Policy Analysis Focus 23-3
Impact of Carbon Pricing in East Asia[1]

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I. Introduction

Global carbon dioxide (CO_2) emissions have continued to increase as a result of persistent increases in developing countries, which more than offset decreases in developed countries. In East Asia, the Regional Comprehensive Economic Partnership (RCEP) Agreement entered into force in January 2022. The agreement does not include a chapter on environment, but the RCEP countries include both Organisation for Economic Cooperation and Development (OECD) countries (Australia, New Zealand, Japan, Korea) and non-OECD countries (China, India[2] and all ten Association of Southeast Asian Nations (ASEAN) countries).

This article quantitatively investigates the impact of carbon pricing in East Asia by means of simulation studies using a Computable General Equilibrium (CGE) model.[3] The relative significance of the impact of those policy measures (by OECD and non-OECD countries) on developed and developing countries will be considered.

II. State of CO_2 emissions

The RCEP countries have been major emitters of CO_2, with a roughly 50% share

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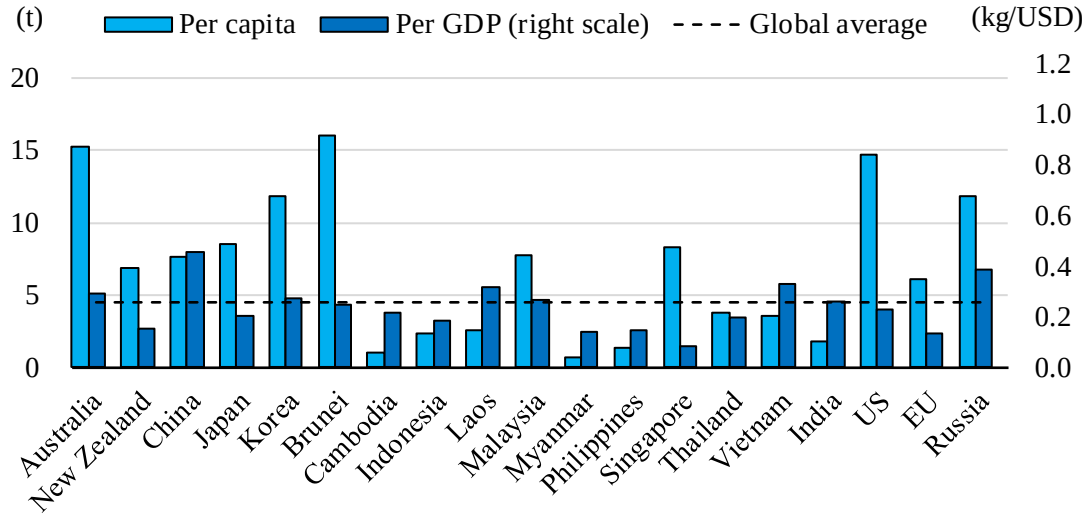
[1] This is an additional note following Kawasaki (2023), "Development of CO_2 Emissions and Impact of Carbon Pricing," GRIPS Discussion Paper 22-13, GRIPS, March 2023. The views expressed in this article are the author's own and do not represent those of GRIPS Alliance or other organizations to which the author belongs.

[2] India withdrew from the RCEP Agreement, but the agreement has been open for accession by India.

[3] The framework of model simulations remains broadly unchanged from that in Kawasaki (2023). It is based on the Global Trade Analysis Project (GTAP) Data Base 10, and the GTAP-E model is solved using GEMPACK software referred to in Horridge, Jerie, Mustakinov & Schiffmann (2018), GEMPACK Manual, ISBN 978-1-921654-34-3. That said, the member countries of RCEP including Australia, New Zealand and all ten ASEAN countries are individually disaggregated here.

Chart 1 Relative levels of CO_2 emissions



Source: Based on GHG Emissions, Climate Watch, World Resources Institute.

of global emissions in 2019, which is larger than that of the OECD countries, which accounted for around a third of total CO_2 emissions in the same year. Among the RCEP countries, China was ranked first in global CO_2 emissions in 2019, followed by India (number 3), Japan (5), Indonesia (8), Korea (9), Australia (16), Viet Nam (18), Thailand (22), Malaysia (23) and Philippines (34).

CO_2 emissions performance would be compared among countries in a more appropriate manner, by relative level rather than absolute level of emissions (as above). Emissions per capita have been higher in developed countries. As is shown in Chart 1, 2019 per capita figures have exceeded the global average in China, Brunei, Malaysia and Singapore, in addition to the OECD countries in East Asia. On the other hand, emissions per Gross Domestic Product (GDP) are expected to be lower in developed countries.

However, the observation is somewhat mixed for a few countries in East Asia. Per GDP emissions in China continue to be significantly higher than the global average despite the fact that Chinese per capita emissions have also been substantially higher than the global average. On the other hand, per GDP emissions in a few ASEAN countries are already lower than the global average, despite the fact that per capita emissions there have not yet reached the global average. It would be worth studying the impact of carbon pricing on individual East Asian countries.

III. Impact of carbon pricing

Carbon pricing instruments, including carbon tax for the reduction of CO_2

emissions, have been implemented mainly in developed countries. Moreover, the European Union (EU) has agreed to introduce a carbon border adjustment mechanism (CBAM) in 2023. The impact of the following three carbon pricing scenarios will be compared here, assuming a carbon tax rate of 100 United States (US) dollars (USD) per tonne (t) CO_2 equivalent. It is also assumed that associated CBAM rates are applied to imports of all goods and services.

1 OECD CTAX: Carbon tax in the OECD countries
2 OECD CTAX+CBAM: Carbon tax in the OECD countries with a CBAM
3 OECD+RCEP CTAX: Carbon tax in the OECD and RCEP countries

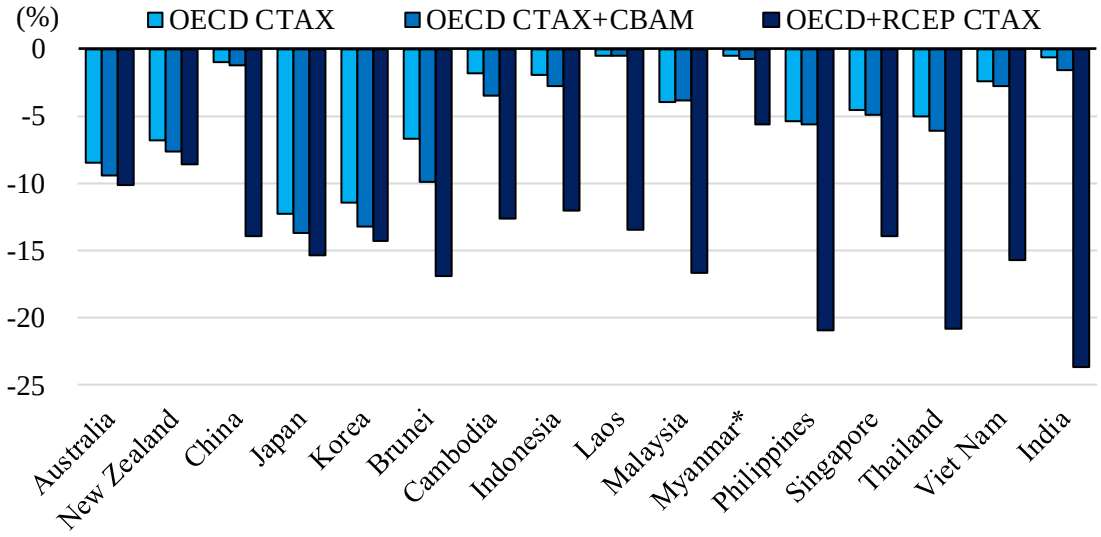
The impact of the OECD CBAM would be minor compared with that of both the OECD carbon tax and the RCEP carbon tax. Global CO_2 emissions are estimated to be reduced by 16.7% under the OECD carbon tax with a CBAM, only marginally larger than that under the OECD carbon tax without a CBAM (16.4%) and far smaller than that under the OECD and RCEP carbon tax (36.6%). It is suggested that the introduction of carbon tax in developing countries would be more effective for substantially reducing global CO_2 emissions than that of carbon tax and, in particular, a CBAM in developed countries.

On the other hand, the adverse impact of carbon pricing on economy would be worrying. World real GDP is estimated to decrease by 4.5% under the first scenario, OECD CTAX; by 4.6% under the second scenario, OECD CTAX+CBAM; and by 8.1% under the third scenario, OECD+RCEP CTAX. The adverse impact of carbon tax by developing countries would still be sizable compared with that of developed countries.

Meanwhile, exports of the RCEP countries are estimated to decrease by 4.7% under the OECD carbon tax, accounting for roughly half of the decreases of exports in the OECD countries (8.8%). On the other hand, under the OECD CBAM, decreases in exports in the RCEP countries (0.8%) are estimated to be almost equal to those in the OECD countries (0.9%). In contrast, if the RCEP countries introduced a carbon tax as did the OECD countries, exports are estimated to decrease by 15.1% in the RCEP countries, larger than in the OECD countries (10.8%). It is suggested that the impact of carbon tax in developing countries would typically be seen in trade of developing countries.

Moreover, the suggested variety of those impacts on trade among the RCEP countries is shown in Chart 2. Among the OECD countries, the impact of carbon pricing is estimated to be larger in Japan and Korea than in Australia and New Zealand. The non-OECD countries in East Asia could be grouped into three to four groups in terms of the relative significance of the impact of carbon tax in the RCEP countries compared with that in the OECD countries. In China, Laos, Myanmar and India, the impact of the RCEP

Chart 2 Impact of carbon pricing on exports



* Proxied by the composite region of Myanmar and Timor-Leste.
Source: Author's simulations.

carbon tax would be far larger than that of the OECD carbon tax, which would be small. In contrast, the impact of the OECD carbon tax would be sizable in Brunei, equivalent to that in the OECD countries. The impact on the other countries would lie between the two mentioned above. That said, the impact of OECD carbon tax would be larger in Malaysia, Philippines, Singapore and Thailand than in Cambodia, Indonesia and Viet Nam. The variation in the relative significance of the impact of carbon tax on trade would be suggested to be correlated with the variation in the stage of economic development among countries.

IV. Concluding remarks

It is suggested that the introduction of carbon tax in developing countries would be more effective for substantially reducing global CO_2 emissions than the introduction of carbon tax, and much more so with a CBAM, in developed countries. That said, the adverse impact on economy of carbon tax imposed by developing countries would be sizable. Moreover, there would be varied impact on trade among developing countries. The impact of carbon pricing by developing countries, in addition to that by developed countries, will be an issue for consideration, along with the variation of those impacts in relation to each country's stage of economic development.