newstats NWT Bureau of Statistics

Released: February 18, 2021

NWT Economic Multipliers

Overview and Results

Introduction

The NWT Bureau of Statistics has maintained an input-output (IO) model since the early 1990's. The model is based on the same structure employed by Statistics Canada, and is updated periodically by the Bureau of Statistics using data from Statistics Canada.

The IO model is based on the Supply Use Tables (SUT) and other data Statistics Canada releases in November. The release in November 2020 contained SUT data for the 2017 reference year. The intention of the Bureau of Statistics is to update the multipliers in this document on an annual basis with each new release of SUT information from Statistics Canada.

The economic multipliers in this document are an output of the NWT IO model, based on the 2017 SUT tables, and are presented here at a broad level of detail, representing 48 industry aggregations. As a major component of Gross Domestic Product, capital expenditures provide an indication of market conditions both in the overall economy and in particular industries. Examples of capital investment activities include construction of resource projects and investment in infrastructure.

Open and Closed Economic Multipliers

The open version of the Bureau of Statistics' input-output model provides estimates of direct and indirect economic effects on the territorial economy. Direct effects are the first round of impacts, the impact on those industries that expand production to satisfy the increased demand for a commodity. Indirect impacts result from backwards linkages in the economy, when the firms producing the commodity purchase additional inputs from other firms.

For the closed version of the input-output model, along with direct and indirect impacts, induced impacts are also estimated. Induced impacts result from the spending of increased household income that results from the change in economic activity. Closing an input-output model to households serves to increase the interdependence within the system and results in higher economic impacts compared to those in the open version.

Closed model, or induced, results are sometimes criticized for the potential to introduce bias, and the potential for overstatement in assessing economic impacts. Care must be taken when interpreting closed model results. The Bureau of Statistics, while recognizing the potential for bias and the overstatement of impacts, also acknowledges the need to estimate induced impacts and therefore closes the NWT model. However, to limit the potential misuse and misunderstanding of the application of induced impacts in the absence of interpretation experience, closed multipliers are not published. Therefore, the multipliers presented in this publication are only provided in the open form – for direct and indirect impacts.

Economic Multipliers (Intensity Ratios)

Economic multipliers are most commonly used to estimate the economic impacts associated with establishing a new firm in a particular industry or with the expansion, contraction or closure of existing firms.

When estimating economic impacts, it is preferable to use multipliers to make relative, rather than absolute, comparisons. Multipliers are more properly used to determine which of several activities would have the largest economic impact rather than to estimate the absolute level of economic impact for a single activity. Where multipliers are used to estimate the impacts of a single activity, the results should be treated only as general estimates, indicating the order of magnitude of the impacts rather than exact levels. The economic multipliers presented in this report are expressed as intensity ratios.

Calculating Intensity Ratios

Intensity ratios are calculated by dividing the total (direct and indirect) economic impact due to some change in consumption or output, by the change in consumption or output. For example, if an industry increases its output by $2 million and this leads to an increase of $1.5 million in total territorial GDP, the GDP intensity ratio for that industry would be 0.75 (that is, $1.5 million / $2.0 million). Due to the significant leakages in the territorial economy (reliance on imports), territorial intensity ratios for industries are usually less than one.

Two important points to note when examining the intensity ratio tables are that:

1. The GDP ratio is generally, but not always, a larger number than the labour income ratio. This is because labour income is a component of GDP. Estimates of GDP are largely comprised of three sub-components: labour income, corporation profits before taxes, and capital consumption allowance (i.e., depreciation), with the latter two grouped as a component referred to as 'surplus'. Therefore, the larger the (positive) difference between the GDP and labour income intensity ratios, the larger is the share of 'surplus' - i.e., profit and depreciation - for that industry.

2. The labour income intensity ratio is lower for industries with relatively high use of technology (i.e., machinery, etc.) use – e.g., diamond mining. Conversely, higher labour income intensity ratios imply lower levels of technology use – e.g., retail trade.

The intensity ratios included in this report are appropriate to use for very general assessments of economic impacts. For more comprehensive assessments, the NWT Bureau of Statistics should be contacted to provide IO simulations using the more detailed information embodied in the IO model. As well, the Bureau of Statistics maintains current expertise in the use of IO models and multipliers, and is therefore in a position to offer guidance in the interpretation of IO results.

Using the Intensity Ratios

Below are two brief examples that demonstrate how to use the intensity ratio table contained in the report.

Example 1: Construction Industry Expansion

Intensity ratios are often used when all that is known about a project is the gross change in economic activity. For example, if there were a $100 million increase expected in the output of the territorial construction industry, then using the intensity ratios from Table 1a, the total effects (direct and indirect) would be as follows:

GDP at Basic Prices ($):	[GDP intensity ratio for Const.] x [Gross output]
	[0.42] x [$100 million] = $42 million
Labour Income ($):	[Labour income intensity ratio for Const.] x [Gross output]
	[0.26] x [$100 million] = $26 million
Employment (PYs):	([Gross output] / [1 million]) x [Jobs intensity ratio for Const.]
	[$100 million/1 million] x [2.3] = 230

Therefore, a $100 million expected increase in the output of the construction industry has a potential GDP impact of $42 million; labour income impact of $26 million; and the potential creation of 230 person-years of employment. This employment should be interpreted with caution because this could represent either 230 employees for a year, 460 half-time employees, or 920 employees for three months.

It should be noted that column three of Table 1a specifies the employment intensity ratio as "Jobs per $million of output", so it is necessary to divide gross output by $1 million as part of the calculation. The intensity ratio for employment is presented this way so that its format is meaningful and consistent to that of GDP and labour income.

Example 2: Comparing relative economic impacts

Consider, for example, that along with the expansion in the construction industry noted above, that it is also expected that the diamond mining industry will expand by $100 million, and you are interested in the relative benefits associated with each expansion. Using the intensity ratios for the diamond mine industry from Table 1a, the total effects (direct and indirect) would be as follows:

GDP at Basic Prices ($):	[GDP intensity ratio for diamond mining] x [Gross output]
	[0.57] x [$100 million] = $57 million
Labour Income ($):	[Labour income intensity ratio for diamond mining] x [Gross output]
	[0.21] x [$100 million] = $21 million
Employment (PYs):	([Gross output] / [1 million]) x [Jobs intensity ratio for diamond mining]
	[$100 million/1 million] x [1.4] = 140

Therefore, a $100 million expected increase in the output of the diamond mining industry has a potential GDP impact of $57 million; labour income impact of $21 million; and the potential creation of 140 person-years of employment.

In comparing the relative economic impacts of the two industrial expansions, we see that the diamond mining industry has a GDP impact that is $15 million larger than the construction industry expansion. The construction industry expansion yields $5 million more in labour income, and 90 more person-years of employment.

At this point, to more definitively gauge the relative economic benefits of the two expansions, one would have to consider (i) how many jobs, and associated labour income would flow to residents versus non-residents; and (ii) does the expansion impact resident businesses (which file tax returns in the NWT) in the two industries, or non-resident businesses.

Table 1a Goods Producing Industry Intensity Ratios

Total Direct and Indirect Economic Impacts
Northwest Territories, 2017

	GDP at Basic Prices per Dollar of Output	Labour Income per Dollar of Output	Jobs (PYs) per $million of Output
Agriculture, forestry, fishing and hunting	0.61	0.39	6.3
Crop and animal production	0.62	0.30	6.4
Forestry and logging	0.34	0.32	9.8
Fishing, hunting and trapping	0.56	0.52	7.6
Support activities for agriculture and forestry	0.73	0.43	4.7
Mining, quarrying, and oil and gas extraction	0.57	0.24	1.5
Oil and gas extraction	0.60	0.92	4.9
Diamond mining	0.57	0.21	1.4
Support activities for mining, oil and gas extraction	0.60	0.56	3.9
Utilities	0.63	0.33	1.9
Construction	0.42	0.26	2.3
Residential building construction	0.47	0.18	1.9
Non-residential building construction	0.27	0.21	1.8
Engineering construction	0.41	0.29	2.3
Transportation Engineering Construction	0.48	0.31	3.0
Repair and other construction	0.50	0.27	2.6
Manufacturing	0.54	0.30	3.6

Table 1b Service Industry Intensity Ratios

Total Direct and Indirect Economic Impacts
Northwest Territories, 2017

	GDP at Basic Prices per Dollar of Output	Labour Income per Dollar of Output	Jobs (PYs) per $million of Output
Wholesale trade	0.86	0.40	3.0
Retail trade	0.79	0.55	7.7
Transportation and warehousing	0.50	0.26	2.6
Air transportation	0.47	0.24	2.2
Truck transportation	0.45	0.24	2.6
Urban transit and ground passenger transportation	0.59	0.44	10.1
Pipeline transportation	0.93	1.69	8.3
Other transportation	0.62	0.36	3.1
Warehousing and storage	0.74	0.06	0.7
Information and cultural industries	0.77	0.18	1.6
Publishing, broadcasting and telecommunications	0.78	0.18	1.5
Motion picture and Sound recording industries	0.45	0.26	6.7
Finance and insurance	0.75	0.38	3.2
Real estate and rental and leasing	0.80	0.56	5.5
Professional, scientific and technical services	0.74	0.58	5.2
Management of companies and enterprises	0.61	0.37	3.5
Administrative and support, waste management, etc.	0.73	0.50	6.5
Administrative and support management	0.75	0.55	7.5
Waste management and remediation services	0.64	0.28	2.8
Educational services	0.75	0.57	4.6
Health care and social assistance	0.76	0.66	6.0
Arts, entertainment and recreation	0.90	0.48	8.3
Accommodation and food services	0.62	0.43	7.2
Accommodation services	0.68	0.43	6.5
Food services	0.56	0.42	7.8
Other services (except public administration)	0.72	0.52	7.7
Public administration	0.67	0.49	3.9
Federal government services	0.64	0.53	3.1
Provincial and territorial government services	0.67	0.48	3.6
Municipal government services	0.71	0.42	4.9
Indigenous government services	0.65	0.51	7.2