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Eco-Innovation on the Cost of Equity and Financial Performance: The Moderating Role of Ownership Structure

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ABSTRACT

This study aims to examine the effect of eco-innovation on the cost of equity and financial performance moderated by ownership structure. This study uses quantitative methods, and data is analyzed using panel data analysis with Eviews. Samples obtained were 237 companies from companies listed on the Indonesia Stock Exchange period 2017-2020. The results show eco-innovation does not affect the cost of equity because the issue of eco-innovation has not become a crucial issue in public; eco-innovation hurts financial performance because of significant expenses for implementation. Ownership structure does not affect eco-innovation, meaning shareholders cannot intervene in the implementation of eco-innovation. Ownership structure (managerial, family, institutional, foreign) harms the cost of equity while ownership structure (government) has a positive impact on the cost of equity. Ownership structure has a negative effect on financial performance because of conflict of interest between shareholders and management, ownership structure does not moderate the relationship between eco-innovation and cost of equity or financial performance because the ownership structure in this research tends not to change. The implications are addressed to investors, company, and future researchers. The implications also need government support in socializing the importance of eco-innovation so investors are more observant in investing. The ownership structure consists of managerial, institutional, family, government, and foreign ownership structures, which are used as moderating variables and independent variables. The five types of ownership structures are examined at once.

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1. INTRODUCTION

Based on Carbon Brief research data, Indonesia is among the top five countries in the world that are a source of air pollution due to the release rate of carbon dioxide after the US, China, Russia and Brazil (Forster et al., 2021). The Director of the World Resource Institute (WRI) Indonesia also said that Indonesia is the eighth most significant emitter of greenhouse gasses globally (Samadhi, 2021). This shows the urgency to deal with emissions and pollution problems in Indonesia, which led to a goal to reduce emissions by 29% with its expertise or 41% with international financial support by 2030 (Samadhi, 2021) although Indonesia's government has already issued The Law on Harmonization of Tax Regulations Number 7 in 2021 as a commitment to reduce air pollution that occurs in Indonesia (Mangoting et al., 2023). Meanwhile, companies are responsible for reducing carbon emissions (Marselita et al., 2021; Nengzih, 2022). The tremendous pressure from the government and the market regarding pollution, emissions and a sustainable economy makes the eco-innovation development program an important planning part of the company's management (Dangelico et al., 2013). According to (UNEP, 2022), eco-innovation is a new business approach that promotes sustainability throughout a product's life cycle while improving the company's performance and competitiveness. Eco-innovation consists of a big business innovation strategy that focuses on increasing the company's profits but still adopts an environmentally responsible approach to achieve a positive economy (Albu and Stelea, 2015) and is considered to be the key to a more competitive transition to realizing a sustainable economy (Kiefer et al., 2017). The relationship between eco-innovation and the manifestation of company performance is by reducing environmental risk. It can reduce costs, increase sales with different products and can increase the value and reputation of the company (Klewitz, et al., 2012). With the implementation of good eco-innovation, companies will be able to reduce environmental impact costs due to good waste management; it can also have an impact on suppressing production costs which can produce products at more competitive prices (Marselita et al., 2021).

In general, eco-innovation is divided into product innovation, process innovation, organizational innovation, and marketing innovation (de Oliveira Brasil et al., 2016), and eco-innovation (product, process, and organization) affects company performance (Cheng et al., 2014; de Oliveira Brasil et al., 2016). This shows that implementing eco-innovation improves company performance by showing a good image of the company but can still reduce negative environmental effects (Marselita et al., 2021). To create a successful eco-innovation program, each manager must mutually understand and support the relationship between different types of eco-innovation. (Cheng et al., 2014). Another crucial factor affecting the company's performance is its ownership structure (Aymen, 2013). The company's ownership structure shows the configuration of shares owned by investors (both individual and institutional) (Apriliani et al., 2016). Many academics have concentrated on the relationship between family management and business performance (Yopie and Chrislin, 2022; Bammens and Hünermund, 2020). In addition, research by Muslim and Setiawan (2021) who divided ownership structures into institutional ownership structures and foreign ownership structures, found that these two ownership structures affect the cost of equity. Consequently, studies on eco-innovation often include research on carbon emissions, a component of eco-innovation (Latupeirissa and Adhariani, 2020). Marselita, et al. (2021) discovered that carbon emission disclosures negatively impact the cost of equity. Additionally, Kim, et al. (2015) found that the effect of carbon intensity on the cost of equity capital was consistent between companies that voluntarily provided sustainability reports and those that did not disclose such information.

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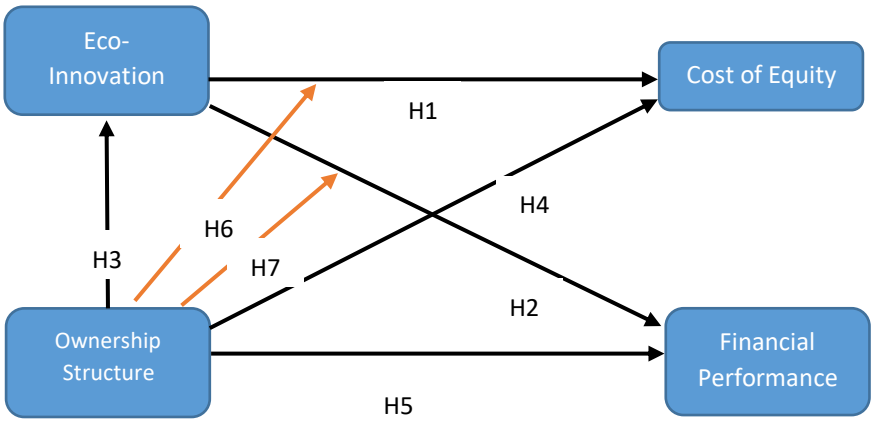
This research introduces a unique research model by incorporating the ownership structure as a moderating and independent variable. This comprehensive approach examines managerial, institutional, family, government, and foreign ownership structures simultaneously, which has not been previously explored in existing literature. Research on the relationship between eco-innovation and the cost of equity remains scarce. Most studies use ownership structure as an independent variable performance (Fauzan, et al., 2024; Nasution et al., 2024; Yopie and Chrislin, 2022; Bammens and Hünermund, 2020). This research employs ownership structure as a moderating variable to complement previous studies, following the direction of Muslim and Setiawan (2021).

This research fills a significant gap by providing empirical evidence on the relationship between eco-innovation, cost of equity, and financial performance. It explores the moderating role of ownership structure, revealing how different ownership types influence the financial outcomes of eco-innovative practices. The findings offer valuable insights for policymakers and business leaders, helping them make informed decisions to enhance sustainability and financial performance. Additionally, this study contributes to sustainability literature by linking eco-innovation with financial performance, highlighting the long-term financial benefits of sustainable practices.

2. METHODS

This study uses secondary data information from audited annual financial reports and company sustainability reports and other information from company websites that support research. Panel data regression analysis, with the help of Eviews software, is used to process research data. This research population are companies listed on the Indonesia Stock Exchange (IDX) in 2017-2020, while the sample was selected using a purposive sampling technique.

The research model used in this study can seen in **Figure 1**.



Source: Processed by Researchers, (2022)

Figure 1. Research Model

The cost of equity is measured using the CAPM model (Hamid et al., 2019; Joni et al., 2020; Muslim and Setiawan, 2021) with the formula:

$$COE_{it} = R_f + \beta \times (R_m - R_f)$$

Where:

R_f is the free risk level, which refers to Bank Indonesia,

β is a systematic risk or market risk,

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R_m is the return market which refers to the JCI price IDX.

The company's financial performance is usually measured by how much it can generate profit (Aymen, 2013; Gugong et al., 2014; Latupeirissa and Adhariani, 2020; Yopie and Chrislin, 2022). Company performance variables are measured by the formula:

$$\text{Return on Assets} = \text{EAT} / \text{Total Assets}$$

Where:
EAT is net profit after tax and total assets are total assets of the company.

Eco-innovation is measured using a dummy variable and scoring, which includes eco-product, process, organizational, and marketing innovation, with a value of 0 if the company does not carry out any type of eco-innovation, a value of 1 if the company carries out one of four types of eco-innovation, a score of 2 if the company carries out two of the four types of eco-innovation, a score of 3 if the company carries out three of the four types of eco-innovation, and a score of 4 if the company carries out all types of eco-innovation (Latupeirissa and Adhariani, 2020).

Ownership structure is an independent and moderating variable in research that can strengthen or weaken the eco-innovation relationship. This study examines managerial, family, institutional, government, and foreign ownership structures. The ownership structure is measured by the percentage of each share's ownership (Gugong et al., 2014; Hamid et al., 2019; Joni et al., 2020; Yopie and Chrislin, 2022). This study also uses control variables, namely firm size as measured by the natural logarithm of a company's total assets, firm cycle as measured by the ratio of retained earnings divided by total assets of the company, and leverage as measured by the ratio of total debt to total equity of the company.

3. RESULTS AND DISCUSSION

This study uses a population of all companies listed on the Indonesia Stock Exchange for the 2017–2020. **Table 1** shows the samples obtained using purposive sampling criteria, which included 237 companies or 948 research observation data.

Table 1. Research sample

Information	Amount
The company is listed on the Indonesia Stock Exchange for the 2017-2020 period	752
The company consistently publishes audited financial statements for the period ended 31 December 2017-2020	(29)
Profit after tax of the company is not negative during 2017-2020	(312)
The company has complete data regarding eco-innovation, ownership structure and other data needed to calculate the cost of equity and assess the company's financial performance	(174)
Total research sample	237
Total research observation data	948

Source: Processed by Researchers, (2022)

3.1. Descriptive Analysis

Based on **Table 2**, the average eco-innovation score of companies listed on the Indonesia Stock Exchange for the 2017–2020 period was 3.24 on a scale of 0–4, which means that most companies have carried out 3 of the 4 types of eco-innovation required. The average eco-

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innovation score continues to increase every year, which shows that there are efforts to reduce the impact of damage to the environment by companies listed on the Indonesia Stock Exchange. The managerial ownership structure has an average proportion of 0.0411, or 4.11%, which means that managerial ownership is small. The average proportion of family ownership structure is 0.0202 or 2.02%, which means that the proportion of family ownership on the Indonesia Stock Exchange is still very small. The average proportion of institutional ownership is 0.4730, or 47.30%, meaning that institutional ownership is quite large and represents almost a part of the company's total shares. The average percentage of government ownership is 0.0363 percent, or 3.63%. Government shares are usually only found in state-owned companies, and the number of companies is still small. The average percentage of foreign ownership is 0.1734, or 17.34%, meaning that foreign ownership is quite large. The average cost of equity is 0.0207, or 2.07%, which means that the rate of return obtained by investors is still quite high; only in 2020 the rate of return obtained by investors is still below expectations.

Table 2. Statistics descriptive

Variable	N	Mean	Std. Deviation	Minimum	Maximum
ECO	948	3,2437	1,10519	,00	4,00
MAN	948	,0411	,13100	,00	,96
FAM	948	,0202	,06387	,00	,49
INS	948	,4730	,31130	,00	,98
SOE	948	,0363	,14839	,00	,90
FOR	948	,1734	,27829	,00	,99
COE	948	,0207	,09782	-,41	,58
KIN	948	,0604	,06468	,00	,47
SIZE	948	29,5488	1,74052	25,47	35,08
CYCLE	948	,2713	,20950	-,43	,87
LEV	948	,5135	,21568	,00	,94

Source: Processed by Researchers, (2022)

3.2. Hyopothesis Test

Based on **Table 3**, eco-innovation has a negative sign coefficient on the cost of equity with a probability value of 0.394; with a probability value greater than 0.05, the first hypothesis is rejected. It can be concluded that eco-innovation does not affect the cost of equity. The results of this study support Latupeirissa and Adhariani (2020) and Li, et al. (2014) which state that reducing carbon emissions does not affect the cost of equity, and other studies conducted by Kim, et al. (2015) who found that the impact of disclosing carbon intensity on the cost of equity did not differ between companies that voluntarily disclosed and companies that did not disclose sustainability reports. This is possible because investors in Indonesia do not really consider the issue of eco-innovation when making investment decisions (Latupeirissa and Adhariani, 2020). Even though currently the Carbon Economic Value target is being intensively proclaimed in Indonesia, socialization, and news information regarding the importance of implementing eco-innovation are still lacking, so this is not a crucial issue for Indonesian investors to invest in companies listed on the Indonesia Stock Exchange. In addition, Li, et al. (2014) also revealed that the concept of eco-innovation is new, so it is possible that market reactions (from investors and the public) on the importance of implementing eco-innovation are still relatively slow.

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As for the fourth hypothesis, managerial, family, institutional, and foreign ownership has a negative coefficient with a probability value of less than 0.05, so it can be said that managerial, family, institutional, and foreign ownership has a negative effect on the cost of equity, while government ownership has a positive coefficient with a probability value of 0.000, so it can be said that government ownership has a positive effect on the cost of equity. These results support Dakhlaoui and Gana (2020) research, which states that ownership structure (institutional, managerial, foreign, and family) has a negative effect on the cost of equity. Likewise, Arifah and Liana research (2018) which examined the structure of family ownership and institutional ownership found that both had a significant negative impact on the cost of equity. Furthermore, Afkhami Rad, et al. (2013) discovered that ownership structure had a negative effect on the cost of equity during the global economic crisis. This means that if the ownership structure (institutional, managerial, foreign, and family) increases, the cost of equity will decrease. The cost of equity used tends to be more efficient because the ownership of professional people and insider management of the company can improve the company's performance. Meanwhile, government ownership has a positive effect on the cost of equity, supporting the research of Shleifer and Vishny (2012) where the research reveals that state ownership in a company can drive up the high cost of equity because it tends to increase political costs and corruption.

Tabel 3. Test results for models 1 and 4

Variable	Model 1 (H_1 and H_4)		Model 4 (H_6)	
	Coeff.	p-value	Coeff.	Coeff.
Constant	*2,613*	*0,000*	*2,623*	*0,000*
Eco-Innovation	*-0,001*	*0,394*	*-0,001*	*0,398*
Manajerial Own.	*-0,237*	*0,006*	*-0,236*	*0,006*
Family Own.	*-0,196*	*0,027*	*-0,192*	*0,029*
Institutional Own.	*-0,139*	*0,002*	*-0,138*	*0,002*
Government Own.	*1,977*	*0,000*	*2,001*	*0,000*
Foreign Own.	*-0,188*	*0,000*	*-0,187*	*0,000*
ECO*Ownership			*-433,814*	*0,395*
Size	*-0,087*	*0,000*	*-0,087*	*0,000*
Cycle	*-0,113*	*0,015*	*-0,113*	*0,015*
Leverage	*0,088*	*0,034*	*0,090*	*0,032*
R Square	0,642		0,643	
Adjusted R Square	0,518		0,518	
F (sig.)	5,154 (0,000)		5,131 (0,000)	

Source: Processed by Researchers, (2022)

In **Table 4** - Model 2, eco-innovation has a negative sign coefficient on financial performance with a probability number of 0.000, thus it was decided to refuse the second hypothesis. This shows that eco-innovation has a negative effect on financial performance. The results of this study confirm the research by Sari and Kusumastuti (2018) which found that financial performance (ROA) significantly and negatively affects eco-innovation. It is possible that the decision to implement eco-innovation is not always made by the company, even though the company achieves high profitability. In a world where things are changing faster, non-financial performance evaluation becomes important in selecting the right project (Ridwan, et al., 2023).

Regarding the fifth hypothesis, managerial, family, institutional, government, and foreign ownership structures have a negative coefficient with a probability value of less than 0.05, so it can be said that the overall ownership structure has a negative influence on financial performance. The results of this study do not support the research by Peter and Ma (2024);

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Gugong, et al. (2014); Yopie and Chrislin (2022); Haija and Alrabba (2017) however, the findings of this study support Maulana, et al. (2021) who examined institutional, foreign, and managerial ownership; Ristati, et al. (2021) who examined managerial and institutional ownership; Angela, et al. (2019) who examined government ownership. The three studies stated that ownership structure (managerial, family, institutional, government, and foreign) had a significant negative effect on financial performance. This is because there is a conflict of interest between the company's management and its shareholders, especially with the majority shareholder. The greater the share ownership, the lower the performance of company management, because of the greater ability of shareholders to influence company operations and management (Maulana et al., 2021).

Table 4. Test results for models 2 and 5

Variable	Model 2 (H_2 and H_5)		Model 5 (H_7)	
	Coeff.	p-value	Coeff.	p-value
Constant	*0,077*	*0,027*	*0,082*	*0,031*
Eco-Innovation	*-0,009*	*0,000*	*-0,009*	*0,000*
Manajerial Own.	*-0,088*	*0,000*	*-0,088*	*0,000*
Family Own.	*-0,119*	*0,000*	*-0,120*	*0,000*
Institutional Own.	*-0,024*	*0,000*	*-0,026*	*0,000*
Government Own.	*-0,173*	*0,030*	*-0,172*	*0,065*
Foreign Own.	*-0,029*	*0,000*	*-0,032*	*0,000*
ECO*Ownership			*1299,3*	*0,051*
Size	*0,001*	*0,344*	*0,000*	*0,387*
Cycle	*0,101*	*0,000*	*0,104*	*0,000*
Leverage	*-0,010*	*0,159*	*-0,011*	*0,144*
R Square	0,952		0,951	
Adjusted R Square	0,936		0,934	
F (sig.)	57,356 (0,000)		55,804 (0,000)	

Source: Processed by Researchers, (2022)

In **Table 5**, managerial, family, institutional, government, and foreign ownership structures have a probability value greater than 0.05, so the authors conclude that ownership structure does not affect eco-innovation. This finding does not support the results of previous studies. This research is in accordance with the research of Eka Chandra Pramuditya and Budiasih (2020) which states that ownership structure (institutional and foreign) does not affect disclosure of eco-innovation in financial reports, as well as Herdianto (2018) research, which states that managerial, institutional, and government ownership do not affect disclosure of corporate carbon emissions in Indonesia. Different ownership structures in companies have different preferences in determining a company's investment decisions. According to Pramuditya and Budiasih (2020) institutional investors still feel that disclosure of carbon emissions is less able to increase company value than other factors such as company liquidity and profitability, so that an increase in the percentage of institutional ownership does not affect the implementation of eco-innovation.

The majority ownership structure cannot intervene in the company's management in making decisions related to the company's work programs and plans. The company's management adheres to the company's programs and goals that have been professionally determined, so that

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the share ownership structure cannot influence the implementation of eco-innovation within the company.

Table 5. Model 3 test results

Variable	Model 3 (H_3)	
	Coeff.	p-value
Constant	*2,235*	*0,000*
Manajerial Own.	*-0,089*	*0,188*
Family Own.	*-0,078*	*0,219*
Institutional Own.	*-0,036*	*0,112*
Government Own.	*0,055*	*0,465*
Foreign Own.	*-0,037*	*0,111*
Size	*0,035*	*0,015*
Cycle	*0,048*	*0,159*
Leverage	*0,000*	*0,500*
R Square	0,999	
Adjusted R Square	0,999	
F (sig.)	9734,72 (0,000)	

Source: Processed by Researchers, (2022)

In **Table 3** and Model 4, eco-innovation, which is moderated by the ownership structure, has a negative sign coefficient and the probability value is 0.395, so it can be said that the ownership structure does not moderate the eco-innovation relationship with the cost of equity. In **Table 4** and model 5, eco-innovation moderated by ownership structure has a positive coefficient with a probability value of 0.051. Although the regression coefficient is positive, the probability value is greater than 0.05, so it can be said that the ownership structure does not moderate the relationship between eco-innovation and a company's financial performance. So the authors conclude that the ownership structure does not moderate the relationship between eco-innovation and the cost of equity or financial performance. The results of this study support the research of Pramuditya and Budiasih (2020) and Herdianto (2018) which reveal that ownership structure does not affect eco-innovation, as well as research by Dakhlaoui and Gana (2020); Maulana, et al. (2021); and Ristati, et al. (2021) which show that ownership structure has a negative effect on the cost of equity and financial performance. This could be because the shareholder structure, particularly the majority shareholder structure, did not change significantly during the study period, namely from 2017 to 2020, so changes in ownership structure did not strengthen the eco-innovation relationship with the cost of equity or financial performance. Policies related to the company's work plan have been prepared in a professional manner by the company's management so that shareholders cannot intervene in the company's management decisions in their work plan.

4. CONCLUSION

Based on the findings and discussion, it can be concluded that eco-innovation does not impact the cost of equity but has a negative effect on financial performance. This is due to eco-innovation not being a major concern for the public and investors, thus not influencing their investment return expectations. The high investment costs in the development phase of eco-innovation reduce company profitability. Ownership structure does not affect eco-innovation, indicating that the proportion of managerial, family, institutional, government, and foreign

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ownership does not influence management's decision to implement eco-innovation. Shareholders cannot interfere with management's decisions on eco-innovation. Ownership structure negatively affects the cost of equity, meaning that increased managerial, family, institutional, and foreign ownership lowers the cost of equity, while government ownership increases it. This aligns with Interest Alignment Theory, where management acts to meet stakeholder expectations, leading to better corporate governance and reduced cost of equity. Increased non-governmental ownership demands better governance and oversight, thus lowering the cost of equity. Conversely, government ownership raises the cost of equity due to political costs and corruption. Ownership structure also negatively affects financial performance, as increased share ownership creates conflicts of interest between management and shareholders, particularly with majority shareholders, leading to poorer management performance. The ownership structure does not moderate the relationship between eco-innovation and the cost of equity or financial performance, suggesting that the ownership structure does not significantly change during the study period, thus not influencing company policies and management.

To address the identified issues and improve financial performance and the cost of equity, regulators can encourage government policies that provide subsidies, tax breaks, or grants for companies investing in eco-innovation. This can offset high initial costs and improve profitability. Improve corporate governance practices by ensuring independent oversight and transparency, particularly in companies with significant government ownership. This can reduce political costs and corruption, thereby lowering the cost of equity. Encourage alignment between ownership structures and eco-innovation goals. For instance, institutional investors with a focus on sustainability can be incentivized to take larger stakes in companies.

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