

EMSI's Input-Output Model Multipliers: A Brief Overview and Comparison with Other Major Models

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Introduction and Background

Aside from EMSI's Economic Impact regional input-output model—a relative newcomer in the market—the most frequently used models are the IMPLAN model, REMI's Policy Insight, or the BEA's (Bureau of Economic Analysis) RIMS II model.

A critical part of these models are their multiplier values. Multipliers quantify how certain changes (i.e., in jobs, earnings, or sales) in one industry will have effects on other industries in the region. Because of the lack of comprehensive regional data, all regional models must estimate multipliers by “regionalizing” national values as calculated by the Bureau of Economic Analysis. This brief paper provides an overview of the methods used by each major model, including EMSI's.

Comparison of Multiplier Methodology

Multipliers are generated largely from (a) regional purchase coefficients (RPCs) and (b) the national direct input technical requirements matrix (also known as the “A” Matrix). RPCs represent the percentage of local demand that is satisfied by local supply. High RPCs are an indication of higher multiplier effects since money spent on input requirements are being retained locally. The national “A” Matrix quantifies, for each major industry, what and how much of the outputs from other industries is needed in order to produce its own outputs. Every major model uses the national “A” Matrix in some way, but each has different methods of calculating RPCs.

RIMS II, which is provided at a nominal cost from the Bureau of Economic Analysis, is the cheapest but also the least sophisticated regional input-output model on the market. RIMS II uses location quotients to regionalize the national technical coefficients and assumes that local demand is satisfied first before the remainder of any production is exported. This creates an applied problem because most businesses satisfy some of regional demand, but in most cases export much of what they produce. To take an example from the automotive industry, not everybody in Michigan is only driving a GM, Chrysler, or Ford even though the production output from these factories could satisfy the state demand for automobiles. In other words, location quotient does not deal with *cross-hauling* (regional demand being satisfied by some combination of regionally produced and imported products/services) very well and tends to overstate the multiplier.

IMPLAN uses interstate trade flow matrices of the uncorrected MIRO model from the U.S. Department of Health and Human Services in combination with regional demand and supply-demand pool ratios. This gives an upper bound on the RPCs, which can create problems on a regional scale if additional industries are added to the region, thereby reducing the level of inter-regional trade flow.

REMI's model, which is by far the most expensive on the market, calculates RPCs based on the Stevens technique (Stevens et al. 1983), which takes national technical coefficients and regionalizes them based on County Business Patterns. The Stevens technique and its variations are generally recognized as the best known method of calculating RPCs.

EMSI's **Economic Impact** model also incorporates a sophisticated variation of the Stevens method of calculating the RPCs, which solves the issue of cross-hauling, but also allows for new industry growth within a region (thereby not restricting RPCs to a somewhat artificial upper bound, as IMPLAN does).

This is the reason why some of EMSI's clients have observed that our multipliers occasionally seem a bit high compared to IMPLAN's (although generally speaking, they are closely aligned with IMPLAN's).

Conclusions

We believe the Economic Impact model's multipliers more accurate than those of RIMS II and IMPLAN, and at least equal in accuracy to REMI's. EMSI's model does not have the limitations inherent in IMPLAN's methodology, while simultaneously addressing issues of inter-regional trade and cross-hauling that are ignored by RIMS II.

With EMSI's new model release on October 1st, 2007, you will find that we have not only increased the number of available industries from 462 to 1,070—we have also realigned our multipliers to be more conservative in hopes that they will better reflect local, sub-regional, and regional economies. This means that as a user you can more easily align regional changes to predict future impacts. In addition, EMSI's model has always allowed knowledgeable users to customize practically any aspect of the model based on local knowledge so that users can maximize accuracy.

About EMSI

Economic Modeling Specialists Inc. (EMSI) is a professional services firm that offers integrated regional data, web-based analysis tools, data-driven reports, and custom consulting services. EMSI has served thousands of workforce, education, economic development, and other policy professionals in the U.S., Canada, and the United Kingdom, and the company's web-based **Strategic Advantage** research and analysis suite is used by over 2,500 professionals across the U.S. For more information, call (866) 999-3674 or visit www.economicmodeling.com.