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## **The Effect of Carbon Emissions on Free Cash Flow and Tobin's Q of Publicly Listed Firms in the ASEAN-5**

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# POLICY BRIEF

## YOUNG ECONOMISTS' PERSPECTIVE

2024-09-040, SEPTEMBER 2024

ISSN # 2094-3342



De La Salle University

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Angelo King Institute  
for Economic and Business Studies

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# The Effect of Carbon Emissions on Free Cash Flow and Tobin's Q of Publicly Listed Firms in the ASEAN-5

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In light of the signing of the Paris Agreement in 2015 with a commitment to limit global warming to less than 1.5°C, businesses around the world have started adopting green strategies like decarbonization to contribute to this effort. This policy brief is based on a study involving a panel regression performed on publicly listed firms in the ASEAN-5 region that disclosed their carbon emissions data from 2019-2022. The study used Tobin's Q to measure firms' market value and Free Cash Flow to measure firms' financial flexibility. The results would provide insights to the impact of carbon emissions on firm performance in the ASEAN-5 context. These findings provide insights on the financial feasibility of Southeast Asian firms pursuing decarbonization strategies.

## **Policy Recommendations**

Pursuing decarbonization strategies is said to improve firm performance due to long-term sustainability and enhanced brand reputation and value which attracts investors. However, the costs of carbon-efficient machinery, transition periods, and the uncertainty of when, or even whether, the effects of decarbonization will be realized hinder firms from pursuing such strategies. The government's intervention is crucial in influencing the firms, consumers, and investors' behavior in giving incentives and favoring firms that actively try to improve their carbon performance. Based on the study's results, the following policies should be implemented:

1. **Imposition of a carbon tax** – Imposing taxes on companies based on the amount of carbon emissions they emit is one way to strengthen the financial incentive for firms to decarbonize to avoid paying large amounts of taxes. This may also prompt investors to buy stocks of firms that are less likely to receive a high carbon tax, allowing the market values of firms to be influenced by their carbon emissions levels.

Implementing this measure may raise prices or induce capital flight from foreign investors in ASEAN-5 firms or foreign firms with branches in the region. Hence, the amount of tax should be raised gradually and in coordination with international standards to avoid widespread negative effects.

2. **Setting up a market for carbon emissions trading** – Limits to carbon emissions or carbon caps are most effectively enforced through carbon emissions trading. Under this scheme, companies will have to buy permits if they exceed carbon emission limits and they will be allowed to sell permits if they are able to keep within the limit. Thus, it provides a profit incentive for firms to decarbonize. As it is a market mechanism, decarbonization will happen voluntarily without strict government mandates but it will require efficient trading platforms.
3. **Issuing strengthened or mandatory carbon disclosure requirements** – ASEAN-5 governments have gradually been introducing sustainability reporting for corporations, requiring them to disclose their performance under the Environmental, Social, and Governance (ESG) pillars. Nonetheless, reporting standards vary across countries and some firms report other metrics of environmental performance while leaving out carbon emissions. Thus, governments will need to outline rules for estimating and reporting carbon emissions in metric tons or metric tons per USD of revenues and require firms to disclose this information in their annual reports. Industry and national averages or targets may also be presented as a reference for stakeholders to know whether a particular firm is a relatively high or low emitter.
4. **Imposing penalties for non-compliance to the aforementioned carbon regulations** – As firms in the ASEAN-5 disclose carbon emissions data, pay carbon taxes, and engage in carbon emissions trading, some firms may attempt to falsify accounts or circumvent the rules. Hence, auditors should verify the correctness of carbon emissions disclosures and carbon tax reports. Firms that violate government regulations on carbon emissions may be charged fines to penalize noncompliance.
5. **Provision of technical assistance** – Decarbonization often requires scientific and technological knowledge, especially when it comes to amendments in production processes. Developing technological improvements is reliant on research and development, which can be costly and time-consuming to perform. Such R&D activities may result in greater efficiency in the long run, but firms may also need guidance on how to transition to low-carbon technologies. Thus, scientific experts may

be tapped by government agencies to brief companies on tried and tested strategies for decarbonization. Narrowing the knowledge gap may encourage firms to pursue carbon reduction with confidence.

## **Introduction**

The impacts of climate change on Southeast Asia are pronounced with Vietnam, Myanmar, the Philippines, and Thailand being among the top ten countries in the world which are expected to be the most affected by climate change as reported by Greenwatch (Prakash, 2018). This creates adverse economic impacts such as a projected 11% reduction in the ASEAN's GDP by the end of the century (Raitzer, 2015). To mitigate these harsh effects, companies have begun to pursue sustainable finance which aims to balance earning a profit while protecting the environment. Nonetheless, this remains to be a challenge as firms face various uncertainties surrounding the transition to carbon neutrality (Bolton & Kacperczyk, 2023). However, Nishitani and Kokubu (2011) have found that Japanese manufacturing firms are able to enhance their firm value while decreasing their GHG emissions. Amidst these contrasting claims, it is necessary to investigate whether or not there truly is a financial and economic incentive for firms to reduce their carbon emissions in the context of the ASEAN.

## **Model Specifications and Results**

The study utilizes Generalized Least Squares panel data regression to analyze if carbon emissions significantly affect Tobin's Q or the Free Cash Flow of ASEAN-5 firms. Data was collected at Eikon Refinitiv's Data Screener from 2019 to 2022 with the following classification of firm industries: (1) Energy, (2) Materials, (3) Industrials, (4) Consumer Staples, (5) Financials, (6) Information Technology, (7) Utilities, and (8) Real Estate. Two distinct datasets were generated that contain (1) Total Carbon Equivalent Emissions and (2) Scope 1 and Scope 2 Carbon Equivalent Emissions. Four panel data regressions were implemented in each independent variable and dataset: (1) baseline model, (2) baseline model with country and industry dummies, (3) baseline model with interaction and quadratic terms, and (4) baseline model with interaction and quadratic terms, and country and industry dummy variables, totaling to 16 panel data regressions for this study.

The findings of interest from the models with total carbon emissions are as follows:

- Total carbon emissions are not significant in determining ASEAN-5 firms' Tobin's Q. This means that regardless of whether a company emits high or low amounts of carbon, their market values are unaffected by this particular factor. This implies that there may be a lack of financial incentives for firms to decarbonize but should they decide to do so, they will face minimal risks. Investors in ASEAN-

5 firms may not be encouraged to buy stocks of low-emitting companies due to their low environmental consciousness, exacerbated by the lack of clear and effective government regulations on carbon emissions.

- Total carbon emissions have a negative relationship with Free Cash Flow at the 10% significance level. This implies that high emitting companies are likely to retain lower levels of Free Cash Flow after paying off their operating expenses and debt expenses. This offers a financial incentive for firms to reduce their total carbon emissions by investing in environmental R&D over other sub-optimal investments.
- A U-shaped relationship between total carbon emissions and Free Cash Flow may also be observed, indicating that firms with high and low emissions outperform firms which are undergoing a transition process. Although this points to the possibility that firms may face carbon transition risks, this result was obtained from one of the inferior models used, hence this result may be less reliable. Still, it may be important to warn firms of the possibility of having less cash on hand after operations in the middle of their decarbonization period.

The findings of interest from the models with scope 1 (direct) and scope 2 (indirect) carbon emissions are as follows:

- Scope 1 and Scope 2 carbon emissions are not significant in predicting the Tobin's Q of ASEAN-5 firms. Despite disaggregating total carbon emissions into its direct and indirect components, Tobin's Q remains unaffected. Whether a firm decides to pursue decarbonization through reformed production processes or adjusting energy use, its market value will not likely be impacted by these changes.
- Scope 1 emissions have a negative relationship with Free Cash Flow while Scope 2 emissions do not significantly affect Free Cash Flow. Hence, if a firm wants to target higher levels of Free Cash Flow, it should attempt to reduce carbon emissions in their production processes rather than in their energy use.
- Scope 1 emissions may have a U-shaped relationship with Free Cash Flow, indicating that firms which emit intermediate levels of carbon dioxide will be outperformed by both high and low emitters. However, this result was obtained from one of the weaker models in the study, suggesting that a negative and linear relationship between scope 1 emissions and Free Cash Flow may be more likely. Nonetheless, this may serve to prepare firms for what to expect during their carbon transition periods.

## Conclusion and Recommendations

The effect of carbon emissions on firm performance varies according to the indicators used, with emissions having a negative impact on Free Cash Flow and no effect on Tobin's Q. This could mean that the financial incentives to pursue decarbonization outweigh the potential financial risks associated with the process. Although Southeast Asian companies may face financial difficulties in complying with such regulations, they are also presented with the opportunity to attain higher financial flexibility which will aid the firm in paying for dividends as well as future investments. Thus, the governments of ASEAN-5 countries may consider implementing more policies that would put pressure on firms to reduce carbon emissions and reinforce practices aligned with sustainable finance.

## References:

- Bolton, P., & Kacperczyk, M. (2023). Global pricing of carbon-transition risk. *The Journal of Finance*, 78(6), 3677-3754. <https://doi.org/10.1111/jofi.13272>
- Nishitani, K., & Kokubu, K. (2011). Why does the reduction of greenhouse gas emissions enhance firm value? The case of Japanese manufacturing firms. *Business Strategy and the Environment*, 21(8), 517-529. <https://doi.org/10.1002/bse.734>
- Raitzer, D. A., Bosello, F., Tavoni, M., Orecchia, C., Marangoni, G., & Samson, J. N. G. (2015). *Southeast Asia and the economics of global climate stabilization*. Asian Development Bank. <https://adb.org/sites/default/files/publication/178615/sea-economics-global-climate-stabilization.pdf>
- Prakash, A. (2018). *Boiling point*. International Monetary Fund. <https://www.imf.org/en/Publications/fandd/issues/2018/09/southeast-asia-climate-change-and-greenhouse-gas-emissions-prakash>