



# Multipliers and Indirect effects

## Description

Economic activity has direct and indirect effects (sometimes also called primary and secondary effects). Demand for any one product has repercussions beyond that industry as it draws in inputs from other sectors. For example, if a tourist spends \$25 on a meal then that revenue will become income for those who supply the restaurant with inputs. This may include staff, food suppliers, landlords and so on. These businesses or individuals will in turn spend a proportion of their income on inputs from other businesses. When assessing economic impacts these flow-on or multiplier effects need to be incorporated.

The most common way of deriving multipliers is using input-output analysis. This looks at the product of each industry (a) as a commodity demanded for final consumption and (b) as a factor in the production of itself and other goods. The process consists of constructing an input-output (I-O) table where the rows describe how one industry's total product is divided among various production processes and final consumption, and the columns denotes the combination of productive resources used within an industry. Input-output tables can be constructed for whole economies or for segments within economies. They are useful in planning the production levels in various industries necessary to meet given consumption goals and in analysing the effects throughout the economy of changes in certain components. Deriving the tables requires large amounts of (survey) data, and because of the complex calculations there is often a significant time lag. They represent a 'snapshot' in time, thus significant changes may not be picked up.

Three types of multipliers can be calculated from input output tables: output, income and employment multipliers. Output multipliers account for changes in output resulting from a unit increase in final demand. Income multipliers are concerned with the increased input from households required to fulfil an increase in input. Employment multipliers are derived by calculating the employment coefficient for each industry. These represent the number of people directly employed per dollar of output. These coefficients are used to calculate employment multipliers in the same way as income multipliers.

Multipliers can be developed for regions, and this is the most common use for tourism purposes. One of the main limitations in deriving regional multipliers is the need to calculate regional input-output tables which require large amounts of survey data. In recent years, however, approximations using non-survey approaches and involving modification of national input-output tables have been developed. This has proved one way of getting good comparative information whilst minimising the amount of direct data collection required.

Regional input-output tables suffer from all the limitations of national input-output tables as well as the fact the inter-regional trade coefficients may be even more unstable than inter-industry coefficients. However, their advantages, in terms of their ability to explain differences, outweigh the disadvantages and they provide the most commonly used tool for regional economic analysis. Hubbard and Brown (1981) described the first New Zealand application of this technique using the GRIT methodology (Generation of Regional Input-Output Tables). This was further developed and applied by Geoff Butcher (1985) - these tables are now updated on a regular basis.

An issue for the tourism sector is that regional economies where tourism exists are not simply scaled down versions of the national economy, and this means that some industries are under-represented and some over-represented. In addition 'tourism' does not appear as a discrete sector in the I-O table data and a lot of assumptions need to be made to get regional multipliers. This means that the calculated multipliers may not be very reliable.

There are two further points to remember about using multipliers -

Firstly, multipliers are concerned with changes at the margin (rather than average increase/decrease) - this is important, since other techniques such as travel cost method, don't look at the margin. On the other hand, in our case we are dealing with the **current** impacts not changes. If we looking the effects of taking away conservation land or increasing conservation land this point about marginal changes is relevant but not in the case where we are estimating the benefits of current circumstances.



## VALUATION AND ALLOCATION Multipliers and Indirect Effects

Secondly, multipliers calculated from input-output tables are concerned with **backward** linkages. Backward linkages only assess the impacts on demand for inputs, not outputs. In other words, the effect of further processing is not included. For example, amongst the backward linkages for dairy factories would be the milk produced by dairy farmers. But it would not include benefits to wholesalers or retailers who sell dairy products as these are forward linkages. Typically, multipliers for primary producers, such as farmers, are low because they have very few backward linkages. Butcher (1985) describes a process for calculating **forward** linkages where these are required.

### How and when the tool is used


Multipliers have been used in the tourism sector in New Zealand - see Kerr et al (1986) (Mt Cook), Kerr et al (1990) (Fiordland), Lim (1989), Gough and Ball (1994) (West Coast).

As noted above regional multipliers can be calculated so that multiplier analysis can be applied at national and regional levels.

### Application

Multipliers are useful, but the number of studies comparing predicted numbers and actual numbers is small, and where they have been undertaken they have shown that actual employment is less than predicted. These differences can usually be explained in economic terms because of 'leakage', substitution and other effects. Therefore, while they are useful, they are only an indication.

### Our evaluation

Regional multiplier analysis is an important predictive tool for anyone seeking to promote a 'development' in the tourism sector. The information obtained can be used as input to [cost-benefit analysis](#) .

A sound understanding of the theoretical (mathematical) foundation and understanding of the effect of the fundamental assumptions associated with the process is required for application.