

Economic and Trade Implications of maritime fuel levy: An Assessment using the GTAP modeling framework

Julien Bliesener, Erwin Corong, Ralf Peters

The GTAP framework explicitly incorporates multi-modal international transportation costs. The GTAP Data Base (Aguiar et al., 2022) includes information on international transport margin information for each available origin-destination-GTAP sector based on fractional share of the transport margin attributable to air, water, and other shipping modes as estimated by Nuno-Ledesma and Villoria (2019). On the other hand, the GTAP model (Corong et al 2017) specifies the modal demand for trade and transport service in proportion to the quantity being delivered, with the possibility of improvements in transport efficiency. Given the lack of bilateral supplies of shipping services, each mode of transport (i.e., air, water, and other shipping) m , is supplied at a uniform price across the world. This global transport price is a composite based on the price of national margin services exports. The global demand for each margin service is the sum of demand across all commodities and across all bilateral trade nodes. A global transport sector then purchases each margin service from each region, minimizing the cost of purchasing the services across regions subject to a CES preference function but parameterized as a Cobb-Douglas function. Optimal demand then determines the regional supply of each trade margin service, by mode of transport.

This paper uses the GTAP version 7 model (Corong et al 2017) and GTAP 11 Data Base with 2017 base year to analyze the economic and trade impacts of fuel levy on international maritime transport. To better assess the economy-wide and trade impacts of fuel levy on international maritime transport, we extend the default Cobb-Douglas specification for international trade and transport margins in the GTAP model, to allow for substitution in transport mode choices in response to changes in relative costs of transport margin modes. We also carry out sensitivity analyses to situate the responsiveness of our results to changes in the elasticity parameters used in the international transport margins.