

Estimating Trade in a Regional Input-Output Table

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Extended Abstract

This paper provides a new hands-on recipe for regionalizing national Input-Output (I-O) tables. While the theoretical grounds of existing non-survey regionalization methods are shaky, we develop a method which is both, theoretically well-founded and consistent with national accounting principles. We derive a regional trade equation that estimates sectoral internal trade and thereby sectoral exports and imports of a regional I-O table. The trade equation is derived as the equilibrium solution of a 2-regions (small region and rest of world) trade model with CES preferences and symmetric trade barriers. As a result, internal trade depends on the economic size of the region as well as on its internal trade barrier. The latter in turn is assumed to depend on the national trade barrier and on the geographical size of the region compared to the nation. We call our method “Gravity Regionalization of Trade Approach” (GRETA).

We show that GRETA’s trade equation exhibits desirable properties. Most notably, it exhibits “increasing returns to scale” regarding output and use and fulfills the constraint that internal trade is non-negative and cannot exceed the minimum of the region’s domestic output and use. We find that alternative regionalization methods either lack one of these desirable properties. Usually, the modeler can choose between “Location Quotient” (LQ) or “Commodity Balance” (CB) approaches originating from the work of Schaffer and Chu (1969) and Isard (1953), respectively. More recent literature suggests that the modeler should choose between the two depending on the national data availability. If national technical coefficients are known, the modeler should choose a CB approach. If instead national production coefficients are known, a LQ method should be applied (Flegg and Tohmo, 2013;

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Kronenberg, 2012). We can show, however, that the latter are no appropriate alternative to GRETA since they lack a clear theoretical foundation, assume product homogeneity and are inconsistent by construction. Thus, any regionalization method should be based on the notion of a CB. However, we show that also existing CB approaches like the commonly used “Cross-Hauling Regionalization Method” (CHARM) by Kronenberg (2009) shows disadvantages compared to GRETA.

Finally, we take our approach to the data and test it with actual I-O survey data for Finland, China and Japan. We find that GRETA generally performs well in estimating sectoral trade, although the performance differs across sectors and regions. Like other methods, GRETA overestimates regional output multipliers, but less so, which is crucial for model applications. We also compare our estimation results with CHARM and find that GRETA performs better.