

Incorporating Port-Level Foreign Trade Data into IMPLAN's Gravity Model to Estimate Region-Specific Foreign Trade Rates

Topic: Regional trade

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Understanding regional participation in international trade is important for state and local policymakers, but useful empirical estimates are often unavailable. This paper describes a new method that incorporates foreign trade data tabulated by customs port into a gravity model of regional trade in order to allow for regionally-specific foreign trade rates and identification of foreign country-level trading partners by commodity at the subnational (county) level. The paper begins with an overview of the gravity model. It then describes the methods used to incorporate the port-level foreign trade data into the gravity model, and finally compares results to existing alternative methods.

This paper uses port-level data, as reported by the United States Census Bureau, on foreign exports and imports of shippable goods (aggregated to 366 commodities) to decompose national foreign imports and exports to the county level (the United States had 3,141 counties in 2015) while maintaining consistency with estimated regional gross supply and demand by commodity. It then further decomposes those trade estimates by country-level trading partner. Estimates of county-level gross commodity supply and demand, as well as gravity model calibration parameters, are based on IMPLAN's 2015 dataset for the United States. National-level estimates of supply, demand, and foreign trade of commodities are derived from U.S. national accounts published by the Bureau of Economic Analysis. This results of this method are compared to two common alternatives: 1) subnational decompositions of foreign trade that rely on fixed import and export rates (the method currently used by IMPLAN, in which, for example, each county that produces a given commodity would export that commodity abroad at the same rate as the U.S.), which may be overly simplistic, and 2) state-level data tabulated by origin of movement or state of destination, which may not coincide with place of production or consumption (or use).