What are input-output models?

Input-output models are based on statistical information about the flow of goods and services among various industries. This information provides a comprehensive and detailed representation of the economy for a given year.

An input-output model consists of three components:

1. A table showing the cost of inputs—goods and services, labour and capital—consumed by each industry in the production process. This is called the input, or use, matrix.

2. A table showing which goods and services are produced by each industry. This is called the output, or make, matrix.

3. A table showing which goods and services are available for consumption by final users. This is called the final demand matrix. The final demand matrix includes goods and services that are locally produced, as well as those that are imported from other regions.

These data, together with supplementary information (e.g., tax rates by commodity) are combined into a single model of the economy which can be used to determine how much additional production is generated either by a change in the demand for one or more commodities (goods or services), or by a change in the output of an industry.

How are input-output models used?

Input-output models are used to assess the total economic impact associated with a change in industry output or a change in the demand for one or more commodities. These models use known information about inter-industry relationships to trace through all of the changes in the output of supplier industries that are required to support an initial increase in an industry’s output, or an increase in commodity expenditures. This process is commonly referred to as shocking the model.

If a change in demand is met by increasing or decreasing imports from other jurisdictions, there is no net effect on domestic production. All of the benefits or costs associated with employment generation or loss, and other economic effects, will occur outside the region. Therefore, it is important to identify whether or not a change in the demand for a good or service is met inside or outside a region.

The British Columbia Input-Output Model

The British Columbia Input-Output model (BCIOM) can be viewed as a snapshot of the BC economy. It is derived from Interprovincial Input-Output tables developed by Statistics Canada and includes details on 727 commodities, 300 industries and 170 “final demand” categories, plus a set of computer algorithms to do the calculations required for the solution of the model. It can be used to predict how an increase or a decrease in demand for the products of one industry will have an impact...
on other industries and therefore on the entire economy. At present, the model reflects the structure of the economy in 2006.

Both indirect (i.e., the economic impact on industries supplying goods and services used in production) and induced (i.e., the economic impact associated with additional spending by workers) effects are estimated in the model, which also generates estimates of tax revenues associated with a change in the demand for one or more commodities, or a change in the output of an industry. These tax revenue estimates include personal and corporate income taxes, as well as taxes on commodities.

At present, estimates of the value of goods and services imported from other provinces and countries are only calculated for direct expenditures.

Although the structure of the model is based on 2006 data, tax revenue and employment estimates generated by the model are based on more up-to-date information.

Tax revenue estimates reflect the current (as of August 2010) tax structure and existing tax rates. Provincial government revenues include the provincial portion of the Harmonized Sales Tax.

Employment estimates generated by the model are calculated using information on average earnings in 2009.

**Limitations and caveats associated with input-output analysis**

Input-output analysis is based on various assumptions about the economy and the inter-relationships between industries. The major assumptions are listed below.

Input-output models are linear. They assume that a given change in the demand for a commodity or for the outputs of a given industry will translate into a proportional change in production.

Input-output models do not take into account the amount of time required for changes to happen. Economic adjustments resulting from a change in demand are assumed to happen immediately.

It is assumed that there are no capacity constraints and that an increase in the demand for labour will result in an increase in employment (rather than simply re-deploying workers).

It is assumed that consumers spend an average of 80% of their personal income on goods and services. The remaining 20% of personal income is consumed by taxes, or goes into savings. (This assumption can be changed if there is evidence to suggest doing so in particular applications.)

The BCIOM is derived from a “snapshot” of the structure of the BC economy in 2006. It is assumed that relationships between industries are relatively stable over time, so that the 2006 structure of the economy can be used to estimate the economic impact associated with a particular project.

At present, the BCIOM does not distinguish between regional effects. It will not, for example, differentiate between the economic impact of a plant located in one region of the province and a similar plant elsewhere in BC.

**Access to the Model**

The BCIOM has been developed and is maintained by BC Stats in the Ministry of Citizens’ Services. BC Stats will run the model for clients who wish to assess the economic impact of particular projects. Charges associated with using the model include two components:
• $700 for the first model run, and $300/run if additional runs (based on the same input data) are required;

• $760/day for consultation time, which includes input data development and preparation of a report summarizing the results of the analysis.

A typical model simulation usually costs $1,500 (plus applicable taxes). Higher charges would apply in more complex situations.

For more information about the model, or to use the BCIOM contact:

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