

Global Price Ripple Effects of the EU Carbon Border Adjustment Mechanism: Evidence from a Multi-Regional Input–Output Approach

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Author: Sho Uehara

The European Union introduced the Carbon Border Adjustment Mechanism (CBAM) in January 2026. CBAM is a policy instrument under which importers of certain products produced outside the EU are required to pay a charge corresponding to the quantity of greenhouse gases emitted during the production process of those products. The primary objectives of the CBAM policy are to address competitive imbalances arising from differences between the EU’s stringent environmental standards and comparatively less rigorous standards in non-EU countries, and to prevent carbon leakage.

Japan is generally considered to face limited direct effects from the CBAM, as its exports of products covered by the mechanism to the European Union are relatively small. However, the indirect effects may be more substantial. In particular, the increase in production costs of EU industries as a result of CBAM may propagate beyond the EU due to the growing complexity and interdependence of global supply chains. Even in cases where Japan does not maintain direct trade linkages with the EU in the affected industries, the burden of CBAM may be transmitted through third countries that are more closely integrated with the EU economy, thereby affecting Japan via supply chain networks.

This study aims to how increases in production costs within EU industries induced by CBAM may influence Japan and other countries through global supply chain networks. The novelty of this study lies in its comprehensive analysis including indirect effects of the CBAM policy on each country via global supply chains. We employ the multi-regional input-output table (GLORIA) of 2020 provided by Industrial Ecology Virtual Laboratory, constructed from transaction data covering 164 countries and 120 industries. GRORIA covers the products subject to the CBAM—iron and steel, cement, aluminum, fertilizers, and electricity—and includes all 27 countries belonging to the European Union. This enables detailed quantification of the impacts of the CBAM regime on individual countries and industries.

In this study, we analyzed the increase in production costs for industries within the EU associated with the implementation of the CBAM. Firstly, we estimated the embodied emissions of CBAM-covered products imported into the EU from non-EU countries, based on import data and the CO₂ emission factors of each producing country. Secondly, based on the price of EU Emissions Trading System (EU ETS) allowance, we estimated the potential increase in production cost of each industry in each country within the EU resulting from the CBAM. To quantify the effect due to the cost increase in EU countries, we estimated the price increase rate of products in all countries using the input-output price model. Additionally, we identified the cost pathway of the ripple effect using Structural Path Analysis.

From the result, we found that, with respect to the total embodied CO₂ emissions associated with the production of chargeable products imported from outside the EU, emissions attributable to iron and steel production account for more than half of the total emissions (56%). Overall, this implies that the CBAM is likely to generate a substantial cost burden associated with the import of iron and steel products. Regarding the breakdown of total embodied emissions by country, emissions embodied in products imported into Germany constitute the largest share (21%), followed by France (18%) and Italy (9%). In particular, for imports into Germany, iron and steel account for 70% of the total embodied emissions, with aluminum representing the second-largest share (19%).

Furthermore, we estimated the price increase rate in each country associated with the introduction of the CBAM. Focusing on Japan, the results reveal that prices are expected to rise in the motor vehicles producing industry, basic petrochemical products, and other manufacturing industries. In addition, structural path analysis demonstrates that the price increase in Japan's motor vehicle industry is partly attributable to the pass-through of cost burdens from the motor vehicle industries of Germany and Italy to Japan's motor vehicle industry. It also shows that increased costs in Germany's iron and steel industry propagate through Germany's motor vehicle industry and ultimately affect Japan's motor vehicle industry. These findings indicate that, although non-EU countries do not directly bear the cost burden under the CBAM, they may experience economic impacts transmitted through global supply chains. Based on this analysis, we provide policy recommendations for industries and countries that are particularly vulnerable to impacts transmitted through multiple pathways.