Uncertainty, financial reporting quality and accounting enforcement: Evidence from the European Union

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Abstract

Research Question: What is the impact of uncertainty on the quality of financial reporting in the European Union and whether accounting enforcement is a critical factor?

Motivation: The advances made by the European Union (EU) in the field of financial reporting have shown the commitment to improve its quality. However, uncertainty creates a difficult context for capital markets, investors, and management. Since financial reporting represents the primary source of information for investors, its quality under uncertainty is a key topic of research. Furthermore, considering the EU efforts to strengthen accounting enforcement, it is fundamental to investigate whether accounting enforcement acts as a moderating factor between uncertainty and financial reporting quality.

Idea: Our study investigates the effects of uncertainty on the quality of financial reporting in the European Union and the role of accounting enforcement.

Data: The sample consists of 35,489 firm-year observations from the 27 EU countries. The sample does not include firms from the finance industry, as they are subject to specific regulations and oversight. Furthermore, the quality of financial reporting is determined differently compared to firms in the services and manufacturing industry.

Tools: We measure the quality of financial reporting using existing models in the literature. We use accruals-based models and real earnings management as an alternative measure. To estimate uncertainty, we rely on two important indexes, the Economic Sentiment Indicator and Business Confidence Indicator; additionally, we use another measure for robustness check. For accounting enforcement, we use the strength of auditing and accounting standards, and another measure grounded in the literature for robustness check.

Findings: Our results suggest that uncertainty is negatively associated with the financial reporting quality in the EU. This indicates that uncertainty worsens the financial reporting

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quality. In addition, we investigate the moderating role of accounting enforcement. We find that when accounting enforcement increases by one unit, the negative association between financial reporting quality and uncertainty decreases between 2.7% and 4.5%. Our results are consistent and robust to the use of alternative measures for financial reporting quality, uncertainty, and accounting enforcement.

Contribution: This study contributes to literature in several ways. The EU presents a particular context that allows us to investigate more thoroughly the association between financial reporting quality and uncertainty using cross country sample. Furthermore, this study provides relevant insights to the policymakers specific to EU institutional settings. Research at EU level is welcome as previous analysis is limited to only seven EU countries. Therefore, more evidence is needed to form solid conclusions relevant for the EU. Additionally, we provide strong evidence about the moderating role of accounting enforcement, which was not investigated in literature in the context of uncertainty. Our results are significant for the EU, since the last years were characterized by high uncertainty, and considering the current developments, the next years will also be under the sign of uncertainty. The findings provide useful information to interested parties on the association between uncertainty and financial reporting quality and highlight the importance of accounting enforcement.

Keywords: financial reporting; uncertainty; accounting enforcement

JEL codes: M41, M42, M48

1. Introduction

High-quality and reliable corporate reporting by listed companies is of key importance for the efficiency of capital markets (EU Commission, 2021). The same report highlights that financial reporting is the foundation of capital markets because it provides investors with the necessary information to base their decision. The latest events, Covid-19, Ukraine's aggression, the energy crisis, and the inflation crisis, cause an increase in uncertainty. During the period 2020-2022, uncertainty[2] increases by 93% compared to 2008 when the financial crisis started and by 70% compared to the last 10 years. This creates a difficult context for investors. The decrease in returns and the value of the shares are only two consequences of a list of adverse effects of uncertainty. Given this, the Chair of the International Accounting Standards Board (IASB) points out that when surrounded by uncertainty and its negative effects, investors need to trust financial reporting. And, in turn, this trust relies on management preparing transparent, accurate, and useful financial reports (Barckow, 2023).

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[2] We calculated the percents based on the global uncertainty index obtained from Economic Policy Uncertainty website (link: https://www.policyuncertainty.com/global_monthly.html)

The first objective of this research is to investigate the association between uncertainty and financial reporting quality (FRQ) for EU member states. We focus on the EU because there is limited evidence at the cross-country level and the EU offers a suitable sample for analysis. The EU made several convergence efforts with respect to the financial reporting of the listed entities. Therefore, as noted by Schipper (2005), the EU provides a more powerful setting to test the determinants of financial reporting quality. A single set of accounting standards, similar accounting practices, and the same reporting requirements allow us to test the association between FRQ and uncertainty without carrying about the estimation errors that arise from different accounting treatments and reporting practices. Furthermore, EU countries aim to harmonize economic development, institutional settings, and regulations. Until now, notable steps have been taken in this direction. This feature of our sample allows us to control potential unobservable effects that in previous cross-country research were not fully accounted for. On the other hand, literature on the impact of uncertainty on FRQ is still emerging with no research done particularly for EU. Therefore, this study will provide applicable and specific findings for the EU.

One of the pillars that guarantees the FRQ in the EU is accounting enforcement. The EU designed an institutional architecture to handle this activity. The European Securities and Markets Authority (ESMA) supervises the enforcement of IFRS, while the Committee of European Auditing Oversight Bodies (CEAOB) supervises the audit of listed entities. The goal of these institutions is to protect investors by ensuring FRQ. The second objective of this study is to test whether accounting enforcement in the EU plays a role during periods of uncertainty. There is a notable gap in the literature on accounting enforcement in the context of uncertainty. Our study fills this gap by analyzing the interaction between accounting enforcement and uncertainty and how this affects the FRQ.

We use four models to capture the FRQ and two measures for uncertainty. Based on 35,489 observations, we find that uncertainty is negatively associated with FRQ in the EU. The results are consistent for all FRQ models and for both measures of uncertainty. Furthermore, we find that accounting enforcement reduces the negative association between uncertainty and FRQ. Our results are robust to an alternative measure for FRQ, we use real earnings management as an alternative measure for FRQ. We also use an alternative measure for accounting enforcement and uncertainty. In all cases, the results are similar and form a solid basis for our conclusions. Additionally, we used country and industry fixed effects in our analysis, which allows us to control country and industry characteristics and better quantify the effects of uncertainty.

Our results suggest that uncertainty is a strong incentive for earnings management. Avoiding small losses (Shin, 2019), producing earnings surprises and good news (Peng *et al.*, 2020), and creating a sense of stability are the key objectives of management in times of high uncertainty.

The findings are of interest to investors and policy makers. Acknowledging that uncertainty is a key determinant of FRQ will help EU policymakers shape future rules and mechanisms to protect investors from untrustworthy financial reports. Furthermore, the standard setter, together with EU regulators, can require specific disclosures to the financial statements to allow investors to understand the firm's performance under uncertainty. The FRQ is also achieved through the participation of investors. The negative association between uncertainty and FRQ should engage investors to create relevant techniques to detect earnings management. This is particularly applicable to institutional investors who have the resources to do so. Moreover, we show that accounting enforcement is essential to secure the FRQ. Therefore, our study provides an available instrument that authorities can use to mitigate the effects of uncertainty on FRQ. There are differences in the implementation of accounting enforcement guidelines across member states (ESMA, 2017). Consequently, the first step that the EU should take is to improve the convergence of accounting enforcement between member states. A possible expansion of the current accounting enforcement guidelines must consider the impact of uncertainty. Accounting enforcement priorities in times of uncertainty must focus on accounting estimates, presentation of performance, and management assumptions. By analyzing the accrual-based models, we draw attention to the fact that estimates are subject to management discretionary behavior when uncertainty rises. However, discretionary behavior is not limited to accounting estimates but is also present in determining whether to incur an expense. The positive association between real earnings management and uncertainty supports this statement. This is of interest for investors, who should focus on business decisions taken by management and their future effects on business developments.

Besides the above-mentioned contributions, our study aims to expand the sample period to 2022; therefore, we are able to reckon important events that increased the uncertainty in the EU. Additionally, the structure and characteristics of our sample allow for high variability, which is desired in the analysis of firm outcomes (FRQ) and macroeconomic aspects (uncertainty). The results of previous research that relies on samples consisting of only one country may be biased due to low variability. Taken together, the characteristics of our sample mentioned above, the period analyzed, the incorporation of accounting enforcement into the analysis, and the additional tests provide a valuable contribution to the existing literature.

The motivation of this study is grounded in the fact that, as Yung and Root (2019) highlight, high uncertainty led to a different economic reality and industry regulations. Moreover, Baker *et al.* (2016) emphasize that uncertainty has harmed the economic performance in the United States and EU. In these circumstances, investors need reliable sources of information, and, as Andrei *et al.* (2023) point out, the investors turn to financial statements. However, most of the research done on the association between uncertainty and FRQ is heavily concentrated in the United States (e.g. Bermpei *et al.*, 2021; Dhole *et al.*, 2021; and Nagar *et al.*, 2018) with no

evidence for the EU which made notable progress toward the harmonization of financial reporting. To protect investors from misleading information, there are several monitoring mechanisms in place; Jiang *et al.* (2022), Cui *et al.* (2021), and El Ghoul *et al.* (2021) indicate that strong external monitoring is beneficial for FRQ when uncertainty rise. However, the accounting enforcement which can be considered as the most important component of external monitoring was not yet examined.

The remainder of this paper is organized as follows. In Section 2, we review the existing literature and build the hypothesis. In Section 3, we present the methodology. In Section 4 we present and discuss the findings, and in Section 5 we draw conclusions.

2. Literature review and hypothesis development

2.1 Uncertainty effects on FRQ

The role of financial reporting is to reduce the asymmetry between management and investors and to attenuate agency conflict. Financial reports are the main source of information for investors when assessing the performance of the firm and making investment decisions. Because uncertainty can create certain constraints and concerns for investors, they pay more attention to financial reports (Andrei *et al.*, 2023). In this context, accounting scholars were interested in the effects of uncertainty on different dimensions of the FRQ. The literature on the subject has grown in recent years; however, most of the research focusses on the United States (e.g., Bermpei *et al.*, 2021; Dhole *et al.*, 2021; and Nagar *et al.*, 2018) and there is little evidence at the cross-country level (e.g., El Ghoul *et al.*, 2021). This aspect has implications for the validity of the results. To better estimate the association between FRQ and uncertainty, high variability between firm outcomes and macroeconomic aspects is required. In the case of one country sample, the uncertainty varies only over time and not cross-sectionally. This limits the explanatory power of uncertainty and does not allow the analysis of other country factors. However, when cross-country samples are analyzed, careful attention should be paid to differences between countries regarding accounting practices and institutional settings. From this perspective, the EU, which has the same requirements and accounting practices for listed entities, presents a pertinent sample to analyze the association between FRQ and uncertainty.

There are three methods to measure uncertainty in the literature. Dai and Ngo (2020), Jain *et al.* (2021), and Goncalves *et al.* (2022) use elections. In election years, the uncertainty about future government policies increases. Shin (2019) uses market volatility to measure uncertainty, while most authors use the index developed by Baker *et al.* (2016). Election years can have great applicability in states like the

United States, where notable changes are expected to occur when the new administration is invested. However, in other countries, it is difficult to measure uncertainty using elections because it will not necessarily lead to significant changes in administration. For example, in EU countries, elections may not create the context for uncertainty. The monetary policy is centralized under the European Central Bank (ECB), while the fiscal policies should adhere to EU rules. On the other hand, market volatility only reflects shocks in the market, which does not always imply uncertainty. The index determined by Baker *et al.* (2016) is superior to the others, it is a comprehensive measure constructed based on the presence of relevant keywords in the main newspapers, changes in monetary and fiscal policy, and macroeconomic forecasts. However, the index is available for 29 countries, of which 11 are from the EU.

In most cases, the sample period ends in the 2015-2018 interval (e.g., Bermpei *et al.*, 2021; El Ghoul *et al.* 2021; Nagar *et al.*, 2018; and Yung & Root, 2019). Consequently, previous research is limited to one single major event that led to an increase in uncertainty, namely the financial crisis of 2008. Therefore, future research is needed that incorporates the latest important events, such as the Covid-19 pandemic or the Ukraine aggression. These increase uncertainty worldwide and help us to better analyze uncertainty.

Regarding the reasons for the decline in FRQ, most researchers argue that this is related to management incentives. Bermpei *et al.* (2021) suggested that management wants to improve financial performance when uncertainty is high. This is linked with the concept introduced by Hirshleifer *et al.* (2009) 'lean against the wind', when everything is going down and the uncertainty rises, the management is incentivized to smooth the earnings to create a sense of stability. Shin (2019) suggests that to avoid small losses, management smooths the earnings until the firm becomes profitable. The author then highlights that investors react more strongly to small losses in times of high uncertainty than in other periods. On the contrary, Jin *et al.* (2019) and Du *et al.* (2023) point out that the decline in FRQ during high uncertainty can be attributed to investors. When uncertainty increases, investors are more concerned with macroeconomic news than with firm-level information. Therefore, it would be difficult for investors to detect the earnings management. The first stream of explanations linking the decline in FRQ with the management incentives is more appropriate, since the literature suggests that investors pay more attention to the financial reports in times of uncertainty (Andrei *et al.*, 2023 and Walters *et al.*, 2023). This is more suitable for the EU, where most of the investors are institutional investors and investment funds that constantly analyze the performance of their portfolio. However, given that there is no specific research for the EU, it is difficult to generalize the previous findings.

The literature shows that uncertainty is disruptive for capital markets, investors, and the economy. Investor pessimism increases in periods with high uncertainty, and due

to financial constraints and fear of future losses, they are concerned about their investments. In this context, financial statements represent a cornerstone and ensuring the FRQ is vital. However, management incentives may prevail over accounting standards, and therefore earnings management is more frequent in periods of high uncertainty. We present that literature has some gaps that need to be addressed to further advance research in this field. First, there was insufficient research done at the cross-country level with all the disadvantages presented above. The period between 2020-2022 has not yet been addressed in the literature, when uncertainty increases significantly. Furthermore, the limitations that arise from previous measures from uncertainty; some of them are not generally applicable, others do not necessarily imply uncertainty, while the index developed by Baker *et al.* (2016) is restricted to several countries. Given these points and the particularities that characterize the EU research, which focusses on the EU is welcome.

H₁: In the EU, the FRQ is negatively associated with uncertainty.

2.2 Accounting Enforcement and FRQ

Jiang *et al.* (2022), Cui *et al.* (2021), and El Ghoul *et al.* (2021) emphasize that external monitoring is essential to reduce the negative association between FRQ and uncertainty. They analyze the coverage of analysts and auditors as a form of external monitoring. Accounting enforcement is also a form of external monitoring. In the latest annual report, ESMA defines accounting enforcement as the examination of the compliance of financial reporting with the applicable framework and taking appropriate measures when infringements are discovered (ESMA, 2023). Ball (2006) discussed the expected outcome of the adoption of IFRS in the EU. The author emphasizes that in the absence of strong accounting enforcement practices, the FRQ will not improve as expected. In this case, after IFRS adoption, the EU made several efforts to improve and harmonize accounting enforcement between member states. ESMA has a dedicated department that coordinates accounting enforcement in the EU. Over the years, this activity has made notable advances. In 2014, ESMA implemented the accounting enforcement guidelines, in 2017 it published the report on the implementation of these guidelines in each member state and starting with 2018 the annual reports for accounting enforcement contain more relevant information. On the other hand, Directive 2006/43/EC and Directive 2014/56/EU strengthen accounting enforcement by regulating audit supervision in the EU.

The literature shows that accounting enforcement is positively associated with FRQ (for example: Brown *et al.*, 2015; Ernstberger *et al.*, 2012; Windisch, 2021; and Böcking *et al.*, 2015). Windisch (2021) describes the mechanism through which accounting enforcement works, that is, name and shame. Accounting errors and infringements are made available to the market by relevant institutions. Following disclosure of accounting errors in the capital market, prior evidence suggests that companies face a decrease in market valuation and an increase in the cost of equity

(for example, Christensen *et al.*, 2020; Ernstberger *et al.*, 2012; and Dee *et al.*, 2011). Accounting enforcement is a powerful mechanism through which the FRQ is secured worldwide. However, the EU presents a particular context because, in the last few years, there has been an improvement in accounting enforcement, and all the member states must follow the same rules. The only difference is in the implementation of these rules, an aspect pointed out also by ESMA in the implementation report (ESMA, 2017). Therefore, this feature allows us to investigate whether accounting enforcement is essential to reduce the uncertainty effects on FRQ.

H_2: In countries with strong accounting enforcement, uncertainty is less negatively associated with FRQ.

3. Research methodology

3.1 Uncertainty

To measure uncertainty, we use two indicators, the Business Confidence Indicator (BCI) determined and published by the OECD and the European Sentiment Indicator (ESI) calculated by Eurostat. In previous research, most scholars used the index developed by Baker *et al.* (2016) or a dummy variable for years with political elections. However, the index developed by Baker *et al.* (2016) has data only for 11 EU countries, and political elections do not necessarily increase the uncertainty in EU as already explained above.

Both BCI and ESI are survey-based indexes. A high value of the ESI and BCI indicates increased confidence in the future performance of the economy, while a low value means uncertainty about the future. We can argue that BCI and ESI are relevant candidates to measure uncertainty and appropriate for this study due to:
a) BCI and ESI are survey-based and reflect the opinion of economic agents about the future. Therefore, when uncertainty rises, the indexes deteriorate;
b) BCI and ESI are calculated for each individual country of the EU. This ensures adequate variability within our sample, since our uncertainty measures vary between the countries included. This facet increases the explanatory power of our results;
c) BCI and ESI decrease around major events or crises such as the financial crisis or the Covid-19 pandemic (please see Figure 1). In this case, BCI and ESI are adequate to capture the uncertainty.
In our analysis, we use the change in BCI and ESI from year to year for each EU country. Both indexes have data available for each EU country on the OECD and Eurostat websites. Bulgaria, Croatia, Cyprus, Malta, and Romania are not part of the OECD, therefore, for BCI we use the value determined for EU 27 instead.

Figure 1 shows the evolution of the median value of BCI and ESI for the 27 EU countries.

Figure 1. BCI and ESI evolution
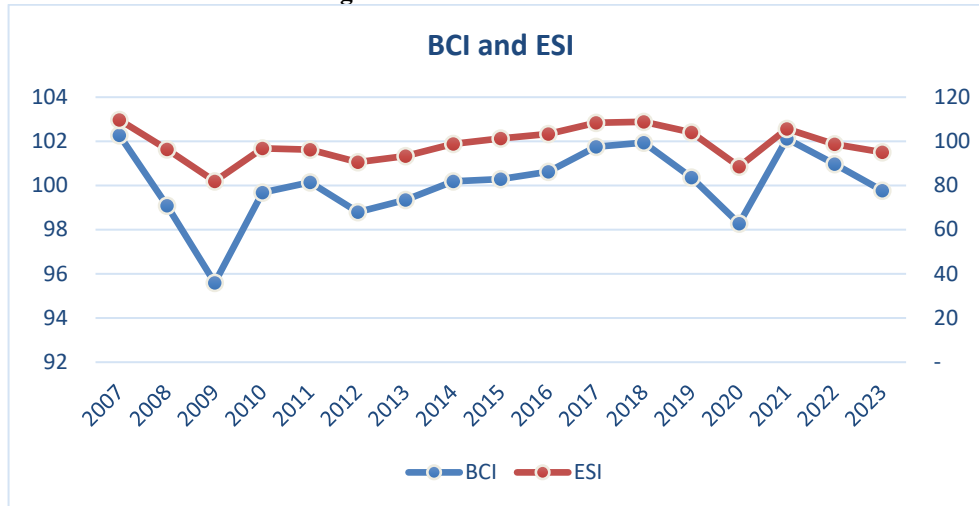
Source: author's processing

3.2 Financial reporting quality

It is difficult to capture FRQ because there are many characteristics of qualitative financial information. However, several models have emerged in the literature that aim to separate reasonable business accruals from abnormal or discretionary accruals. Accrual-based models regress the total accruals of the firm on fundamental characteristics. Variations in total accruals that can be explained by variations in firm fundamental characteristics are reasonable business accruals, while variations that cannot be explained are discretionary accruals. We used four accrual-based models, the standard Jones model (Jones, 1992), the modified Jones model (Dechow *et al.*, 1995), the modified Jones model with performance (Kothari *et al.*, 2005), and the Dechow-Dichev model (Dechow and Dichev, 2002). Each of the models subsequent to the standard Jones model improves the initial one. Dechow *et al.* (1995), considered the credit sales which can be more easily manipulated by the management. Kothari *et al.* (2005) introduced the performance of the firm as a key attribute that can explain the variation in accruals. Dechow and Dichev (2002) presented a new model, which is based on the principle that business reasonable accruals should transform into cash flow in the future. We used the absolute value of the residuals from the following regressions.

$$ACC_{it} = \alpha_0 + \alpha_1 \frac{1}{TA_{it-1}} + \alpha_2 \left(\frac{\Delta REV_{it}}{TA_{it}}\right) + \alpha_3 \left(\frac{\Delta PPE_{it}}{TA_{it}}\right) + \varepsilon_{it} \qquad \text{(FRQ1)}$$

$$ACC_{it} = \alpha_0 + \alpha_1 \frac{1}{TA_{it-1}} + \alpha_2 \left(\frac{\Delta REV_{it}}{TA_{it}} + \frac{\Delta AR_{it}}{TA_{it}}\right) + \alpha_3 \left(\frac{\Delta PPE_{it}}{TA_{it}}\right) + \varepsilon_{it} \qquad \text{(FRQ2)}$$

$$ACC_{it} = \alpha_0 + \alpha_1 \frac{1}{TA_{it-1}} + \alpha_2 \left(\frac{\Delta REV_{it}}{TA_{it}} + \frac{\Delta AR_{it}}{TA_{it}}\right) + \alpha_3 \left(\frac{\Delta PPE_{it}}{TA_{it}}\right) + \alpha_4 ROA_{it} + \varepsilon_{it} \qquad \text{(FRQ3)}$$

$$WC_{it} = \alpha_0 + \alpha_1 CFO_{it-1} + \alpha_2 CFO_{it} + \alpha_2 CFO_{it+1} + \alpha_2 \Delta REV_{it} + \alpha_3 PPE_{it} + \varepsilon_{it} \qquad \text{(FRQ4)}$$

Table 1 lists the variables used in the FRQ model.

Table 1. Variables used in the FRQ model

Variable	Description
ACC	Change in non-cash current assets - Change in current liabilities, Change in the current portion of long-term debt - Depreciation and amortization expense scaled by lagged total assets for firm i in year t
WC	Change in receivables + change in inventory – change in accounts payables – change in income tax payable + change in other assets scaled by lagged total assets for firm i in year t
Tait	Total assets of firm i in year t
Δ REVit	Change in sales of firm i in year t
Δ Arit	Change in trade receivables of firm i in year t
Δ PPEit	Change in the gross property, plant and equipment of firm i in year t
CFOit	Cash flow from operations of firm i in year t scaled by lagged total assets of firm i in year t
ROA	Net income/total assets of firm i in year t

Source: author's processing

The higher the residuals of the regression, the lower the FRQ. The models are estimated cross-sectionally at the industry-year level. According to the literature, we require at least 10 observations for each industry year.

3.3 Accounting Enforcement

To measure accounting enforcement, we use the Strength of Auditing and Reporting Standards estimated by the World Bank. The index is calculated based on surveys from business leaders. Respondents were asked to assess how strongly they perceive the enforcement of accounting and auditing standards in their country. Boolaky *et al.* (2015) demonstrated that this index is relevant to investors. The efficiency of the legal framework, ethical behavior, financial market sophistication, and investor protection are correlated with the high value of this index and have explanatory power for variations in it. We consider this index to be relevant for our purpose, since it is available for a long period of time and could be easily obtained by other researchers. We use the change in accounting enforcement from year to year in each EU country. However, we have available data until 2019 for the ENF, for 2020, 2021, and 2022. For missing years, we used the average change in the ENF. To mitigate this issue, we perform an additional test using another measure for ENF which is well-grounded in the literature.

To include comparable data in our analysis for ENF, BCI, and ESI, we use the min-max method to normalize the data between -50 and +50. This will improve the consistency and precision of our analysis.

3.4 Sample Selection

We extract financial data about companies from Refinitiv. We selected only companies listed in the EU. The Refinitiv returned 117,810 firm-year observations out of which 41,310 firm-year observations were eliminated as they are from the finance industry (banks, insurance, capital markets, financial services, consumer finance, mortgage). We decided to eliminate the finance industry since it has specific regulations, and the FRQ is measured through other models. Furthermore, we request that companies have available data for three consecutive years for total assets, current assets, total liabilities, current liabilities, equity, market capitalization, cash flow from operations, revenue, and net income. This will result in the elimination of another 41,011 firm-year observations. The final sample consists of 35,489 firm-year observations. Table 2 shows the sample distribution per country.

Table 2. Sample distribution per country

Country	Number of observations	Country	Number of observations
Germany	5,291	Croatia	696
France	5,144	Portugal	498
Sweden	5,048	Austria	436
Poland	4,354	Cyprus	419
Italy	2,519	Hungary	279
Greece	1,806	Lithuania	266
Finland	1,533	Slovenia	194
Spain	1,444	Estonia	181
Bulgaria	1,199	Malta	134
Belgium	984	Ireland	127
Romania	946	Luxembourg	86
Denmark	911	Latvia	83
The Netherlands	810	Czech Republic	79
		Slovakia	22

Source: author's processing

We can observe that the countries with the most observations are Germany, France, Sweden, Poland, and Italy. They represent 62% of the total number of observations. We have enough observations for each country to run the FRQ models and regression analysis. This is important because we ensure the variability of our data and increase the explanatory power of the results. Furthermore, we need data for each EU member state to analyze accounting enforcement. Table 3 shows the sample distribution by industry.

Table 3. Sample distribution per industry

Industry	Number of observations	Industry	Number of observations	Industry	Number of observations	Industry	Number of observations
Real Estate Management & Development	2,355	Entertainment	713	Construction Materials	363	Distributors	167
Machinery	2,227	Oil, Gas & Consumable Fuels	681	Independent Power and Renewable Electricity Producers	352	Office REITs	166
Software	1,508	Professional Services	638	Semiconductors & Semiconductor Equipment	340	Ground Transportation	162
IT Services	1,333	Specialty Retail	638	Paper & Forest Products	333	Broadline Retail	158
Construction & Engineering	1,324	Automobile Components	593	Diversified REITs	321	Gas Utilities	152
Food Products	1,298	Pharmaceuticals	588	Containers & Packaging	283	Leisure Products	132
Media	1,232	Building Products	556	Personal Care Products	277	Wireless Telecommunication Services	89
Hotels, Restaurants & Leisure	1,188	Trading Companies & Distributors	553	Air Freight & Logistics	259	Water Utilities	85
Electronic Equipment, Instruments & Components	1,156	Health Care Providers & Services	551	Energy Equipment & Services	249	Tobacco	84
Commercial Services & Supplies	1,041	Diversified Telecommunication Services	491	Marine Transportation	242	Passenger Airlines	79
Chemicals	986	Beverages	468	Retail REITs	236	Residential REITs	76
Textiles, Apparel & Luxury Goods	894	Transportation Infrastructure	410	Technology Hardware, Storage & Peripherals	233	Household Products	59
Health Care Equipment & Supplies	887	Electric Utilities	399	Interactive Media & Services	228	Industrial REITs	56
Biotechnology	836	Consumer Staples Distribution & Retail	399	Health Care Technology	225	Diversified Consumer Services	50
Metals & Mining	811	Communications Equipment	380	Automobiles	204	Hotel & Resort REITs	13
Electrical Equipment	804	Industrial Conglomerates	378	Life Sciences Tools & Services	199	Specialized REITs	10
Household Durables	723	Aerospace & Defense	375	Multi-Utilities	193		

Source: author's processing

We use the Morgan Stanley Capital International (MSCI) industry classification from Refinitiv, which includes a total of 74[3] industries. According to MSCI, the GICS was designed to help investors understand the key business activities of listed companies (MSCI, 2023). Therefore, considering the context of this study and the focus on investors, we consider this classification to be relevant. Furthermore, this industry classification is the most widely used internationally. We can observe that the largest industries in our sample are real estate (6.64%), machinery (6.28%), software (4.25%), IT services (3.76%), and construction & engineering (3.73%). The fact that we have in our sample all industries from MSCI classification, and we have required observation to run FRQ models (10) have important implications for the representativeness of our findings for all industries.

3.5 Empirical model and control variables

Table 5 presents the empirical model and the summary of the variables.

$$FRQ = \alpha_0 + \alpha_1 BCI \text{ or } ESI + \alpha_2 ENF$$
$$+ \alpha_3 SIZE + \alpha_4 AUD + \alpha_5 AS + \alpha_6 LEV + \alpha_7 ROE + \alpha_8 \Delta REV + + \alpha_9 \Delta CFO$$
$$+ \varepsilon + Industry \text{ and } Country \text{ fixed effects}$$

Table 4. Variables

Variable	Description	Type of variable	Source of data
FRQ	Financial Reporting Quality	Dependent Variable	Refinitiv
BCI	Change the Business Confidence Index	Focus variable	OECD
ESI	Change Economic Sentiment Indicator	Focus variable	Eurostat
ENF	Change in Strength of Auditing and Reporting Standards	Focus variable	World Banck
SIZE	Natural logarithm of the gross domestic product	Control variable	World Bank
AUD	Dummy variable equal to 1 if the financial statements were audited by a Big 4 auditor or 0 otherwise	Control variable	Refinitiv
AS	Dummy variable which equals 1 if the financial statements were prepared in accordance with IFRS and 0 otherwise	Control variable	Refinitiv
LEV	Total liabilities divided by equity	Control variable	Refinitiv
ROE	Return on equity calculated as net income divided by total equity	Control variable	Refinitiv

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[3] Please note that we eliminate from the sample the financial industry (Banks, Capital Markets, Financial Services, Insurance, Consumer Finance, and Mortgage Investment Trusts). Therefore the number of industries in our sample is 68.

Variable	Description	Type of variable	Source of data
Δ REV	Change in sales scaled by lagged total assets	Control variable	Refinitiv
Δ CFO	Change in net cash flow from operations scaled by lagged total assets	Control variable	Refinitiv

Source: author's processing

Dechow *et al.* (2010) indicate that it is likely that small firms have weaker internal controls over financial reporting due to fixed costs associated with skilled personnel. Additionally, small firms are not subjected to intense scrutiny from the public. Therefore, small firms are likely to engage in earning management more frequently. We control this in our model by including the natural logarithm of market capitalization as a proxy for the size of the company.

Auditors have an important role to play in ensuring the FRQ. The literature shows that Big4 auditors have an advantage over non-Big4 auditors due to their ability to attract talent, industry expertise, and available resources (Che L. *et al.*, 2020 and De Fond *et al.*, 2014). We include a control variable that equals 1 if the auditor is a Big4 one and 0 otherwise. The adoption of IFRS in 2005 led to an increase in FRQ in the EU, especially when FRQ is compared with previous national accounting standards (Soderstorm & Sun, 2007; Yip & Young, 2012). We included in our analysis a dummy variable, which equals 1 if the company reports under IFRS and 0 otherwise. Anagnostopoulu and Tsekrekos (2017), Gu *et al.* (2005) and Lazzem and Jilani (2018) suggest that high-leveraged firms are more likely to smooth the earnings to meet the debt covenants. This means that firms that are liquid and do not need external funding are less likely to engage in earnings management. To control this, we included the leverage calculated as the total liabilities divided by the total equity in our model.

DeFond and Park (1997) highlight that to reduce the threat of dismissal, the management of firms with poor performance has the incentive to manage the earnings. We control for firm performance by including in out model the return on equity.

4. Results and discussions

4.1 Regression analysis

On the other hand, the goals set by the EU Commission, to strengthen investor protection by promoting the FRQ, are not achieved when we consider the uncertainty. This has major implications for capital markets and calls for immediate attention from policymakers.

Table 5. Regression results

	(1) FRQ1	(2) FRQ2	(3) FRQ3	(4) FRQ4	(5) FRQ1	(6) FRQ2	(7) FRQ3	(8) FRQ4
BCI	-0.0150***	-0.0145***	-0.0147***	-0.0156***				
	(-6.06)	(-5.87)	(-5.93)	(-6.19)				
ESI					-0.0070***	-0.0064***	-0.0070***	-0.0076***
					(-4.65)	(-4.30)	(-4.63)	(-5.06)
ENF	-0.0068**	-0.0071**	-0.0066**	-0.0065**	-0.0072**	-0.0073**	-0.0071**	-0.0067**
	(-2.71)	(-2.89)	(-2.67)	(-2.60)	(-2.85)	(-2.99)	(-2.83)	(-2.66)
ENF#BCI	0.0004*	0.0004*	0.0005*	0.0003*				
	(2.11)	(2.21)	(2.25)	(2.13)				
ENF#ESI					0.0003**	0.0003*	0.0004**	0.0003*
					(2.69)	(2.52)	(2.86)	(2.26)
SIZE	-0.3510***	-0.3690***	-0.3530***	-0.3410***	-0.3530***	-0.3710***	-0.3540***	-0.3420***
	(-15.28)	(-16.05)	(-15.36)	(-14.87)	(-15.33)	(-16.11)	(-15.41)	(-14.91)
AUD	-0.1560	-0.0850	-0.1540	-0.1510	-0.1540	-0.0829	-0.1510	-0.1500
	(-1.73)	(-0.95)	(-1.70)	(-1.70)	(-1.71)	(-0.93)	(-1.67)	(-1.68)
AS	-1.0750***	-0.9770***	-1.0720***	-1.0460***	-1.0690***	-0.9720***	-1.0660***	-1.0400***
	(-7.21)	(-6.58)	(-7.21)	(-7.29)	(-7.17)	(-6.54)	(-7.17)	(-7.25)
LEV	0.3220***	0.3340***	0.3190***	0.3390***	0.3230***	0.3350***	0.3190***	0.3400***
	(6.51)	(6.87)	(6.57)	(7.02)	(6.52)	(6.88)	(6.58)	(7.03)
ROE	-0.8930***	-0.9670***	-0.8730***	-0.9430***	-0.8920***	-0.9660***	-0.8720***	-0.9420***
	(-8.29)	(-9.01)	(-8.11)	(-8.89)	(-8.28)	(-8.99)	(-8.10)	(-8.88)
ΔCFO	0.0011	0.0008	0.0008	0.0007	0.0011	0.0009	0.0009	0.0008
	(1.83)	(1.38)	(1.38)	(1.27)	(1.94)	(1.50)	(1.48)	(1.38)
ΔREV	0.0021***	0.0013**	0.0017***	0.0018***	0.0020***	0.0012*	0.0016**	0.0017***
	(4.26)	(2.69)	(3.48)	(3.63)	(4.03)	(2.43)	(3.27)	(3.42)
R-squared	0.1308	0.1342	0.1296	0.1331	0.1305	0.1339	0.1294	0.1328
N	35489	35489	35489	35489	35489	35489	35489	35489
Country and industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Source: author's processing

Table description: The table shows the regression results. In each case, we employed an OLS model with country- and industry-fixed effects. BCI#ENF and ESI#ENF are the interaction effects between our uncertainty measures and accounting enforcement. In terms of interaction, each variable was centred by subtracting the median value. In each model, the standard errors are clustered at the firm level. The T values are in parentheses. The significance levels at 10%, 5%, and 1% are represented by *, **, and ***, respectively.

Challenges arising from climate change, existing conflicts, and a fragile economic situation will make uncertainty a persistent state in the coming years. If policymakers do not take the appropriate measures, the decline in FRQ will result in a deterioration in investor confidence, reduced market participation, and withdrawal of investors and orientation towards other capital markets. Consequently, the inability to obtain financing from the capital market will increase the cost of capital for the companies, and this will affect the EU economy.

Next, we investigate whether accounting enforcement can act as a moderating factor between FRQ and uncertainty. The literature suggests that accounting enforcement is positively associated with FRQ. Our results are consistent with the literature, the coefficient of ENF is 0.0068 in Model 1, 0.0071 in Model 2, 0.0066 in Model 3, 0.0065 in Model 4, 0.0072 in Model 5, 0.0073 in Model 6, 0.0071 in Model 7, and 0.0067 in Model 8. The coefficient is statistically significant at the 5% level in all cases. The results show that if accounting enforcement increases by one unit, the FRQ will increase on average across all models with 0.0069. To analyze whether accounting enforcement holds significance in context of uncertainty, we introduce two interaction terms between accounting enforcement and the two measures for uncertainty. The positive coefficient of both interaction terms indicates that accounting enforcement has the ability to reduce the negative association between FRQ and uncertainty. The interaction term between BCI and ENF is statistically significant at the 10% level, while the interaction term between ENF and ESI is statistically significant at the 5% level in Model 5 and Model 7 and at 10% in Model 6 and Model 8. The results indicate that when accounting enforcement increases by one unit, the negative association between uncertainty and FRQ will decrease on average by 2.7% in the first four models and by 4.57% in the last four models.

Regarding the interaction term between ENF and BCI/ESI, the results can be linked to the existing literature. There is a body of research suggesting that accounting enforcement infringements produce strong negative market reactions when they are made available to the public (Christensen *et al.*, 2020; Dechow *et al.*, 1996; Ernstberger *et al.*, 2012; Dee *et al.*, 2011). In the EU, accounting enforcement bodies select a sample of several companies or auditors to be scrutinized in a financial year. Errors are made available to the public through different channels: changes in the financial statements, public corrective notes, or an official announcement from the accounting enforcement body. We know that uncertainty is generalized to the entire market and produces negative effects for investors and companies. However, when an accounting enforcement action is taken against a company or its auditor, this creates a particular context that captures the attention of the entire market. Therefore, the negative effects produced by uncertainty combined with accounting enforcement actions worsen the company's position in the capital market. Consequently, in EU countries where accounting enforcement is strong, management is not likely to engage in earnings management frequently.

The results are of interest to EU policymakers; accounting enforcement is a useful instrument that can counter the negative association between FRQ and uncertainty. In the latest peer review report on the implementation of enforcement guidelines, ESMA lists several points of deficiency for specific EU member states such as inadequate staffing, insufficient qualification of human resources, improper selection methods, and inconsistencies regarding the timing and extent of procedures (ESMA, 2017). Therefore, strengthening the implementation of the enforcement guidelines and the convergence between the member states is a starting point. Furthermore, possible changes in guidelines should incorporate the effects of uncertainty, for example, to increase the sample of companies to be examined when uncertainty rises or to focus on specific industries, for example, Bermpei *et al.* (2021) demonstrate that the FRQ of companies from healthcare, transport, defense, tabaco, and pharma is more susceptible to uncertainty. Additionally, the member states should allocate sufficient resources to accounting enforcement to facilitate proper staffing, talent attractiveness, and enough training. We rely on accruals-based models in testing our hypotheses and we show that management discretionary behavior intensifies in times of uncertainty. Therefore, the enforcer bodies should prioritize the accounting estimates and the management assumptions. Inspectors should check how accounting estimates are determined, their presentation in financial statements, and related disclosures. Cooperation between member states is also a key point in ensuring strong accounting enforcement.

The control variables are consistent with the literature. There is a negative association between firm size and FRQ, resulting in smaller companies managing earnings more frequently than larger companies. Firms that are audited by a Big4 auditor, reports under IFRS, have good financial performance, and are not leveraged are positively associated with FRQ. The adjusted R squared is approximately 10%, which is comparable to the adjusted R squared obtained by Bermpei *et al.* (2021), Goncalves *et al.* (2022), Yung and Root (2019), Jain *et al.* (2021), and El Ghoul *et al.* (2021).

4.2 Another measure for FRQ

Real earnings management (RMS) is used to improve company performance by reducing discretionary expenses. This method estimates the expected discretionary expenses and then compares them with the actual discretionary expenses. The large difference between the two means that managers cut discretionary expenses to improve performance and, therefore, the FRQ decrease. The RMS is obtained following the approach of Cohen *et al.* (2008) and is equal to the residuals from the below model.

$$\frac{DE_{it}}{TA_{it_{it}}} = \alpha_0 + \alpha_1 \frac{1}{TA_{it-1}} + \alpha_2 \left(\frac{REV_{it}}{TA_{it}}\right) + \varepsilon_{it}$$

The DE is discretionary expenses, which is the sum of selling and general administrative expenses and research and development expenses. The remaining variables are explained in Section 3. To facilitate interpretation, we multiply the residuals by -1. For the sake of brevity, in Table 6 we present only the results for the variables of interest.

Table 6. Regression results for uncertainty and RMS

	(9) RMS	(10) RMS
BCI	-0.0575***	
	(-10.41)	
ESI		-0.0491***
		(-14.59)
ENF	-0.0263***	-0.0298***
	(-3.44)	(-3.89)
BCI#ENF	0.0011**	
	(2.62)	
ESI#ENF		0.0010*
		(2.41)
Control variables	Yes	Yes
R-squared	0.4515	0.4522
N	35489	35489
Country and industry fixed effects	Yes	Yes

Table description: The table shows the regression results for real earnings management (RMS). In each case, we employed an OLS model with country- and industry-fixed effects. BCI#ENF and ESI#ENF are the interaction effects between our uncertainty measures and accounting enforcement. In terms of interaction, each variable was centered by subtracting the median value. In each model, the standard errors are clustered at the firm level. The T values are in parentheses. The significance levels at 10%, 5%, and 1% are represented by *, **, and ***, respectively.

The coefficients of BCI and ESI are negative, which also means that in this case the uncertainty is negatively associated with FRQ. The negative coefficient of BCI is 0.0575 while the coefficient of ESI is 0.0491 which means that for an increase with one unit of uncertainty, the FRQ will decrease by 5.75% in Model 9 and by 4.91% in Model 10. Both coefficients are statistically significant at the 1% level. Regarding accounting enforcement, the results are consistent with those obtained in the first 8 models. For an increase with one unit in accounting enforcement, the negative association between FRQ and uncertainty decreases by 1.98% in Model 9 and by 2.12% in Model 10. When comparing earnings management with real earnings management, the latest is harder to discover by auditors and enforcement bodies because it lies in operational decisions rather than accounting treatments. This implies that it is more likely that management will engage in real earnings management more frequently than in earnings management. This draws attention to the investors to monitor the business decisions taken by management and to analyze their impact.

4.3 Another measure for uncertainty

Uncertainty is an event-based phenomenon. Certain events raise or prolong uncertainty. As another measure of uncertainty, we identify 6 years with notable events in the EU. Table 7 shows the year and the associated event.

Table 7. Years of uncertainty in the EU

Year	Event
2008	Financial crisis
2011	EU sovereign debt crisis
2016	Brexit
2020	Covid-19
2021	Inflation and Energy Costs
2022	Ukraine aggression

Source: author's processing

We argue that in these years the uncertainty increases across the EU. We create a dummy variable that takes 1 for those years and 0 for the remaining years. The regression results are in Table 8. For the sake of brevity, we present only the results for the variables of interest.

Table 8. Regression results for EVENT

	(11) FRQ1	(12) FRQ2	(13) FRQ3	(14) FRQ4
EVENT	0.1790**	0.1320*	0.1970***	0.2040***
	(3.22)	(2.40)	(3.53)	(3.68)
ENF	-0.0050*	-0.0053*	-0.0049*	-0.0046*
	(-2.00)	(-2.17)	(-1.97)	(-1.88)
EVENT#ENF	-0.0071**	-0.0063**	-0.0069**	-0.0060**
Control variables	Yes	Yes	Yes	Yes
R-squared	0.1304	0.1337	0.1293	0.1326
N	35,489	35,489	35,489	35,489
Country and industry fixed effects	Yes	Yes	Yes	Yes

Table description: The table shows the regression results for EVENT as another measure of uncertainty. In each case, we employed an OLS model with country- and industry-fixed effects. EVENT#ENF is the interaction effects between our uncertainty measure and accounting enforcement. In terms of interaction, the ENF was centred by subtracting the median value. In each model, the standard errors are clustered at the firm level. The T values are in parentheses. The significance levels at 10%, 5%, and 1% are represented by *, **, and ***, respectively.

The results suggest that in those 6 years with events generating uncertainty, at EU level, the FRQ declines. In contrast to BCI and ESI, we expect a positive sign for the EVENT coefficient. The coefficient is statistically significant at 1% in Model 13 and

Model 14, 5% in Model 11, and 1% in Model 12. The results for accounting enforcement are similar to those obtained previously. This robustness test demonstrates that our results hold their significance.

4.4 Another measure for accounting enforcement

Isidro *et al.* (2020) provide a comprehensive measure consisting of four factors that explain more than 70% of the variation in FRQ. Factor 3 deals with accounting enforcement. We use the value of that factor as another measure of accounting enforcement. We rely on this because the study of the recent Isidro *et al.* (2020) advances a measure for accounting enforcement and has data available for 14 EU countries. The principal effect was eliminated due to collinearity with country fixed effects. In Table 9 are the results of regression; for the sake of brevity, we present only the results for the variables of interest.

The results of the interaction terms are similar to the previous ones and show that accounting enforcement has the capacity to reduce the negative association between FRQ and uncertainty. In Models 15-18, the reduction is estimated at an average value of 15%, while in Models 19-22 it is estimated at 10%. The coefficient is positive and statistically significant at the 5% level. Therefore, we conclude that our results are robust to another measure of accounting enforcement.

Table 9. Regression results for another measure of accounting enforcement

	(15) FRQ1	(16) FRQ2	(17) FRQ3	(18) FRQ4	(19) FRQ1	(20) FRQ2	(21) FRQ3	(22) FRQ4
ESI	-0.0060*** (-3.73)	-0.0057*** (-3.54)	-0.0061*** (-3.80)	-0.0068*** (-4.21)				
BCI					-0.0151*** (-5.10)	-0.0146*** (-4.97)	-0.0149*** (-5.07)	-0.0162*** (-5.48)
ESI#ISIDRO	0.0009** (3.02)	0.0009*** (2.96)	0.0009** (3.05)	0.0010** (3.29)				
BCI#ISIDRO					0.0016** (2.99)	0.0015** (2.97)	0.0015** (2.94)	0.0017** (3.19)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.1308	0.1330	0.1303	0.1334	0.1310	0.1332	0.1305	0.1337
N	29,178	29,178	29,178	29,178	29,178	29,178	29,178	29,178
Country and industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table description: The table shows the regression results for ISIDRO as another measure of accounting enforcement. In each case, we employed an OLS model with country- and industry-fixed effects. BCI#ISIDRO and ESI#ISIDRO are the interaction effects between our uncertainty measures and accounting enforcement. In terms of interaction, each variable was centred by subtracting the median value. In each model, the standard errors are clustered at the firm level. The T values are in parentheses. The significance levels at 10%, 5%, and 1% are represented by *, **, and ***, respectively.

5. Conclusions

The purpose of this study is to analyze the effects of uncertainty on FRQ in the context of the EU. Based on 35.489 firm-year observations, our results suggest that uncertainty is negatively associated with FRQ. Through the present study, we draw attention to the EU institutions that the efforts made to improve the FRQ need to be reassessed, as it is expected that the next years will be characterized by high uncertainty. Furthermore, it is necessary to ensure that investors can always rely on the quality of financial information, even in periods of profound crisis and uncertainty. The functioning of modern capital markets is highly dependent on the information provided by firms; therefore, EU institutions need to find efficient measures to combat the effects of uncertainty.

We analyze uncertainty in the context of EU countries since this allows us to observe directly the effects of uncertainty and accounting enforcement. Our results are robust and consistent. We use real earnings management as another measure for FRQ. We then argue that managers are likely to engage more frequently in real earnings management than in earnings management. The results of this robustness test validate the findings of this study. Furthermore, we use another measure of uncertainty and accounting enforcement. The results show that if we use other measures for our variable of interest, the findings are the same. Furthermore, we use in our analysis country and industry fixed effects and combining this with the same set of rules applied to all EU listed companies, our sample can benefit from partially eliminating the effects of potential unobservable effects.

One of the available instruments that EU institutions can use to combat the effects of uncertainty is represented by accounting enforcement. We provide evidence that when accounting enforcement is strong, the negative association between uncertainty and FRQ is less pronounced. Our results can guide policy makers and motivate them to improve accounting enforcement.

Our conclusions are similar to those already presented in the literature that uncertainty is negatively associated with FRQ (see, e.g., Bermpei *et al.*, 2021; Shin, 2019; Jin *et al.*, 2019; Du *et al.*, 2023; and Yung & Root, 2019) and highlight that management incentives prevail in times of high uncertainty. Regarding accounting enforcement, our conclusions are in line with Jiang *et al.* (2022), Cui *et al.* (2021), and El Ghoul *et al.* (2021), which highlights the importance of external monitoring when uncertainty rises.

In Section 4 we also discuss the implications of this study for investors and EU institutions and propose several actions to improve accounting enforcement. Implementing the enforcement guidelines and bringing the convergence among the member states of the EU are the first measures to be taken. Then, the accounting

enforcement methodology should account for uncertainty. All these proposed actions will strengthen accounting enforcement in the EU.

The present study has some limitations. The first is that the strength of auditing and reporting standards is available until 2019. We mitigate the possible concerns regarding this by using another measure for accounting enforcement. Furthermore, certain changes could have occurred in recent years regarding accounting enforcement, changes that are not fully reflected in our accounting enforcement measure. Therefore, future research is needed in the coming years which can provide additional evidence on this subject. We include control variables already established in the literature in our regression analysis, and the explanatory power of our model is similar to those already existing in the literature on this subject. However, the results may be sensible to the inclusion of other control variables. We believe that this limitation was addressed in the present study by including industry and country fixed effects. Another limitation is that FRQ models may have some measurement errors, which are acknowledged in the literature. We addressed this using four models of earnings management and one model of real earnings management. We believe that this is sufficient for the purpose of this study; however, future research could rely on other models. Another potential topic of future research is the management estimates in times of uncertainty; since these are sensitive to subjectivity, the discretion of management could increase when uncertainty is high.

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