Earnings Quality in Times of Crisis: Evidence from the EU

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The main purpose of the current study is to investigate the status of earnings quality in the time of crises using a sample of firms in 15 EU countries covering the period 2002-2021. The study also examines the impact of female representation in corporate boards on the sign of earnings quality during the Covid-19 pandemic. The findings indicate that EU firms are more likely to engage in earnings management practices to offset the impact of the crisis on their operations and financial performance, thereby negatively affecting earnings quality. The results also suggest that the level of earnings management is statistically different across years, sectors and countries. In addition, the results revealed that female representation in the board of directors enhances earnings quality by mitigating the level of earnings management. The current study's findings provide practical policy implications for policymakers, shareholders and creditors when making investment decisions during times of economic turmoil.

Keywords: Earnings Quality, Financial troubles, EU, Female Representation, Economic Contraction

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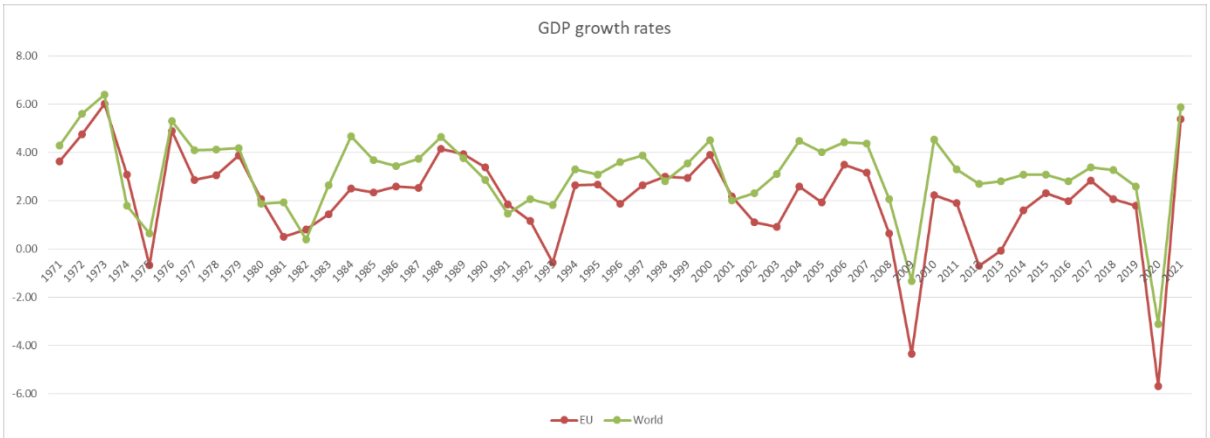
1. Introduction

On December 31st, Wuhan Municipal Health Commission, China, reported a cluster of pneumonia cases in Wuhan, Hubei province, eventually a novel coronavirus was identified, due to the alarming levels of spread and severity, on March 11th, 2020, Covid-19 has been declared as a global pandemic by the World Health Organisation (WHO)[1]. As of December 2021, there have been 286,995,426 confirmed cases of COVID-19, reported to WHO, and Europe account for more than 36% of confirmed cases (i.e., 104,162,493 cases). The challenges presented by the pandemic have indeed resulted in substantial disruptions and induced uncertainties across the operating environment worldwide (Taylor et al., 2023). The Covid-19 pandemic is considered the most serious global economic crisis since the great depression of 1930s (Vidya and Prabheesh, 2020), with the world's GDP declining by more than 3%, compared to 1.3% during the global financial crisis of 2008-2009, the disastrous impact was even worse in the European Union, where its GDP declined by 5.7%, as can be seen from Figure 1 below (World Bank, 2021), with the second quarter of 2020 falling by 11.8%, the lowest since 1995, highlighting the severity of the pandemic in the EU (Taylor et al., 2023).

Figure 1: GDP growth worldwide and in the EU from 1971 to 2021



Note: The figure shows the GDP growth since 1971 worldwide and in EU.

[1] Coronaviruses (CoV) are a large family of viruses that cause illness ranging from the common cold to more severe diseases. A novel coronavirus (nCoV) is a new strain that has not been previously identified in humans (WHO, 2020).

Furthermore, the pandemic has caused significant disruption to global trade, which fall by almost 9%[2], with services trade declining by more than 20%, being the most hit by Covid-19 restrictions (OECD, 2022). Indeed, capital markets around the globe have experienced a free fall, with Dow Jones Industrial Average (DJIA) and S&P500 indices dropping by 33% and 29%, respectively in the period between December 31st, 2019, and March 20th, 2020 (World Economic Forum, 2020). In the UK, FTSE100 suffered the worst quarter since 1987, recording a drop of 24.80% (The Guardian, 2020). Amidst this global turbulence, many enterprises were exposed to illiquidity, even bankruptcy (Syriopoulos, 2020). Furthermore, the damaging impact of the pandemic has constrained firms' resources and threatened their long-term viability (Yang et al., 2022). In this regard, it has been argued that firm's survival is regarded as a crucial issue during crisis times (Trombetta and Imperatore, 2014). Consequently, firms' operations and performance around the globe have been significantly disrupted and adversely affected, due to uncertainty lockdown measures imposed by governments (Ozili and Arun, 2020). This prevailing period of economic turbulence has precipitated a formidable challenge for corporate managers and financial advisers tasked with preserving investors' confidence in the performance trajectory of companies. For instance, Tesco's chairman explicitly expressed the unprecedented impact of the pandemic on their operations by indicating that:

> "Reflecting on this year [2020], I believe it has been among the most challenging that Tesco has faced in its 101-year history. This year, we reflect on the serious challenges and uncertainty our business and our colleagues have faced. It has been hugely difficult".

Indeed, the extant research has systematically documented that periods characterized by economic turbulence have the potential to exert a discernible impact on the accounting choice behaviour of management, including the propensity towards engaging in earnings management (e.g., Han and Wang, 1998; Smith et al., 2001; Saleh and Ahmed, 2005; Ahmad-Zaluki et al.,

[2] This is the steepest drop since the 2008-2009 global financial crisis.

2011; Filip and Raffournier, 2014; Ali et al., 2022), which in turn leads to a deterioration in the financial reporting quality (FRQ) (Stein and Wang, 2016)[3]. FRQ which also ensures earnings quality (EQ), and thus, improves the capital market efficiency by alleviating the information asymmetry and stewardship problems and reporting earnings in the financial statements that capture an entity's economic reality (Krishnan and Parsons, 2008). In this regard, it has been suggested that Black swan events, often referred to as "knowable unknowns," are characterized by information asymmetry, caused by uncertainty, and lack of relevant information (Phillips et al., 2023). This worsened information asymmetry problem due to the unprecedented challenges caused by the Covid-19 pandemic is thought to negatively affect firm's FRQ and thereby EQ. In this regard, it has been suggested that FRQ is negatively impacted during periods of uncertainties (Hail, 2013; Stein and Wang, 2016). Nonetheless, the extant literature does not provide "clear-cut" evidence regarding the status of the link between EQ and macroeconomic factors more specifically during times characterised by economic turbulence (Trombetta and Imperatore, 2014; Ali et al., 2022), as prior studies have revealed inconclusive evidence concerning the direction of EM/EQ during crisis times and it was suggested that the extent of turbulence caused by the crisis would determine that direction (Jaggi and Lee, 2002; Ahmad-Zaluki et al., 2011; Talyor et al., 2023). For example, Jaggi and Lee (2002) reported that US distressed firms, which managed to get waivers for any violations related to debt covenants, adopt downward-earnings management, while they engage in upward-earnings management if they were denied these waivers, implying that there are several reasons that determine the direction of EM during crisis times (Filip and Raffournier, 2014). As mentioned above, the pandemic had a disastrous impact on firms' operations, financial health and performance, so the majority of firms are expected to report negative earnings (Taylor et al., 2023), which could

[3] FRQ refers to satisfying the need for a credible financial reporting process (Ball, 2006) and is crucial for the efficient functioning of capital markets (Paul and Krishna, 2001).

predispose management to engage in upward EM practices to offset these negative consequences (Ahmad-Zaluki et al., 2011), prevent a decline in the firm's share price (Charitou et al., 2007), avoid violations of debt covenants (Dichev and Skinner, 2002), as manipulating earnings upward would reduce that violations (Sweeney, 1994; Saleh and Ahmed, 2005) and reassure debtholders of the firm's ability to generate profits and thereby service its obligations. Furthermore, engaging in income-increasing earnings management would help in regaining shareholders' confidence regarding the continuation and viability of their investee firms. On the other hand, and in line with the political cost hypothesis, which suggests that firms are inclined to report lower earnings to avoid costs that may be imposed by external parties (Watts and Zimmerman, 1986), periods characterised with economic downturn might motivate firms to engage in income-decreasing EM to receive governmental support/bailout and/or reduce political pressures (DeAngelo et al., 1994)[4], to undertake debt restructuring that would result from the failure to pay debt (Filip and Raffournier, 2014)[5], to extract concessions from employees during union negotiations (DeAngelo and DeAngelo, 1991)[6].

One of the main purposes of the current study is to examine the impact of women representation in corporate boards on EQ during crisis times. In this context, the extant literature reveals that corporate governance mechanisms including board characteristics such as size, independence, financial expertise, the number of meetings and multiple directorships as well as board gender

[4] In a response to the emerging COVID-19 crisis, governments and central banks have decisively intervened to mitigate the economic effects of this crisis and have introduced several stimuluses plans to save their economies. For example, the US has issued US$484 billion Paycheck Protection Program and Health Care Enhancement Act, committed US$2.3 trillion (around 11% of GDP) Coronavirus Aid, and introduced Relief and Economy Security Act costing US$8.3 billion Coronavirus Preparedness and Response Supplemental Appropriations Act and provided US$192 billion Families First Coronavirus Response Act as well as adopting an unprecedented decision by the Federal Reserve to lower interest rate to zero% (IMF, 2020). In the UK, the Bank of England Covid Corporate Financing Facility introduced £330bn of loan program to support businesses (15% of GDP) and reduced the interest rate by 65 basis sliding into 0.1 percent (IMF, 2020).

[5] Considering the deterioration of the realizable value of firm's assets during crisis time (Shleifer and Vishny, 1992), lending institutions would offer debt restructuring by waiving the covenants, delaying the payment, and reducing the interest rate (Asquith et al., 1994).

[6] DeAngleo et al. (1994) provided evidence that firms might report losses to portray their negative performance and put them in a good position when negotiating with employees.

diversity affect the board's effectiveness in fulfilling its controlling and monitoring role and, therefore, the quality of the financial reporting process and thereby earnings quality (e.g. Beasley, 1996; Dechow et al., 1996; Klein, 2002; Agrawal and Chadha, 2005; Shu et al., 2015). More specifically, board effectiveness requires diverse knowledge, competence, and organisational values (Labelle et al., 2010). In this context, gender diversity, which refers to the proportion of female board members within corporate boards, has received considerable attention in the past decade (Adams and Ferreira, 2009; Nguyen et al., 2020) and has become an established practice for many developed countries worldwide. For instance, several European countries, including the UK, have adopted mandatory and voluntary regulations to increase the presence of female directors on corporate boards (Rao and Tilt, 2016; Hollindale et al., 2019). More specifically, corporate boards in all publicly traded firms in the EU are required to have a 40% women representation on corporate boards, with penalties for non-compliance (European Union, 2012; Zalata et al., 2022). In line with the social role theory and their communal characteristics, females are more ethical and rational compared to their male counterparts (Huang and Kisgen, 2013; Kimbrough et al., 2013), focus more on communicating and disseminating information, and exhibit a greater sensitivity toward moral responsibility (Gillian, 1982). Prior evidence suggested that gender diversity improves board efficiency (Higgs, 2003), enhances earnings quality (Krishnan and Parsons, 2008; Peni and Vahamaa, 2010; Garcia-Sanchez et al., 2015; Nguyen, et al., 2020; Zalata et al., 2022), and decreases financial reporting fraud (Wahid, 2019).

As mentioned above, the main purpose of the current study is to examine the status of EQ during crisis times and the impact of gender diversity on this status focusing on a sample of firms representing 15 European countries during the period 2002-2021. The findings indicate that EU firms are more likely to engage in earnings management practices to offset the impact

of the crisis on their operations and financial performance, thereby negatively affecting earnings quality. The results also suggest that the level of earnings management is statistically different across years, sectors and countries. In addition, the results revealed that female representation in the board of directors enhances earnings quality by mitigating the level of earnings management.

The current research makes three main contributions to the extant literature on EM and EQ. First, the study provides recent evidence regarding EQ in crisis times, including the global financial crisis and the Covid-19 pandemic. As mentioned above, EU countries were hit hard during these two events and firms were subject to challenges that affect their operations and performance, which might push them towards engaging in EM practices to mitigate the impact of these crises. In this regard, EU countries offered government support, grants and bailouts during crisis times, the current results might portray that these firms might have engaged in EM to qualify for the offered support. The results also should provide some insights to EU governments regarding the fairness of the support offered to firms. Second, this is the first study to investigate two major crises namely: the global financial crisis and the Covid-19 pandemic, which is important to compare the consequences of manmade financial crisis and health crisis. Finally, this is the first study to examine the impact of women representation in corporate boards on the status of EQ during crisis times, where the results shed lights on the crucial importance of gender diversity to maintain EQ during periods characterised by economic turbulence.

The current paper is organized as follows. Following this introduction, we review the pertinent literature and present hypotheses in Section 2. The third section outlines the methods, and the fourth section provides the results. Lastly, we conclude the paper and discuss some policy implications.

2. Literature Review and Hypotheses Development

2.1 Earnings Quality in Crisis Times

There is an abundance of studies that have investigated earnings management practices, including earnings quality, especially in countries with developed capital markets, however a considerable number of these studies do not consider the macroeconomic environment of firms under investigation (Filip and Raffournier, 2014; Ali et al., 2022; Rueangsuwan and Jevasuwan, 2022). Therefore, there is a scarcity of research that examines these practices at crisis times including financial crises, natural disasters and pandemics, however, as discussed above, the reported evidence is inconclusive. In other words, during economic turbulence firms might engage in income-increasing EM to offset the negative impact of these events on their operations and performance (Sweeney, 1994; Filip and Raffournier, 2014; Ozili and Arun, 2020) or choose to engage in income-decreasing EM to avoid the political monitoring costs, receive governmental support, restructure their debts, to extract concessions from employees during union negotiations (DeAngelo and DeAngelo, 1991; DeAngleo et al., 1994; Filip and Raffournier, 2014). For example, Saleh and Ahmed (2005) and Ahmad-Zaluki et al. (2011) reported evidence of EM by firms troubled by the East Asian crisis, similar results were reported for European firms operating in crisis time during the period 2005-2013 by Tahinakis (2014). More recently, Rueangsuwan and Jevasuwan (2022) found that Thai firms engage in EM following the 2011 floods. Another strand of the literature suggests that firms might refrain from engaging in EM practices during crisis times, as they are expected to be more subject to monitoring from different stakeholders (Francis et al., 2013), thereby firms might strive to engage in less EM and report earnings of high quality. For example, Filip and Raffournier (2014) found evidence of less EM practices during the global financial crisis of 2008-2009 for European firms, similar results were reported by Dimitras et al. (2015) for Greek and Spanish and Vieira (2016) for Portuguese firms. More recently, Ali et al. (2022) revealed that firms in

the G-12 countries were found to engage less in EM during the Covid-19 pandemic. Due to the inconclusiveness of the above results, the first hypothesis is formulated as follows:

H1: Firm's earnings quality is significantly impacted during the Covid-19 pandemic.

2.2 Board Gender Diversity and Earnings Management

The extant literature suggests that women have a more democratic and trust-based management style (Klenke, 2003). In addition, females are more risk-averse, cautious, conservative, and show higher ethical values when making decisions (Powell and Ansic, 1997; Sunden and Surette, 1998; Clikeman et al., 2001)[7]. These unique characteristics qualify female board members to offer effective monitoring of management activities compared to their male counterparts (Adams and Ferreira, 2009), thereby enhancing the quality of financial reporting (Labelle et al., 2010; Lara et al., 2017). On a very relevant note, Peni and Vahamaa (2010) suggest that more women on corporate boards can impact the quality of financial reporting, as they have a conservative mindset and a low tendency to commit fraud (Vermeir and Van Kenhove, 2008; Ho et al., 2015). Therefore, board gender diversity is believed to have a positive impact on the quality of financial reporting as it provides new insights and perspectives, which in turn improve the monitoring of the management's activities (Carter et al., 2003)

There is a scarcity of studies investigating the impact of diverse boards on earnings quality. One of the earliest studies in this regard has been conducted by Krishnan and Parsons (2008) using Fortune 500 during the period 1996-2000. This study reported that earnings quality is positively associated with gender diversity in senior management. In the same vein, Peni and Vahamaa (2010) indicated that S&P 500 with female CFOs are engaging in income-decreasing discretionary accruals, thereby having higher earnings quality; similar results were reported by

[7] These characteristics are the basis of the Lehman Sisters hypothesis, which argues that the global financial crisis of 2008 would not have happened if there had been more women on senior management roles (Van Staveren, 2014).

Ho et al. (2015). Similarly, Srinidhi et al. (2011) find a positive association between gender diversity and earnings quality. In China, Cummings et al., (2015) suggest that board diversity helped in constraining fraud. Garcia-Sanchez et al. (2017) suggest that gender diversity is linked to accounting conservatism and earnings quality using a sample of 159 banks from nine different countries covering the period 2004-2010. Moreover, using more than 6,000 US firms from 2000 to 2010, Wahid (2019) reported that firms with more gender-diverse boards commit fewer financial reporting mistakes and fraud. Based on the preceding argument, the study proposes the following hypothesis:

H2: Women representation in corporate boards impacts firm's earnings quality during the Covid-19 pandemic.

3. Research Methodology

The current study examines the earnings quality during the financial crises for a sample of listed EU companies for the period between 2002 and 2021. Prior to the regression analysis, the study provides a one-way ANOVA test to examine whether earnings quality means are significantly different across years, countries and sectors. Then, the current paper develops two regression models to examine the relationship between earnings quality and the financial crisis and to study the role of Board Gender Diversity (BGD) in mitigating the impact of crises on earnings quality:

$$EQ_{i,t=}\beta_0 + \beta_1 LGTA_{i,t} + \beta_2 LEV_{i,t} + \beta_3 CFO_{i,t} + \beta_4 LROA_{i,t} + \beta_5 CFO - FOLT_{i,t} + \beta_6 Distress_{i,t} + \beta_7 CRISIS_{i,t} + \varepsilon_{i,t} \quad \text{(Equation 1)}$$

$$EQ_{i,t=}\beta_0 + \beta_1 LGTA_{i,t} + \beta_2 LEV_{i,t} + \beta_3 CFO_{i,t} + \beta_4 LROA_{i,t} + \beta_5 CFO - FOLT_{i,t} + \beta_6 Distress_{i,t} + \beta_7 CRISIS_{i,t} + \beta_8 BGD_{i,t} + \beta_9 BGD * CRISIS_{i,t}\varepsilon_{i,t} \quad \text{(Equation 2)}$$

The data used in the current study was collected from Refinitiv Eikon. Financial firms (banks, financial institutions, real estate and insurance) were excluded as they work under different accounting and governance regulations across countries.

3.1 Earnings Quality Measurement

Accrual quality has been measured using the three most commonly used models in the extant accounting literature. Our proxy for earnings quality is based on the concept of accrual quality derived from previous research (Jones, 1991; Dechow et al., 1995; Dechow and Dichev, 2002; McNichols, 2002; Kothari et al., 2005) which have been extensively used in the extant literature.

Kothari et al. (2005) estimated the performance-matched Jones-model discretionary accrual as the difference between the Jones model discretionary accruals and the corresponding discretionary accrual for a performance-matched firm. Thus, they modified the Jones (1991) and Dechow et al. (1995) accrual models including lagged ROA as follows:

$$TA_{i,t=}\beta_0 + \beta_1 \frac{1}{Ait-1} + \beta_2(\Delta Rev_{i,t} - \Delta Rec_{i,t} + \beta_3 GPPE_{i,t} + \beta_4 ROA_{i,t} + \varepsilon_{i,t} \quad \text{(Equation 3)}$$

{EQ1}

$TA_{i,t}$ is accruals, scaled by lagged total assets, where accruals equal the year-to-year change in non-cash current assets minus current liabilities (excluding short-term debt and income taxes payable) minus depreciation,

$\beta_1 \frac{1}{Ait-1}$ represents lagged total assets,
$\Delta Rev_{i,t}$ measures the annual change in revenues, scaled by lagged total assets,
$\Delta Rec_{i,t}$ represents account receivables, scaled by lagged total assets
$GPPE_{i,t}$ refers to gross property, plant and equipment, scaled by lagged total assets,
$ROA_{i,t}$ measures lagged return on assets, ε_{it} is the error term.
In general, larger (lower) values of accruals quality proxies indicate lower (higher) accruals quality because less of the variation in current accruals is explained by operating cash flow realizations. Lower (higher) accruals quality implies a higher (lower) level of earnings quality.

Dechow et al. (1995) estimated accruals quality by using the residuals of the following regression equation:

$TA_{i,t=}\beta_0 + \beta_1 \frac{1}{Ait-1} + \beta_2(\Delta Rev_{i,t} - \Delta Rec_{i,t} + \beta_3 GPPE_{i,t} + \varepsilon_{i,t}$ (Equation 4) {EQ2}

$TA_{i,t}$ is the accruals, scaled by lagged total assets, where accruals equal the year-to-year change in non-cash current assets minus current liabilities (excluding short-term debt and income taxes payable) minus depreciation,

A_{it-1} measures lagged total assets
$\Delta Rev_{i,t}$ represent annual change in revenues, scaled by lagged total assets,
$\Delta Rec_{i,t}$ refers to the annual change in receivables, scaled by lagged total assets
$GPPE_{i,t}$ represents gross property, plant and equipment, scaled by lagged total assets,
ε_{it} is the error term.

In general, larger (lower) values of accruals quality proxies indicate lower (higher) accruals quality because less of the variation in current accruals is explained by operating cash flows realizations. Lower (higher) accruals quality implies a higher (lower) level of earnings quality.

McNichols and Stubben (2008) measure accruals quality by using the standard deviation of estimated residual ($\hat{\varepsilon}_{it}$) from the following equation:

$\Delta Rec_{i,t=}\beta_0 + \beta_1 \Delta Rev_{i,t} + \varepsilon_{i,t}$ (Equation 5) {EQ3}

$\Delta Rec_{i,t}$ is the annual change in accounts receivable for firm i in the year t.
$\Delta Rev_{i,t}$represents the annual change in revenues for firm i in the year t.
ε_{it} is the error term.
All terms are scaled by lagged total assets.
In general, large (small) values of ($\hat{\varepsilon}_{it}$) correspond to lower (higher) accruals and lower (higher) earnings quality.

3.2 Financial Crisis Measurement

Different approaches have been used in the existing literature to define the financial crisis periods. First, using historical narratives of well-known systemic banking crises, when bank capital was eroded, lending was disrupted, and significant public intervention was often needed. Another version of this methodology is to adopt both a chronology of events about banking crises and date currency crises by using quantitative threshold (Kaminsky and Reinhart, 1999; Reinhart and Rogoff, 2009a, 2009b). Another line of research identifies crises through binary variables based on extreme values of one or two underlying financial variables. For instance, currency crises are usually determined as significant devaluations, losses in reserves, and/or defensive interest rate increases. Instead, equity crises are defined as a sharp decline in the overall market index where the decline can be indicative of greater expected loss, higher dispersion of potential losses (higher risk), or increased uncertainty about the return of firms (Illing and Liu, 2003).

Based on the time span of the current study (2002-2021) and the existing literature, two periods of financial crisis were identified: 2008/9 Crisis and 2020/21 Crisis. Hence, Crisis variable represent a dummy variable which takes the value of 1 for pre-2008/9 Crisis, takes 2 for 2008/9 Crisis, takes 3 for pre-2020/21 Crisis and takes 4 for 2020/21 Crisis.

3.3 Control Variables

Consistent with the existing literature, a set of controls related to the firm characteristics were used are found to affect the use of EQ activities, including firm size (Watts and Zimmerman, 1990), leverage (Lazzem and Jilani, 2018; Zamri et al., 2013), profitability (Leuz et al., 2003) and future growth opportunities (Ali et al., 2007; Prencipe et al., 2008). Firm size (LGTA) measured as the logarithm of the total assets, leverage (LEV) computed as the loon-term debt divided by the total common equity, cash flow from operations (CFO) calculated as the cash flow from operating activities scaled by total assets, returns on assets (LROA) computed as the

logarithm of returns on assets, Cash flow volatility (CFO-VOLT) as measured by the standard deviation of the cash flow divided by the total assets, distress (Distress) as measured by the value of one if net income is positive and zero otherwise.

4. Results

4.1 Descriptive and Correlation Analysis

Table 1 outlines the descriptive statistics for the variables examined in the current study. An analysis of Table shows that EQ measures had means of 0.01(Jones Modified Model), -0.05 (Dechow & Dechow Model) and 0.016 (McNicholas and Subban Model) with a standard deviation ranged between 0.064 and 0.22. Further, Table 1 reports the statistics of the control variables including LGTA, LEV, CFO, LROA, and CFO-VOLT.

4.2 Analysing Earnings Quality During financial crisis across years, Countries and sectors

This section analyzes the EQ measures by year, country, and sector. Table 2 shows EQ means has been significantly different with f-value of 8.6 and p-value of 0.001 as per One-Way ANOVA test. An analysis of Table 2 reports means in crisis times that were higher than the previous period. For example, EQ1 reports a mean of 0.058 in 2008 (2008-crisis) as compared to 0.037 in 2007. Similarly, EQ1 outlines a mean of 0.07 in 2020 (COVID-19 crisis) as compared to 0.025 in 2019. Other measures of EQ (EQ2 & EQ3) report similar results to those reported by EQ1. This indicates that firms are much more motivated to manage their earnings during financial troubles. Table 3 outlines the EQ measures across countries examined and indicates that EQ means are statistically different with f-value of 12.5 and p-value of 0.001 as per One-Way ANOVA test. Similarly, Table 4 reports EQ means which were significantly different across sectors.

Table 5 presents the correlation matrices of the variables considered in the analysis. To get insights into how financial crises might affect the relationship between firms' EQ practices and Crisis. An analysis of Table indicates a statistically negative correlation between all EQ measures used indicating that firm are more likely to engage in earnings management practices during crisis period which ultimately reduce the EQ.

4.3 EQ, Financial Crises and Board Gender Diversity

This section outlines the results of examining the relationship between earnings quality and financial crises on one hand, and the role of the board gender diversity in such relationship. Table 6 indicates a significantly negative association between EQ measures and the crisis variable with coefficients of -0.02 (EQ1), -0.025 (EQ2) and -0.03 (EQ3) with p-values ranged between 0.01 and 0.05 suggesting that the quality of corporate earnings is managed and accordingly reduced during the financial crisis times. These findings are unsurprising as those firms listed in adversely affected countries are expected to engage in more earnings management practices to mitigate the negative effects of the crisis on their operating performance and so report better performance, which is also in line with prior studies (Filip and Raffournier, 2014; Ozili and Arun, 2020). Taken together, our findings provide strong evidence (over two financial crises) about the negative influence of crisis times on the EQ. Other variables examined in Table 6 pointed out mixed results. For example, while firm size (as measured by the total assets), CFO (scaled by total assets), and ROA reported a statistically positive relationship with earnings quality, others including LEV, CFO-VOLT and distress indicate a significantly negative association with EQ.

Board gender diversity is thought to positively impact on the quality of earnings as it provides new insights and perspectives, which in turn improve the monitoring of the management's

activities (Carter et al., 2003). Table 7 reports the findings on the mediating role of the board gender diversity in the relationship between EQ and the financial crisis times. In particular, the results of Table 7 indicate a significantly positive influence of the female board engagement in enhancing the earnings quality and mitigate the possibility of aggressive earnings management. Across all proxies employed in the current study, Table 7 reports positive coefficients and p-value of less than 0.05 for the relationship between EQ (dependent variable and the BGD-Crisis. The results are consistent with prior research which indicates a positive association between gender diversity and earnings quality (e.g., Srinidhi *et al.*, 2011). Also, the results are in line with a strand of research which outlines that female engagement in the board of directors linked to accounting conservatism (Garcia-Sanchez *et al.*, 2017) and mitigating fraud and misrepresentation of the financial statements (Wahid, 2019).

5. Conclusion and Implications

The present study examines corporate earnings quality during financial troubles using an EU sample for the period of 2002-2021. The findings are consistent with the extant literature which suggest that firms are more likely to adopt earnings management techniques that reduce earnings quality which ultimately confuse stakeholders when making decision in such difficult times. In particular, the results show that earnings quality has been negatively impacted during financial crisis (e.g., 2008/9 and COVID-19 crises). The Findings also outlines that the level of earnings management is statistically different across years, sectors and countries. Finally, the results point out that female participation in the board of directors mitigates the level of earnings management during financial troubles.

This study contributes to the literature by providing results that allows for better understanding the link between EQ during financial crises. Although there is indeed empirical evidence on

the impact of the global financial crises on EQ (Filip and Raffournier, 2014; Li et al., 2020), such evidence in the context of the COVID-19 pandemic remains very limited (Xiao and Xi, 2021). Therefore, to the best of our knowledge, this study is one of the first attempts to examine EQ under both 2008/09 and COVID-19 crises. In addition, the current study extends the prior literature by examining the effect of gender board diversity on the EQ. In doing so, this study provides more insights into the impact of the female board participation on the quality of earnings during periods of economic turbulence and financial downturns. Moreover, we provide cross-country evidence using a sample from EU countries as most previous research used a single-country setting.

The scope of this paper provides direction for future research. As we are using data across countries, our paper has not captured all other important institutional factors that affect earning quality. Hence, future studies might extend our study by examining several others institutional and governance factors that may affect EQ. Other directions for future research can focus on examining the impact of accounting standards on how firms' financial reporting quality will be affected by the crisis in countries with different accounting standards. Moreover, our study uses a sample of firms in the context of the largest economics worldwide. Hence, including other companies listed in other emerging countries would provide more insights into the results.

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Table 1: Variables Definition and Measurement

Variable	Definition and Measurement
DA	Discretionary accruals that are estimated using the corrected version of the Jones (1991) as suggested by Dechow et al. (1995).
BODGD	Board Gender Diversity: which is the percentage of females on the board (DataStream code: CGBSO03V).
SIZE	Firm Size: which is the natural log of the firm total assets.
LEV	Leverage: computed as the loon-term debt divided by the total common equity
LROA	Computed as the logarithm of returns on assets
CFO-VOLT	As measured by the standard deviation of the cash flow divided by the total assets
MTBV	MTBV: which is a company's market-to-book ratio.
Distress	As measured by the value of one if net income is positive and zero otherwise
Crisis	A dummy variable which takes the value of 1 for pre-2008/9 Crisis, takes 2 for 2008/9 Crisis, takes 3 for pre-2020/21 Crisis and takes 4 for 2020/21 Crisis.

Table 1: Descriptive Statistics					
Variables	Observation	mean	SD	Min	Max
EQ 1	16712	0.022	0.22	-6.67	2.5
EQ 2	16712	-0.049	0.095	-2.25	2.25
EQ 3	16712	0.013	0.064	-1.34	5.36
LGTA	17328	14.3	1.8	5.8	20.1
LEV	17322	0.62	4.6	-222.5	244.6
ToninQ	16896	1.6	3.3	0.001	286
CFO_TA	17208	0.09	0.11	-2.7	1.4
DY_P	16890	0.027	0.25	0	24
REV_VOLT	17328	59.05	548.8	0.027	44307
Cor-Per	17208	7.9	73.5	0.0037	5937
Distress	17329	0.0847	0.36	0	1
Crisis	17329	2.45	1.05	1	4
BGDiv	10687	0.21	0.15	0	0.75

Note: this table provide descriptive statistics for the variables examined in the current study. EQ1 represents Equation 3, EQ3 refers to Equation 4, EQ3 represents Equation 5, Total assets (LGTA) represents the logarithm of total assets, leverage (LEV) computed as the loon-term debt divided by the total common equity, cash flow from operations (CFO)

calculated as the cash flow from operating activities scaled by total assets, returns on assets (LROA) computed as the logarithm of returns on assets, Cash flow volatility (CFO-VOLT) as measured by the standard deviation of the cash flow divided by the total assets, distress (Distress) as measured by the value of one if net income is positive and zero otherwise.

Table 2: Earnings Quality means by years			
Years	EQ1	EQ2	EQ3
2002	-0.0036	-0.053	0.018
2003	-0.026	-0.049	0.008
2004	-0.018	-0.042	0.028
2005	0.011	-0.041	0.026
2006	0.032	-0.048	0.03
2007	0.037	-0.042	0.0265
2008	0.058	-0.052	0.08
2009	0.019	-0.044	0.0025
2010	-0.006	-0.042	0.029
2011	0.028	-0.054	0.023
2012	0.027	-0.052	0.018
2013	0.008	-0.055	0.009
2014	-0.017	-0.058	0.015
2015	0.01	-0.049	0.022
2016	0.06	-0.053	0.01
2017	0.01	-0.055	0.016
2018	0.025	-0.056	0.0145
2019	0.025	-0.048	0.0143
2020	-0.07	-0.052	-0.06
2021	-0.033	-0.063	0.021
One-Way ANOVA Test			
F-Value	8.6	P-Value	0.001

Note: This table provide the means of EQ as per the three measures used in the current study across years

Table 3: Earnings Quality means by country			
Country	EQ1	EQ2	EQ3
Austria	0.013	-0.047	0.014
Belgium	0.011	-0.049	0.011
Denmark	0.04	-0.04	0.015
Finland	0.026	-0.052	0.012
France	-0.02	-0.06	0.012
Germany	0.012	-0.053	0.015
Greece	0.051	-0.033	0.017
Ireland	0.043	-0.046	0.02
Italy	0.014	-0.054	0.012
Netherlands	0.02	-0.052	0.02
Norway	0.02	-0.056	0.012
Poland	0.045	-0.046	0.021
Spain	0.018	-0.062	0.012
Sweden	0.025	-0.048	0.01
Switzerland	0.032	-0.045	0.013
United Kingdom	0.037	-0.042	0.015
One-Way ANOVA Test			
F-Value	12.5	P-Value	0.001

Note: This table provide the means of EQ as per the three measures used in the current study across countries.

Table 4: Earnings Quality means by industry			
Industry	EQ1	EQ2	EQ3
Basic Materials	0.022	-0.052	0.01
Consumer Discret	0.038	-0.04	0.015
Consumer Staples	0.034	-0.05	0.014
Energy	-0.01	-0.053	0.013
Health Care	-0.02	-0.056	0.015
Industrials	0.02	-0.055	0.014
Technology	0.023	-0.037	0.02
Telecommunications	0.024	-0.029	0.01
One-Way ANOVA Test			
F-Value	57.3	P-Value	0.001

Note: This table provide the means of EQ as per the three measures used in the current study across sectors

Table 5: Correlation Matrix												
	EQ1	EQ2	EQ3	LGTA	LEV	CFO	LROA	CFO-VOLT	Distress	Crisis	BGD	BGD-Crisis
EQ1	1.000											
EQ2	0.55***	1.000										
EQ3	-0.130***	-0.26***	1.000									
LGTA	0.15***	0.045***	0.068**	1.000								
LEV	-0.022**	-0.042***	-0.05***	0.056***	1.000							
CFO	0.57***	0.97***	-0.24***	0.036***	0.08*	1.000						
LROA	0.950***	0.53***	-0.044***	0.095***	-0.035***	0.56***	1.000					
CFO-VOLT	-0.44***	-0.18***	-0.027**	-0.26***	0.095**	-0.19***	0.38***	1.000				
Distress	0.37***	0.33***	-0.01***	0.2***	-0.023**	0.35***	-0.04***	-0.11***	1.000			
Crisis	-0.02**	-0.03***	-0.06***	0.15***	0.016**	-0.026**	-0.025**	-0.056***	-0.075***	1.000		
BGD	-0.025*	-0.026**	0.055***	0.125***	0.2**	-0.27*	-0.06***	-0.047***	0.0594***	0.25***	1.000	
BGD-Crisis	-0.065***	-0.04***	0.07***	0.076***	0.023**	-0.038**	0.55***	-0.035***	-0.05***	0.73***	0.68***	1.000

Note: this table provides correlation coefficients for the variables examined in the current paper.

Table 6: Earnings Quality and Crisis			
Ind Variables/Dep	Model 1	Model 2	Model 3
LGTA	0.01*** (3.2)	0.02*** (3.5)	0.03*** (1.85)
LEV	0.002 (1.4)	-0.005 (-1.15)	-0.025 (-1.05)
CFO/TA	0.12*** (3.5)	0.7*** (244.5)	-0.195*** (-3.8)
LROA	1.56*** (68.5)	-0.07** (-2.9)	0.05** (0.95)
CFO-VLOT	-0.005*** (-14.20)	0.002** (2.75)	-0.0035** (-3.25)
Distress	-0.008*** (-0.65)	-0.002** (-3.3)	-0.012** (4.95)
Crisis	-0.02** (-1.99)	-0.025*** (-3.7)	-0.03*** (-4.7)
Constant	-0.2*** (-5.2)	-0.15*** (-20.8)	-0.75* (-1.6)
Country fixed effect	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes
F-value	6.287***	11.852***	5.9***
Adjusted R2	0.095	0.11	0.08

Note: This table provide the result of testing the relationship between EQ and financial crisis times (Equation 1) using three proxies (models) for the earnings quality.

Table 7: Earnings Quality, Crisis and Gender Diversity			
Ind Variables/Dep	Model 1	Model 2	Model 3
LGTA	0.02*** (3.5)	0.03*** (5.36)	0.08** (3.5)
LEV	0.08 (0.68)	-0.045 (-1.56)	-4.9 (-0.8)
CFO/TA	0.06** (2.6)	0.7*** (153.5)	0.185*** (-4.2)
LROA	1.45*** (117)	-0.0065* (-1.73)	0.02 (3.45)
CFO-VLOT	-0.005*** (-27.5)	0.006*** (8.2)	0.008** (-2.35)
Distress	-0.003** (-2.48)	-0.016** (-6.5)	-0.01*** (-4.45)
Crisis	-0.05*** (-5.7)	-0.02** (-2.45)	-0.05*** (-3.4)
BGD	-0.04 (-1.8)	0.05** (2.3)	-0.05** (-5.75)
BGD-Crisis	0.015** (3.73)	-0.03*** (5.46)	0.016** (3.37)
Constant	-0.12*** (-12.5)	0.18*** (-17.5)	0.09** (2.45)
Country fixed effect	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes
F-value	5.222***	8.857***	3.668***
Adjusted R2	0.098	0.096	0.062

Note: This table provide the result of testing the relationship between EQ and financial crisis times (Equation 2) using three proxies (models) for the earnings quality.