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The Role of Carbon Pricing Policy on ESG Performance in Asia Countries

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Abstract: This study analyses the relationship between countries' regulatory context and Environment, Social, and Governance (ESG Performance). Little attention has been paid to how carbon pricing policy influences companies' ESG performance. This study uses data from 2,600 companies from 11 countries in Asia, both with and without carbon policies, to test whether there is a difference in ESG scores between the two groups of countries. This study found that the ESG score in countries with carbon pricing policies is lower than the ESG in countries without carbon pricing policies. This difference proved to be significant. In the context of this research, Environment Modernization Theory has not been proven to be able to encourage corporate reporting activities and improve corporate environmental, social, and government (ESG) performance. The implications of this study highlight the need for a critical reassessment of carbon pricing policies, further research into their effectiveness, and a focus on regional differences to enhance ESG performance in Asia. This is the first research considering carbon pricing policy regulation in the study of ESG, especially in Asia.

Keywords: carbon pricing, ESG performance, Ecological Modernization Theory, ESG scores.

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INTRODUCTION

Carbon pricing is a policy that many countries have implemented in the last decade (Best et al., 2020; Steinebach et al., 2021; Raghoo & Shah, 2022). Started by Finland and Poland in 1990, this policy has been adopted by many countries to reduce greenhouse gas emissions (Koskimaa et al., 2021; Lamb et al., 2022; Juszczyk et al., 2022). A recent High-Level Commission on Carbon Pricing and Competitiveness report found that 'Carbon pricing is an effective, flexible and low-cost approach to reducing greenhouse gases (GHG)' (CPLC, 2022). The widespread—and growing—use of carbon pricing reflects confidence in its effectiveness.

Carbon pricing is an instrument that captures the external costs of greenhouse gas (GHG) emissions—the costs of emissions paid by the public, such as crop damage, health care costs from heat waves and droughts, and property losses from floods and droughts, sea level rise— and ties it to the source via a price, usually in the form of a price of carbon dioxide (CO_2) produced. Carbon pricing helps shift the brunt of the damage from GHG emissions back to those responsible and can avoid it; instead of dictating who should reduce emissions, where,

and how, carbon prices provide economic signals to emitters and allow them to decide to change their activities and reduce or continue to emit and pay for their emissions.

Several studies have tried to prove the impact of carbon pricing policies on reducing emissions in a country. Some studies prove that carbon pricing policies reduce GHG emissions (Arimura et al., 2021; Dechezleprêtre et al., 2022). However, several other researchers have proven the opposite results that carbon pricing policies do not have the expected emission reduction impact (Ćetković et al., 2021; Pretis, 2022; Salleh et al., 2022; Yauri & Widianingsih, 2023). Previous research was generally conducted in European countries but still minimal in Asian countries.

Carbon pricing policies in a country are generally aimed at businesspeople or companies in that country (Finon, 2019; Bento & Gianfrate, 2020; Nippa et al., 2021). So, the existence of this policy will undoubtedly affect the company's operational policies related to the environment, society, and governance (ESG). Several studies have discussed the impact of environmental policies on a country's corporate financial disclosure and performance. As Siddique et al. (2024) suggest, that environmental regulations can provide long-term increases in corporate earnings by encouraging them to concentrate on lowering production costs and increasing customer satisfaction and sales. Thus, corporate ecological regulations can be a "win-win" solution for companies and society. Strict environmental regulations generate more competition and motivate efficiency and innovation (Yauri & Widianingsih, 2023; Yusof et al., 2020). Companies can increase their profitability through environmental regulation and commitment to environmental issues (Huang et al., 2022; Lunawat & Lunawat, 2022).

In addition, Ćetković et al., (2021) argues that environmental regulations can encourage increased productivity. Existing literature suggests that pressure exerted through government regulation is a significant driver of corporate environmental action (Le & Azhgaliyeva, 2023; Makan & Kabra, 2021; Aragòn-Correa et al., 2020).

Many studies have been conducted on company ESG performance, discussing the relationship between ESG performance and company financial performance. Several studies have been recorded, such as in Malaysia (Mohammad & Wasiuzzaman, 2021). USA (Atayah et al., 2024); Korea (Lee et al., 2022; Yang & Han, 2023); Europe (Almaqtari et al., 2023; Gavrilakis & Floros, 2023); Australia (Galbreath, 2013); compare several countries (Almaqtari et al., 2023; Powaski et al., 2021; Rajesh et al., 2022). This study proves varied and inconsistent results.

There is an overlooked research gap that may be why the results of these studies are inconsistent. The different research locations between countries are one of the things that can cause inconsistency. More specifically, a country's policies, such as carbon pricing, can influence the company's ESG policy. However, little evidence links a country's carbon pricing policy with the company's ESG rating.

A country's carbon policy will force companies to implement energy efficiency to avoid paying high carbon taxes (Hájek et al., 2019; Dissanayake et al., 2020; Kiss & Popovics, 2021). Energy efficiency reduces emissions, which increases a company's ESG performance. Therefore, the carbon pricing policy implemented in a country will impact companies' ESG performance.

Sustainability accounting, particularly in the areas of carbon emissions recording and ESG reporting, is essential for companies to comply with carbon pricing policies (Dechow, 2023; Juusola & Srouji, 2023; Luo & Tang, 2023). Sustainability accounting ensures that companies are held accountable for their carbon emissions. By systematically recording and reporting emissions, companies can demonstrate compliance with carbon pricing regulations, which often require transparency in environmental impact (Evana et al., 2021). Carbon pricing policies often come with specific reporting requirements. Sustainability accounting helps companies meet these requirements by providing the necessary data for compliance. This is crucial for avoiding penalties and maintaining a good standing with regulators.

To address the research gap related to carbon pricing, this research raises the issue of the relationship between carbon pricing policy and corporate ESG performance. This research will identify and compare several countries, especially in the Asian region. The carbon pricing policy in a country can be predicted to influence the policies and practices that apply to companies in that country, which will affect the company's ESG performance in that country.

This research will discuss the ESG performance of companies in countries in the Asian region with carbon pricing policies and those without. The data used comes from ESG Book and carbon pricing dashboard.worldbank.org. ESG Book is a SaaS data management and disclosure platform providing raw ESG data, company-level and portfolio-level scores, ratings, and analytics. Meanwhile, data on countries implementing carbon pricing through the carbon tax mechanism and emissions trading systems (ETS) are obtained from the Carbon Pricing Dashboard.

This research contributes by providing evidence regarding the impact of carbon pricing policies on company ESG performance by comparing ESG performance between countries in the Asian region that apply carbon pricing and those that do not apply carbon pricing.

METHODS

This study aims to analyze differences in company ESG performance in countries in the Asian region that implement carbon pricing policies and those that do not. Data regarding company ESG performance is obtained from the website https://app.esgbook.com, which provides company ESG data worldwide. ESG Book is a global leader in data and sustainability technologies. There are approximately 100,647 companies around the world whose ESG score data is recorded in the ESGBook. This research is limited to companies originating from countries in the Asian region. As of July 2022, 2,651 companies originate from ASIA and have ESG score data. Out of 2,651, 51 companies do not have complete data. So, the companies that have complete data are 2,600 (Table 1).

Table 1 Country of origin of companies with ESG data

No	Country	Company	Percentage
1	China	834	32.1%
2	Hongkong	176	6.8%
3	India	171	6.6%
4	Indonesia	49	1.9%
5	Jepang	568	21.8%
6	Korea	144	5.5%
7	Malaysia	261	10.0%
8	Philipine	27	1.0%
9	Singapore	88	3.4%
10	Taiwan	154	5.9%
11	Thailand	128	4.9%
	Total	2,600	100.0%

Source: Data processed from https://app.esgbook.com

Meanwhile, data on countries that have and have not implemented carbon pricing policies are obtained from the World Bank website. Until now, there are 68 carbon pricing policies that 46 countries in the world have implemented. Some countries apply more than one carbon pricing policy. Of the 68 policies, there are emissions trading systems (ETS) and carbon trading policies. This research does not distinguish between the types of carbon pricing policies a country adopts, either ETS or carbon trading.

Of the 11 countries in the Asian Region, five countries have implemented carbon pricing policies, and six other countries have not implemented carbon pricing policies (Table 2).

Table 2 Carbon Pricing Policy in Asian Countries

No	Country	Carbon Pricing
1	China	1
2	Hongkong	0
3	India	0
4	Indonesia	0
5	Jepang	1
6	Korea	1
7	Malaysia	0
8	Philippine	0
9	Singapore	1
10	Taiwan	1
11	Thailand	0

(Source: Data Processed, 2023)

Table 3 Number of samples in Carbon Policy Country and Non-Carbon Policy

No	Carbon Pricing	Sample	Percentage
1	China	834	46.6%
2	Jepang	568	31.8%
3	Korea	144	8.1%
4	Singapore	88	4.9%
5	Taiwan	154	8.6%
	Total	1,788	100.0%
No	**Non-Carbon Pricing**	**Sample**	**Percentage**
1	Hongkong	176	21.7%
2	India	171	21.1%
3	Indonesia	49	6.0%
4	Malaysia	261	32.1%
5	Philipine	27	3.3%
6	Thailand	128	15.8%
	Total	812	100.0%

(Source: Data Processed, 2023)

Table 3 shows the number of sample companies in each country in the Carbon Policy Country and non-Carbon Policy Country groups. To test whether there is a difference between the ESG performance of companies in countries with carbon pricing policies and those that do not, this study uses an independent t-test. The Independent T-test is a comparative or different test to determine whether there is a significant difference in the mean or average between 2 independent groups with interval/ratio data scales. This test can be carried out because the data must come from different groups, the data type is numeric, the data interval or ratio scale, and the data is usually distributed. The variance between the two sample groups must be the same.

RESULTS AND DISCUSSION

The following table evaluates and compares ESG scores from two groups of countries: countries that apply carbon pricing and countries that do not implement carbon pricing. Table 4 describes the ESG scores of sample companies in countries with carbon pricing policies. Meanwhile, Table 5 shows ESG scores in countries without carbon pricing policies.

Table 4 ESG scores of companies in Carbon Pricing countries

No	Carbon Pricing	ESG Score	ESG - Env	ESG - Gov	ESG - Social
1	China	48.65	49.60	46.71	49.94
2	Jepang	53.36	59.63	47.45	55.32
3	Korea	50.91	57.54	44.83	53.43
4	Singapore	53.27	54.31	50.78	56.24
5	Taiwan	57.35	65.04	49.38	60.25
	Mean	52.71	57.22*	47.83	55.04

(Source: Data Processed, 2023)

China

The average ESG score for companies in China is 48.65, with the highest score for ESG Social, which is 49.94. The lowest ESG score in China is the Governance ESG score, 46.71.

Japan

The average ESG score for Japanese companies is 53.36. The ESG environment has the highest score, 59.63, while the lowest score is for ESG governance, 47.45.

Korea

The average ESG score at Korean companies is 50.91. Like Japan, Korean companies also have the highest environmental ESG score of 57.54. Meanwhile, the governance ESG score is only 44.83.

Singapore

The average ESG score of companies in Singapore. For companies in Singapore, the Social ESG Score has the highest score of 56.24 compared to environmental and governance ESG.

Taiwan

Of the six countries that apply carbon pricing, companies in Korea have the highest ESG score (57.35). Environmental ESG has the highest score of 65.04, followed by Social ESG at 60.25 and Governance ESG at 49.34.

In countries with carbon pricing, companies in Korea have the highest ESG environmental and social scores. At the same time, ESG governance is the highest in Singapore. In addition, the Environmental ESG score is the highest in carbon-pricing countries compared to governance ESG and social ESG.

Table 5 ESG scores of companies in Non-Carbon Pricing countries

No	Non-Carbon Pricing	ESG Score	ESG - Env	ESG - Gov	ESG - Social
1	Hongkong	53.11	61.06	45.00	57.57
2	India	57.35	61.92*	53.69	58.72
3	Indonesia	57.72*	59.60	55.13*	60.39*
4	Malaysia	55.40	56.78	51.38	59.93
5	Philipine	52.92	59.90	44.37	57.85
6	Thailand	54.81	57.00	50.00	59.76
	Average	55.22	59.38*	49.93	59.04

(Source: Data Processed, 2023)

Hong Kong

The average ESG score for companies in Hong Kong is 53.11. The company has the highest environmental ESG score compared to governance and social ESG scores.

India

Companies in India have an average ESG score higher than Hong Kong, which is 57.35. The environmental ESG score has the highest score (61.92) compared to social ESG and governance ESG.

Indonesia

The average ESG score of companies in Indonesia is 57.72, the highest of all non-carbon pricing countries. The highest score is ESG Social, 60.39, while the lowest is ESG Governance, 55.13.

Malaysia

Companies in Malaysia have an average ESG score of 55.4. The social ESG score is the highest compared to environmental ESG and governance ESG scores for companies in that country.

Philippine

Companies in the Philippines have the lowest ESG score of 52.92 compared to other non-carbon pricing countries. Like companies in India, companies in the Philippines have the highest environmental ESG scores.

Thailand

The average ESG score of Thai companies is 54.81. In Thailand, companies' social ESG scores are higher (59.76) than their environmental and governance ESG scores.

The average ESG score in non-carbon pricing countries is 55.22. The highest score was in environmental ESG, 59.38, followed by social ESG, 49.93, and governance ESG, 59.04. Subsequent analysis shows the ESG scores by sector in the two groups of countries. Sustainalytics data divides companies into twenty industries.

In the Carbon Policy Country group, the highest ESG score was in the Energy sector, namely 55.9, followed by the communications sector (55.63) and producer manufacturing (54.47). Meanwhile, in the non-Carbon Policy group, the Electronic Technology sector had the highest ESG score (60.71), followed by the Consumer Non-Durables sector (60.59) and Consumer Durables (59.19) (Table 6). In the two groups of countries, the financial industry has the second smallest ESG score after the Miscellaneous sector.

Table 6 ESG Score by Company Sector

No	Sectors	ESG Score	
		Carbon Policy	Non-Carbon Policy
1	Commercial Services	48.26	54.75
2	Communications	55.63	54.50
3	Consumer Durables	54.42	59.19
4	Consumer Non- Durables	54.37	60.59
5	Consumer Services	51.16	53.17
6	Distribution Services	51.29	54.26
7	Electronic Technology	54.02	60.71*
8	Energy Minerals	55.99*	57.26
9	Finance	47.02	52.91
10	Health Services	47.81	54.18
11	Health Technology	49.20	53.78
12	Industrial Services	51.90	54.74
13	Miscellaneous	42.25	46.50
14	Non-Energy Minerals	53.02	56.54
15	Process Industries	52.69	56.17
16	Producer Manufacturing	54.47	57.18
17	Retail Trade	50.00	54.62
18	Technology Services	47.59	54.21
19	Transportation	51.13	55.13
20	Utilities	50.60	55.67

(Source: Data Processed, 2023)

Furthermore, Table 7 compares ESG scores based on the two groups of countries. Table 7 shows that the ESG score in countries with carbon pricing is lower (52.71) compared to non-carbon pricing countries (55.22). Environmental, governance, and social scores also follow this. All ESG scores in carbon-pricing countries are lower than in non-carbon-pricing countries. This indicates that the ESG performance of companies in carbon-pricing countries is not better than companies in non-carbon-pricing countries.

Table 7 Differences ESG Scores in Carbon Pricing and Non-Carbon Pricing Countries

Country	Carbon Pricing	Non-Carbon Pricing
ESG Score	52.71	55.22
ESG - Env	57.22	59.38
ESG - Gov	47.83	49.93
ESG - Social	55.04	59.04

(Source: Data Processed, 2023)

Furthermore, Table 8 compares the differences between countries with carbon and non-carbon pricing. The average ESG score in non-carbon-pricing countries is higher than in carbon-pricing countries. This indicates that companies in countries that do not have a carbon pricing policy tend to disclose more about their sustainability performance. The same is also seen in each disclosed ESG component. In both groups of ESG-environment countries, the ESG-Score was the highest score. This indicates that, both regulated and unregulated, all companies agree that the environment is an essential thing that must be considered in sustainability performance. Meanwhile, ESG-Governance is the ESG with the lowest score in the two groups of countries. The mineral energy sector has the highest ESG score in countries with carbon pricing. The electronic technology sector has the highest ESG score in non-carbon pricing countries. What is interesting is that the financial sector is the sector with the lowest ESG score in both groups of countries. As described in Table 8, there are some differences between the two groups of countries. To prove whether this difference is statistically significant, an independent t-test is performed. The results of the T-test are shown in Table 9 and Table 10.

Table 8 ESG score pada Carbon Pricing Country dan Non-Carbon Pricing: A Comparison

	Carbon Pricing	Non-Carbon Pricing
Sample	1788	812
Mean ESG Score	52.71	55.22
Mean ESG - Env	57.22	59.38
Mean ESG - Gov	47.83	49.93
Mean ESG - Social	55.04	59.04
Category with highest ESG-Score	ESG-Environmental	ESG-Environmental
Category with lowest ESG-Score	ESG-Governance	ESG-Governance
The industry has the highest ESG score.	Energy Minerals	Electronic Technology
The industry with the lowest ESG-Score	Finance	Finance

(Source: Data Processed, 2023)

Table 9 shows that the average ESG score in the group of non-carbon-pricing countries is higher than that in the group of carbon-pricing countries. The independent t-test analysis results show a significant difference at the 1 percent level between the ESG scores of companies in carbon-pricing countries and non-carbon-pricing countries. The independent t-test shows that companies in countries without carbon-pricing policies have higher ESG scores than countries with carbon-pricing policies (Table 10). There may be many reasons for this

finding. First, companies in non-carbon pricing countries feel the need to take place internationally because their own countries do not yet have a policy related to carbon pricing. In contrast, this issue has become an international issue. They try to legitimize themselves in the global world. This finding aligns with research (Siddique et al., 2024) which found that corporate sustainability practices in developed countries are lower than those in developing countries. Some countries that apply carbon pricing in this context include China and Japan, which are considered advanced based on World Bank data. Second, showing good ESG performance for companies in non-carbon pricing countries helps demonstrate performance to stakeholders and helps to get better access to capital. This finding aligns with research (Farisyi et al., 2022), which found that sustainability disclosure in developing countries is better than in developed countries. Countries not implementing carbon-pricing policies in this study are all developing countries. Besides that, the lower ESG score in countries with carbon pricing policies aligns with research findings (Almaqtari et al., 2023) in France that the existence of a carbon pricing policy can only reduce 1 percent of emissions from companies. This indicates companies do not appreciate the carbon pricing policy by increasing their ESG performance.

Table 9 Differences in Means in the Two Groups of Countries

	Carbon Policy	N	Mean	Std. Deviation	Std. Error Mean
ESG Score	Carbon Pricing	1788	51.3037	9.03388	.21364
	non-Carbon Pricing	812	55.2736	8.44976	.29653

(Source: Data Processed, 2023)

Table 10 Result of independent sample t-test

		F	Sig.	t	Sig (2-tailed)	Mean Difference	Std. Error Difference
ESG Score	Equal variance assumed	7.282	.007	–10.593	.000	–3.96985	.37475
	Equal variance not assumed			–10.682	.000	–3.96985	.36548

(Source: Data Processed, 2023)

The study found that countries with carbon pricing policies had lower ESG scores compared to those without. This finding challenges the assumption that regulatory frameworks inherently lead to better corporate sustainability practices (Aureli et al., 2020). It suggests that the mere existence of carbon pricing does not guarantee improved ESG performance, indicating a potential gap between policy intention and corporate action. One possible explanation for the lower ESG scores in carbon-pricing countries could be the varied quality of reporting. Companies in these regions may focus more on compliance with carbon pricing regulations rather than on comprehensive ESG practices. This could lead to superficial reporting that does not accurately reflect their sustainability efforts.

Then, an analysis was conducted to identify differences in each ESG component: environmental ESG, governance ESG, and social ESG. The data above shows that the value of each ESG in non-carbon-pricing countries is higher than in carbon-pricing countries (Table 11). Furthermore, an ANOVA test was carried out to determine whether there is a significant difference between each ESG score based on carbon pricing policies. The results of the ANOVA test showed that the scores are environmental_ESG ($F = 3.255$; p-value = $0.035 < 0.05$), governance ESG ($F = 3.935$; p-value = $0.018 < 0.05$), and social ESG ($F = 3.42$; p-value = $0.021 < 0.05$) is influenced

by the presence or absence of a carbon pricing policy in that country. There are significant differences in both the ESG score and the ESG per dimension in the two groups of countries. This indicates that this difference is due to the presence of carbon policies. These findings are consistent with research by Green (2021); Hossain & Farooque (2019). However, the results obtained do not support the initial assumption of the research as the view of ecological modernization theory.

Table 11 The description of ESG Env, ESG Gov, and ESG Social from Carbon Pricing and non-carbon Pricing Country

	Carbon Policy	N	Mean	Std. Deviation	Std. Error Mean
ESG_Environment	Carbon Pricing	1788	54.9895	13.82147	.32687
	non-Carbon Pricing	812	59.0828	10.65473	.37391
ESG_Governance	Carbon Pricing	1788	47.2234	15.22047	.35995
	non-Carbon Pricing	812	50.2602	15.51664	.54453
ESG_Social	Carbon Pricing	1788	53.1303	9.80614	.23191
	non-Carbon Pricing	812	59.0904	7.70521	.27040

(Source: Data Processed, 2023)

Ecological Modern Theory posits that environmental policies can drive corporate sustainability (Ashrafi et al., 2020; Julkovski et al., 2021; Xie et al., 2022). However, the study's findings suggest that carbon pricing policies may not be effectively encouraging companies to enhance their ESG performance. This discrepancy highlights the need for a deeper understanding of how such policies are implemented and their actual impact on corporate behavior. The results also relate to stakeholder theory, which emphasizes the importance of meeting the expectations of various stakeholders. Companies in carbon pricing countries may prioritize regulatory compliance over broader stakeholder engagement, leading to lower ESG scores. This indicates a potential misalignment between stakeholder expectations and corporate practices in these regions.

Carbon accounting plays a crucial role in measuring the impact of carbon pricing policies on corporate ESG performance (Cordova et al., 2021; Bui et al., 2022; Jiang & Tang, 2023). By accurately tracking carbon emissions, companies can assess their compliance with regulations and identify areas for improvement. This data is essential for understanding how carbon pricing influences corporate behavior and sustainability practices.

CONCLUSION

Many studies have discussed the influence of ESG on company financial performance, but they have had inconsistent results. However, very little research has explored a company's ESG performance regarding carbon policies in a country. This study discusses the impact of carbon pricing policies in Asian countries by comparing the ESG scores of companies in countries with carbon pricing and non-carbon pricing policies. This research found that all ESG scores in carbon-pricing countries are lower than in non-carbon-pricing countries. This indicates that the ESG performance of companies in carbon-pricing countries is not better than companies in non-carbon-pricing countries. In countries with carbon pricing, companies in Korea have the highest ESG scores and environmental and social ESG. At the same time, ESG governance is the highest in Singapore. In addition, the Environmental ESG score is the highest in carbon-pricing countries compared to governance ESG

and social ESG. In non-carbon pricing countries, the average ESG score is 55.22. The highest ESG score was in environmental ESG, 59.38, followed by social ESG, 49.93, and governance ESG, 59.04.

To improve corporate ESG performance through carbon pricing policies in Asian countries, policymakers can consider several concrete strategies. These suggestions aim to create a more effective regulatory environment that encourages companies to adopt sustainable practices while complying with carbon pricing mechanisms. Implement standardized ESG reporting frameworks that require companies to disclose their carbon emissions and sustainability practices comprehensively. This can help ensure that all companies are held to the same standards, improving the quality of ESG data available for analysis. Mandate regular audits of corporate ESG reports to verify compliance and accuracy. This can help build trust in the reported data and encourage companies to genuinely improve their sustainability practices rather than merely meeting regulatory requirements. By adopting these policy suggestions, Asian countries can optimize their carbon pricing policies to be more effective in improving corporate ESG performance. Enhancing transparency, incentivizing sustainable practices, engaging stakeholders, and implementing flexible policies can create a more conducive environment for companies to thrive while contributing to sustainability goals.

There are several reasons why, in this study, the ESG score in countries with carbon pricing policies is lower than the ESG score in countries without carbon pricing policies. First, this study does not distinguish between the types of carbon pricing applied, whether a carbon tax or ETS. Second, this study also does not differentiate at which level these policies are enforced, whether national or regional. Third, this study also did not distinguish when the policy was implemented. Another opinion, as conveyed by (Green, 2021), is that carbon pricing is not high enough to motivate companies to improve their ESG performance. Most carbon prices are far below even the most conservative estimates of the 'social cost of carbon' (SCC) (Green, 2021). So that all of these things can have an impact on research results. For this reason, further research is expected to explore these matters more deeply.

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