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Exploring The Moderation Role of Environmental Leadership Between Environmental Management Accounting and Firm Financial Performance

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ABSTRACT

Purpose : The article examines the relationship between environmental management accounting (EMA), environmental leadership (EL), and firm financial performance in Indonesian corporations.
Method : The study uses a Moderated Regression Analysis (MRA) to examine the moderating role of EL. Using secondary data, the research analyses 52 observations from 45 companies listed in the LQ45 Index on the Indonesia Stock Exchange. The unit of analysis is the firm level, with EL measured as the proportion of female commissioners, EMA proxied by the ESG score, and firm financial performance represented by ROA. Control variables include leverage, operating profit, and sales growth to ensure robust results.
Findings : The study finds that EMA does have an impact on financial performance, while EL has a negative direction and does not give an impact on strengthening the relationship between EMA and financial performance. The research suggests the importance of implementing EMA practices to enhance company performance. The study also highlights the need for future research to focus on industries closely related to the environment, such as mining companies.
Novelty : The study introduces the proportion of female commissioners on the board as a novel proxy for EL within the framework of Indonesian corporations. Unlike prior research focusing solely on EL in generic terms, this approach leverages gender diversity to explore its moderating role between EMA and firm financial performance. By doing so, it provides unique insights into how gender-inclusive leadership can influence environmental practices and corporate outcomes, where female representation on boards is still emerging.

INTRODUCTION

Global business and economic developments in recent years have become the main focus of attention, with interesting and complex dynamics. Technological transformation, globalization of trade, and changes in economic paradigms have had a significant impact on development of business sectors throughout the world (Luo, 2023). Through these changing dynamics, companies face various challenges to be able to adapt quickly in order to maintain economic sustainability and create growth opportunities (Skare & Soriano, 2021). Adapting to rapid change, building a resilient business model, and aligning it global business realities are very important to maintaining economic sustainability, which ultimately provides an overview of the company's performance. Company performance refers to a measure of the company's efficiency and success in achieving its goals. Company performance can be measured in various ways, including profitability, growth, market value, total shareholder profit, economic added value, and customer satisfaction (Taouab & Issor, 2019). Financial performance is the main aspect of company performance, which measures how well the company can use its assets to generate revenue and overall company finances during a certain period.

The company's financial performance is very important for the company because it can influence the welfare of shareholders and show the value of the company, which is adjusted by demand and supply, which can influence

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investors' perceptions of the company (Priyatama et al., 2022). The wealthier the owner, the better the company's financial performance (Zhang & Ma, 2021). Therefore, companies need to pay attention to their performance in order to attract the attention of investors and creditors, as well as improve shareholder welfare. To ensure that the activities carried out by companies are safe for the environment, environmental costs need to be taken into account. If the costs incurred are not in accordance with the objectives of improving the environment, this will make what the company does become increasingly burdened (Sari et al., 2020). Costs related to the environment can significantly influence the value of company performance. Besides that, the application of environmental leadership (EL) is one factor that can mitigate environmental costs and help increase company value (He et al., 2023). EL is associated with environmental orientation and, in this case, can help companies identify and utilize the environment, which leads to improved financial and environmental performance for the company (Su et al., 2020).

EL refers to the ability of an individual or group to guide the vision of environmental aspects towards positive change. Leaders who implement EL promote environmental sustainability by incorporating environmental protection factors into their decision-making processes and actions. This factor also focuses on the internal and external aspects of the company in managing waste, resources, and environmental efficiency (Sari & Gantino, 2022). EL can have significant impact on various aspects (Xu et al., 2022), such as environmentally friendly innovation performance, which shows that EL can improve the identity of environmentally friendly organizations. Second, EL can increase employees' understanding of environmental issues and their commitment to sustainability. Lastly, for public perception, companies that promote EL can improve their public image and attract environmentally conscious customers. EL is very important for companies because it helps organizations and individuals make decisions that are beneficial to the environment and influence the performance of the company itself (He et al., 2023).

Environmental issues and their associated costs, disclosures, and benefits are increasingly of concern to citizens, government officials, and corporate leaders in most countries around the world (Ekins & Zenghelis, 2021). However, there is a growing consensus that prevalent accounting practices do not provide sufficient information to support appropriate decision-making in environmental management responsibilities (Gunarathne, 2023). To fill this gap, the field of environmental management accounting (EMA) has recently received increasing attention. EMA emerged because companies needed to consider the environmental impacts of their operations and accounting for the costs associated with those impacts (Aziz et al., 2023).

In Indonesia, not many companies have implemented EMA (Lanita & Rachmawati, 2020). EMA links aspects of the company's environment to management accounting and influences the decision-making process (Aziz et al., 2023). By adopting EMA practices, companies can improve their environmental performance and create value for stakeholders. Therefore, it is important for companies to prioritize environmental leadership and sustainability practices, through which they can mitigate risks and improve overall performance. The use of EMA can help companies identify and manage environmental risks, which can impact company performance (Burritt et al., 2021). The physical aspect of EMA is, for example, that it can provide information about the use of energy flows, water, and waste, while the monetary aspect is that it provides information related to costs, income, and savings related to the environment (Gunarathne, 2023). This can help identify environmental problems caused by the company, what improvements need to be made, and their relationship to the company's financial performance (Burritt et al., 2021).

The implementation of EMA has a positive effect on organizational performance, including financial performance, by encouraging companies to innovate processes to make them more environmentally friendly (Sari & Gantino, 2022). EMA is very important to be able to increase environmental awareness and improve company financial performance, which in this case plays an important role in decision-making, risk management, and resource allocation (Al Mosaoy, 2023). However, although previous research seems to state that EMA has an impact on company performance, there are studies that state that EMA has not been proven to have a positive effect on company performance (Sales, 2019). Studies conducted by Hengky (2020); Angelina & Nursasi (2021); Faizah (2020) respectively shows the results that environmental accounting has no effect on a company's financial performance. This inconsistent results of previous studies between EMA and company performance provide a research gap.

There are several previous studies that show the relationship between EL and company financial performance. Research conducted by Su et al. (2020) shows that EL has a positive relationship with company performance, especially environmental performance and financial performance. Other research shows that leadership practices related to the environment can influence a company's financial performance, and these practices can help manage company finances (Mehdijev & Kolli, 2022). By using the number of women on board as a proxy for the EL variable. The use of this proxy variable is due to previous journal references such as Zhang & Ma (2021) as well as the statement that women are underrepresented in leadership roles, including on the board of directors (WEF, 2022). Apart from that, this study use of the environmental, social, and governance (ESG) index as a proxy for the EMA variable (Ali et al., 2022). As for control variables, this study use return on assets (ROA) as a proxy for the company's financial performance as well as leverage (cost of capital), operating profit (operational profit), and growth (sales). The use of the ESG index as a proxy for the EMA variable is because the ESG index can be used to evaluate company performance in terms of environmental, social, and governance factors, which are now increasingly relevant for investors and stakeholders (Boffo et al., 2020).

The use of the ESG index is also supported by its ability to provide information on the management and

resilience of environmental and company factors. ESG assessment and reporting can also provide important information regarding EMA covering environmental topics (McGeorge et al., 2023). The use of ROA as a proxy for a firm financial performance is based on the measurement of ROA, which measures the ability of a company's assets to generate net profits. Apart from that, ROA as a profitability ratio can show the effectiveness or performance of a company in generating profit levels using the assets it owns, which in this case also shows the firm financial performance (Yousaf & Dey, 2022). In addition, ROA also provides a good picture of net margin and asset turnover, two main performance drivers from fundamental analysis for a company's financial performance (Hargrave, 2022). In the end, the use of ROA as a proxy for a firm financial performance can show the assessment of a company because companies with higher ROA are generally considered to have high performance value, and vice versa for companies with lower ROA. This is also because a higher ROA indicates that a company is generating strong profits from the assets it owns, which can lead to an increase in the firm financial performance.

Then, use leverage (cost of capital), operating profit (operational profit), and growth (sales) as control variables to isolate the influence of other independent variables on the dependent variable. These control variables are used in financial analysis to ensure that test results are fair and do not deviate (Vural et al., 2012). In this case, the selected control variables can help isolate the relationship between EL and the firm financial performance by controlling other factors that might influence the results. This ensures that the results are not influenced by unrelated factors. The leverage variable refers to the amount of debt a company has compared to its equity, and this can have an impact on the company's profitability and risk. Furthermore, regarding the operating profit variable, the use of variables can be useful to enable a more accurate assessment of the contribution of environmental leadership by taking into account the influence of statistical factors on financial performance. In addition, the use of the operating profit variable ensures that the findings can be applied to various companies and industries, thereby increasing the generalizability of the results. In this case, large companies may find it easier to access investment in environmentally friendly projects. Lastly, the use of the growth variable through sales can reflect sales growth, which also shows changes in company income over time. This variable can help account for the dynamic nature of company sales, which is a factor in the company's financial performance.

The aim of this research is to obtain empirical evidence regarding the influence of EMA on financial performance as well as empirical evidence regarding the moderation of EL on EMA on financial performance. The difference with previous research is that this research uses EL as a moderating variable in the relationship between EMA and company financial performance. The role of EL has been linked to the implementation of various environmental practices and the responsibilities of top managers in supporting change (Pabian, 2019). EL is defined as the ability to influence individuals and mobilize organizations to realize a vision of long-term environmental sustainability (Egri & Herman, 2000). Effective EL can help companies face the challenges of external environmental pressures, enable companies to save resources and energy, and encourage companies to fulfil their social and ethical responsibilities (Afsar et al., 2018). Several stakeholder groups are putting pressure on companies to improve their ESG practices and increase their impact on society and the environment (de Souza Barbosa et al., 2023). In this case, a diverse board is necessary to closely monitor managers' activities and provide them with sufficient space to pursue beneficial growth opportunities for the company (Dong et al., 2023). A company's board of directors is considered the highest body responsible for vision, monitoring, and decision-making (Dong et al., 2023).

This study offers a novel contribution by introducing the proportion of female commissioners on corporate boards as a unique proxy for EL. While prior research has predominantly examined EL in broad conceptual terms, this study contextualizes EL through gender diversity, particularly the presence of female leaders. This approach is grounded in evidence suggesting that women in leadership roles are more attuned to sustainability and environmental concerns (Strumskyte et al., 2022; Balabantaray, 2023; Lyons, 2023 ; Mansour et al., 2024), thereby enhancing the strategic alignment of EMA practices with firm financial performance. By focusing on Indonesian corporations—where female representation in leadership remains underexplored—this research bridges significant gaps in the literature. It not only emphasizes the role of gender inclusivity in enhancing sustainability practices but also evaluates its moderating influence in a developing market context. This perspective advances the discourse on EL and its integration with EMA, offering actionable insights for corporate governance and environmental sustainability strategies.

This research uses the Natural Resource-Based View Theory (NRBV) as one of the theories underlying the research. The NRBV theory is a sub-dimensional or extension of the RBV theory and explains that organizations can achieve competitive advantage in industry through responding to environmental issues responsibly (Hart, 1995; Barney, 1991). The NRBV framework explains the relationship between the natural environment and a company's resources and capabilities (Hanif et al., 2023). The NRBV also shows that organizations utilize their resources and capabilities to achieve competitive advantage in the market (Mishra & Yadav, 2021; Yahya et al., 2021). NRBV considers the impact of an organization's resources, final products, and production processes on the environment (Andersén, 2021). NRBV theory can be used to evaluate a company's environmental performance by looking at innovation in production processes and employee capabilities (Appannan et al., 2020). NRBV provides a link between the natural environment and environmentally friendly organizational capabilities and resources (Almada & Borges, 2018). The connection between the NRBV theory and this research is that this theory explains that companies can utilize their resources and capabilities to achieve competitive advantage. In other words, EMA is a company resour-

ce to achieve competitive advantage so that this has an impact on the company's financial performance, where the EMA variable is moderated by EL to see whether there is a significant positive influence on the company's financial performance. This research is important because there is strong pressure on organizations from stakeholders to improve their environmental performance, and organizations are now taking many initiatives to play an active role in environmental stability (Hanif et al., 2023). When companies ignore environmentally friendly strategies and only focus on profit maximization, this can cause serious financial losses in the future because everyone is now very concerned about environmental stability (Hanif et al., 2023).

Another theory used in research is contingency theory. Contingency theory was developed by Fred Fiedler in 1958 with his research relating to leader effectiveness in group situations. Fiedler observed that people have dominant leadership characteristics that are generally inflexible. This theory says that leaders will increase their leadership effectiveness if they are placed in situations that suit their orientation, be it task orientation or human relations orientation (Tsolka, 2020). As contingency theory states that the best way to organize is to depend on the nature of the environment in which the organization is concerned, the implementation of environmental management can be considered a result of the fit between an organization's decision-making structure and a set of external factors. Leadership style determines a favourable situation through style effectiveness based on group performance (Alajmi, 2022). Leaders can find a position that suits their leadership style, then modify their situation to suit their leadership style or change their behaviour to fit the situation. However, according to Fiedler's contingency theory, it is easier to change the situation to suit the leader's style. Therefore, companies should not choose leaders according to the situation because leadership styles are unlikely to change (Tsolka, 2020). The connection between contingency theory and the variable of this research is that this theory touches on the issue of performance, which depends on the leader's style. This means that there will be an influence between leadership style and company performance, which in this research uses the company's financial performance.

EMA is a scientific discipline that supports managers in making decisions by providing information about the environmental impacts of organizational activities. Implementing EMA can help companies achieve better environmental performance and value creation (Wicaksono & Tarisa, 2022). EMA involves the creation, analysis, and use of financial and non-financial information to optimize a company's environmental and economic performance. Several studies have highlighted the effect of EMA on corporate financial performance, showing that it can improve corporate performance and reputation, which ultimately affects corporate financial performance (Gerged et al., 2023;Chaudhry et al., 2020). Therefore, by integrating EMA into their practices, companies have the potential to improve their environmental performance, reputation, and ultimately, their value. Companies often try to maintain the level of stakeholder satisfaction over a long period of time. This is where EMA plays a role in helping make this happen. EMA, which can be a forum for implementing innovative pro-environmental strategies, can encourage better accounting, provide profitable financial decisions for the company, and ultimately improve the company's financial performance (Chaudhry et al., 2020).

Ultimately, EMA provides an appropriate picture of the situation for companies to improve their economic and environmental performance. This information can be provided by the EMA, which combines short-term operational and long-term strategic issues as well as how they are managed. EMA provides a useful strategy for designing and implementing environmental strategies by collecting financial information as well as environmental information (Sari et al., 2020). Meanwhile, there are also several previous studies stating that EMA has a significant positive impact on company performance such as studies by Aldama (2022);Endiana & Suryandari (2020); Sari et al. (2020); and Gerged et al. (2023) as well as environmental management practices that also have a significant positive impact on environmental performance (Ali et al., 2022). So, the hypothesis in this research is that EMA influences the company's financial performance.

H_1: Environmental management accounting has a positive impact on firm financial performance

EL is defined by Fan & Chung (2023) as capabilities or actions that encourage internal and external stakeholders to achieve environmentally sustainable goals. The research results show that there is a positive and significant influence of leadership on performance (Hou et al., 2023). Top managers who pay attention to the environment tend to be better at balancing environmental protection with other finances to ensure the company's economic growth (Zhang & Ma, 2021). In this case, a diverse board is necessary to monitor managers' activities and provide them with sufficient space to pursue growth opportunities that are beneficial to the company (Dong et al., 2023). It can be a good argument that boards that are diverse not only structurally but also demographically are considered superior in terms of decision-making, oversight, consultation, and monitoring (Winkler et al., 2020).

EL plays a critical role in influencing various organizational facets, including quality management, supplier relationship management, product design and production, and the adoption of new technologies, all of which contribute to reducing environmental pollution, enhancing a company's green image, and expanding market share (Su et al., 2020). Leaders are pivotal in addressing environmental issues, with their influence shaping managers' and employees' behaviours regarding environmental management (Su et al., 2020). EMA can leverage EL to ensure compliance with environmental regulations and policies (Mariyamah & Handayani, 2020). Furthermore, leaders are recommended to undergo training to develop their capacity for implementing environmentally friendly actions, as such initiatives enhance both environmental and financial performance. Companies can also benefit significantly

from hiring leaders with strong environmental values and competencies (Su et al., 2020).

Gender diversity has been shown to enhance corporate image and lead to higher corporate performance (Olaoye & Adewumi, 2020). However, the relationship between the presence of women on boards and company performance is often overlooked (Chatterjee & Nag, 2023). This oversight may stem from perceptions that women lack self-confidence, avoid risks, and have mental instability (Maxfield et al., 2010). Despite these biases, prior research such as Lyons (2023); Cakti et al. (2022); Kirana & Prasetyo (2021); and Keller (2024) highlights the importance of incorporating gender diversity into leadership structures. As a result, this study employs the number of female commissioners as a measurement instrument to assess the potential impact of EL.

While it is reductive to assume all women inherently prioritize environmental issues, research shows that women in leadership positions tend to advocate more strongly for sustainable and eco-friendly policies than their male counterparts (Strumskyte et al., 2022; Balabantaray, 2023). This trend can be attributed to socio-cultural factors, such as their roles as caregivers and resource managers, which foster a deeper awareness of sustainability. Women leaders often emphasize collaboration, inclusivity, and long-term sustainability—key components of effective EL. Higher representation of women in leadership correlates with improved environmental and financial performance, reflecting the systemic benefits of diversity and inclusivity (Lyons, 2023; Mansour et al., 2024). These outcomes demonstrate that gender diversity within EL enhances the organization's ability to address environmental challenges effectively, thereby supporting EMA practices and driving overall firm performance.

Pro-environmental values and attitudes are considered antecedents of EL, Egri & Herman (2000); Zhang et al (2015) suggesting that leaders with such values can positively influence their organizations through environmentally conscious actions. Studies confirm that EL has a significant positive impact on both environmental and financial performance (Su et al., 2020). As one of the primary drivers of company value, EL serves as a moderating factor between EMA and firm financial performance. One key aspect of EL, the green organization, strongly aligns with EMA practices (Agustia et al., 2019). Therefore, integrating EL into organizational strategies, supported by gender diversity, can strengthen the relationship between EMA and firm financial performance, offering a competitive advantage in achieving sustainability goals.

H_2: Environmental leadership strengthens the relationship between environmental management accounting and firm financial performance

RESEARCH METHODS

Researchers used secondary data to collect data for this research. The population in this study consists of 45 companies, which are corporate companies included in the LQ45 index. LQ45 companies are a group of 45 shares on the Indonesian stock exchange that have the most liquid stock transactions, so this research can help investors consider making the right investment decisions in companies that care more about environmental issues (Meiryani et al., 2023). Because it is the most liquid, the company's growth is good, which is characterized by stable financial conditions. So, by taking LQ45 as the object of this research because it represents and is a benchmark for other companies listed on the IDX, in addition, companies listed on LQ45 have not been previously researched.

Furthermore, through these 45 companies, elimination will be carried out for those that do not meet the specified criteria. Through the elimination process, 52 observational data points were obtained. The companies that are included as samples in this research consist of companies operating in the industrial sector, including manufacturing, automotive, mining, and banking companies. The variables used in this research are Environmental Management Accounting (ESG), Firm Financial Performance (ROA), and Environmental Leadership (WWOB) as moderating variables, with leverage (LEV), operating profit (OP), and growth (GROWTH) as control variables.

The operational definition in this research is EL, which is defined as the ability to influence individuals and mobilize organizations to realize a vision of long-term ecological sustainability. In this study, the proxy variable is the proportion of female commissioners referring to research (Zhang & Ma, 2021). To establish the rationale for using the proportion of female commissioners as a proxy for EL, it is essential to examine the unique contributions women bring to leadership roles, particularly in environmental contexts. A higher proportion of women on corporate boards positively influences a company's environmental management, as women are generally more attuned to ethical considerations and more sensitive to environmental and social concerns (Mansour et al., 2024). Female board members play a pivotal role in advancing proactive environmental strategies, with organizations led by gender-diverse teams demonstrating greater effectiveness in implementing environmentally sustainable initiatives (Zhang & Ma, 2021). Therefore, this study uses the proportion of female commissioners as an EL measurement.

EMA is another variable used in this research. EMA is a management accounting method that complements the financial accounting approach. EMA provides information that supports managers in planning, decision-making, and controlling a company's environmental practices and impacts. The proxy for this variable is ESG, referring to research (Ali et al., 2022; Gerged et al., 2023). Another variable used in this research is company financial performance, which is a description of the company's financial condition that is analyzed using financial analysis. The company's high financial performance will make the market believe not only in the company's current overall performance but also in the company's prospects in the future. The proxy for this variable uses the company's ROA.

Table 1. Operational Definitions

Variables	Definition	Indicator	Previous Research
Environmental Leadership	Ability to influence individuals and mobilize organizations to realize a vision of long-term ecological sustainability	Proportion of female leaders	(Su et al., 2020); (Zhang & Ma, 2021)
Firm Financial Performance	an overview of the company's financial condition analyzed using financial analysis	ROA (Return on Assets)	(Olaoye & Adewumi, 2020); (Su et al., 2020)
Environment Management Accounting	Management accounting methods that complement financial accounting approaches	ESG (Environmental, Social, Governance)	(Ali et al., 2022); (Gerged et al., 2023)
Leverage	Percentage of liabilities in the company's capital structure	Debt on Equity Ratio (DER)	(Walls et al., 2012)
Operating Profit	Operating profit is the profit a company earns from its core business operations during a certain period, excluding interest and taxes. It is calculated by subtracting operating expenses, depreciation, and amortization from gross profit.	Operational profits	(Jayathilaka, 2020)
Growth	Expansion of a company in terms of increasing revenue, customer base, market share, or producing more goods.	Sales	(Goh et al., 2022)

ROA itself was chosen because it can provide an overview of a company's profitability relative to its total assets, which shows how efficiently the company uses its assets to generate income. The use of ROA is also supported by its inclusion in various specifications to control for the dependent variable's mean return, ensuring that the analysis takes into account the mechanical aspects of the relationship between corporate social responsibility (CSR) expenditures and future changes in accounting performance (Sloans, 1996). ROA itself is commonly used as an indicator to measure a company's financial performance (Yousaf & Dey, 2022). Leverage, operating profit, Growth (sales) is a control variable that functions so that the data obtained later is not distorted by the presence of other influencing variables. In other words, researchers can ensure that the relationships between observed variables are truly accurate.

Based on the hypothesis determined above, the data analysis method used in this research is moderated regression analysis (MRA). Before applying MRA, the data was first tested using descriptive statistical analysis and classical assumption tests such as multicollinearity tests and heteroscedasticity tests. The regression model used in the research can be seen in the equation 1.

$$Y_{it} = \alpha_{it} + b_1 X_{it} + b_2 Z_{it} + b_3 X_{it} * Z_{it} + b_4 Control_{it} \quad \text{.....1}$$

Description :
X : Environmental Management Accounting
Y : Firm Financial Performance
Z : Environmental Leadership
α : Constant
β1- β4 : Variable coefficients
Control : Leverage, Operating Profit, Growth

Table 2. Descriptive Statistic

Variable	Obs	Mean	Std. dev.	Min	Max
roa	52	7.59	8.93	0.13	45
esg	52	59.52	21.86	8.6	85.6
lev	52	3.85	4.17	0.34	16.08
op	52	9940894	1.60e+07	285	6.43e+07
growth	52	0.14	0.25	-0.31	1.03
wwob	52	1.25	0.48	1	3

Source: The Processed Secondary Data, 2024

Table 3. Multicollinearity Test

Variable	VIF	1/VIF
wwob	9.75	0.10
esg	7.54	0.13
lev	2.69	0.37
op	1.86	0.53
growth	1.47	0.68
Mean VIF	4.66	

Source: The Processed Secondary Data, 2024

Table 4. GLS Regression

Cross-sectional time-series FGLS regression			
Coefficients	: generalized least squares		
Panels	: homoskedastic		
Correlation	: no autocorrelation		
Estimated covariances	= 1	Number of obs	= 52
Estimated autocorrelations	= 0	Number of groups	= 10
Estimated coefficients	= 6	Obs per group:	
		min	= 2
		avg	= 5.2
		max	= 6
		Wald chi2(4)	= 173.06
Log likelihood	= -149.0366	Prob > chi2	= 0.0000

Source: The Processed Secondary Data, 2024

RESULTS AND DISCUSSIONS

The results of the first test in the research are shown in Table 2 for descriptive statistical tests on each variable. Based on the test results, in terms of standard deviation values, the operating profit variable has the highest value of 1.60e+07, and the growth variable has the lowest value of 0.25. Furthermore, the lowest minimum value is the growth value, which is -0.31, and the highest maximum value is the operating profit variable, 6.43e+07.

The results of the research testing classical assumptions, starting with the results of the multicollinearity test, are presented in Table 3. Based on the results of the multicollinearity test, the VIF value for each research variable was less than 10. This means that in the research, no multicollinearity problems were found in the regression model used (Purnomo et al., 2022)

The heteroscedasticity test results in Table 4 show that the model used in this research obtained homoscedastic panel results, which means this research is free from heteroscedasticity (Purnomo et al., 2022).

Testing of the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM) regression models used in this research is done through the Chow Test, Hausman Test, and Lagrange Test. The Chow test used to compare the CEM and FEM models shows a probability result of 0.0007, which means this value is smaller than 0.05, so the model used in this research is FEM. Next, the test was continued with the Hausman test to compare the REM and FEM models. Through this test, the result was 0.0294. This result also showed that it was smaller than 0.05, so the model chosen was FEM. So, through these tests, the regression model chosen in this research is the FEM model.

Table 5 shows the results of the regression test. Table 5 shows that the EMA variable obtains a sig value. 0.02 < 0.05; this result means that H_1 is accepted. Meanwhile, H_2 testing uses MRA as a regression analysis method. Based on Table 6, in the results of Model 1, the EL variable obtained a sig value. 0.00 < 0.05; this result means that the EL variable has an effect on the variable. Then, for the results of Model 2, the moderation of EL between EMA and firm financial performance variable obtains a sig value. 0.43 > 0.05; this result means that EL as a moderating variable is not proven. By comparing the two models, this means that the moderating variable is a moderating predictor, meaning that this variable only acts as an independent variable in the relationship in the existing model (Bryan & Haryadi, 2018). Based on the test results of Models 1 and 2, it can be concluded that H_2 is rejected. The test results shown in the t-Model 2 results of EL have a negative direction with a value of -0.31, which means it weakens the relationship between the EMA and the firm financial performance. From Table 6, it also can be seen that all the control variables used have an effect on firm financial performance.

Table 5. Regression

roa	Coefficient	Std. err.	t	P>t	[95% conf.	interval]
esg	0.09	0.04	2.54	0.02	0.02	0.16
lev	-0.90	0.19	-4.84	0.00	-1.28	-0.53
op	-7.79e-08	4.50e-08	-1.73	0.09	-1.68e-07	1.26e-08
growth	21.34	2.81	7.58	0.00	15.68	27.00
_cons	3.44	2.02	1.70	0.10	-0.63	7.51

Source: The Processed Secondary Data, 2024

Table 6. Moderate Regression Analysis

roa	t-Model 1	t-Model2	P>t-Model1	P>t-Model2
esg	2.28	-0.34	0.03	0.74
lev	-6.18	-4.99	0.00	0.00
op	-3.33	-3.41	0.00	0.00
growth	7.77	7.77	0.00	0.00
wwob	3.24	-0.31	0.00	0.76
esgwwob	-	0.79	-	0.43
_cons	-0.47	0.70	0.64	0.49

Source: The Processed Secondary Data, 2024

The Influence of Environmental Management Accounting on Firm Financial Performance

Based on the results of this research, it shows that EMA has a positive effect on the firm financial performance. These results are in line with research conducted by Gerged et al. (2023) where the results of the research show that implementing EMA has a positive influence on performance. The application of EMA in a company can have an impact on the efficient use of resources (Gerged et al., 2023), which can then reduce process costs, improve company quality through eco-friendly innovation, and lead to better financial performance. EMA uses standard accounting techniques by allocating environmental costs to products, processes, and services. This technique includes input/outflow analysis, cost flow accounting, activity-based costing, and determining life cycle costing. By adopting EMA, companies can achieve good corporate financial performance (Le et al., 2019). In addition, EMA can encourage innovation in companies. By identifying opportunities for environmentally friendly development or using environmentally friendly technology, this will benefit the company by increasing its competitiveness in the business environment. This is in line with research conducted by Ferreira et al. (2010) which shows that the use of EMA can be associated with process innovation, which can then improve company performance.

The application of EMA, which can influence a company's financial performance, can apply to various types of companies included in LQ45, which is the object of this research. The first type of industry-based company is a mining company, which can be categorized as a company that specializes in the production of precious metals and energy commodities. In the mining sector, EMA plays an important role in identifying environmental costs both in the production process and in preventing pollution. Then next, the automotive industry is a sector whose work involves the design, manufacturing, and sales of motor vehicles. In this case, EMA has a role in balancing the economic context and environmental sustainability of the company. EMA can support the development of environmental policies because automotive companies are often associated with significant uses of energy, water, and waste.

For industrial-based companies, implementing EMA is a relevant and appropriate thing to do. Implementing EMA in industrial companies can provide various significant benefits for companies, which will ultimately help improve company performance. Industrial companies with complexity in their business are often associated with environmental protection actions and their contribution to sustainable development in society (Al Mosaoy, 2023). This certainly makes industrial companies tend to pay more attention to environmental issues and integrate them into their accounting systems. The application of EMA can provide a series of appropriate pieces of information by prioritizing environmental and economic dimensions in a balanced and clear manner (Chichan et al., 2021). The integration of EMA into the company itself also supports the company in carrying out the obligations of industrial companies as stated in Law Number 24 of 2009 concerning environmental management obligations (KLHK, 2009). Through EMA, companies contribute attention to environmental issues, which will ultimately have a positive impact on company performance (Bibi & Narsa, 2022).

EMA is very relevant for use in various types of companies. Even though industrial companies are often mentioned in environmental change issues, banking companies such as those in LQ45 actually also contribute because they fund various industries as a whole (Dhar & Chowdhury, 2021). A banking company is a financial institution that provides various financial-related products and services, ranging from savings to investments. In the context of banking companies, EMA can support the development of policies and procedures related to the environment. EMA should be relevant to encouraging the implementation of green banking for banking companies. Green Banking, which is part of the EMA, functions to ensure that the implementation of banking activities does not cause environmental pollution (Gonzalez & Peña-Vinces, 2023). he implementation of green banking to support company performance in Indonesia is also supported by the issuance of policies related to green banking by Bank Indonesia. The regulations issued are Bank Indonesia Regulation No. 14/15/PBI/2012 concerning Asset Quality Assessment of Commercial Banks, where this regulation is intended for banks in Indonesia to also assess environmental suitability factors in assessing companies.

The Moderating Influence of Environmental Leadership between Environmental Management Accounting and Firm Financial Performance

Regarding the effect of EL as a moderating variable which is not proven, it shows that the implementation of environmental sustainability can have a negative impact on a firm financial performance, especially with leadership style. This can show that a company's ability to carry out environmental practices also influences how they can carry out EMA practices within the company. Larger organizations are more likely to invest resources in preparing and disclosing environmental accounting due to their greater financial capabilities, whereas smaller companies may struggle to cover the costs associated with environmental disclosure, which may limit their ability to practice EL (Tarus, 2020).

The influence of EL on a firm financial performance can be complex and depend on various factors. In several examples and situations, EL can be considered to have a negative impact on a firm financial performance. According to research conducted by Serafeim (2020), companies that implement EL sometimes carry out leadership that is not in line with the company's goals or vision. This misalignment can lead to a lack of commitment and inappropriate use of resources, which can make it difficult for companies to realize the benefits of EL practices. Furthermore, the practice of EL can has an impact on market misalignment, which will also have an impact on the firm financial performance. This misalignment can cause pressure on employee satisfaction, motivation, and overall well-being (Hoicka et al., 2023). These things will ultimately have an impact on the firm financial performance in terms of growth and revenue. Then, EL practices that are considered excessive can give rise to the perception of 'greenwashing' or an attempt to create a positive image without a substantial commitment to sustainability (de Freitas Netto et al., 2020). Research shows that this perceived greenwashing can cause a gap between symbolic and substantive corporate behaviour, which can cause consumers to perceive companies as insincere and difficult to trust (Nyilasy et al., 2014). This can give rise to 'mislead' among consumers, which can lead to a decrease in sales and customer loyalty (Santos et al., 2023). Therefore, greenwashing can have a significant and detrimental impact on a company's reputation and even its financial performance.

Implementing environmental practices in LQ45 companies may be a challenge in itself, especially during the transition period. This transition period can be difficult due to the potential for large investment costs, technological obstacles, and disruption to business processes (Dechezleprêtre & Sato, 2018). This can gradually reduce company performance, especially financial performance, which is closely related to company costs. NRBV theory emphasizes the strategic management of environmental resources to achieve sustainable competitive advantage. Although sustainable practices can produce long-term benefits, companies may face short-term difficulties in adapting their operations and overcoming resistance to change (Lubin & Esty, 2010). The relationship between environmental sustainability and financial performance is much more complex and can be influenced by various factors, for example, external economic conditions and market dynamics. Research conducted by Kaakeh & Gokmenoglu (2022) shows that when the COVID-19 pandemic occurred as an external factor, economic uncertainty occurred, which showed different dynamics in the relationship between financial performance and environmental performance. In the context of this external influence, the moderating effect of EL on EMA becomes closed because the company's financial performance becomes more vulnerable to these external factors. Then, when a company does not have a full commitment to EL and only implements EL practices as a form of compliance, EL's role here becomes blurred. This can happen because implementing EMA without a meaningful commitment to EL is less able to integrate environmental aspects into organizational strategy and ultimately has an impact on the company's financial performance (Huang et al., 2023). The results of the findings for H2 itself can be related to the use of NRBV theory. The lack of strategic value in EL can reduce the influence of EL on financial performance. If EL practices do not directly support business strategy or do not provide significant added value to managerial decisions, then their impact on financial performance is not strengthening at all. In this context, awareness of EMA in business strategy is very important.

CONCLUSIONS

Based on the research results that have been processed, it was found that EMA has a positive effect on the firm financial performance. The application of EMA in a company can have an impact on the efficient use of resources, which can then reduce process costs, improve company quality through eco-friendly innovation, and lead to better financial performance. Meanwhile, the moderating variable EL has a negative direction and does not have a significant effect on the firm financial performance, indicating that EL does not strengthen the relationship between EMA and financial performance. This research has limitations. First, the sample is limited to 45 companies listed in the LQ45 Index, representing highly liquid and financially stable firms. This may not adequately capture industries with high environmental risks, such as mining companies, where EMA and EL practices are critical and often under greater scrutiny. Second, the proxies used, such as the proportion of female commissioners for EL and the ESG score for EMA, may not fully encompass the complexity of these constructs, particularly in environmentally intensive industries. Finally, the use of secondary data limits insights into specific operational practices or managerial perspectives on environmental and leadership strategies. Future research could address these limitations by focusing on companies in industries closely tied to environmental issues, such as mining companies (oil and gas; coal). Such

research could provide deeper insights into the effectiveness of EMA and EL in these contexts and clarify the role of leadership in improving financial and environmental performance under heightened environmental challenges.

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