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1. The Impact of COVID 19 on Sustainability Reporting: A Perspective from the US Financial Institutions

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Abstract

Design/methodology/approach: We use the independent sample t-test and U Mann-Whitney test throughout as well as OLS, random effects, fixed effects, heteroskedasticity corrected model to test the impact of the COVID-19 pandemic on sustainability reporting in the US financial sector.

Purpose: We provide the first empirical study on the effects of the COVID-19 pandemic on sustainability reporting in US financial institutions using institutional, stakeholder, and legitimacy theories. We use a sample from all listed US financial firms after controlling for both the Refinitiv Eikon sector classification and the NAICS sector classification.

Findings: Using U Mann–Whitney test and independent sample t-test, we find that the average ESG score for the pre-COVID19 period is 53% compared with 62.3% for the COVID-19 period, indicating that the sustainability reporting during COVID-19 is much higher compared with a pre-pandemic period. The findings of regression analysis also confirm that the US financial companies increased their sustainability reporting during the COVID-19 pandemic.

Research limitations/implications: Our research offers useful recommendations for policymakers to create standards for regulators on the significance of raising sustainability awareness. Our findings are crucial for accounting regulators as they work to implement COVID-19 and enforce required integrated reporting rules and regulations.

Originality/value: We provide the first empirical evidence on the impact of the COVID-19 pandemic on sustainability reporting, by examining how US financial institutions approach the topic of sustainability during the COVID-19 pandemic and assessing the pandemic's current consequences on sustainability.

Keywords: *COVID-19, Sustainability Reporting, Environmental, Social and Governance (ESG), Financial Institutions.*

2. Introduction

The various impact that COVID-19 bring to human capital, investments, supply chain, and global trade created the expectation for the world to face the worst financial collapse in decades. After the pandemic, global attention has been created worldwide towards the company's behaviour and obligations to its stakeholders and how they will face the economic, environmental, and social challenges to survive its business and enhance its reputation. A natural part of crisis management is sustainability reporting, which offers the comprehensive communication necessary to control stakeholder perception and enhance the reputation of the company (Zharfpeykan and Ng, 2021). Sustainability reporting is the primary instrument available to businesses to voluntarily publish their performance on environmental, social, and governance (ESG) aspects (Bosi et al., 2022). Due to the COVID-19 epidemic, firm sustainability reports would become a crucial source of information for accountability for many reasons; the first one is in keeping stakeholders informed about how their businesses are reacting to crises now and how they should react in the future. The second reason is that businesses would have to justify actions made at this time and offer predictions and contributions for the future.

Basic science, drugs and vaccine development have been the focus of recent publications on COVID-19. However, despite the increased interest and awareness of the crisis's expected impact and the sustainability issue, some researchers highlighted that the studies concerning sustainability still need a systematic strategy to identify and address these issues on both academic and firm levels. For example, Alkaraan (2021) and Alkaraan (2022) argue that sustainability studies and corporate governance remains open for debate from different perspectives, whereas debates on sustainability remain open dialogues among scholars, policymakers, and practitioners. However, our study differs from the wide extent of research in that it investigates the impact of COVID-19 on sustainability reporting in different ways. First, most of the literature currently examines the impact of COVID-19 on the non-financial sector, for example, Abhayawansa and Adams (2021) analysed the sustainability and risk reporting for the largest companies in the airline, cruise and hotel industries, Elmarzouky, et al. (2021) analysed COVID-19 disclosure and uncertainty within annual reports for UK FTSE-All share non-financial firms, while Tao, et al. (2022) used a sample from Greek energy companies to analyse the market reaction for news announcement related to COVID-19. In the same context, Hussainey, et al. (2022) and Alkaraan (2023) investigated the corporate narrative and sustainability reporting for UK firms after excluding financial firms due to the differences in the disclosure regulations. However, the financial sector is indicted on charges of failing to disclose how loans and investments affect the environment. Nevertheless, they primarily concentrate on disclosing

the immediate effects of their actions, such as their materials utilization and energy consumption (Weber and Feltnate 2018). Most of the environmental and social risks, however, do not directly affect the sector, which is the issue. The crucial role that financial institutions play in directing sustainable development is worth highlighting and it have received insufficient attention from scholars. Therefore, unlike previous studies that mainly analysed the non-financial industries, we mainly focus on the importance of the US financial institutions in terms of sustainability reporting.

Second, most of the previous studies aim to analyse the negative implication of COVID-19 on socioeconomic, for instance, soil pollution has increased because of restrictions on sustainable waste management and the suspension of the recycling process in some metropolitan areas (Yang et al., 2021). In addition to the high increase in the organic and inorganic municipal wastes caused by the lockdown (Chowdhury et al., 2022), as well as increasing both stock market volatility (Yousef, 2020) and gold price volatility (Yousef and Shehadeh, 2020). Unlike previous studies, we try to find the positive side of the impact of COVID-19 on sustainability. According to Rupani et al. (2020), during the pandemic, greenhouse gases that contribute to global warming were continuously reduced in many nations, and air pollution significantly decreased in most the world's countries. Yunus et al. (2020) for instance, find that pollution levels in the hydrosphere have temporarily decreased and are typically lower than they were before COVID-19.

Third, unlike previous studies that used a qualitative content analysis or primary data collection via questionnaires and interviews to analyse the impact of COVID 19 on reporting. Praveena & Aris (2021) for instance, used qualitative content analysis to examine the impacts of COVID-19 on the environment in Southeast Asia. Sultana, et al. (2021) used a structured questionnaire to analyse the impact of COVID-19 on financial reporting and disclosure practices. Amidjaya and Widagdo (2019) argue that there might be subjectivity substance from the researcher's perspective during the assessment of the variable scoring process when measuring sustainability reporting using the content analysis method, consequently they suggest that the measurement of sustainability reporting needs confirmation from independent parties that have expertise in this research subject. Therefore, we used the ESG score from Refinitiv Eikon Datastream, where during the 2020 pandemic, the flow of funds to sustainable investments reached new heights. Companies with strong ESG ratings have seen decreased volatility and greater stock return gains, due to the positive relationship between sustainability and firm value (Broadstock et al., 2021). Gerged, et al. (2023) argued that adopting global sustainability reporting principles is positively attributable to the market value of firms. Hence, the possibility to calculate public domain reported data transparently and objectively is the most important advantage behind using the ESG score from Refinitiv Eikon.

Fourth, rather than focusing on a single disclosure, such as carbon emission disclosures (Yang et al., 2022) or greenhouse gas disclosures (Schulman et al., 2021), we place more

emphasis on sustainability reporting, which we evaluate using Refinitiv's ESG ratings. In contrast to Simnett et al. (2009)'s cross-country research, the typology utilized in our work assists in assessing sustainability reporting by using thresholds as opposed to the dichotomous measure used by Liao et al. (2015), or the two-step method used by Simnett et al. (2009), or the qualitative and disclosures. Unfortunately, the methodological variations in the results mean that the conclusions of past research cannot be compared (Dimson, et al. 2020).

Consequently, the current paper seeks to make the following contributions to the existing literature. Firstly, the study provides the first empirical study on the impact of the COVID-19 pandemic on sustainability reporting in the US financial sector. Additionally, because the financial sector involves in-service functions, it is important to note that it does not, by nature, have a detrimental influence on the environment. A wide spectrum of stakeholders, however, expect open disclosures due to the effects of financial and banking activities with a diverse consumer base. Finance companies are becoming more interested in environmentally responsible operations to positively impact their stakeholders and boost the company's reputation. Consequently, they offer a range of resources to achieve a reasonable impact in line with the Sustainability goals. Hence, the intersection of economic, social, and environmental factors is important in this sector (Lopez et al., 2020).

Second, this study contributes to the body of literature by examining how US financial institutions approach the topic of sustainability during the COVID-19 pandemic and assessing the pandemic's current consequences on sustainability. Sustainability reporting will become increasingly important after COVID-19 and raise awareness of the need for business openness on sustainability concerns to maintain stakeholder confidence (Khurshid, 2020). Companies may outline their strategies for moving the firm ahead in sustainability reporting. While many businesses continue to prioritize managing COVID-19's direct effects, it is still crucial to report historical ESG data and performance because the COVID-19 crisis is putting a greater focus on social issues. This is because companies' past performance on important social issues will likely be examined in greater detail than ordinary cases.

Thirdly, we contribute to the literature by outlining a novel method for calculating the amount of available sustainability data using a well-known database (Refinitiv ESG). Our technique is more automated and more repeatable than past studies that use hand-collected data, which opens up new avenues for the field's future investigation (Ottenstein et al., 2021). Given the information provided by companies in the public domain, one significant benefit of the ESG score from Refinitiv Eikon is that it is generated transparently and impartially (Buallay and Al-Ajmi, 2019; Wiecezorek-Kosmala et al., 2021).

Therefore, we analyse the impact of COVID-19 on sustainability reporting for US financial institutions using institutional, stakeholder and legitimacy theories. Using U Mann–Whitney test and independent sample t-test, we find that the average ESG score for the pre-

COVID19 period is 53% compared with 62.3% for the COVID-19 period, indicating that the sustainability reporting during COVID-19 is much higher compared with a pre-pandemic period. Importantly, the mean differences in ESG score (9.3%) between pre and during the pandemic is significant at 1%. This indicates that the US financial companies increased their sustainability reporting during the COVID-19 pandemic. We also tested our hypothesis using OLS pooled regression, heteroskedasticity corrected model HCM, random effects and fixed effects models, and the findings confirm that there is a significant positive impact of COVID-19 on sustainability reporting for US financial institutions.

The remainder of the paper is arranged as follows. The next section contains a review of the theoretical background that covered the commonly used theories of sustainability reporting. The third section outlines the sustainability aspects during COVID-19 and hypothesis development. The fourth section presents the research methodology applied, while the fifth section presents and discusses the research results. Finally, the conclusion, implications and limitations of the research.

3. Theoretical Background

Theorizing sustainability has been provided in a variety of methods such as the distinction between weak and strong sustainability which was used as a general conceptual characterization. Furthermore, the stakeholder theory contended that sustainability is the process of balancing the requirements of a company's many stakeholders. Additionally, political economics is infused with theoretical perspectives. For instance, Castro (2004) created a critical theory of sustainability, contending that the exploitation of both natural and social capital was necessary for economic progress. While, Amsler (2009) emphasized the need to examine the intricate processes through which competing visions of equitable futures are formed, rejected, and realized when he proposed a more critical view of sustainability.

Such theories have been provided and used by investigations on the management of the crisis to aid businesses in developing their skills and plans for crisis management. Businesses engaged in managing crises look for standards and norms from their institutional context to guide their activities in order to gain legitimacy and comprehend stakeholder requirements. According to Christensen et al. (2016), having the ability to handle a crisis is not enough for businesses; they also need to uphold their decisions' credibility which could enhance the image of the company to obtain this legitimacy. Alpaslan et al. (2009) contend that comprehension of stakeholder behaviour and demands is necessary for efficient response and management of the crisis. In this context, the influence of COVID-19 on sustainability reporting is hypothesized using institutional, stakeholder and legitimacy theories.

3.1. Institutional theory

According to institutional theory, a firm's reporting is influenced by its desire to conform to its institutional environment, which is established by external cultural norms. Specific procedures are institutionalized within the company as a result or response to external influences and cultural norms which are expected to be followed by a group of organizations that follow the same institutionalized approach. As sustainability reporting matures, according to the theory, businesses in the same environment will create reports that are similar to one another as accountants imitate one another's standard methods or react to comparable coercive forces (Zharfpeykan and Ng, 2021). Since institutional contexts might alter during a crisis, established sustainability reporting standards could no longer be suitable.

Institutional theory, according to Craighead et al. (2020), can help explain the difficulties and throw light on potential remedies for post-COVID-19. They contend that during the epidemic, businesses might operate differently from their long-term plans to deal with shocks and their effects. However, despite discussing several ideas, Craighead et al. (2020) only give a cursory summary of institutional theory and no empirical examples. Amankwah-Amoah (2020) further suggest that although distinguishing between internally and externally imposed impacts, changes in the institutional environment of organizations may disregard organization-specific difficulties, leading to new challenges and repercussions.

3.2. Stakeholder theory

According to the stakeholder theory, companies strive to satisfy not only their shareholders but also other groups such as customers, suppliers, creditors, regulators, NGOs, and social groups. This helps to establish a balance between shareholders and stakeholders and minimize conflicts of interest between them. As a result, it has become necessary to provide comprehensive disclosures of both financial and non-financial (Alkaraan, et al. 2023).

Therefore, according to the stakeholder theory, businesses engage with numerous societal groups that have various expectations in an open system (Alkaraan, et al. 2022). To satisfy the demands of various social groups, businesses must connect with stakeholders and comprehend their needs. If businesses continue to have positive connections with important stakeholders, performance should increase (Buallay et al., 2020). As is customary, reporting is expected to target important parties so that "parties with a higher power, urgency, and legitimacy will be more conscious of sustainability activities than parties with lesser power, urgency, and legitimacy" (Peloza and Papania, 2008).

Crises, however, may alter the significance of different stakeholder groups, with certain stakeholders moving from latent to definitive status or vice versa. In order to establish a more thorough theoretical framework for sustainable growth, the COVID-19 crisis undoubtedly highlights the necessity to incorporate the interests of a larger variety of stakeholders, including all workers, consumers, and society as a whole. As a result,

corporations should create sustainable industries, sustainable pay structures, and sustainable corporate governance systems (Jones and Comfort, 2020).

3.3. Legitimacy theory

According to legitimacy theory, a business thrives and survives if its stakeholders view it as a legitimate subject because it abides by societal norms, values, and expectations derived from a kind of implicit social contract. A business is compelled to make amends by providing the market with more information if it intends to break this agreement. According to the concept of legitimacy, it is "a broad sense that an entity's acts are preferable, suitable, or acceptable within some socially formed system of norms, values, beliefs, and definitions" (Suchman, 1995). It stands for a crucial component in luring funding and winning the support of the stakeholders required for the long-term sustainability of the business. Institutional and organizational legitimacy are two categories of legitimacy. The latter is defined as an activity intended to guarantee the market flawless harmony between social ideals and corporate strategy as well as adherence to the established social norms of conduct of which the firm is a member.

This is because corporate transparency and the disclosure of both financial and non-financial information are components that may be used to manage organizational legitimacy throughout time in a consistent and ongoing manner (Chu et al., 2013). In reality, businesses can offer data to support the actions performed and to adhere to the social norms required by the environment. In essence, businesses may utilize transparency as a tool to lessen the pressure brought on by the social environment.

The inclusion of data on the COVID-19 pandemic's effects and management in integrated reports is seen from the standpoint of businesses seeking to uphold or protect credibility. In reality, the pandemic has considerably raised the demand for investors and stakeholders in general to get information about company management and the consequences of the epidemic on business operations. It has also generated an essential atmosphere of uncertainty. In light of this, corporations are requested to provide particular information about the pandemic in the integrated reports to uphold or defend legitimacy and prevent the establishment of legitimacy gaps that might put the company's medium- to long-term existence at risk. In addition, previous studies have indicated that there is a relationship between disclosure and financial performance, as per the signaling and agency theories (Hassanein et al., 2019; Albitar et al., 2020; Alkaraan, et al., 2022). These theories propose that managers of successful companies tend to disclose crucial information in their annual reports voluntarily. This is done to signal their firm's profitability, boost investors' trust and confidence, and enhance their compensation.

4. COVID-19, Sustainability and Hypothesis Development

The COVID-19 epidemic has a wide range of effects on the economy and society. Operational and disruption risks are brought on by the pandemic, which might have long-

term effects and are less predictable and manageable (Burleyson et al., 2021). The short-term actions and regulations that were put in place during COVID-19 to safeguard essential industries and workplaces, as noted by Markard and Rosenbloom (2020), run the danger of overlooking long-term environmental concerns. Some contend that COVID-19's beneficial impacts are just temporary and that whether firms choose to revert to regular operations or shift toward sustainable development will determine how the future develops (Bodenheimer and Leidenberger, 2020).

Due to a severe systemic lock-in, businesses do have the propensity to follow established movements, which helps in explaining the past experience with the global financial crises of 2008–2009, in which the stabilization of industries and production took place before dealing with the issues related to sustainability and the climate (Sarkis et al., 2020).

According to Abbasi and Nilsson (2012), firms must operate on the underlying presumption that economic growth and health are important and that implementing sustainability typically entails higher costs. One of the challenges to sustainability, according to Jia et al. (2018), is a high economic cost, which helps to explain potential negative sustainability transition scenarios following COVID-19 (Rosenbloom and Markard, 2020). Furthermore, according to researchers, crises can force businesses to change their business models to draw in more clients and develop and provide fresh value propositions. Furthermore, businesses of all sizes prefer to use similar COVID-19 analysis and mitigation tactics and some studies have looked at how COVID-19's disruption prompted an increase in innovation (Amankwah-Amoah, 2021).

Corporate social responsibility and sustainability have grown in importance as strategic problems within the finance industry. Authorities in the financial sector implemented a wide-ranging, complementary set of temporary measures to protect the stability of core markets and continue to deliver essential financial services to the real economy, such as credit and payments, while also preserving responsible risk management practices, bank balance sheet transparency, and financial resilience (Feyen et al., 2021). COVID-19 has placed a strain on the banking system and core markets were unstable, EMDEs saw large capital outflows, and certain borrowers encountered issues with liquidity and repayment (Feyen et al., 2021). Market functioning was generally restored, risk asset prices recovered, capital flows to EMDEs resumed, and credit to the actual economy was mainly sustained as a result of a concerted effort by policymakers. However, there are still significant downside risks, and historical issues like high debt and non-performing loan levels might negatively affect some nations.

Hence, based on the previous literature review, this paper explores the impact of COVID-19 on sustainability reporting in US financial institutions by proposing the following hypothesis:

H: there is a significant impact of COVID-19 on sustainability reporting in US financial institutions.

5. Research Methodology

5.1. Data and sample of the study

The increased interest in sustainability has resulted in new systems for rating firms according to their nonfinancial performance. An example of such rating frameworks is the ESG Ratings which include the Refinitiv ESG Rating that rank the performance of the firm from three nonfinancial perspectives; Environment (E), Social (S) and Corporate Governance (G) based on company-reported data (Thimm and Rasmussen, 2022).

In this context, the current study utilized the Refinitiv Eikon Datastream which contains accounting-based data for worldwide listed firms. The analysis covers the data of the US financial firms during the period 2010–2022. Besides, we controlled for Refinitiv Eikon sector classification (TRBC) and the NAICS sector classification. Furthermore, we checked the classification for validity by adjusting the convergence of industry classification for every firm. After determining if the Refinitiv ESG database covers the firms and excluding firms that are not covered during the research period, the final sample of the current study covers 57 US financial firms with 666 unbalanced year-firm observations.

5.2. Variable Measurements and Data

Table (1) illustrates the variables that we implement in the current study with the firm's sustainability reporting as the dependent variable and the firm's financial factors and corporate governance factors as control variables.

According to previous studies, various measurements have been used to measure sustainability reporting such as self-developed indices (Hausmann and Szalai, 2021); selecting variables of study such as greenhouse gas emissions to measure environmental performance (Braam et al., 2016); using sustainability ratings developed by various agencies such as Thomson Reuters Datastream (Pucheta-Martínez and Gallego-Álvarez, 2018). The significant methodical differences among these measurements limit the opportunities to compare the results, however, the ESG score was implemented in various studies such as (Buallay, 2019; Hamrouni, et al. 2019; Buallay and Al-Ajmi, 2019; Buallay et al., 2020). Accordingly, the ESG score was used to proxy the sustainability reporting in the current study.

The main aim of this study is to analyse the impact of the COVID-19 pandemic on sustainability reporting in the US financial sector. Therefore, our main independent variable is the COVID-19 pandemic, we used a dummy variable that is equal to one for the period 2020–2022, and zero otherwise. Following prior studies on sustainability reporting,

this study uses several corporate governance and internal firm factors as control variables (Salem, et al. 2021; Alkaraan, et al. 2022). Corporate governance variables are board size (i.e., the total number of board members); board independence (i.e., the percentage of independent board members relative to the total number of board members); female directors (i.e., the percentage of female board members relative to the total number of board members); and board meeting attendance (i.e. the percentage attendance of meetings held per year). We also control for firm variables mainly firm size measured by total assets, profitability measured by ROA, and growth opportunity measured by the market-to-book ratio. Table 1 presents the variables of the study.

[Insert table 1 here]

5.3. Methods

We use a two-stadial technique to test our primary hypothesis. We use the independent sample t-test and U Mann-Whitney test throughout the initial stages of our studies to analyse if there are any significant differences in the ESG score between the pre-COVID period and during the COVID period. In other words, U Mann–Whitney test and independent sample t-test will compare the average of the ESG score between the two groups of periods (pre- and during the COVID period).

In the second stage of our investigations, we employed several models to test the impact of the COVID-19 pandemic on sustainability reporting in the US financial sector, we use mainly OLS, random effects, fixed effects, and heteroskedasticity corrected model (HCM). In this regard, our empirical model resembles this:

$$ESG = \beta_0 + \beta_1 COVID + \beta_2 Board\ Size + \beta_3 Independent\ Board + \beta_4 Gender\ Diversity + \beta_5 Board\ Attendance + \beta_6 Firm\ Size + \beta_7 ROA + \beta_8 M-B-Ratio + \beta_9 Leverage + \varepsilon$$

Where the dependent variable is the ESG score (Environmental, social, and corporate governance) from Refinitiv Eikon Datastream; COVID-19 is a dummy variable that equals one for the period 2020-2022, and zeroes otherwise; board size is the number of directors in the board; independent directors is the percentage of independent directors on the board; gender diversity is the percentage of female directors in the board; Board Attendance is board meeting attendance average; Firm Size is measured by the log of total assets; ROA is the return on assets; M-B-Ratio is market to book ratio; leverage measured by long term debt to total assets; leverage is the ratio of total debt to total assets.

6. Results of Data Analysis

6.1. Correlations and Descriptive Statistics

Table 2 presents the results of the descriptive and correlations analysis for the variables of the study. The average ESG score is 54.8%, which is slightly higher than the average ESG from previous studies, for example, Kosmala, et al. (2021) find that the average ESG for Europe energy firms is the range between 20.85% to 29.50% over the period in 2013-2019.

The introduction of the US guideline on non-financial reporting, which required the biggest corporations to publish extensive information on their sustainable performance, appears to be the driving force behind this. On the other hand, Gerged, et al. (2023) found that the average ESG score is 50.44% for UK firms, 51.4% for Canadian firms, and 50.23% for US firms.

[Insert table 2 here]

According to the correlation analysis results, there is a significant positive relation between ESG score with firm size, leverage, gender diversity, independent board, and board meetings attendance. Moreover, the results in table 2, show that there is a significant positive relationship between ESG score and COVID-19, indicating that the US financial firms increased their sustainability reporting. However, as the ESG score is a continuous variable while COVID-19 is a dummy (binary) variable, therefore, the independent sample t-test (parametric test) and Mann-Whitney U Test (nonparametric test) should be used.

6.2. Independent Sample t-test

[Insert table 3 here]

The results of the independent sample t-test as a parametric test (Table 3) aim to analyse the impact of COVID-19 on sustainability reporting by testing if there are any significant differences in the ESG score between the pre-COVID period and during the COVID period. The results in table 3 show that the average ESG score for the pre-COVID-19 period is 53% compared with 62.3% for the COVID-19 period, indicating that the sustainability reporting during COVID-19 is much higher compared with a pre-pandemic period. Importantly, the mean differences in ESG score (9.3%) between pre and during the pandemic is significant at 1%. This indicates that the US financial companies increased their sustainability reporting during the COVID-19 pandemic.

[Insert figure 1 here]

[Insert table 4 here]

Figure 1 and Table 4 present the results of the Mann-Whitney U Test as a non-parametric test that also aims to analyse the impact of COVID-19 on sustainability reporting. In other words, U Mann–Whitney test will compare the mean rank of the ESG score between the two groups of periods (pre- and during the COVID period). The results of the Mann-Whitney U Test confirm the findings of the independent sample t-test, where the null hypothesis for the Mann-Whitney U Test is that the distribution of ESG Scores is the same across categories of COVID-19. As the results of the test are significant, then we can reject the null hypothesis and conclude that the sustainability reporting during COVID-19 is much higher compared with the pre-pandemic period. This indicates that the US financial companies increased their sustainability reporting during the COVID-19 pandemic.

6.3. Regression analysis and testing hypotheses

Table 5 presents the results of the regression analysis that aims to test our main hypothesis that there is a significant impact of COVID-19 on sustainability reporting in US financial institutions. We used four models, OLS pooled regression (model 1+2), heteroskedasticity corrected model HCM (model 3+4), random effects model (5+6) and fixed effects model (7+8). In each model, we used one regression with COVID-19 as our main independent variable (model 1+3+5+7) and then used the regression with both the independent and control variables. The dependent variable in our model is the ESG score from Refinitiv Eikon Datastream which measures sustainability reporting. COVID-19 is the main independent variable in our model as a dummy variable that equals one for the period 2020-2022 (pandemic period) and zero otherwise (pre-pandemic period).

[Insert table 5 here]

Consistent with the results of correlation analysis, independent sample t-test and Mann-Whitney U Test, the results in table 4 show there is a significant positive impact of COVID-19 on sustainability reporting for US financial institutions. This finding is consistent regardless of the models used (OLS pooled regression, heteroskedasticity corrected model, random effects model and fixed effects model).

The reporting in financial companies has experienced an increase in the interest in sustainability and increased effort to integrate sustainability and transparency into its environment and activities as a result of the COVID-19 crisis. The Global Reporting Initiative (GRI) also gets more interested in social topics, occupational health and safety, and employee well-being after the crisis and started to provide guidance and support for companies about where they should emphasize their sustainability activities and the importance of risk management. However, it is worth mentioning that the crisis has also resulted in a catastrophic impact on economies and societies across the world. The crisis resulted in temporary or permanent loss of jobs for Millions of people around the world. Hence, the increased interest in sustainability will enable businesses to create flexible manufacturing systems that prioritize environmental, economic, and social sustainability in the future.

The published reports are usually different in quality due to the complexity of the reporting activity and the need for experience and professional skills. However, the quality of the reported information both financial and non-financial is critical for stakeholders to make accurate judgments of an organization and to take relevant actions (Rawlins, 2008). Reports should represent both good and negative elements of business efficiency, and their content should be intelligible, verifiable, and in compliance with commonly recognized reporting principles (Krivačić and Janković, 2021). However, the challenge is to provide the appropriate quantity and quality of information, in restrictive business conditions.

Our findings are consistent with prior studies. For instance, Krivačić & Janković (2021) evaluated public sustainability reports from reports before and after COVID-19 in Croatia. Investigators discovered an increase in the number of practically all sorts of environmental

responsibility information compared to prior years. Although the amount of social responsibility information has not changed considerably, the overall amount of social responsibility information has increased. According to Atkins et al. (2022), all organizations have shown a high degree of maturity in providing ESG information, particularly in disclosing their actions relevant to the six clusters "Emissions, Energy, Water and Environment, Board and Management Oversight, Governance, Health and Safety".

Furthermore, several recent studies have proven some positive socio-economic externalities of the pandemic such as re-configuring the business role in societies (Brammer et al., 2020), human management approach that can reengage employees in corporate social responsibility, or by the positive influencing the strategic marketing approach (He & Harris, 2020). The extensive effects of COVID-19 on society are creating firms that are increasingly focused on true and trustworthy CSR initiatives, as well as genuine dedication to social concerns.

6.4. Robustness check

[Insert table 6 here]

For the robustness check, we used alternative measurements for the ESG score by using Environmental (E), Social (S) and Governance (G) separately from Refinitiv Eikon Datastream. In models 1-4, we used environmental disclosure data, models 5-8 used social disclosure data and models 9-12 used governance disclosure data. We used four models, OLS pooled regression (model 1+5+9), heteroskedasticity corrected model HCM (model 2+6+10), random effects model (3+7+11) and fixed effects model (4+8+12). The main independent variable in our model is COVID-19 as a dummy variable that equals one for the period 2020-2022 (pandemic period), and zero otherwise (pre-pandemic period).

Consistent with our previous findings in correlation analysis, independent sample t-test and Mann-Whitney U Test and regression analysis, the results in Table 6 confirm that there is a significant positive impact of COVID-19 on Environmental (E) and Social (S) reporting for US financial institutions. This finding is consistent regardless of the models used (OLS pooled regression, heteroskedasticity corrected model, random effects model and fixed effects model). Interestingly, however, the results of the Governance (G) are insignificant in all models. This may be because the US financial institutions disclose a high quality of data related to governance before the COVID-19 crisis. Since the 2008 mortgage financial crisis, financial companies, particularly banks, have been under growing pressure to take a longer-term perspective of the economic interests of their investors and to recognize and adhere to the best corporate governance practices. Salem, et al. (2022) argued that the quality of financial disclosure increased over the 2008 mortgage financial crisis since managers are more likely to disclose high-quality information to attract potential investors.

7. Conclusion

Sustainability reporting aims to support stakeholders in making educated decisions about the impact of their businesses on the environment and how the changing global environment impacts the sustainability performance of their businesses. In this way, reporting on sustainability is more crucial than it has ever been, and going forward, it will be crucial to comprehend how COVID-19 may affect reporting on sustainability. The enormous effects of COVID-19 on enterprises may be seen as a major motivator for encouraging firms to apply sustainability reporting in its true sense by giving back to society during a pandemic. The COVID-19 situation acts as a powerful chance to see alternative corporate reactions and to highlight businesses that are demonstrating resilience to investors while making significant and genuine pledges to their stakeholder connections.

Financial organizations may see opportunities in green investments to raise the standard of their operations. For instance, banks might enhance their risk management strategies by including environmental challenges in their decision-making and building up their portfolios of investments that are ecologically conscious. These portfolios provide funding for initiatives promoting the preservation of natural resources and the adoption of ethical corporate practices.

We analyse the impact of COVID-19 on sustainability reporting for US financial institutions. We used a sample from all listed US financial firms. To select the financial companies, we controlled for both the Refinitiv Eikon sector classification and the NAICS sector classification. The final sample of the current study includes 57 US financial businesses with 666 year-firm observations after we determine if a firm is covered by the Refinitiv ESG database and eliminate firms lacking coverage during the study period (2010-2022). Using U Mann–Whitney test and independent sample t-test, we find that the average ESG score for the pre-COVID19 period is 53% compared with 62.3% for the COVID-19 period, indicating that the sustainability reporting during COVID-19 is much higher compared with the pre-pandemic period. Importantly, the mean differences in ESG score (9.3%) between pre and during the pandemic is significant at 1%. This indicates that the US financial companies increased their sustainability reporting during the COVID-19 pandemic. We also tested our hypothesis using OLS pooled regression, heteroskedasticity corrected model HCM, random effects model and fixed effects model, and the findings confirm that there is a significant positive impact of COVID-19 on sustainability reporting for US financial institutions.

COVID-19 presents several previously unknown issues for financial institutions' viability. Financial institutions must prioritize sustainable development, even though the full consequences of this shift are rarely explained. Financial institutions must look at

methods to move away from traditional philanthropy activities and ethical financial systems and into key sustainability-related topics. Financial institutions must explain their obligations to all parties involved so that they may share the costs and risks of getting sustainable. When conventional banking moves its money into green ventures, it can develop into more ethical banking methods. Therefore, establishing reliable reporting standards is crucial for both revealing significant climate-related financial disclosures and effectively communicating ESG performance to a variety of stakeholders. Additionally, our research offers useful recommendations for policymakers to create standards for regulators on the significance of raising sustainability awareness. Our findings are crucial for accounting regulators as they work to implement COVID-19 and enforce required integrated reporting rules and regulations.

We provide strategies to current businesses on how to consider non-human factors and make it more thorough for the stakeholders to improve the quality of reporting. This research recommends that regulations in financial institutions should continuously monitor sustainability reporting. However, the study is an early attempt to look at how the COVID-19 epidemic has affected financial reporting procedures, although it is only focused on one area when we might have considered other entity-related factors like stock market implications, company governance, internal audit practice, etc.

The findings of our study have practical implications regarding the relationship between COVID-19 on sustainability reporting. First, US financial companies increased their sustainability reporting during the COVID-19 pandemic. Our findings reveal that financial companies appear to be increasing their sustainability reporting during the crisis time to enhance their quality of financial reporting. Second, the findings offer insights to decision-makers and regulatory bodies regarding the current practices of sustainability reporting in US financial companies.

The COVID-19 crisis brought to light some of the shifting connections between sustainability and financial institutions, and these connections present a variety of theoretical and empirical study opportunities. As with other future research lines, it would be an opportunity to investigate the main factors that may influence the quality of voluntary disclosures during the COVID-19 crisis.

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Table 1: Variables of the study

Variable	Definition
ESG Score	Environmental, Social, and Governance (ESG), as provided by Refinitiv Eikon Datastream
COVID19	A dummy variable that equals one for the period 2020-2022, and zeroes otherwise.
Firm Size	log of total assets
ROA	Profitability is measured by Return on Assets
M-B-Ratio	Growth opportunity measured by the market-to-book ratio
Leverage	Total debt to total assets ratio
Board Size (Log)	Total number of directors on the board
Independent Board	The proportion of the independent directors on the board to board size
Gender Diversity	The proportion of the female directors on the board to the board size
Board Meetings Attendance	Percentage attendance of meetings held per year

Note: Tables Created by Authors

Table 2: Correlations and Descriptive Statistics

	N	Mean	Std. Dev.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) ESG Score	666	.548	.155	1									
(2) COVID19	666	.189	.392	.236**	1								
(3) Firm Size	666	11.005	.733	.518**	.072	1							
(4) ROA	665	.030	.060	-.185**	-.007	-.634**	1						
(5) Leverage	666	.164	.193	.161**	.008	.164**	-.137**	1					
(6) M-B-Ratio	666	1.844	2.250	-.145**	.053	-.553**	.822**	.006	1				
(7) Board Size (Log)	605	1.098	.093	.003	.014	.216**	-.018	.012	-.016	1			
(8) Gender Diversity	605	.227	.089	.361**	.382**	.217**	-.015	-.137**	.011	-.066	1		
(9) Independent Board	605	84.243	8.132	.378**	.078	.189**	-.091*	-.087*	.025	-.093*	.240**	1	
(10) Board Meetings Attendance	603	79.712	9.499	.193**	0.057	0.0371	-0.017	-0.041	-0.055	0.006	0.0344	-.094*	1

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Table 3: Variables of the study

		N	Mean	Std. Deviation	Mean Difference	Std. Error Difference	t	Sig.
ESG Score	Before COVID19	540	.530	.154				
	During COVID19	126	.623	.133	-.093	.014	6.857	.000***

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Table 4: Mann-Whitney U Test

Hypothesis Test Summary				
	Null Hypothesis	Test	Sig.	Decision
1	The distribution of ESGScore is the same across categories of COVID-19.	Independent-Samples Mann-Whitney U Test	.000	Reject the null hypothesis.
Asymptotic significances are displayed. The significance level is .05.				

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Table 5: Regression analysis

Table 5 presents the results of the regression analysis, where the dependent variable in our model is the *Environmental, Social, and Governance (ESG) score* from Refinitiv Eikon Datastream that measure sustainability reporting. The independent variables are (1) COVID-19 is the main independent variable in our model as a dummy variable that equals one for the period 2020-2022 (pandemic period), and zero otherwise (pre-pandemic period); (2) Firm Size: measured by logarithm of total assets; (3) ROA: Profitability measured by Return on Assets; (4) M-B-Ratio: Growth opportunity measured by the market to book ratio; (5) Leverage: Total debt to total assets ratio; (6) Board Size (Log): logarithm of a total number of directors on the board; (7) Independent Board: proportion of the independent directors on the board to board size; (8) Gender Diversity: proportion of the female directors on the board to the board size; (9) Board Meetings Attendance: percentage attendance of meetings held per year. Models 1 and 2 are pooled OLS, models 3 and 4 are heteroskedasticity corrected model HCM, models 5 and 6 are random effects models, and models 7 and 8 are fixed effects models. Asterisks indicate significance at 10%(*), 5% (**), 1% (***)

DV: ESG Score	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
57-666	OLS	OLS	HCM	HCM	RE	RE	FE	FE
R-squared	0.056	0.465	0.062	0.572			0.723	0.799
Adjusted R-squared	0.054	0.457	0.060	0.565			0.192	0.416
F(24, 20528)	39.1***	56.47***	43.7***	86.61***				
Hausman test					7.6***	23.542***		
const	0.53***	-1.274***	0.53***	-1.226***	0.525***	-1.074***	0.528***	-1.061
COVID19	0.093***	0.046***	0.093***	0.043***	0.102***	0.039***	0.102***	0.037***
Firm Size		0.105***		0.098***		0.08***		0.08
ROA		0.642***		0.669***		-0.185		-0.392
M-B-Ratio		-0.006		-0.006		0.006		0.008
Leverage		0.126***		0.144***		0.073		-0.06
Board Size (Log)		-0.116**		-0.065*		0.041		0.065
Independent Board		0.005***		0.005***		0.005***		0.005***
Gender Diversity		0.252***		0.236***		0.376***		0.389***
Board Meetings Attendance		0.003***		0.003***		0.002***		0.002***

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Table 6: Robustness check

Table 6 presents the results of the regression analysis. We used three dependent variables: (1) *Environmental* in models 1 to 4; (2) *Social* in models 5 to 8; (3) *Governance* in models 9 to 12. The independent variables are the same as in table 5. Models 1, 5 and 9 are pooled OLS, models 2, 6 and 10 are heteroskedasticity corrected model HCM, models 3, 7 and 11 are random effects models, and models 4, 8 and 12 are fixed effects models. Asterisks indicate significance at 10%(*), 5% (**), 1% (***).

DV	Environmental (E)				Social (S)				Governance (G)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Pooled OLS	HCM	RE	FE	Pooled OLS	HCM	RE	FE	Pooled OLS	HCM	RE	FE
57-666												
R-squared	0.539	0.677		0.868	0.484	0.566		0.783	0.251	0.271		0.665
Adjusted R-squared	0.532	0.672		0.370	0.476	0.559		0.335	0.240	0.260		0.286
F(24, 20528)	75.8572***	136.0473***		53.4787***	60.9622***	84.5463***		29.3877***	21.7796***	24.1816***		16.1169***
Hausman test			30.4638***				16.4293*				5.3954	
const	-1.6608***	-1.5084***	-1.145***	-0.6801***	-0.4793***	-0.4875***	-0.3832***	-0.2686**	-0.055	0.0053	-0.1124	-0.2667**
COVID19	0.0393***	0.033***	0.0401***	0.045***	0.017***	0.0167***	0.018***	0.0189***	0.0057	0.0025	0.0012	-0.0012
Firm Size	0.1372***	0.1265***	0.0872***	0.0435**	0.0453***	0.0479***	0.0347***	0.0249**	-0.0028	-0.0083***	0.0011	0.0155
ROA	0.9928***	0.9959***	0.095	-0.1208	0.2333***	0.302***	0.0168	-0.0761	-0.0523	-0.112**	-0.1417**	-0.1386*
M-B-Ratio	-0.0111***	-0.0077***	-0.0003	0.0014	0.0004	0.0011	0.0028**	0.0033**	-0.0017	-0.0014	0.0016	0.002
Leverage	0.0678***	0.0701***	0.0456	0.0202	0.0405***	0.0385***	0.0232	-0.0362	0.0241**	0.0126	0.0176	0.0022
Board Size (Log)	-0.0909**	-0.0898***	0.0865*	0.1125**	-0.0186	-0.0313*	0.0272	0.0358	-0.0332*	-0.0282*	-0.022	-0.0207
Independent Board	0.002***	0.0015***	0.0013***	0.0013***	0.0013***	0.0013***	0.0011***	0.0011***	0.002***	0.0019***	0.0019***	0.0019***
Gender Diversity	0.1216**	0.1513***	0.2297***	0.2467***	0.0655***	0.0661***	0.087***	0.0922***	0.0925***	0.0912***	0.1249***	0.1257***
Board Meetings Attendance	0.0026***	0.0025***	0.0012***	0.0011***	0.0005***	0.0004***	0.0003**	0.0003*	0.001***	0.0012***	0.001***	0.001***

Note: Tables Created by Authors

