis (decile ranking)		*Long-InsInvestors and accruals quality analysis (decile ranking)*		*Short-InsInvestors and accruals quality analysis (decile ranking)*		*InsInvestors and earnings smoothness*	
	InfoAsym (1)	*InfoAsym* (2)	*InfoAsym* (3)	*InfoAsym* (4)	*InfoAsym* (5)	*InfoAsym* (6)	*InfoAsym* (7)	*InfoAsym* (8)
EQ	-0.00045*	-0.00092*	-0.00015	-0.000069	-0.00048**	-0.00079**	0.0061***	0.0047***
	(-1.89)	*(-1.87)*	*(-0.62)*	*(-0.23)*	*(-2.00)*	*(-2.07)*	(7.30)	(2.90)
InsInvestors	-0.00041***	-0.00047***	-0.00061***	-0.00084***	0.00048***	0.00052***	-0.00042***	-0.00038***
	(-14.3)	*(-7.95)*	*(-10.0)*	*(-6.99)*	*(17.4)*	*(10.0)*	(-14.5)	(-7.75)
*EQ*InsInvestors*		-0.00010*		-0.000040*		-0.0000078		0.00034*
		(-1.87)		*(-1.83)*		*(-0.83)*		(1.97)
Size	-0.015***	-0.015***	-0.017***	-0.017***	-0.015***	-0.015***	-0.015***	-0.015***
	(-31.6)	*(-31.9)*	*(-35.1)*	*(-35.1)*	*(-31.2)*	*(-31.4)*	(-32.0)	(-32.0)
Volume	0.000014***	0.000014***	0.0000061**	0.0000061**	0.000014***	0.000014***	0.000011***	0.000011***
	(5.01)	*(5.01)*	*(2.54)*	*(2.53)*	*(5.24)*	*(5.24)*	(4.04)	(4.11)
σReturn	-0.0047***	-0.0048***	-0.0049***	-0.0049***	-0.0048***	-0.0049***	-0.0057***	-0.0057***
	(-2.87)	*(-2.91)*	*(-2.88)*	*(-2.87)*	*(-2.97)*	*(-3.00)*	(-3.50)	(-3.51)
IFRS	-0.014***	-0.014***	-0.014***	-0.014***	-0.014***	-0.014***	-0.014***	-0.014***
	(-4.14)	*(-4.13)*	*(-4.09)*	*(-4.12)*	*(-3.99)*	*(-3.99)*	(-4.17)	(-4.18)
Crisis	0.050***	0.050***	0.049***	0.049***	0.049***	0.049***	0.050***	0.050***
	(6.84)	*(6.84)*	*(6.90)*	*(6.90)*	*(6.71)*	*(6.70)*	(6.87)	(6.89)
WGI	-0.056***	-0.056***	-0.042***	-0.042***	-0.055***	-0.055***	-0.056***	-0.055***
	(-4.80)	*(-4.81)*	*(-3.50)*	*(-3.51)*	*(-4.70)*	*(-4.71)*	(-4.76)	(-4.74)
COVID	0.015**	0.015**	0.010*	0.010*	0.015***	0.015***	0.015***	0.015***
	(2.53)	*(2.55)*	*(1.69)*	*(1.69)*	*(2.62)*	*(2.63)*	(2.64)	(2.64)
Constant	0.31***	0.31***	0.33***	0.33***	0.30***	0.30***	0.30***	0.30***
	(14.1)	*(14.1)*	*(15.0)*	*(15.1)*	*(13.7)*	*(13.7)*	(14.0)	(14.0)
N	31,976	31,976	31,976	31,976	31,976	31,976	31,976	31,976
adj. R^2	0.193	0.193	0.204	0.205	0.197	0.197	0.198	0.198
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: This table presents the results of clustered pooled regressions of information asymmetry on earnings quality calculated using decile ranking, the interaction between earnings quality calculated using decile ranking and institutional investors, and control variables. The main findings on the moderating effect of institutional ownership on the relationship between earnings quality and information asymmetry (H_1) are exhibited in columns 1 and 2. Columns 3-6 report the results related to the type of institutional investors (long-term vs short-term). Columns 7-8 report the results related to earnings smoothness (*Smooth*). The sample comprises 31,976 firm-year observations spanning from 2000 to 2022 across 8 industries. Values with asterisks *, **, and *** correspond to significance at the 10%, 5%, and 1% levels, respectively.

Table 9: The relationship between information asymmetry, earnings quality calculated using REM, institutional ownership, and control variables

	InsInvestors and REM analysis (decile ranking)		*Long-InsInvestors and REM analysis (decile ranking)*		*Short-InsInvestors and REM analysis (decile ranking)*	
	InfoAsym	*InfoAsym*	*InfoAsym*	*InfoAsym*	*InfoAsym*	*InfoAsym*
	(1)	(2)	(3)	(4)	(5)	(6)
REM	0.0041***	0.0015	0.0052***	0.0042***	0.0039***	0.0021*
	(3.07)	*(0.54)*	*(3.88)*	*(2.71)*	*(2.89)*	*(1.92)*
InsInvestors	-0.00040***	-0.00041***	-0.00054***	-0.00052***	0.00046***	0.00047***
	(11.5)	*(11.7)*	*(-7.37)*	*(-6.40)*	*(14.0)*	*(13.9)*
*REM*InsInvestors*		0.00013**		0.00014*		0.000048
		(2.08)		*(1.84)*		*(0.99)*
Size	-0.016***	-0.016***	-0.017***	-0.017***	-0.016***	-0.016***
	(-26.3)	*(-26.4)*	*(-28.8)*	*(-28.8)*	*(-26.0)*	*(-26.0)*
Volume	0.000013***	0.000014***	0.0000067**	0.0000067**	0.000014***	0.000014***
	(3.81)	*(3.89)*	*(2.21)*	*(2.19)*	*(3.97)*	*(4.01)*
σReturn	-0.0053***	-0.0053***	-0.0042**	-0.0042**	-0.0056***	-0.0056***
	(-2.80)	*(-2.81)*	*(-2.09)*	*(-2.08)*	*(-2.95)*	*(-2.95)*
IFRS	-0.016***	-0.015***	-0.014***	-0.014***	-0.015***	-0.015***
	(-3.57)	*(-3.55)*	*(-3.16)*	*(-3.14)*	*(-3.44)*	*(-3.44)*
Crisis	0.044***	0.044***	0.045***	0.045***	0.043***	0.043***
	(5.16)	*(5.13)*	*(5.50)*	*(5.49)*	*(5.03)*	*(5.03)*
WGI	-0.034**	-0.033**	-0.010	-0.010	-0.033**	-0.033**
	(-2.45)	*(-2.43)*	*(-0.74)*	*(-0.73)*	*(-2.40)*	*(-2.40)*
COVID	0.0096	0.0097	0.0022	0.0023	0.010	0.010
	(1.29)	*(1.31)*	*(0.31)*	*(0.32)*	*(1.36)*	*(1.37)*
Constant	0.29***	0.29***	0.29***	0.29***	0.29***	0.29***
	(11.5)	*(11.5)*	*(11.5)*	*(11.5)*	*(11.2)*	*(11.2)*
N	28,761	28,761	28,761	28,761	28,761	28,761
adj. R^2	0.205	0.205	0.225	0.225	0.209	0.209
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes

Note: This table presents the results of clustered pooled regressions of information asymmetry on earnings quality calculated using *REM*, the interaction between earnings quality calculated using *REM* proxy and institutional investors, and control variables. The main findings on the moderating effect of institutional ownership on the relationship between earnings quality and information asymmetry (H_1) are exhibited in columns 1 and 2. Columns 3-6 report the results related to the type of institutional investors (long-term vs short-term). The sample comprises 28,761 firm-year observations spanning from 2000 to 2022 across 8 industries. Values with asterisks *, **, and *** correspond to significance at the 10%, 5%, and 1% levels, respectively.

Table 10: The relationship between information asymmetry measured by log quoted spread and percentage effective spread, earnings quality, institutional ownership, and control variables

Panel A: Using log quoted spread (LnQSpread) as a measure of information asymmetry

	InsInvestors and accruals quality analysis (1) LnQSpread	*InsInvestors and accruals quality analysis* (2) LnQSpread	*Long-InsInvestors and accruals quality analysis* (3) LnQSpread	*Long-InsInvestors and accruals quality analysis* (4) LnQSpread	*Short-InsInvestors and accruals quality analysis* (5) LnQSpread	*Short-InsInvestors and accruals quality analysis* (6) LnQSpread
EQ	-0.16**	-0.19	-0.29***	-0.40***	-0.14*	-0.12
	(-1.99)	*(-1.36)*	*(-3.98)*	*(-4.78)*	*(-1.87)*	*(-1.05)*
InsInvestors	-0.011***	-0.011***	-0.0048***	-0.0064***	0.010***	0.011***
	(-33.4)	*(-27.2)*	*(-7.07)*	*(-7.11)*	*(34.1)*	*(28.4)*
*EQ*InsInvestors*		-0.0079**		-0.017***		-0.0074***
		(-2.72)		*(-2.79)*		*(-2.79)*
Size	-0.41***	-0.41***	-0.43***	-0.43***	-0.41***	-0.41***
	(-96.8)	*(-96.8)*	*(-103.6)*	*(-103.7)*	*(-95.8)*	*(-95.9)*
Volume	-0.000050*	-0.000049*	-0.00023***	-0.00023***	-0.000057*	-0.000056*
	(-1.71)	*(-1.67)*	*(-8.43)*	*(-8.46)*	*(-1.93)*	*(-1.91)*
σReturn	-0.047***	-0.049***	-0.081***	-0.080***	-0.056***	-0.057***
	(-3.30)	*(-3.42)*	*(-5.66)*	*(-5.59)*	*(-3.89)*	*(-3.98)*
IFRS	-0.0061	-0.0055	-0.031	-0.033	0.0038	0.0036
	(-0.20)	*(-0.18)*	*(-1.07)*	*(-1.14)*	*(0.13)*	*(0.12)*
Crisis	-0.027	-0.027	0.022	0.024	-0.041	-0.040
	(-0.41)	*(-0.41)*	*(0.35)*	*(0.38)*	*(-0.61)*	*(-0.60)*
WGI	-0.55***	-0.55***	-0.58***	-0.58***	-0.53***	-0.53***
	(-3.92)	*(-3.92)*	*(-4.16)*	*(-4.15)*	*(-3.76)*	*(-3.77)*
COVID	-0.76***	-0.76***	-0.71***	-0.70***	-0.76***	-0.76***
	(-10.8)	*(-10.8)*	*(-10.3)*	*(-10.3)*	*(-10.8)*	*(-10.8)*
Constant	1.67***	1.63***	2.59***	2.59***	1.63***	1.60***
	(6.29)	*(6.15)*	*(9.86)*	*(9.89)*	*(6.16)*	*(6.06)*
N	31,976	31,976	31,976	31,976	31,976	31,976
adj. R^2	0.588	0.588	0.565	0.565	0.589	0.589
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes

Panel B: Using percentage effective spread (EffectSpread) as a measure of information asymmetry

	InsInvestors and accruals quality analysis (1) *EffectSpread*	*InsInvestors and accruals quality analysis* (2) *EffectSpread*	*Long-InsInvestors and accruals quality analysis* (3) *EffectSpread*	*Long-InsInvestors and accruals quality analysis* (4) *EffectSpread*	*Short-InsInvestors and accruals quality analysis* (5) *EffectSpread*	*Short-InsInvestors and accruals quality analysis* (6) *EffectSpread*
EQ	-0.019***	-0.010	-0.016**	-0.0087	-0.020**	-0.00083
	(-2.36)	*(-0.61)*	*(-1.96)*	*(-0.89)*	*(-2.43)*	*(-0.066)*
InsInvestors	-0.00022***	-0.00016***	-0.00029***	-0.00037***	0.00025***	0.00020***
	(-8.86)	*(-4.20)*	*(-5.58)*	*(-4.91)*	*(10.4)*	*(6.06)*
*EQ*InsInvestors*		-0.00071*		-0.00055*		-0.00085*
		(-1.86)		*(-1.75)*		*(-1.69)*
Size	-0.0099***	-0.0099***	-0.011***	-0.011***	-0.0097***	-0.0097***
	(-24.5)	*(-24.7)*	*(-27.4)*	*(-27.4)*	*(-24.3)*	*(-24.5)*
Volume	0.000022***	0.000022***	0.000017***	0.000017***	0.000022***	0.000022***
	(9.10)	*(9.01)*	*(8.18)*	*(8.20)*	*(9.16)*	*(9.11)*
σReturn	0.00041	0.00054	0.000064	0.00011	0.00031	0.00038
	(0.30)	*(0.39)*	*(0.045)*	*(0.076)*	*(0.23)*	*(0.28)*
IFRS	-0.0019	-0.0020	-0.0031	-0.0032	-0.0017	-0.0017
	(-0.73)	*(-0.74)*	*(-1.14)*	*(-1.18)*	*(-0.63)*	*(-0.62)*
Crisis	0.027***	0.027***	0.026***	0.026***	0.027***	0.027***
	(4.20)	*(4.21)*	*(3.99)*	*(4.00)*	*(4.12)*	*(4.12)*
WGI	-0.020*	-0.020*	-0.013	-0.013	-0.019*	-0.019*
	(-1.90)	*(-1.90)*	*(-1.25)*	*(-1.25)*	*(-1.84)*	*(-1.84)*
COVID	-0.012**	-0.012**	-0.0100*	-0.0099*	-0.012**	-0.012**
	(-2.41)	*(-2.38)*	*(-1.81)*	*(-1.79)*	*(-2.45)*	*(-2.43)*
Constant	0.18***	0.18***	0.19***	0.19***	0.17***	0.18***
	(9.37)	*(9.57)*	*(10.1)*	*(10.1)*	*(9.17)*	*(9.30)*
N	31,976	31,976	31,976	31,976	31,976	31,976
adj. R^2	0.088	0.088	0.115	0.115	0.089	0.089
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes

Note: This table presents the results of clustered pooled regressions of information asymmetry measured by log quoted spread (*LnQSpread*) (Panel A) and percentage effective spread (*EffectSpread*) (Panel B). The main findings on the moderating effect of institutional ownership on the relationship between earnings quality and information asymmetry (H_2) are exhibited in columns 2, 4 and 6. The sample comprises 31,976 firm-year observations spanning from 2000 to 2022, across 8 industries. Values with asterisks *, **, and *** correspond to significance at the 10%, 5%, and 1% levels, respectively. Detailed definitions and data sources for all variables are provided in Appendix A.

Table 11: Fixed effect panel regression of the relationship between information asymmetry, earnings quality calculated using decile ranking, institutional ownership, and control variables

	InsInvestors	*Long-InsInvestors*	*Short-InsInvestors*
	InfoAsym	*InfoAsym*	*InfoAsym*
	(1)	(2)	(3)
EQ	-0.012*	-0.011*	-0.010*
	(-1.79)	*(-1.75)*	*(-1.69)*
InsInvestors	-0.00021***	-0.00013***	0.00024***
	(-4.87)	*(-4.02)*	*(5.38)*
Size	-0.018***	-0.019***	-0.018***
	(-16.4)	*(-18.0)*	*(-16.2)*
Volume	-0.000014***	-0.000021***	-0.000014***
	(-3.48)	*(-5.73)*	*(-3.40)*
σReturn	-0.012***	-0.014***	-0.012***
	(-5.80)	*(-6.95)*	*(-5.88)*
IFRS	0.00072	0.00029	0.00063
	(0.39)	*(0.17)*	*(0.35)*
Crisis	0.023***	0.022***	0.023***
	(11.5)	*(11.2)*	*(11.5)*
WGI	-0.046***	-0.042***	-0.045***
	(-5.56)	*(-5.29)*	*(-5.50)*
COVID	0.0032**	0.0035**	0.0033**
	(2.15)	*(2.34)*	*(2.17)*
Constant	0.32***	0.34***	0.32***
	(17.2)	*(20.4)*	*(18.0)*
N	31,976	31,976	31,976
adj. R^2	0.115	0.121	0.114

Note: This table reports the results of fixed effect panel regressions of information asymmetry on earnings quality. The sample comprises 31,976 firm-year observations spanning from 2000 to 2022, across 8 industries. Values with asterisks *, **, and *** correspond to significance at the 10%, 5%, and 1% levels, respectively. Detailed definitions and data sources for all variables are provided in Appendix A.