

THE IMPACT OF FAMILY AND POLITICAL CEOS ON CLIMATE CHANGE DISCLOSURE: THE MODERATING ROLE OF CEO AGE

Ivone^{1*}
Iskandar Itan²
Sheila Septiany³
Budi Chandra⁴
Angelica⁵

^{1,2,3,4,5} Department of Accounting, Faculty of Economics and Business, Universitas
Internasional Batam, Batam, Indonesia

*Correspondent: ivone.chen@uib.ac.id

Abstract

Climate change risks not only affect the environment but also pose significant risks to companies, including operational, insurance, regulatory, shareholder, capital, competition, and litigation risks. This study aims to examine the influence of family CEOs and political CEOs on climate change disclosure, with CEO age as a moderating variable. A quantitative approach is employed by analyzing 121 non-financial companies listed on the Indonesia Stock Exchange during the period 2019-2023. Climate change disclosure is measured using the Task Force on Climate-related Financial Disclosure index and analyzed through panel ordinary least squares regression with industry and year fixed effects. The novelty of this study lies in its ability to assess disclosure quality through the Task Force on Climate-related Financial Disclosure framework, focusing on family and political CEOs which are rarely explored in previous studies, and including CEO age as a moderating variable. The findings indicate that family and political CEOs negatively affect climate change disclosure, and CEO age significantly moderates this relationship by strengthening the negative effect among older family CEOs. In contrast, older political CEOs are more likely to engage in climate-related disclosure, thereby weakening the negative relationship between political CEOs and climate change disclosure. Future studies are encouraged to enhance data comprehensiveness, employ alternative disclosure measurement approaches, and incorporate broader CEO characteristics to provide deeper insights into climate disclosure practices.

Keywords : CEO Age; Climate Change Disclosure; Family CEO; Political CEO.

JEL Classification : G34, M41, Q56

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INTRODUCTION

Since the 1990s, climate change has emerged as one of the most urgent global concerns (Aldoseri & Albaz, 2023) and is now recognized as a potentially irreversible threat to human life, the environment, and the world. Its impacts are becoming increasingly evident through rising global temperatures, ecosystem degradation, and more frequent natural disasters. These developments mark a critical turning point in efforts to maintain an environmental balance and ensure long-term sustainability. Therefore, in recent years policymakers have launched various initiatives and policies aimed at addressing climate change (Gaganis et al., 2021), such as the Kyoto Protocol (1997) and the Paris Agreement (2015), which aim to reduce greenhouse gas emissions and strengthen resilience to climate change (Luo & Tang, 2021). Indonesia is one of the world's largest greenhouse gas (GHG) emitters (International Energy Agency, 2023). Its commitment to addressing climate change is reflected in its participation in these global climate initiatives (Chandra et al., 2026). At the national level, this commitment is reflected in the Nationally Determined Contribution (NDC).

Consequently, corporate climate disclosure has become increasingly important. At the corporate level, companies play a crucial role in addressing climate change, as they face various strategic and financial risks, including operational, insurance, regulatory, shareholder, capital, competition, and litigation risks. To mitigate these risks, companies are increasingly being encouraged to disclose climate-related information. From the perspective of legitimacy theory, disclosure is a company policy that aligns its activities with societal values and norms to maintain legitimacy and ensure long-term viability (Deegan et al., 2002; Gray et al., 1996; Ihlen, 2009). A survey (PwC, 2014) highlighted that over 95% of businesses in Indonesia are family-owned, while in Southeast Asia, approximately 60% of publicly listed companies are family-owned. These companies generally have governance structures with family members in key positions (Itan et al., 2024).

Despite these developments, there remains a gap between public and corporate practice. A survey by Edelman Trust Barometer (2023) shows that in Indonesia, climate change is a major public concern, with strong expectation that CEOs will take concrete action on this issue. However, many companies have not made sufficient efforts to enhance the quality of their climate disclosures. Furthermore, corporate actions are often perceived as political, especially when the disclosure is minimal. This perception reflects the limited regulatory framework addressing climate change issues, which focuses only on carbon emission reduction (Agustini & Arifa, 2024).

In practice, climate change disclosures reflect a company's operational commitment to sustainability. Prior studies confirm that climate change risk disclosure reflects a company's operational commitment to addressing climate change, as evidenced by increased strengths and reduced concerns regarding climate impacts (Aldoseri & Albaz, 2023). As climate change becomes more significant, the greater the pressure from stakeholders for companies to confront and disclose their environmental impacts (Saha & Khan, 2024). In response, companies are encouraged to demonstrate environmental accountability, which is largely influenced by internal leadership. Therefore, the CEO is considered to be the most influential individual and plays a critical role in corporate management (X. Zhang et al., 2024).

To explain this relationship, this study applied Upper Echelon Theory, Legitimacy Theory, and Agency Theory. Although previous research has examined CEO

characteristics in the context of Corporate Social Responsibility (CSR), few studies have examined their influence on climate change disclosure using the Task Force on Climate-related Financial Disclosure index while also considering the moderating role of CEO age, especially in a developing country like Indonesia. This gap highlights the novelty of the study, as most companies rely on the Global Reporting Initiative (GRI) standards rather than the more comprehensive Task Force on Climate-related Financial Disclosure (TCFD) framework. Therefore, this study examines the influence of family and political CEO on climate change disclosure and investigates how CEO age moderates this relationship. By integrating Upper Echelon Theory, Legitimacy Theory, and Agency Theory, this study contributes new insights into the role of leadership in shaping corporate environmental accountability, particularly in emerging markets such as Indonesia.

To achieve this research objective, we addressed the following research questions:

RQ₁: Does the presence of a family CEO negatively impact climate change disclosure?

RQ₂: Does the presence of a political CEO negatively impact climate change disclosure?

RQ_{3a}: Does CEO age moderate the relationship between family CEOs and climate change disclosures?

RQ_{3b}: Does CEO age moderate the relationship between political CEOs and climate change disclosures?

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Accounting information serves to inform stakeholders regarding the actual condition of a company (Wati & Malik, 2021). It involves the measurement, recording, analysis, and reporting of current, actual, and potential climate change impacts and risks to a company. In terms of environmental sustainability, climate change disclosure provides information on climate change through annual reports, statements, and official documents. Climate change disclosure is important for a wide range of stakeholders, including regulators, investors, and the broader public, regarding how companies respond to and manage climate-related opportunities and risks (Aldoseri & Albaz, 2023). Therefore, this study focuses on voluntary climate change disclosure, using Upper Echelons Theory (UET) and Legitimacy Theory as the primary theoretical framework and supported by Agency Theory. The research framework of this study is presented in Figure 1.

Upper Echelons Theory

Upper Echelons Theory (Hambrick & Mason, 1984) states that demographic factors and personal characteristics such as age, values, and background influence perception, information processing, strategic decision-making, and organizational outcomes. In other words, strategic decisions contain a significant behavioral component, including perception and interpretation, which depends on the cognitive bases and values of decision-makers (Hambrick & Mason, 1984). Therefore, CEO characteristics play a significant role in shaping corporate behavior, including disclosure practices (Chapple et al., 2025).

Legitimacy Theory

Legitimacy Theory suggests that corporate disclosure policies serve as an important mechanism for shaping public and external stakeholders' perceptions of a company,

which may in turn influence corporate practices in social, political, and environmental areas due to their fundamental interconnectedness (Deegan et al., 2002; Joshi & Gao, 2009). Beyond public perception, legitimacy is also shaped by external institutional pressures, including expectations regarding environmental disclosure, particularly climate change disclosure. To maintain legitimacy in their operations, businesses may need to demonstrate that their activities align with stakeholder expectations (Yun et al., 2023). In response, organizations may adjust their disclosure practices. Brown & Deegan (1998) show that companies tend to respond to environmental concerns by expanding the scope and quality of information in their annual reports. Therefore, climate change disclosure may reflect different approaches to legitimacy management.

Agency Theory

Agency theory (Jensen & Meckling, 1976) examines the conflict of interest between two parties within a company: the principal (shareholder) and agent (manager). Agents act on behalf of principals and are responsible for making strategic decisions, including resource allocation, coordination across subunits, pricing, costing, compensation, and incentives (Hendrastuti & Harahap, 2023; Fitriani, 2019). However, agency problems often arise because individuals tend to prioritize their own interests over those of the principal (Alexander, 2025). When goals are not aligned, managers may withhold or misrepresent information to maximize their own interests (Fitriani, 2019). Consequently, agents may not act in the best interests of the principal, unless their actions are closely monitored. To address this issue, corporate governance mechanisms are implemented to monitor and control agents' actions. Companies can enhance environmental disclosure by providing verifiable and measurable information (Itan et al., 2023), that, in turn, helps reduce information asymmetry between shareholders and management, thereby minimizing agency problems and strengthening corporate accountability (Wahyuningrum et al., 2025).

Family CEO and Climate Change Disclosure

Family companies are common within a corporate scope (Cristiano & Yopie, 2021). In the context of family ownership, investors often associate family businesses with greater stability and deeper involvement as they typically focus on long-term growth (Itan et al., 2025). However, agency problems between shareholders and top management may still arise and can be exacerbated when the company is led by a family CEO. Family CEOs tend to prioritize family interests and the preservation of socioemotional wealth, and such companies often exhibit lower internal control quality compared to non-family companies. This condition may encourage weaker internal controls to protect family interests, thereby reducing future accountability (Jadoon et al., 2021).

Supporting this argument, Borsuk et al. (2023) found that companies controlled by family CEOs tend to exhibit stronger environmental performance while disclosing less information about these outcomes, indicating lower environmental transparency and weaker environmental disclosure. This suggests that family CEOs are less transparent in providing information on environmental issues, which is associated with lower climate change disclosure (CCD) scores.

H₁: Family CEOs are negatively associated with climate change disclosure

Political CEO and Climate Change Disclosure

The influence of political CEOs on disclosure is more complex. Some studies argue that CEOs with political connections tend to improve a company's image by adopting pro-climate strategies because, in general, CEOs with a political background are considered to have higher moral and ethical standards, thereby increasing their motivation to make decisions regarding corporate environmental responsibility (Fahad Khalid et al., 2022).

However, other studies suggest that political CEOs may disclose less information. Rauf et al. (2021) stated that executives with political ties often disclose lower-quality CSR information, reflecting a tendency to limit transparency due to political legitimacy concerns. Wang et al. (2023) found that local governments tend to protect political CEOs by reducing or even exempting them from punishment when they commit environmental violations. This protection minimizes regulatory pressure and weakens incentives for transparency, potentially lowering environmental and climate change disclosure. Similarly, (Li et al., 2022) argued that executives with political connections are less likely to disclose environmental information due to political career concerns. In a political context, climate change disclosure is considered sensitive due to the potential risks to image, reputation, and long-term personal interests. As a result, political CEOs may be encouraged to limit such disclosure, thereby reducing corporate transparency.

H₂: Political CEOs are negatively associated with climate change disclosure

The Moderating Impact of CEO Age

Demographic characteristics such as age can influence a company's sustainability performance. This study focuses on the influence of CEO age, although this relationship is complex and varied. Age can influence attitudes and behaviors towards strategic decision-making, including sustainability initiatives. CEOs from different age groups have different cognitive abilities and mindsets as well as different priorities regarding their needs, behaviors, and careers, resulting in different strategies within their companies (Sang et al., 2024).

Older CEOs have greater influence and better attitudes towards government environmental policies that address local and national scale issues compared to their younger counterparts (Aljughaiman et al., 2024). Such attitudes may encourage greater attention to sustainability-related communication and environmental disclosure practices. Conversely, younger CEOs may be more knowledgeable about environmental issues and more sensitive to stakeholder pressures, such as consumers and investors who are increasingly concerned about sustainability. These differences suggest that age may be a contextual factor influencing the relationship between CEO characteristics and climate-related disclosure. These arguments are consistent with Upper Echelons Theory, which suggests that demographic attributes such as age influence CEOs' perspectives and preferences (Hambrick & Mason, 1984).

In general, family businesses tend to focus on long-term sustainability rather than short-term profits due to the preservation of socioemotional wealth, in line with environmental, social, and governance (ESG) principles (Zhu et al., 2025). Developments related to ESG have increased corporate awareness of sustainability issues (Suhardjo et al., 2024). As family CEOs grow older, concerns regarding reputation, maintaining legacy, and stakeholder trust may become increasingly important, potentially weakening the negative relationship between family CEOs and climate change disclosure. Furthermore, reputation is closely linked to the identity of family

firms in shaping strategic decisions and relationships with stakeholders (Ivone et al., 2026).

However, companies with CEOs with political ties tend to be more environmentally conscious than companies with CEOs without political ties (C. Zhang, 2017). Supporting this argument, Lapologang & Zhao (2023) suggest that political connections can strengthen a company's alignment with sustainable development strategies and enhance environmental disclosure. This suggests that CEO age may weaken the negative relationship between political CEOs and climate change disclosure. Thus, the following hypotheses were developed:

H_{3a}: CEO age weakens the negative relationship between family CEOs and climate change disclosure.

H_{3b}: CEO age weakens the negative relationship between political CEOs and climate change disclosure.

Research Framework

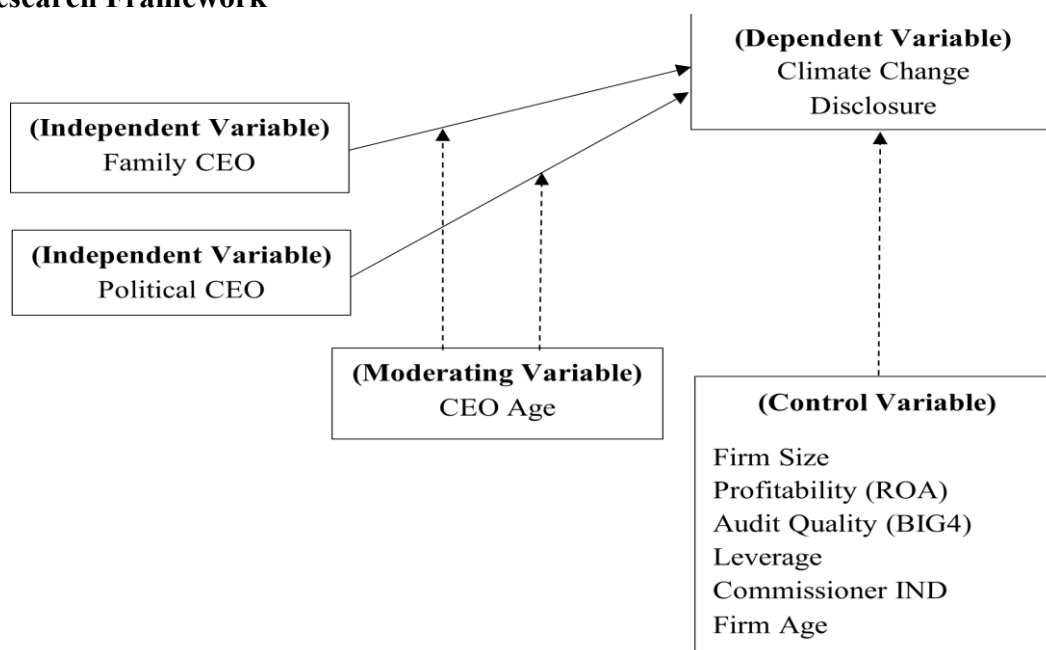


Figure 1.
Research Conceptual Framework

Source: Authors' processing

RESEARCH METHOD

The initial data were collected from the annual reports, sustainability reports, and integrated reports of non-financial companies listed on the Indonesia Stock Exchange (IDX) during the 2019–2023 period. Financial companies (SIC 6) were excluded to avoid biased results, as the financial industry is highly regulated, including regulations related to sustainability reporting (Harymawan et al., 2021). Nonfinancial sector companies were selected as research objects because they generally have more intensive emissions and a more significant direct impact on the environment compared to the financial sector. As part of the sampling criteria, companies whose corporate reports were unavailable or incomplete, or that did not provide information on firm size, return on assets (ROA), leverage, firm age, BIG4, and independent commissioners, were excluded. The final

sample consisted of 121 companies observed during the 2019-2023 period. The details of the final sample selection criteria are listed in Table 1.

Table 1.
Sampling Criteria

Description	No. of Firms	Obs.
Indonesian listed firm on the IDX from 2019-2023	941	4.705
Less: Financial Firm	(104)	(520)
Less: Firms that do not publish sustainability reports	(110)	(550)
Less: Firms that do not disclose information for 5 consecutive years	(584)	(2.920)
Less: Firm-year observations with incomplete data	(47)	(213)
Less: Firm-year observations identified as conceptual outliers	(5)	(11)
Total	121	491

Source: Authors' processing

Climate Change Disclosure (CCD) is the dependent variable in this study. Climate change is a major global concern and refers to long-term changes in climatic conditions that occur for decades or longer. In the business context, information disclosure is important as it enhances accountability and transparency. Climate change disclosure refers to a report published by an organization or company that reveals the carbon footprint of their activities and their exposure to climate risks and how much the organization's activities affect and are affected by climate change. In this study, climate change disclosure was measured based on the recommendations of the Task Force on Climate-Related Financial Disclosures (TCFD). These recommendations aim to improve transparency and consistency in climate-related reporting, enabling stakeholders including investors to make better and more informed decisions. The TCFD recommendations were categorized into four attributes: governance, strategy, risk management, and metrics and targets, as summarized in Table 2.

Table 2.
Climate Change Disclosure Performance

Topic	Disclosure
Governance	1. Describe the board's oversight of climate-related risks and opportunities 2. Describe management's role in assessing and managing climate-related risks and opportunities.
Strategy	3. Describe the climate-related risks and opportunities the organization has identified over the short, medium and long term. 4. Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy and financial planning 5. Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario
Risk Management	6. Describe the organization's processes for identifying and assessing climate 7. Describe the organization's processes for managing climate-related risks. 8. Describe how processes for identifying, assessing and managing climate-related risks are integrated into the organization's overall risk management
Metrics and Targets	9. Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with their strategy and risk management process

Topic	Disclosure
	10. Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks.
	11. Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets

Each item if present is set to 1, and 0 otherwise

Source: (Task Force on Climate-related Financial Disclosures, 2021)

The independent variable focuses on CEO characteristics and is measured as a dummy variable, specifically for family CEOs and political CEOs. CEO age serves as a moderating variable, focusing on the interaction effect between family and political CEOs. Several control variables are used in the analysis: firm size, return on assets, leverage, firm age, audit quality (BIG4), and independent commissioners. Firm size reflects the extent of a firm's operational capacity; larger firms are generally expected to disclose more because of their greater responsibility, transparency, and sustainability demands. Leverage (LEV) indicates how effectively a firm utilizes debt to support its operations. Return on assets (ROA) reflects a firm's efficiency in generating profits from its assets. Independent commissioners play key roles in corporate oversight and governance. Audit quality (BIG4) reflects that firms audited by Big Four accounting firms tend to exhibit a higher level of voluntary environmental disclosure. Finally, firm age represents the firm's experience and stability. The measurements details for these variables are presented in Table 3.

Table 3.
Variable Description

Variable	Measurement
Dependent Variable	
CCD	The mean score of the 11 TCFD recommended disclosure items across governance, strategy, risk management and metrics and targets
Independent Variable	
FCEO	Dummy variable equal to 1 if the firm is managed by a CEO who is a family member but not the founder, and 0 otherwise. (Meier & Schier, 2021)
PCEO	Dummy variable equal to 1 if the CEO has political connections, such as being a former government official (e.g., member of parliament, minister, or regional head), or holding an official position in a political party. Otherwise, it equals 0. (Sun & Zou, 2021)
Moderating Variable	
CEOAGE	Natural logarithm (Ln) of CEO age in years. (Alshahrani et al., 2025)
Control Variable (Alshahrani et al., 2025)	
FSIZE	Natural logarithm (Ln) of the firm's total assets
ROA	Net Income divided by the firm's total assets
LEV	Total liabilities divided by the firm's total assets
FAGE	Natural logarithm of firm age (year since incorporation)
BIG4	Dummy variable equal to 1 if the firm is audited by one of the largest four auditing firms and 0 otherwise
COMIND	Proportion of independent commissioners

Source: Authors' processing

This study employs a panel Ordinary Linear Squares regression with clustered robust standard errors and year and industry fixed effects to examine the impact of CEO characteristics on climate change disclosure (CCD). The baseline model estimates the direct impact of family CEO (FCEO) and political CEO (PCEO) on CCD while controlling for years and industry fixed effects. The model is specified as follows.

$$\begin{aligned}
 CCD = & \beta_0 + \beta_1 FCEO + \beta_2 PCEO + \beta_3 LN_FSIZE + \beta_4 ROA + \beta_5 LEV \\
 & + \beta_6 LN_FAGE + \beta_7 BIG4 + \beta_8 COMIND + Year\ FE \\
 & + Industry\ FE + e_{i,t}
 \end{aligned}
 \tag{1}$$

The second model includes the natural logarithm of CEO age to examine the direct effect of CEO age on climate change disclosure. This specification allows us to assess the main effect of CEO age before testing the interaction effects. The model is specified as follows:

$$\begin{aligned}
 CCD = & \beta_0 + \beta_1 FCEO + \beta_2 PCEO + \beta_3 LN_CEOAGE + \beta_4 LN_FSIZE + \beta_5 ROA \\
 & + \beta_6 LEV + \beta_7 LN_FAGE + \beta_8 BIG4 + \beta_9 COMIND + Year\ FE \\
 & + Industry\ FE + e_{i,t}
 \end{aligned}
 \tag{2}$$

The final model includes CEO age to verify the moderating effect on the relationship between CEO characteristics and climate change disclosures. Specifically, the interaction terms were $FCEO \times LN_CEOAGE$ and $PCEO \times LN_CEOAGE$. This allows us to test whether the impact of family or political CEO affiliation on climate change disclosure differs depending on CEO age. The full model is as follows.

$$\begin{aligned}
 CCD = & \beta_0 + \beta_1 FCEO + \beta_2 PCEO + \beta_3 LN_CEOAGE + \beta_4 FCEO \times LN_CEOAGE \\
 & + \beta_5 PCEO \times LN_CEOAGE + \beta_6 LN_FSIZE + \beta_7 ROA + \beta_8 LEV \\
 & + \beta_9 LN_FAGE + \beta_{10} BIG4 + \beta_{11} COMIND + Year\ FE \\
 & + Industry\ FE + e_{i,t}
 \end{aligned}
 \tag{3}$$

Where:

CCD	= Climate Change Disclosure
FCEO	= Family CEO
PCEO	= Political CEO
LN_CEOAGE	= Natural Logarithm of CEO age
FCEO x LN_CEOAGE	= Interaction term between Family CEO and CEO age
PCEO x LN_CEOAGE	= Interaction term between Political CEO and CEO age
LN_FSIZE	= Natural Logarithm of firm size
ROA	= Return on Assets
LEV	= Leverage
LN_FAGE	= Natural Logarithm of firm age
BIG4	= A dummy variable for Big four auditors
COMIND	= Proportion of Independent commissioners
Year FE	= Year fixed effects
Industry FE	= Industry fixed effects
ϵ_{it}	= Error term

This stepwise modeling strategy allows us to (i) estimate the direct effects of family and political CEO, (ii) evaluate the main influence of CEO age, and (iii) identify whether age strengthens or weakens the relationship between family and political CEO on climate change disclosure.

RESULT AND DISCUSSION

Table 4 presents descriptive statistics of the variables used in this study. The mean value of Climate Change Disclosure (CCD) is 0.377, with a standard deviation of 0.314, indicating a generally low level of disclosure among Indonesian firms. The CCD score ranges from 0.091 to 1.000, where the maximum score reflects full disclosure in the CCDP index.

Table 4.
Descriptive Statistics

Variable	N	Mean	Standard Deviation	Minimum	Maximum
CCD	491	0.377	0.314	0.091	1.000
CEOAGE	491	54.652	8.356	26.000	83.000
FSIZE (Total asset)	491	26.258.070.115.	50.163.354.074.423	46.840.047.799	445.679.000.000.
LEV	491	0.475	0.276	0.003	2.058
ROA	491	0.031	0.127	-1.277	0.599
FAGE	491	35.690	19.891	4.000	110.000
COMIND	491	0.439	0.115	0.200	1.000

Source: Authors' processing (Stata 17)

The CEO's age ranges from 26 to 83 years, with a mean age of 54.65 years, reflecting substantial diversity in leadership experience among the sample firms. The average firm size measured by total assets is approximately IDR 26.26 trillion, while the average firm age is 35.69 years, suggesting that the companies in the research sample are relatively mature. Regarding financial characteristics, leverage (LEV) has a mean value of 0.475, indicating that the average firm finances almost half of its assets through debt. Return on assets (ROA) ranges from -1.277 to 0.599, showing that while some firms are highly profitable, others operate at a loss. Regarding governance characteristics, the proportion of independent commissioners (COMIND) was 0.439, which suggests a moderate level of board independence.

As shown in Table 5, 14.26% of firms are led by family CEOs (FCEOs), whereas 1.63% are led by political CEOs (PCEOs). This suggests that most companies in the sample are led by non-family and non-political CEOs, reflecting a tendency to prioritize professionalism and independence in leadership. Furthermore, 40.73% of the companies are audited by Big Four accounting firms (BIG4), indicating a relatively high level of audit quality.

Table 5.
Frequency Distribution

Frequency	0	1
FCEO	85.74%	14.26%
PCEO	98.37%	1.63%
BIG4	59.27%	40.73%

Source: Authors' processing (Stata 17)

Table 6 reports the Pearson correlations coefficients among the variables. Family CEO (FCEO) has a significant negative correlation with Climate Change Disclosure (CCD) at $p < 0.1$, indicating that firms managed by family CEOs usually disclose less climate-related information. In contrast, political CEOs (PCEO) are not statistically significant, suggesting that political connections alone do not necessarily improve disclosure. CEO age is positively and significantly correlated with CCD, implying that older CEOs may be more transparent in disclosure.

Among the control variables, the results for firm size (FSIZE) and audit quality (BIG4) differ from those of previous studies, which generally report significant positive correlations. In contrast, this study found that both FSIZE and BIG4 were negatively correlated with CCD ($p < 0.01$). The negative correlation for BIG4 is consistent with (Roberts et al., 2022), which argues that the presence of Big Four auditors does not always lead to stronger environmental accountability. Independent commissioners (COMIND) showed a positive correlation with CCD ($p < 0.05$), indicating that firms with a larger proportion of independent commissioners tended to be more transparent in disclosing climate-related performance. Overall, there is no multicollinearity problem because the variance inflation factor (VIF) value is below two, which is consistent with Kim (2019) and well below the generally accepted threshold of 5–10.

Table 6.
Pearson Correlation

	CCD	FCEO	PCEO	LN_CEOAGE	LN_FSIZE	LN_FAGE	LEV	ROA	BIG4	COMIND
CCD	1									
FCEO	-0.083* (0.065)	1								
PCEO	0.009 (0.851)	0.132*** (0.003)	1							
LN_CEOAGE	0.131*** (0.004)	-0.134*** (0.003)	-0.222*** (0.000)	1						
LN_FSIZE	-0.132*** (0.003)	0.026 (0.568)	-0.133*** (0.003)	0.120*** (0.008)	1					
LN_FAGE	0.007 (0.879)	0.095** (0.036)	-0.047 (0.303)	0.251*** (0.000)	0.420*** (0.000)	1				
LEV	-0.060 (0.186)	-0.133*** (0.003)	-0.013 (0.769)	-0.055 (0.225)	0.275*** (0.000)	0.085* (0.060)	1			
ROA	0.070 (0.121)	0.094** (0.038)	-0.040 (0.375)	0.073 (0.106)	0.224*** (0.000)	0.100** (0.027)	-0.352*** (0.000)	1		
BIG4	-0.128*** (0.005)	0.006 (0.899)	-0.107** (0.018)	0.076* (0.093)	0.466*** (0.000)	0.292*** (0.000)	-0.008 (0.860)	0.285*** (0.000)	1	
COMIND	0.095** (0.035)	0.060 (0.183)	0.044 (0.325)	0.010 (0.821)	-0.008 (0.855)	0.060 (0.183)	0.194*** (0.000)	0.037 (0.416)	-0.011 (0.800)	1

p-values in parentheses

* p < 0.1, ** p < 0.05, *** p < 0.01

Source: Authors' processing (Stata 17)

Table 7 presents the results of the regression analysis examining the influence of CEO characteristics on climate change disclosure (CCD) and the moderating role of CEO age. CEO age is assumed to have both a direct influence on CCD and an interaction effect with CEO characteristics, indicating quasi-moderation. The analysis is divided into three models. Model 1 examines the effect of the independent and control variables on CCD. Model 2, CEO age, was added as a direct effect, while Model 3, a full interaction model, was tested to examine the moderating role of CEO age.

In the first model, the results show that family CEOs have a significant negative effect on climate change disclosure (CCD). This suggests that companies led by family CEOs tend to be less transparent in disclosing climate change, likely because of conservative tendencies. This finding is consistent with Upper Echelons Theory (Bonsu et al., 2024; Hambrick & Mason, 1984), which argues that CEOs' characteristics and experiences shape their approach to strategic opportunities and problems, ultimately reflected in organizational outcomes. Simultaneously, Agency Theory suggests that family CEOs may prioritize private interests, resulting in a lack of transparency in climate-related disclosure due to principal-agent conflicts (Geng et al., 2023). This supports H1. Meanwhile, Political CEOs (PCEO) have no significant effect on CCD.

In Model 2, the direct effect of CEO age (LN_CEOAGE) is positive and significant, indicating that older CEOs are more likely to disclose climate-related information, possibly because of their greater awareness of long-term reputational risks and stakeholder demands. This is consistent with Upper Echelons Theory (Hambrick & Mason, 1984), which emphasizes how demographic characteristics, such as age, influence strategic decision-making, including disclosure behavior. The main effect of FCEO remains significantly negative, whereas that of PCEO is insignificant.

In Model 3, interaction effects are introduced. The results show that the moderating role of CEO age differs between family CEOs and political CEOs. The interaction between FCEO $\times$ LN_CEOAGE is negative and significant, indicating that, as the family CEO gets older, the negative effect on CCD becomes stronger. This finding does not align with H3a, which predicted that CEO age would weaken the negative relationship between family CEOs and CCD. Instead, the result reflects the tendency of older family CEOs to adopt more conservative disclosure practices, strengthening the negative effect on CCD. This finding is consistent with Upper Echelons Theory (Hambrick & Mason, 1984), as older family CEOs tend to show stronger risk aversion due to hesitation toward innovation under uncertain conditions. However, when CEO age was included as a moderator in Model 3, the FCEO effect became slightly positive. This should not be interpreted as conflicting with the previous findings. Instead, it reflects the presence of an interaction effect, indicating that the influence of family CEOs on CCD varies with CEO age. Therefore, these findings suggest that CEO age strengthens the negative relationship between family CEOs and CCD, leading to more conservative disclosure practices as family CEOs grow older. Additionally, PCEO exhibited significant negative effects in Model 3, supporting H2, which suggests that political connections can reduce disclosure. They also align with (Heitz et al., 2023), who find that political CEOs weaken regulatory pressures, leading to lower environmental disclosure. In contrast, the interaction between political CEOs and CEO age (PCEO $\times$ LN_CEOAGE) showed a significant positive effect on CCD, supporting H3b. This indicates that older political CEOs are more likely to engage in climate-related disclosure, thereby weakening the negative relationship between political CEOs and CCD. Consistent with Upper Echelons Theory perspective, older political CEOs have more experience in dealing with uncertain and complex institutional environments (Zhao et al., 2022), leading to greater and more transparent climate-related disclosure. This tendency is also consistent with Legitimacy

Theory, which suggests that political CEOs tend to provide greater disclosure to gain and maintain legitimacy from stakeholders (Saraswati et al., 2020). Overall, these findings suggest that CEO age plays a crucial moderating role in the influence of background characteristics on climate change disclosures. While family CEOs become more conservative with age, political CEOs appear to become more transparent in environmental disclosure over time. These results are broadly consistent with the theoretical frameworks used in this study, including Upper Echelons Theory, Agency Theory, and Legitimacy Theory.

Table 7.
Regression Analysis

	(1) CCD	(2) CCD	(3) CCD
FCEO	-0.101*** (-2.74)	-0.092** (-2.44)	1.459* (1.70)
PCEO	-0.094 (-0.95)	-0.050 (-0.55)	-3.321*** (-3.33)
LN_CEOAGE		0.233*** (2.81)	0.267*** (2.91)
FCEOxLN_CEOAGE			-0.388* (-1.78)
PCEOxLN_CEOAGE			0.853*** (3.22)
LN_FSIZE	-0.036*** (-3.26)	-0.036*** (-3.31)	-0.038*** (-3.44)
LN_FAGE	0.015 (0.55)	0.003 (0.09)	-0.001 (-0.04)
LEV	0.019 (0.30)	0.031 (0.50)	0.034 (0.54)
ROA	0.332* (1.88)	0.321* (1.80)	0.319* (1.78)
BIG4	-0.003 (-0.08)	-0.003 (-0.10)	0.006 (0.18)
COMIND	0.342*** (2.63)	0.333** (2.56)	0.344*** (2.61)
_cons	1.264*** (4.11)	0.390 (0.92)	0.296 (0.68)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
r2	0.160	0.171	0.179
r2_a	0.123	0.132	0.137
N	491	491	491

t statistics in parentheses

* p < 0.1, ** p < 0.05, *** p < 0.01

Source: Authors' processing (Stata 17)

This study also conducted several robustness checks to ensure the consistency of the results. First, a robustness regression with alternative specifications that include industry and year fixed effects produced results consistent with the main regression, as presented in Table 8. Family CEOs (FCEO) remained negatively associated with climate change disclosure (CCD), whereas political CEOs (PCEO) showed no direct effect. CEO age consistently had a positive impact on disclosure practices. Furthermore, the interaction term confirmed that older family CEOs tend to be more conservative, whereas older political CEOs tend to exhibit greater climate-related disclosure.

Second, several alternative estimation methods were employed. Coarsened Exact Matching (CEM) was used to reduce selection bias by balancing the sample. Compared

with other common matching methods, CEM is superior in its ability to reduce imbalance, model dependence, estimation error, bias, variance, and mean square error (Iacus et al., 2012). Generalized Least Squares (GLS) was applied to correct for heteroscedasticity and autocorrelation. Finally, Heckman correction was employed to address potential selection bias issues in the regression model.

The results were generally consistent across estimation methods: FCEO had a significant negative impact on CCD, PCEO exhibited a significant negative effect in most specifications, and the interaction between PCEO $\times$ LN_CEOAGE was significantly positive. The moderating effect of FCEO $\times$ LN_CEOAGE was significantly negative in some specifications, supporting the main regression result that CEO age strengthens rather than weakens the negative relationship between family CEOs and CCD. However, some differences were observed in the GLS test, in which the moderating effect on PCEO became insignificant, and in the Heckman test, in which the FCEO $\times$ LN_CEOAGE interaction was also insignificant. Overall, this consistency across methods provides additional support for the robustness of the main findings.

Table 8.
Robustness Analysis

	(1) CCD	(2) CCD	(3) CCD
FCEO	0.032 (0.05)		1.459* (1.70)
PCEO		-2.323*** (-3.34)	-3.321*** (-3.33)
LN_CEOAGE	0.247*** (2.72)	0.222*** (2.67)	0.267*** (2.91)
FCEO $\times$ LN_CEOAGE	-0.032 (-0.18)		-0.388* (-1.78)
PCEO $\times$ LN_CEOAGE		0.601*** (3.06)	0.853*** (3.22)
LN_FSIZE	-0.036*** (-3.30)	-0.038*** (-3.41)	-0.038*** (-3.44)
LN_FAGE	0.002 (0.08)	-0.004 (-0.15)	-0.001 (-0.04)
LEV	0.031 (0.50)	0.049 (0.79)	0.034 (0.54)
ROA	0.324* (1.81)	0.299* (1.68)	0.319* (1.78)
BIG4	-0.004 (-0.11)	0.005 (0.16)	0.006 (0.18)
COMIND	0.332** (2.56)	0.314** (2.34)	0.344*** (2.61)
_cons	0.325 (0.75)	0.466 (1.10)	0.296 (0.68)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
r2	0.171	0.168	0.179
r2_a	0.132	0.129	0.137
N	491	491	491

t statistics in parentheses

* p < 0.1, ** p < 0.05, *** p < 0.01

Source: Authors' processing (Stata 17)

Table 9 presents the results of an additional analysis using firm size (FSIZE), by dividing the sample into large and small firms based on their average values. This method

examines whether the impact of CEO characteristics on climate change disclosure (CCD), differs between large and small firms.

Table 9.
Additional Analysis

	Firm with smaller size	Firm with bigger size	Firm with smaller size	Firm with bigger size
FCEO	-0.452 (-0.47)	0.374 (0.40)		
PCEO			-2.916*** (-3.39)	-24.873*** (-6.29)
LN_CEOAGE	0.334** (2.25)	0.263* (1.85)	0.271* (1.96)	0.299** (2.41)
FCEOxLN_CEOAGE	0.101 (0.41)	-0.137 (-0.57)		
PCEOxLN_CEOAGE			0.759*** (3.09)	6.324*** (6.32)
LN_FAGE	-0.012 (-0.33)	-0.027 (-0.66)	-0.024 (-0.66)	-0.029 (-0.71)
LEV	-0.086 (-1.26)	0.234** (2.23)	-0.096 (-1.43)	0.258** (2.44)
ROA	0.125 (0.61)	0.335 (1.15)	0.053 (0.27)	0.342 (1.17)
BIG4	-0.091 (-1.56)	0.070* (1.66)	-0.084 (-1.46)	0.068 (1.62)
COMIND	0.219 (1.02)	0.381** (2.38)	0.228 (1.06)	0.393** (2.38)
_cons	-0.736 (-1.34)	-1.025* (-1.89)	-0.477 (-0.93)	-1.234** (-2.54)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
r2	0.278	0.251	0.293	0.233
r2_a	0.205	0.189	0.222	0.169
N	230	261	230	261

t statistics in parentheses

* p < 0.1, ** p < 0.05, *** p < 0.01

Source: Authors' processing (Stata 17)

These results indicate that firm size does not consistently moderate the relationship between CEO characteristics and CCD. The negative relationship between family CEOs (FCEO) and CCD remains consistent across firm sizes, suggesting that the conservative disclosure tendency of family CEOs is relatively stable regardless of firm size. Meanwhile, the effect of PCEO on CCD varied. In smaller firms, the negative effect of political CEOs (PCEO) on CCD is stronger, while in larger firms, the negative effect becomes weaker. This finding may reflect greater external visibility or scrutiny in larger firms. Overall, these results reinforce our main regression findings. The consistent negative effect of FCEO across subsamples supports the consistency of negative relationship between family CEOs and CCD across subsamples, whereas the varying effect of PCEO suggests that external visibility influences the extent of political influence on disclosure.

CONCLUSIONS, LIMITATIONS, AND SUGGESTIONS

Conclusions

This study was conducted in Indonesia, within an emerging market context, where over 95% of businesses are family owned. Although previous research has examined

corporate sustainability reporting (CSR), none have specifically analyzed climate change disclosures using the Task Force on Climate-related Financial Disclosures (TCFD) framework, particularly in Indonesia. Furthermore, the role of family and political CEOs, particularly as moderated by CEO age, remains underexplored. This is especially relevant, given that in our sample, CEOs tend to be relatively older, which may influence disclosure practices.

This study concludes that CEO characteristics and age play significant roles in shaping climate change disclosure behavior. Specifically, family CEOs negatively influence climate change disclosure, and this negative effect strengthens as they age. By contrast, Political CEOs do not consistently influence disclosure directly, but CEO age weakens the negative relationship between political CEOs and climate change disclosure. These findings contribute to Agency Theory by highlighting how disclosure outcomes depend on the CEO's background, particularly in terms of personal interests and monitoring mechanisms. Furthermore, the moderating role of CEO age aligns with Upper Echelons Theory, which suggests that personal values, experience, and reputational concerns influence strategic outcomes such as disclosure. The findings also support Legitimacy Theory by showing that climate-related disclosure may serve as a mechanism for preserving organizational legitimacy.

Limitations

This study has several limitations. First, the data collection process relied on publicly available corporate reports, including annual reports, sustainability reports, and integrated reports. However, the diversity of corporate disclosure media and reporting practices across firms may have resulted in some climate-related information not being fully captured in the analysis. Second, the measurement of climate change disclosure was conducted using content analysis based on the TCFD framework. Although verification procedures were applied to improve consistency, the assessment may still involve a degree of subjectivity. Third, CEO age was employed as a demographic proxy; however, age may not fully capture broader managerial characteristics such as experience, values, leadership style, or risk preferences that could influence climate-related disclosure decisions. Finally, the use of the TCFD framework may not completely reflect the diversity of climate disclosure practices across firms, particularly in contexts where reporting standards and disclosure quality vary substantially.

Suggestions for Further Research

Future studies are encouraged to further enhance data comprehensiveness by incorporating external databases and other publicly available sources to obtain more comprehensive climate-related information. Further research may also improve the robustness of climate change disclosure measurement by combining content analysis with alternative approaches, such as automated textual analysis or multi-rater assessment procedures, to reduce subjectivity. In addition, future studies could employ broader CEO characteristics, including educational background, tenure, experience, leadership style, or risk-taking behavior, to better explain managerial influence on climate disclosure practices. Lastly, future research may consider integrating additional climate disclosure frameworks or cross-framework comparisons beyond TCFD to provide a more comprehensive understanding of corporate climate reporting practices.

Author Contributions

All authors contributed equally to the development of the research framework, study design, and writing of this paper, and approved the final version for publication.

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Data Availability

The data that support the findings are available from the corresponding author upon reasonable request.

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