Article Type: Research Paper

The effect of COVID-19 and CEO tenure on environmental and social disclosure scores

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DOI: 10.18196/jai.v25i1.20376

CITATION:
Teja, A. (2024). The effect of COVID-19 and CEO tenure on environmental and social disclosure scores. *Journal of Accounting and Investment, 25*(1), 289-310.

ARTICLE HISTORY
Received:
31 Oct 2023
Revised:
07 Dec 2023
Accepted:
26 Jan 2024

JAI Website:

Abstract
Research aims: The study aims to understand the effect of COVID-19 and the tenure of Chief Executive Officers (CEOs) on environmental and social disclosure scores.
Design/Methodology/Approach: The research sample included listed Indonesian firms, excluding those in the financial sector, for 2015-2021. The samples were analyzed by cross-sectional data regression and controlled by corporate governance mechanisms proxied by the number of women and independent Boards of Commissioners, leverage, size, profitability, and growth opportunity proxied by price-to-book-value ratio and capital-expenditure-to-depreciation ratio.
Research Findings: The COVID-19 pandemic has positively affected environmental and social disclosure scores. While CEO tenure negatively affected social disclosure scores, its effect on environmental disclosure scores was statistically insignificant.
Theoretical Contribution/Originality: The study provides empirical evidence on the progression of change in environmental and social disclosure scores triggered by COVID-19.
Practitioner/Policy Implications: CEOs need to be persuaded and incentivized to increase their firms' commitment to enhancing social performance and disclosure scores after COVID-19.
Research Limitation/Implications: The effect of the COVID-19 pandemic and CEO tenure on environmental and social disclosure scores from firms with high stock market capitalization were analyzed. The data did not yet consider the medium and small stock market capitalization firms.
Keywords: CEO Tenure; COVID-19; Environmental Disclosure Scores; Social Disclosure Scores

Introduction

The paper studies the effect of COVID-19 and Chief Executive Officer (CEO) tenure on environmental and social disclosure scores. In this case, the COVID-19 pandemic is a unique context for the level of mortality rates, economic impact, and regulations that force businesses to change their business processes. The government requires firms to improve their business process to reduce risks of COVID-19 contagion to employees and customers by providing proper working environments (KPMG, 2020).

Hu et al (2020) compares COVID-19 against SARS (Severe Acute Respiratory Syndrome) and MERS (Middle East Respiratory Syndrome) as can be seen in Table 1.

Table 1 Selected Data on COVID-19, SARS, and MERS

Description	COVID-19	SARS	MERS
Outbreak date	December 2019	November 2002	September 2012
Confirmed cases	4,731,458 (Within six months)	8,096 (Within eight months)	2,519 (Over eight years)
Countries infected	213	29	27

Surendra et al. (2021) have studied the COVID-19 mortality rate from March 2 to July 31, 2020. They reported that COVID-19 had different mortality rates for different patient age groups; the average mortality rate was 12%. Schultze and Aschenbrenner (2021) found that variability in human innate immune reaction to COVID-19 infection leads to different outcomes, from mild symptoms to multiple organ failures that cause death. Yazdanpanah et al. (2020) uncovered that immune systems overreact and produce inflammatory cytokines, contributing to multiple organ failures. The mortality rates of COVID-19 tend to be higher among people with higher health risks. Malik et al. (2022) also specify that this group includes older people and patients with cancer, human immunodeficiency virus (HIV), chronic obstructive pulmonary disease (COPD), and neurological and cardiovascular disease (CDV). The high COVID-19 fatality rate is also attributed to the lack of antiviral medicine. Antiviral medicine was developed and became effective two years after the first COVID-19 case (Singh & de Wit, 2022).

Within these two years, epidemiologists and doctors advised governments to reduce human interactions to lower the spread of COVID-19 (Hu et al., 2020). Countries applied different strategies to reduce human interactions to stem the spread of COVID-19, including total and partial lockdowns. Specifically, Indonesia chose partial lockdown and applied its strategy, Large-Scale Social Restrictions (LSSR), to contain the spread of COVID-19. The objective of the LLSR strategy is to maintain economic activities while minimizing the spread of COVID-19 disease. LLSR requires firms to operate with strict regulations. Firms must spend additional resources to comply with and disclose health and safety measures stipulated by the regulations. After several months of implementing LLSR, John Hopkins University reported and acknowledged Indonesia's LLSR strategy as one of the best strategies in the world to contain COVID-19 while minimizing the negative effect on the economy (Pratama, 2021).

Even though LLSR is designed to maintain economic activities, COVID-19 resulted in negative growth of Indonesia's Gross Domestic Product (GDP), from USD 1,119.10 in 2019 to 1,058.69 in 2020, or a decrease of 5.39% (TradingEconomics.com, 2023a). Indonesia also experienced higher unemployment rates than the increase from 4.94% in the first quarter of 2020 to 7.07% in the second quarter 2020 (TradingEconomics.com, 2023b) and higher poverty rates (Lachance, 2021).

LLSR pressures businesses on two fronts: the government mandates result in lower economic activities and higher costs, which lessen revenue, and stakeholders compel firms to allocate resources to uphold health and safety measures. These pressures bring

about many firms experiencing an existential crisis (Brennan et al., 2022; Kumar & Zbib, 2022; Zhang & Sogn-Grundvåg, 2022). In response, businesses must change their processes significantly and disclose the changes to the government and stakeholders, i.e., employees and customers. The Indonesian government also issued the Banking Credit Relaxation regulation (Sekretariat Kabinet Republik Indonesia, 2021) to tackle the problem of non-performing loans (NPL), to ensure that economic conditions remain under control, and to help businesses avoid bankruptcy.

Nevertheless, studies on the effect of COVID-19 on firms' environmental, social, and governance (ESG) disclosure scores are scarce. The nearest research on the effect of COVID-19 on firm disclosure scores is directed toward firms' Corporate Social Responsibility (CSR) disclosure scores. Bahadar and Zaman (2022) revealed that COVID-19 confirmed cases have positive relations with firms' Corporate Social Responsibility (CSR) disclosure scores.

CSR is usually used interchangeably with ESG. O'Neill (2023) explains that CSR is not the same as ESG. CSR is a firm internal commitment to sustainability. Each firm has its ideal regarding the direction and magnitude of internal commitment to sustainability. CSR between firms may differ markedly. On the other hand, ESG is a standard developed to provide investors with a measure of firms' commitment to sustainability.

Previously, Al Amosh and Khatib (2023) investigated the effect of COVID-19 on ESG performance scores in developed and emerging studies. They obtained the positive effect of COVID-19 on ESG performance scores. ESG performance scores are, in fact, not the same as ESG disclosure scores. ESG performance provides information regarding the firm progression in closing the gap between ESG's current and targeted performance. Morningstar, Inc. provides ESG performance ratings with the brand name Sustainalytics. ESG disclosure scores provide the amount of information that the firm is providing. Each disclosure related to ESG is given the value of 1 and zero otherwise. All the disclosures are summed up and reported as ESG disclosure scores. When firms disclose more information, regardless of positive or negative disclosure, ESG disclosure scores will be higher. ESG disclosure scores are provided by Bloomberg, L.P.

Based on the study from Al Amosh and Khatib (2023) and Bahadar and Zaman (2022), the first research problem is that no empirical study exists for the effect of COVID-19 on ESG disclosure scores. For that reason, the authors focus the analysis on E (Environmental) and S (Social) disclosure scores from Bloomberg ESG disclosure scores. The first consideration is that the E and S disclosure scores are significantly lower and have faster progression than the G disclosure scores. Environmental disclosure scores grow from 9.44 to 24.40, or growing 158.47% for 2015-2021. Social disclosure scores grow from 16.57 to 30.35, or 83.16% for 2015-2021. In comparison, governance disclosure scores grew from 64.02 to 74.08 or 15.71% for 2015-2021. Secondly, the strong progression of the E and S concerning COVID-19 is taken into account, whereas G disclosure scores are not related to COVID-19. G disclosure scores are intended to report firm effort in solving agency problems.

Further, COVID-19 pressures CEOs to change business processes (Van Looy, 2021). The CEO is responsible for ensuring that firms improve their business process to meet the health and safety standards and disclosures as requested by the government (Kumar & Zbib, 2022). Improving business processes is good progress that the firm can capitalize on by disclosing its progression to the public.

Studies on the effect of CEO tenure on environmental and social disclosure scores are, however, not yet complete and provide negative results. Lewis et al. (2014) scrutinized the effect of CEO tenure and educational background on environmental disclosure. They unveiled that CEOs with shorter tenures with Master of Business (MBA) degrees were more committed to environmental disclosure. Khan et al. (2021) also studied the effect of CEO tenure on environmental and social disclosure and found that longer-tenured CEOs tend to have a lower commitment to environmental and social disclosure. The sample of analysis was China firms for 2008-2016. The study was performed within the context of normal economic conditions, and the CEO has the discretion to choose the environmental and social issues to be addressed and the amount of information to be disclosed. As such, based on the studies of Lewis et al. (2014) and Khan et al. (2021), the second research problem is the effect of CEO tenure on environmental and social disclosure scores during the COVID-19 period.

Therefore, this study aims to address two research problems by providing empirical evidence on the effect of COVID-19 and CEO tenure on environmental and social disclosure scores. In doing so, the authors contribute to advancing the literature and empirical evidence on the effect of COVID-19 and CEO tenure on speeding up environmental and social disclosure scores. The study research questions are as follows: What is the effect of COVID-19 and CEO tenure affect environmental disclosure scores? What is the effect of COVID-19 and CEO tenure on social disclosure scores? The findings of the studies provide shareholders and stakeholders, especially the government, with ways to incentivize the CEO in different economic conditions to speed up their contributions to address environmental and social issues.

Literature Review and Hypotheses Development

Theory on Disclosure and COVID-19 Institutional Setting

Two theories on disclosure are agency theory and quality uncertainty problems theory. The agency theory is built upon two assumptions: the principal and agent want to maximize economic utilities, and the agent has an information advantage relative to the principal. The two assumptions of agency theory suggest that the agent will always take advantage of the information advantage relative to maximizing economic utilities. The information advantage enables the agent to expropriate larger economic utilities from the principal. Hence, the disclosure requirements in agency theory were directed to reduce information asymmetry between principal and agent (Jensen & Meckling, 1976). The agency theory necessitates that the agent should disclose all information, whether good or bad.

The agency theory is different from the quality uncertainty problem theory. The former theory was built based on principal perspectives, while the latter was built based on the agent or the producer of information perspectives. The agency theory suggests that the principal is willing to spend resources to reduce the loss that results from agent expropriation. The quality uncertainty problem theory suggests that the agent, as the information producer, will act strategically to increase the benefit of information for themselves. It is imperative that disclosure of good information will have more benefits for the agent relative to bad information. Hence, the agent will have a stronger tendency to disclose good information relative to bad information (Akerlof, 1970). In doing so, the information provided was mostly positive. Disclosing more positive information will not reduce information asymmetry.

The agency and quality uncertainty problem theories were built on a voluntary institutional setting or normal economic conditions. There were episodes of government enacting regulations for firms to increase information disclosure significantly. For instance, Sarbanes-Oxley in 2002, and the latest was COVID-19. The Sarbanes-Oxley required firms to increase information disclosure for the benefit of principals or shareholders. COVID-19 required firms to increase information disclosure mainly to benefit the environment and society. In the mandatory institutional setting, firm disclosure will increase significantly because the principal, shareholder, agent, and chief executive officer (CEO) have the same vision to comply with government regulations.

Previous Study and Hypotheses

COVID-19 is a highly contagious respiratory disease with a high mortality rate (Malik et al., 2022; da Costa et al., 2020; Hu et al., 2020; Schultze & Aschenbrenner, 2021; Surendra et al., 2021). To mitigate the potential for COVID-19 transmission to employees and customers, the government mandates that organizations enhance their operational procedures by providing a suitable working environment (KPMG, 2020). Firms' actions to mitigate the spread of COVID-19 negatively affect the environment and society. Hammad et al. (2023) explained that environmental quality improved during COVID-19 due to decreased economic activity. However, new environmental quality issues arise from the disinfectants excessively used to sterilize the working environment.

Loughran and McDonald (2023) reported that the stock market authority required firms to disclose all COVID-19 risk-related factors. Accompanying the disclosures, firms should disclose their strategy to mitigate the COVID-19 risk factors. Loughran and McDonald (2023) also discovered that firms used more COVID-19-related words in annual reports. Zaidi et al. (2018) suggested that firms are more inclined to disclose and exaggerate positive information. Since COVID-19 exposes firm vulnerability, firms could be reluctant to disclose potential risks.

When the firm's financial conditions are weak and cost savings are essential, the firm will be tempted to reduce information-producing activities (Brennan et al., 2022). On the contrary, Bahadar and Zaman (2022) found that firms in New Zealand increased their corporate social responsibility (CSR) disclosure during the COVID-19 crisis period. Lee et

al. (2020) exposed that firms increased their CSR in times of crisis to justify low profitability. Rezaee and Tuo (2017) also showed that positive disclosure signals firms' confidence in achieving the targeted performance. Besides, Fatemi et al. (2018) revealed that a firm's non-financial disclosure, i.e., ESG disclosure, positively affects firm value. Based on the analysis, COVID-19 influences firm disclosures, including environmental and social disclosures. COVID-19 led firms to face an existential crisis (Brennan et al., 2022; Kumar & Zbib, 2022; Zhang & Sogn-Grundvåg, 2022). The highly contagious respiratory disease prompted the government to limit people's mobility. Since mobility directly relates to consumption, lower mobility results in lower revenues for firms. At the same time, government requirements motivate firms to spend additional funding to improve working environment safety and health measures. COVID-19 also introduced unprecedented challenges for CEOs: lower revenue, higher costs, and new employee work methods, i.e., work from home (WFH) or work from anywhere (WFA). Based on the aforementioned studies, COVID-19 will result in higher firm disclosure on environmental and social issues.

The Chief Executive Officer (CEO) determined and executed the firm's strategic directions. The choice of actions is determined by CEO competencies, including experiences, after considering its effect on personal benefits. Failure to comprehend and adapt to the new competitive forces leads to lower performance (Miller, 1991). Oh et al. (2018) suggested that longer CEO tenure relates to higher firm-specific knowledge, including dealing with crises. Zhou et al. (2020) also reported that longer CEO tenure results in more successful merger and acquisition activities. Matta and Beamish (2008) found that longer-service CEOs were more likely to expand internationally than early-service CEOs. In addition, Henderson et al. (2006) stated that the effect of CEO tenure was more positive when they operated under stable industry conditions. In comparison, Musteen et al. (2006) reported that CEO tenure negatively affects firms' strategic change. Wu et al. (2005) further unmasked that CEO tenure affects technology development differently. Early-service CEOs were more engaged in frontier technology, while late-service CEOs were more engaged in mature technology.

Corporate social responsibility refers to firm activities to meet the stakeholder's expectations on the progression of human and social cohesiveness and a healthier environment (Arena et al., 2018). The firm commitment to meet stakeholders' expectations contributed to the firm's long-term business sustainability (Kadłubek, 2015; Ma, 2023).

O'Neill (2023) explained that corporate social responsibility activities were more customized than standardized. The customized activities made it difficult for the investors to understand the firms' commitment and contributions to the stakeholders. Hence, standardized methods to report firm commitment and contributions to the stakeholders were developed to meet the investors' needs. The standardized methods were environmental, social, and governance (ESG) disclosure.

There were two measures used in corporate social responsibility studies. First, environment and social disclosure blend into a single number. Second, environment and

social disclosure were treated as separate measures. Khan et al. (2021) analyze the effect of CEO tenure on corporate responsibility disclosure using measures that blend social and environmental indicators.

Environmental and social disclosure have significant differences. Global Reporting Initiatives (GRI) consist of three reporting standards related to economics, environment, and social. Economics has seven standards: economic performance, market presence, indirect economic impacts, procurement practices, anti-corruption, anti-competitive behavior, and tax. The environment has eight standards: materials, energy, water and effluents, biodiversity, emissions, effluents and waste, environmental compliance, and supplier environmental assessment. The social has the largest number of standards. The social has 19 standards: employment, labor, occupational health and safety, training and education, diversity and equal opportunity, non-discrimination, free of association and collective bargaining, child labor, forced or compulsory labor, security practices, rights of indigenous peoples, local communities, supplier social assessment, public policy, customer health and safety, marketing and labeling, customer privacy, and socioeconomic compliance.

Based on a different number of GRI standards, the effect of CEO tenure on environmental and social disclosure should be different and need to be analyzed separately. Studies also confirmed that CEOs have different commitments to environmental and social disclosure. Lo and Fu (2016) asserted that regardless of tenure, CEOs are already concerned about sustainability. Xu et al. (2022) found that CEOs with longer tenure engaged more in environmental issues. On the contrary, Chen et al. (2019) reported that early-service CEOs exhibit higher CSR performance than late-service CEOs. Meanwhile, Jeong et al. (2021) uncovered an inverted U-shaped relationship between CEO tenure and firm CSR. In addition, Lewis et al. (2014) studied the joint effect of CEO tenure and educational background on firm disclosure. They revealed that CEO tenure has a negative relationship with the Carbon Disclosure Project (CDP), and a CEO with a Master of Business Administration (MBA) degree is more responsive than those with a law degree on CDP. Based on the previous studies, the hypothesis offered:

***H_1**: COVID-19 and CEO tenure influence environmental disclosure scores.*

Solving social issues was a long-term investment (Khan et al., 2021). CEOs with longer tenure tend to be reluctant to spend resources to solve social issues because they will not benefit from solving social issues investments. Hence, CEOs with longer tenure tend to have lower commitment and social disclosure scores. Bochkay et al. (2019) suggest that early-service CEOs are more optimistic and want to share their views with their stakeholders. However, CEOs' optimism declines as tenure increases, and their motivation to disclose declines. Based on the previous studies, the hypotheses offered:

***H_2**: COVID-19 and CEO tenure influence social disclosure scores.*

Theories on Control Variables

The effect of COVID-19 and CEO tenure on environment and social disclosure were controlled by firm's internal corporate governance mechanisms, leverage, size, profitability, and growth opportunities. The internal corporate governance mechanisms under consideration were the number of female members of the Board of Commissioners and the number of independent Boards of Commissioners. Amorelli and García-Sánchez (2020) exhibit the importance of the number of female members of the Board of Commissioners to put forth sustainable issues. Chen et al. (2019) also reported that firms' CSR performance tends to be stronger in the presence of a more significant number of independent Boards of Commissioners.

Potentially, improvement in a firm's environmental and social disclosure scores is limited by its leverage and profitability. Firms with higher levels of debt allocate more resources to higher-priority activities, such as capital expenditure, to capitalize on more considerable growth opportunities than disclosure activities. Firms with higher profitability tend to have higher resources to improve environmental and social performance.

The costs to improve environmental and social performance are dominated by fixed costs. Bissoondoyal-Bheenick et al. (2023) found that larger firms may reach economies of scale in dealing with environmental and social issues faster than smaller firms.

To measure firm growth opportunities, the proxy was Tobin's Q (Karpavičius & Yu, 2019). As another proxy for firm growth opportunities, the authors added the economic life of fixed assets. Here, when the economic life of assets is longer, firm assets tend to be new and support strong growth.

Research Method

In this study, the ESG disclosure scores for Indonesian firms were provided by Bloomberg Terminal. The samples were firms with ESG data. In 2021, firms with ESG data availability were 104 firms out of 766 firms. The firm in 2021 with ESG disclosure scores data was set as the anchor firm to select firms in 2015-2020. The final data for 2015-2021 was 104 firm or 728 firm-year observations. The Bloomberg terminal also provides data on the number of females on the Board of Commissioners, the number of independent Boards of Commissioners, and CEO tenure in years.

The authors obtained the financial data from S&P Capital IQ. The financial data is as follows: firm leverage proxied by debt-to-total-assets ratio, firm size proxied by the natural logarithm of total assets, firm profitability proxied by earnings before interest tax depreciation and amortization (EBITDA) to total sales ratio, and firm growth opportunities proxied by the price-to-book-value (PBV) ratio and capital-expenditure-to-depreciation-expenses ratio.

The authors performed descriptive statistics analysis to determine the data characteristics. Descriptive statistics calculated were mean, standard deviation, and correlations.

The authors also performed two regression methods to test the effect of COVID-19 and CEO tenure on environmental and social disclosure scores. The first is panel data regression. There are three-panel data regression methods: pooled least square model (PLS), fixed effect model (FE), and random effect model (RE). The best model is chosen after the Chow Test to choose between PLS and FE, the Hausman Test to choose between FE and RE, and the Lagrange Multiplier Test to choose between RE and PLS. The test findings indicated that the FE model was the best.

However, the panel regression model resulted in an omitted variable for the dependent variable, environmental and social disclosure scores. For that, STATA output suggests that the omitted variable results from collinearity issues. The STATA output screenshot is presented in Appendix 1. Since COVID-19 is one of this study's main variables, the authors did not use panel data regression results and employed cross-sectional data regression instead.

Second, the authors conducted cross-sectional data regression. The cross-sectional regression analysis could measure the effect of COVID-19 on environmental and social disclosure scores without the consequences of losing the dummy variable in the model. The cross-sectional regression method requires tests for multicollinearity, e.g., tests for variance inflation factors (VIF) and heteroskedasticity, Breusch Pagan. If multicollinearity is too high, the variable should be removed from the equation. If heteroskedasticity exists, the authors could solve the issue using the Stata statistical program command "robust." The program command will standardize the error but maintain the coefficient value.

The cross-sectional regression model is as follows:

Model 1: the effect of COVID-19 and CEO tenure on environment disclosure scores

$$E_i = \alpha + \beta_1 dCovid_i + \beta_2 CEOTenure_i + \varepsilon_i \ldots (1)$$

Model 2: the effect of control variables on environment disclosure scores

$$E_i = \alpha + \beta_1 FemBOC_i + \beta_2 IndeBOC_i + \beta_3 Lev_i + \beta_4 Size_i + \beta_5 EBITDA_i + \beta_6 PBV_i + \beta_7 CapexDep_i + \varepsilon_i \ldots (2)$$

Model 3: the effect of COVID-19, CEO tenure, control variables on environment disclosure scores

$$E_i = \alpha + \beta_1 dCovid_i + \beta_2 CEOTenure_i + \beta_3 FemBOC_i + \beta_4 IndeBOC_i + \beta_5 Lev_i + \beta_6 Size_i + \beta_7 EBITDA_i + \beta_8 PBV_i + \beta_9 CapexDep_i + \varepsilon_i \ldots (3)$$

Model 4: the effect of COVID-19 and CEO tenure on social disclosure scores

$$S_i = \alpha + \beta_1 dCovid_i + \beta_2 CEOTenure_i + \varepsilon_i \ldots (4)$$

Model 5: the effect of control variables on social disclosure scores

$$S_i = \alpha + \beta_1 FemBOC_i + \beta_2 IndeBOC_i + \beta_3 Lev_i + \beta_4 Size_i + \beta_5 EBITDA_i + \beta_6 PBV_i + \beta_7 CapexDep_i + \varepsilon_i \quad \ldots (5)$$

Model 6: the effect of COVID-19, CEO tenure, and control variables on social disclosure scores

$$S_i = \alpha + \beta_1 dCovid_i + \beta_2 CEOTenure_i + \beta_3 FemBOC_i + \beta_4 IndeBOC_i + \beta_5 Lev_i + \beta_6 Size_i + \beta_7 EBITDA_i + \beta_8 PBV_i + \beta_9 CapexDep_i + \varepsilon_i \quad \ldots (6)$$

Table 2 provides information regarding variable operationalization, sources, and references.

Table 2 Variables Notation and Measurement

Variables	Notations	Formulas	Variable references	Source
Dependent Variables				
Environmental disclosure score	E	Environmental disclosure scores value	Al Amosh and Khatib (2023)	Bloomberg Terminal
Social disclosure score	S	Social disclosure scores value	Al Amosh and Khatib (2023)	Bloomberg Terminal
Independent Variables				
COVID-19	dCovid	Dummy variable COVID-19 period takes values of one and zero otherwise. COVID-19 period is 2020-2021.	Brennan et al. (2022)	United Nations
CEO tenure	CEOTenure	Number of years as CEO	Jeong et al. (2021)	Bloomberg Terminal
Control Variables				
Internal corporate governance mechanism				
Number of females on Board of Commissioners	FemaleBOC	Number of Female Members on Board of Commissioners	Bigelli et al. (2023)	Bloomberg Terminal
Number of Independent Board of Commissioners	IndeBOC	Number of Independent Boards of Commissioners	Bigelli et al. (2023)	Bloomberg Terminal
Leverage				
Debt to Total Asset	Lev	$Lev = \frac{Total\ Debt}{Total\ Assets}$	Bahadar and Zaman (2022)	S&P Capital IQ
Firm size				
Total asset	Size	$Size = \ln(Total\ Assets)$	Bahadar and Zaman (2022)	S&P Capital IQ
Firm profitability				
Earnings Before Interest Tax Depreciation Amortization to Total Sales	EBITDA	$EBITDA = \frac{EBITDA}{TotalSales}$	Fuente et al. (2022)	S&P Capital IQ
Firm growth opportunity				
Price to Book Value	PBV	$PBV = \frac{Market\ Value\ of\ Equity}{Book\ Value\ of\ Equity}$	Karpavičius and Yu (2019)	S&P Capital IQ
Capital Expenditure to Depreciation Expense	CapexDep	$CapexDep = \frac{Capex}{DepreciationExp}$	Lee et al. (2012)	S&P Capital IQ

Result and Discussion

Descriptive Statistic

Figure 1 depicts the environmental, social, and governance (ESG) disclosure scores for 2015-2021 from Bloomberg Terminal. Indonesian-listed-firm ESG disclosure scores were relatively weak because their environmental and social disclosure scores were significantly lower than the governance disclosure scores. Environmental disclosure scores rose fast, increasing 14.96 points from 9.44 to 24.40 for 2015-2021. The social disclosure score also grew from 16.57 to 30.35 or growing 13.78 points for 2015-2021.

Following that, Table 3 presents that the CEO tenure averaged around six years, varying between one month and 26 years. The average number of females on the Board of Commissioners was relatively low, 0.5938, with a range from zero to four. Besides, the average number of Independent Boards of Commissioners was 2.4785, ranging from zero to ten. In addition, firms in the sample were relatively large with relatively low financial constraints, as shown by the average debt-to-total-asset ratio of 0.2280 and strong operating profit margin, as indicated by the average EBITDA to Total Asset ratio of 0.1657. The firm also had good current growth opportunities, as illustrated by the capital-expenditure-to-depreciation-expense ratio of 20.1612, and future growth opportunities, as evidenced by the price-to-book-value ratio of 2.0252.

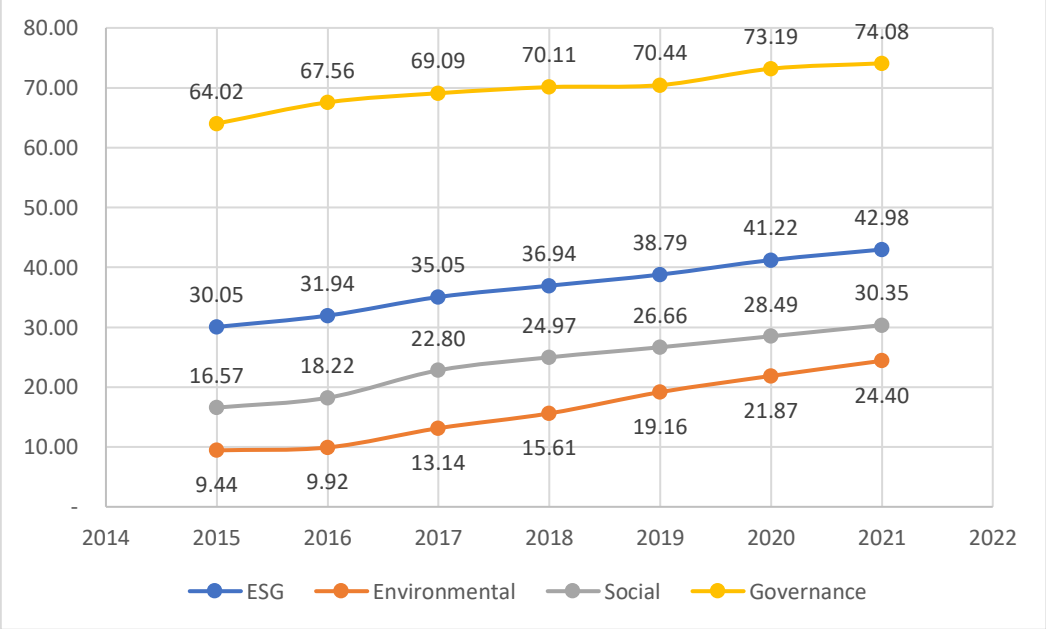

Figure 1 Indonesia listed firm ESG disclosure scores

Additionally, Table 4 displays that environmental and social disclosure scores strongly correlated at 0.6808. Figure 1 also illustrates that environmental and social disclosures tended to have consistent correlations because they grew in tandem.

Table 3 Descriptive Statistics

Variable	n	Mean	Standard Deviation	Min	Max
E	650	16.5736	17.8826	0	78.0731
S	650	24.3110	12.7204	0	58.1016
Covid	728	0.2857	0.4521	0	1.0000
CEOTenure	653	6.0679	5.7178	0.0800	26.0800
FemaleBOC	650	0.5938	0.7779	0	4.0000
IndeBOC	650	2.4785	0.9994	0	10.0000
Lev	713	0.2280	0.2048	0	1.4791
Size	714	7.5757	1.4982	3.7280	11.7045
EBITDA	586	0.1657	0.6864	- 13.0862	0.8135
PBV	677	2.0252	2.8892	0.5516	35.6336
CapexDep	711	20.1612	297.0241	0	6,521.857

Note: E = Environmental Disclosure Score; S = Social Disclosure Score; COVID = COVID-19; CEOTenure = CEO Tenure; FemaleBOC = Number of Females on Boards of Commisioners; IndeBOC = Number of Independent Board of Commisioners; LEV = Leverage; Size = Firm Size; EBITDA = Earning Before Interest Tax Depreciation Amortizaton to Total Sales; PBV = Price to Book Value; CapexDep = Capital Expendture to Depreciation Expense.

Table 4 Correlation

Variable	E	S	Covid	CEOTenure	FemaleBOC	IndeBOC	Lev	Size	EBITDA	PBV	CapexDep
E	1										
S	0.6808	1									
Covid	0.2755	0.3056	1								
CEO Tenure	-0.0803	-0.2313	0.0444	1							
Female BOC	0.0034	-0.0511	-0.0069	0.1097	1						
IndeBOC	0.1485	0.1043	0.0368	-0.0913	0.1164	1					
Lev	-0.0282	-0.0581	0.0507	0.0152	-0.0541	-0.0760	1				
Size	0.2677	0.2708	0.0933	-0.1783	0.0214	0.1282	0.3245	1			
EBITDA	0.0298	0.0149	0.0111	-0.0908	0.0591	0.1144	-0.2281	0.0242	1		
PBV	0.0594	0.0711	-0.0373	-0.0809	0.0483	0.1401	-0.1677	-0.1739	0.0541	1	
Capex Dep	-0.0894	-0.1063	-0.0897	-0.0136	0.0161	-0.1029	0.0497	-0.0908	-0.0075	0.1491	1

Note: E = Environmental Disclosure Score; S = Social Disclosure Score; COVID = COVID-19; CEOTenure = CEO Tenure; FemaleBOC = Number of Females on Boards of Commisioners; IndeBOC = Number of Independent Board of Commisioners; LEV = Leverage; Size = Firm Size; EBITDA = Earning Before Interest Tax Depreciation Amortizaton to Total Sales; PBV = Price to Book Value; CapexDep = Capital Expendture to Depreciation Expense.

Cross-sectional Data Regression

This paper studied the effect of COVID-19 and CEO tenure on environmental and social disclosure scores. The authors performed six cross-sectional regression analyses for 2015-2021. The results of the cross-sectional regression analysis are presented in Table 5. The first hypothesis regarding the effect of COVID-19 and CEO tenure on environmental disclosure was reported in model one to three. The second hypothesis regarding the

effect of COVID-19 and CEO tenure on social disclosure scores was reported in model four to six.

COVID-19 had a positive effect on environmental disclosure scores. The COVID-19 variable was represented by a dummy variable that took the value of one for the COVID-19 period and zero otherwise. The coefficient for the COVID-19 dummy variable in model one was 9.9223, significant at alpha 1%, and the coefficient for model three was 10.2524, significant at alpha 1%. The author did not find enough statistical support for the effect of CEO tenure on environmental disclosure scores. Hence, the first hypothesis regarding the effect of COVID-19 and CEO tenure on environmental disclosure scores was partially supported.

COVID-19 and CEO tenure had a consistent effect on social disclosure scores. The coefficient of the dummy COVID-19 variable was 7.777, significant at alpha 1% in model four, and 7.7552, significant at alpha 1% in model six. The coefficient of CEO tenure was negative 0.5325, significant at alpha 1% in model four, and negative 3.8057, significant at alpha 1% in model six. Hence, the second hypothesis regarding the effect of COVID-19 and CEO tenure on social disclosure scores was statistically supported.

Moreover, internal corporate governance was represented by the number of females on the board of an independent Board of Commissioners. Yet, the author did not find enough statistical support for the contributions of the number of females on the Board of Commissioners on environmental and social disclosure scores, both in models three and six. In comparison, the number of independent Boards of Commissioners yielded a positive and significant effect at alpha 10% on environmental disclosure scores, i.e., model three. However, the authors did not find enough statistical evidence of a similar effect on social disclosure scores in model six.

Further, only two control variables consistently affected the environmental and social disclosure scores. First, financial constraints proxied by the debt-to-asset ratio had a negative effect and were significant at alpha 5% and 1% on firm environmental and social disclosure scores; see models three and six. Second, firm size, as proxied by the natural logarithm of total assets, revealed a positive effect and was significant at alpha 1% on environmental and social disclosure scores, as seen in models three and six.

Table 5 Cross-sectional Regression Results

Description	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Dependent Variable	E	E	E	S	S	S
Independent Variables						
dCovid	9.9223***		10.2524***	7.7773***		7.7552***
CEOTenure	-0.1409		-0.0822	-0.5325***		-3.8057***
Control Variable						
FemaleBOC		- 0.4037	-0.3796		- 1.0143	-0.7168
IndeBOC		2.1385**	1.8977*		0.7044	0.3315
Lev		-7.7361*	- 10.1661**		-7.9729***	-8.8264***
Size		5.0835***	4.7160***		3.7664***	2.9806***
EBITDA		-0.3484	-0.6512		-0.6388	-1.0242

Table 5 Cross-sectional Regression Results (Cont.)

Description	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
PBV		0.5564**	0.6069		0.4660**	0.4254**
CapexDep		-0.1487*	-0.1003		-0.1252*	-0.0986
Intercept	14.5271***	-23.1273***	-21.8947***		-4.0522	2.9009
N	612	539	510	612	539	510
R-Square	0.0681	0.1043	0.1702	0.1369	0.1232	0.2320

Note: Note: E = Environmental Disclosure Score; S = Social Disclosure Score; dCovid = COVID-19; CEOTenure = CEO Tenure; FemaleBOC = Number of Females on Boards of Commisioners; IndeBOC = Number of Independent Board of Commisioners; LEV = Leverage; Size = Firm Size; EBITDA = Earning Before Interest Tax Depreciation Amortizaton to Total Sales; PBV = Price to Book Value; CapexDep = Capital Expendture to Depreciation Expense; ***p-value < 0.01; **p-value < 0.05; *p-value < 0.1

Multicollinearity among variables was measured using variance inflation factor (VIF) methods. The results are summarized in Table 6. The mean of VIF was 1.11, and each VIF had a value of around one.

Table 6 Variance Inflation Factors

Variable	VIF
dCovid	1.02
CEOTenure	1.08
FemaleBOC	1.04
IndeBOC	1.09
Lev	1.23
Size	1.25
EBITDA	1.08
PBV	1.11
CapexDep	1.06
Mean	1.11

Note: dCovid = COVID-19; CEOTenure = CEO Tenure; FemaleBOC = Number of Females on Boards of Commisioners; IndeBOC = Number of Independent Board of Commisioners; LEV = Leverage; Size = Firm Size; EBITDA = Earning Before Interest Tax Depreciation Amortizaton to Total Sales; PBV = Price to Book Value; CapexDep = Capital Expendture to Depreciation Expense

Afterward, heteroskedasticity issues were tested using the Breusch-Pagan Heteroscedasticity test. The results are presented in Table 7. The heteroskedasticity issues were found in model three, presenting the environmental disclosure scores as a dependent variable. The authors solved the issue using the Stata command “robust,” which standardizes the error but does not change the coefficient values and significance level. In comparison, the authors did not find heteroskedasticity issues in model six, with social disclosure scores as the dependent variable.

Table 7 Heteroskedasticity Test

Breusch-Pagan Heteroskedasticity Test	Environmental	Social
Prob>Chi2	0.0002	0.1523
Treatment	Robust	None

Discussion

The regression analysis revealed that COVID-19 significantly affected environmental and social disclosure scores. This study supports the empirical findings from Lewis et al. (2014) and Bahadar and Zaman (2022), who found that COVID-19 improves firms' disclosure scores. The study contradicts Brennan et al. (2022), who uncovered that firms do not want to disclose negative information related to COVID-19.

The regression analysis also demonstrated that CEO tenure did not influence environmental disclosure scores. The fact that environmental disclosure scores are increasing significantly suggests that CEOs, regardless of tenure, already have concerns regarding environmental issues. Environmental issues have a long history; for instance, in 1988 James Hansen raised global warming awareness by giving testimony before the US Senate (Hansen et al., 1988). Empirical evidence supports the anthropogenic climate change theory that human activities are the main contributor to the continuing growth of global warming (Mahmoud & Gan, 2018; Yoro & Daramola, 2020). Governments worldwide have already issued regulations that require firms to be actively involved in reducing carbon emissions. The government also provides regulations and incentives for firms to achieve zero carbon emissions (Pratama et al., 2022).

Additionally, the regression analysis revealed that CEO tenure negatively affected social disclosure scores. The results reinforce the findings of Khan et al. (2021), who found that CEO tenure negatively affects social disclosure scores. Related to that, social projects are usually considered as a long-term investment. CEOs with longer tenure, especially those near retirement age, tend not to experience the positive effect of long-term investments in social practices. Hence, CEOs with longer tenure tend to scale back investments in social projects.

Further, two control variables consistently affected environmental and social disclosure scores: firm financial constraints, as proxied by debt-to-total-asset ratio, and size, as proxied by the natural logarithm of total assets. Firm size produced a positive effect, consistent with studies from Bissoondoyal-Bheenick et al. (2023), suggesting the importance of economies of scale in dealing with environmental and social issues.

The authors, nevertheless, did not find enough statistical evidence for the effect of a firm's profitability and growth opportunities on environmental and social disclosure scores. The fact that environmental and social disclosure scores increased significantly for 2015-2021 may imply that firm commitment to environmental and social issues is unrelated to profitability and growth opportunities.

Conclusion

This paper studied the effect of COVID-19 and CEO tenure on environmental and social disclosure scores. The sample came from Indonesian firms listed on the Indonesian Stock Exchange from 2015-2021. Indonesian firms have a relatively high understanding of governance disclosure scores and a low understanding of environmental and social disclosure scores. However, from 2015 to 2021, Indonesia improved its environmental and social disclosures significantly. Environmental and social disclosure scores increased by around 15 points within the seven years or almost double and triple, respectively.

The average increase in environmental and social disclosure scores is relatively the same, around two points each year. However, the cross-sectional regression results suggest that COVID-19 yielded a positive and significant effect on accelerating environmental and social disclosure scores, and CEO tenure only provided a negative and significant effect on social disclosure scores. The findings on COVID-19 also indicate that firms were forced to improve their business processes significantly within a short period. As firms succeed in improving their business processes, they have more incentives to share the positive development in the form of higher disclosure scores on environmental and social issues. In addition, the findings on CEO tenure imply that CEO commitment to environmental issues was not influenced by tenure, and tenures affected CEO commitment to social issues. In other words, CEOs with more extended services seem to have more consideration for improving social issues.

However, the authors did not find enough statistical evidence on the role of the number of females as members of the Board of Commissioners and independent Boards of Commissioners. It may be because firms' ability to improve their environmental and social disclosure scores is influenced heavily by their financial constraints and size. While the financial constraints reduce environmental and social disclosure scores, firm size increases environmental and social disclosure scores.

In this study, a firm commitment to environmental and social issues was not influenced by firm growth opportunities, either by firm assessment as measured by capital-expenditure-to-depreciation ratios or investors' assessment as measured by price-to-book-value ratio.

The study also revealed that longer-service CEOs must be persuaded to increase their commitment to improving firms' social performance and disclosures. The authors may expect the persuasion activities to increase longer-service CEOs' commitment to firms' social performances and disclosure scores.

For its limitations, the data used for the study was relatively small. Only 104 firms had ESG data from 766 firms or one-seventh of the total firms listed on the Indonesian Stock Exchange in 2021. Firms that can provide complete data tend to have higher asset values. Hence, the study results tilt toward the large market capitalization of listed companies. The authors do not know the behavior of the six-sevenths of the remaining firms listed on the Indonesian Stock Exchange. Since the listed firms provide sustainability reports, the

authors expect that the understanding of the effect of COVID-19 and CEO tenure on environmental and social governance disclosure scores will be more representative.

The study further highlights the importance of pressure from stakeholders, i.e., the government, employees, and customers, on environmental and social disclosure scores. As the COVID-19 crisis is ongoing, stakeholders' pressure on firms' business process improvements is unknown. Hence, future research should compare environmental and social disclosure scores for pre- and post-COVID-19 periods.

Appendix

Appendix 1. Screenshot of STATA Panel Data Regression

Screenshot of STATA output for panel data regression, fixed effect model for the effect of COVID-19 and CEO tenure on Environmental disclosure scores.

```
. xtreg environment womanbod idirector  da lnasset ebitda tobin capitaldep covid, fe
note: covid omitted because of collinearity

Fixed-effects (within) regression               Number of obs      =       539
Group variable: year                            Number of groups   =         7

R-sq:  within  = 0.0982                         Obs per group: min =        71
       between = 0.7824                                        avg =      77.0
       overall = 0.1037                                        max =        84

                                                F(7,525)           =      8.17
corr(u_i, Xb)  = 0.0802                         Prob > F           =    0.0000
```

environment	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
womanbod	-.2141041	.9421193	-0.23	0.820	-2.064891	1.636682
idirector	2.113493	.9875878	2.14	0.033	.1733843	4.053603
da	-7.257756	3.962538	-1.83	0.068	-15.04213	.5266213
lnasset	4.598914	.7328806	6.28	0.000	3.159176	6.038653
ebitda	-.6178193	1.272567	-0.49	0.628	-3.117768	1.88213
tobin	.622499	.2699027	2.31	0.021	.092277	1.152721
capitaldep	-.1319127	.0999261	-1.32	0.187	-.3282168	.0643914
covid	0	(omitted)				
_cons	-19.82151	5.447735	-3.64	0.000	-30.52355	-9.119474
sigma_u	5.9584412					

Screenshot of STATA output for panel data regression, fixed effect model for the effect of COVID-19 and CEO tenure on Social disclosure scores.

```
. xtreg social womanbod idirector  da lnasset ebitda tobin capitaldep covid, fe
note: covid omitted because of collinearity

Fixed-effects (within) regression               Number of obs      =       539
Group variable: year                            Number of groups   =         7

R-sq:  within  = 0.1196                         Obs per group: min =        71
       between = 0.8588                                        avg =      77.0
       overall = 0.1221                                        max =        84

                                                F(7,525)           =     10.19
corr(u_i, Xb)  = 0.0794                         Prob > F           =    0.0000
```

social	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
womanbod	-.8876506	.5959627	-1.49	0.137	-2.058415	.2831138
idirector	.7115525	.624725	1.14	0.255	-.5157152	1.93882
da	-7.334264	2.506609	-2.93	0.004	-12.25848	-2.410049
lnasset	3.358045	.4636032	7.24	0.000	2.4473	4.26879
ebitda	-.945363	.8049962	-1.17	0.241	-2.526772	.6360462
tobin	.5264179	.1707342	3.08	0.002	.1910118	.8618239
capitaldep	-.1176943	.0632109	-1.86	0.063	-.2418717	.0064831
covid	0	(omitted)				
_cons	-1.354827	3.44611	-0.39	0.694	-8.124685	5.415032
sigma_u	4.7002603					
sigma_e	10.807625					

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Conflicts of Interest

The author declares no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.