

Approaches to estimating regional input-output tables

Full report: www.nzta.govt.nz/resources/research/reports/619

Novel approach developed for creating regional input-output tables

A Transport Agency-funded project has developed a method to produce regional input-output tables for New Zealand, which can then be used to assess the impact of transport and transportation industries on regional economies.

Input-output tables are a statistical summary of the flow of industry inputs into production and the subsequent use of the outputs of that production.

Tables can be produced at both a national and regional level. National input-output tables are used to give greater granularity to the national accounts by providing an understanding of the technology of production. Regional input-output tables are about regional variation in that technology and about providing an understanding of the role of inter-regional trade in an economy. With regional tables the focus is on the technology of production and on trade.

Building national-level input-output tables is highly resource intensive, requiring extensive surveying and data examination. In New Zealand, national tables are produced every five years. Regional tables are more effort to produce and require more surveying than national tables. Although some countries do produce them, it is generally not feasible to do so. As a result, one of the central issues in developing regional input-output tables is how to use the data that is already available (including the survey data collected for the national-level table) to estimate inter-regional trade and regional variations in production technology.

To this end, a number of methods have been developed internationally to estimate regional input-output tables based on previously developed national tables. However, the statistical data that New Zealand currently collects about production, consumption and trade is not sufficient to use any of these commonly adopted approaches.

The Transport Agency's research project, conducted by Holt Data Science, has developed a new method for producing the most general form of regional input-output tables for New Zealand from the data that is available here. The method provides estimates of uncertainty for the entries of the table, allows the incorporation of third-party data, and makes best use of available data, be that official statistics, third-party data, or subject matter expertise. It contains a novel approach to estimating bi-lateral regional trade, allowing for cross-hauling (concurrent import and export of the same goods).

Several elements will be required in order to run the model, including a data set, which could be assembled from Statistics New Zealand and possibly the Longitudinal Business Database. Ideally, assembly of the data set should be automated, so the tables can easily be updated in the future. Once built, however, the regional input-output model could be made available as a public resource and automatically refreshed every year or even more frequently if required.

Official statistical data is not the only data that might be useful for creating regional input-output tables, and the project also explored other third-party data sources the model might be able to draw on.

John Holt from Holt Data Science explains, 'We take the view that a regional input-output table is both a set of accounts, giving amounts of inputs and amounts of production and consumption, and also a description of the trade, production and consumption dynamic that is the New Zealand economy. Data describing systems which are influenced by that dynamic can be statistically modelled in terms of any regional input-output table we developed using the official statistical data – if the data can be made representative of the business population, then the results of the model can be used to improve the accuracy of the regional input-output table.'

Four sources of third-party data were looked at as part of the project and, although a couple are promising, all will require significant work to make them usable.

Assessing the impact of transport

The project also sought to understand how a regional input-output table could be used to understand the economic impact of transport and transportation industries.

Overall, the conclusion was reached that it was not feasible to measure the direct economic impact of transport using a single regional input-output table. However, indirect effects can be measured and would provide useful input into transport planning at a regional level.

Three main measures were identified – each drawing on the information in the input-output tables to indicate aspects of the economic impact of transportation.

- The efficiency of a regional transport industry can be measured in terms of how much added value it provides as a proportion of the output of the purchasing industries. In this measure, large amounts would be interpreted as inefficiency, though it is likely this measure is very coarse.
- Transport industry inter-dependencies can be quantified using regional input-output tables to understand how air, sea and road transport cooperate to deliver regional transport. This is

not an absolute measure of impact, but a measure of the impact one regional transport industry has on another regional transport industry.

- The use of transport is in the movement of people and things. Thus an indirect impact is in how transport facilitates trade. In this measure, the importance of a region to another region is measured in terms of how much added value flows through the region into the other region's production. Transport or value-chain links between a region and another region of high importance should be prioritised, so this measure provides a quantification of importance that informs resource allocation.