Trade Policy as Climate Policy: Payoffs and Tradeoffs

Topic:
Author: Karen Thierfelder
Co-Authors: Delfin Sia Go

Reducing carbon emissions is a global public good: every country has an incentive not to reduce its own emissions and still benefit from the actions of compliant countries. We explore how import tariffs can solve this free-rider problem. We use a multi-region, multi-sector computable general equilibrium (CGE) model in which some countries adopt a carbon tax and compete with non-compliant countries in global markets. Data are from GTAP 10; there is a social accounting matrix (SAM) for each region in the model. Regions are linked via trade flows. We use GTAP satellite data sets for carbon dioxide (CO2) emissions. We include information on CO2 emitted per unit of fossil fuel used in each production activity and household by region. Our model includes production and trade linkages among integrated regions in the global economy: Europe, NAFTA, and East and Southeast Asia, a novel feature of the CGE model. We use nested import demand functions: aggregate imports are substitutes for the domestic variety; aggregate imports are a constant elasticity of substitution (CES) aggregate over imports by integrated region. Import substitution among countries in an integrated region (e.g. US, Mexico, and Canada in the NAFTA region) is low to reflect the integration of production and specialization of imported intermediate inputs in production.

First, we consider the European Union (EU)â€™s carbon border adjustment mechanism (CBAM) in which non-compliant countries face import tariffs in selected sectors based on the carbon emitted in production. Tariffs are based on the CO2 emitted in producing goods for export. We consider different methods to calculate the emissions from production. First, we consider only the direct effects which account for the emission of CO2 when producers burn fossil fuels in production. Then we consider the direct and indirect CO2 emissions which account for the emissions used in intermediate inputs. Finally, we consider direct and one round of intermediate input use to compute emissions. In this case, we include the emissions from use of electricity as an intermediate input.
We find that CBAM helps EU producers because it â€œlevels the playing field,â€• CBAM does not reduce global emissions because exporting countries can diversify their trade to non-EU countries.
Consistent with other studies, we also find that direct and one round of indirect CO2 emissions capture most of the pollution emitted in production. The advantage to using direct and one round of indirect emissions is that it is easier to calculate than the full direct and indirect effects. Electricity used as an intermediate is the main source of indirect CO2 emissions.

Next, we consider a climate club in which members adopt a carbon tax and impose punitive tariffs against all products from non-members. In this case, tariffs can reduce global emissions by inducing non-taxing countries to join the club. However, climate clubs are fragile. When club members are strongly linked to non-club regions through integrated production relationships, in which imports complement domestic goods, they suffer trade losses, adding to the cost of club membership. Furthermore, high punitive tariffs are needed to induce all regions to join the club.