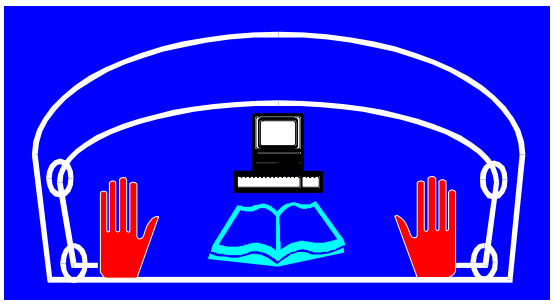

Evaluation Of The Economic Impact Of Capital Projects Using The Statistics Canada Inter-provincial Input-output Model

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SUMMARY

In addition to its responsibility for identifying, protecting and managing examples of the country's natural and cultural heritage, Parks Canada is also interested in finding out about the impact of its activities on the Canadian economy. For the past several years, Parks Canada has therefore made use of a number of economic impact models, including Statistics Canada's national input-output model and the regional "Tiebout" model.

If the economic impact of capital projects on the provinces is to be identified, another model should perhaps be introduced. Instead of being substituted for work to date, it should rather add refinements to existing knowledge concerning economic impacts.

The Statistics Canada Inter-provincial Input-output Model

The approach recommended for evaluating the provincial impact of capital projects is based on the Statistics Canada inter-provincial input-output model, which is developed from three sets of tables. The first describes the supply position, showing the output of each commodity by industry and province. The second presents the demand position, showing sectoral use of each commodity (industries, households, government, etc.) in each province. The last of the three sets of tables describes inter-provincial flows for each of the goods and services. Taken together, the tables provide a very detailed account of Canada's economy.

Using the three sets of tables, Statistics Canada estimates a series of input-output coefficients, which relate production in a given industry to the industries providing it with the required inputs, whether or not they are in the same province. Other coefficients, such as employment or income coefficients, are then computed. All the coefficients together become the substance of the model, and they make it possible to track the effects of an increase of x dollars in demand for a specified commodity through the economy.

The Statistics Canada inter-provincial input-output model nevertheless has a number of weaknesses and limitations that must be taken into account. The first has to do with the quality of available

statistical data for some industries, especially the service industries, for which there are either only fragmentary data or none at all, leading statisticians to estimate the data using on the basis of the national model. There are also no data available on inter-provincial trade flows for services. To make the model work, Statistics Canada had to make a number of assumptions concerning such flows. Moreover the structure of the model is based on a number of assumptions that limit its usefulness, such as assumptions about the input utilization ratio, the absence of dynamic effects and economies of scale, etc. Finally, since the model is based on 1979 data, it must be assumed that there have not been any structural changes in the economy since 1979.

Despite these shortcomings, the model remains a valuable tool for evaluating the economic impact of capital projects. Although Statistics Canada was aware of the limitations of inter-regional input-output models, it found them preferable to the available alternatives, and devoted considerable resources to the task of developing the model. The latest version of the inter-provincial input-output model, for example, took over two years to prepare.

Using the Statistics Canada Inter-provincial Input-output Model

The input-output coefficients are used for economic impact analysis. Economic impact is defined as total benefits in all sectors of the provincial economies resulting from specified expenditures.

Three types of economic impacts have been identified: direct, indirect and induced. Direct impacts relate to the sectors or industries involved in the process of implementing project structures or components while indirect impacts have to do with the industries that supply intermediate products to industries directly involved in the project. Finally, households, by reintroducing their wages into the economy in the form of purchases of all kinds, are the source of induced impacts.

The model computes economic impact in terms of several aggregates, including labour income, GDP and employment. Labour income is the sum of worker wages and salaries, supplementary labour income and net income of unincorporated businesses. If net income of incorporated businesses is added, the total is the gross domestic product (GDP). GDP is the difference between the value of goods and services produced and the value of goods and services purchased and used to produce the former.

Employment refers to the number of person-years generated by a specified expenditure. Direct, indirect and induced impacts are identified for each of these three aggregates.

Let us take a capital project like the construction of a visitor reception centre in Alberta as an example. The model estimates the direct, indirect and induced impacts on labour income, GDP and employment in Alberta and in the other provinces. To do these estimates, however, it must be decided whether or not the project's direct inputs are to come wholly or partly from Alberta. Statistics Canada offers two alternative approaches . In the first, goods are supplied only by the province in question while in the second, provinces producing goods for the province of impact are included. A proportion of production may therefore come from the province of impact as well as from foreign countries. The computation is based on the inter-provincial flows matrix. Since the Parks Canada capital investment policy is to encourage production of goods and business in the target province, the "goods supplied wholly by the province" alternative will be adopted wherever possible.

The inter-provincial model can be used in a number of different ways , some of which are more complex than others. Since Parks Canada will be undertaking a number of capital project impact studies over the next few years, it appears reasonable to adopt a simple procedure.

The approach finally adopted is based on a series of impact tables resulting from inter-provincial input-output model simulations. Of the model's 602 commodity categories, eight were identified as being appropriate to cover most of the goods included under Parks Canada capital projects. Most such goods can be produced and supplied by the industries within each province. For each of these eight goods is a corresponding impact table showing direct, indirect and induced impacts, as well as total impacts, for the purchase of the good in question in each impact province, in terms of labour income, GDP and employment. Total impacts in terms of labour income, GDP and employment are also given for all other provinces together.

It should be pointed out that the approach was designed to evaluate the economic impact of capital projects such as building roads, visitor centres, campgrounds, etc. The results of such an approach relate solely to capital expenditures and do not include economic impacts relating to the operation and maintenance of the structures in question or to additional visitors attracted by such facilities.

There are four stages involved in the approach adopted. The first requires determining all project costs that must be taken into account. It identifies the cost of each structure or component rather than the cost of all materials required by the project. In the second stage, each component is placed in one of the eight goods and services categories used in the approach. The amounts entered under each category are then totalled. Every capital project is thus measured by the same standard goods and services. The third stage involves examining the impact tables to identify the coefficients needed for the impact study for each commodity included in the project and for the province in which the project is to be undertaken. Finally, the fourth phase involves doing the economic impact calculations for labour income, GDP and employment. It applies the coefficients identified in stage three to the amounts estabLished in stage two. The results of all these operations must then be totalled to obtain total impacts.

The calculation for employment is longer. The value of production will have increased between the model's 1979 base year and the year in which the impact study is carried out. Since employment generated is calculated using the "employment/value of production" ratio, production data must be adjusted for the year in which the model is applied if job creation is not to be overestimated.

The index used for this adjustment is Statistics Canada's "output price index of non-residential construction: institutional building", which is the index that most accurately reflects the increase in the value of production.

Examples of Approach Applications

The proposed approach was applied to a number of Parks Canada capital projects currently being reviewed, implemented or both. The examples, which cover different projects carried out in different provinces in various years, show how the approach works. The six examples are described in chapter 3; the reader may refer to section 3.1 for the first of the six examples.

The last example requires further comment. It involves simulating a given project for each of the ten provinces in order to identify differences in economic impacts among the various provinces. Carrying out the exercise shows that the impacts on GDP and employment

vary significantly from one province to another. The impact is greater in the more highly industrialized provinces and, conversely, lower in the less industrially developed provinces.

Computerization of the Approach

In order to facilitate using the proposed approach, a computer program for the model has been developed. Running it requires no programming knowledge, and it allows the user to estimate the economic impact of capital projects much more readily. The program identifies the coefficients needed for the evaluation and for subsequent calculations in stages two and three of the approach. A program tutorial session is described in chapter 4.

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INTRODUCTION

While protecting Canada's natural and cultural heritage and encouraging public understanding and appreciation of this heritage with a view to leaving it unimpaired are basic objectives of the Parks Canada program, Parks Canada is also interested in the economic impact of its activities. In recent years, Parks Canada has therefore introduced a number of economic impact models and applied them to its activities. For the program as a whole, the Statistics Canada input-output model has been used on a number of occasions to evaluate national impact. The "Tiebout" approach has also been used to identify the local economic impact of some current capital projects and parks.

In order to be able to better identify the economic effects generated by the Parks Canada program, an approach using provinces as the geographical units could be established. Such an approach, far from replacing the work already carried out in this area, would add to and complement available knowledge on economic impacts. This report describes such an approach; it is based on the Statistics Canada inter-provincial input-output model. Unlike the national input-output model, which evaluates the economic impact of the whole program, the approach recommended here is designed to estimate the Impact of specific capital projects such as building a visitor reception centre or a road. The resulting economic impact is associated only with infrastructure construction, and does not include impacts related to the operation or maintenance of the structures in question or to additional visitors attracted by such facilities.

The report has four chapters. In the first, the interprovincial input-output model is described and analyzed. In the second, a simple method for using the model is described. In chapter three, several examples of how the approach can be applied are given. Chapter four develops a computer version of the approach. Finally, the report should give the reader a practical understanding of the Statistics Canada inter-provincial model.

CHAPTER 1

DESCRIPTION OF THE STATISTICS CANADA INTER-PROVINCIAL INPUT-OUTPUT MODEL

There are several models available for evaluating the economic impact of capital projects in specific provinces. The best known of these, and certainly one of the easiest to use, is the input-output model. Many input-output models are used in Canada's provinces, but they are so expensive to construct that only a few provinces - Nova Scotia, Quebec, Alberta and British Columbia - have produced operational versions . Although all the data required for them come from Statistics Canada, there are differences in their design, such as different industry classifications, different equations, etc., which may sometimes make them incompatible.

Statistics Canada has its inter-provincial input-output model. Unlike the provincial models, it was designed specifically to take trade flows of goods and services among the various provinces into account. Moreover all provinces are included and the results are standardized.

For these reasons, and because the Parks Canada program is national in scope, the approach put forward in this report is based on the Statistics Canada model. This chapter will give a brief overview of the configuration of the model, as well as its main characteristics and limitations.

1.1 Structure of the Model

It is worth noting at the outset that the format used for the inter-provincial model is an extension of that used for the national input-output model. It is virtually a national model broken down into various regions.

In the inter-provincial model, there is no direct correspondence between commodities and sectors: a sector may produce more than one commodity and a commodity may be produced by more than one sector. In fact, the number of commodities is higher than the number of sectors. The construction industry is nevertheless the exception to the rule, with each sector producing only one commodity and with each commodity produced by only one sector.

At the highest Level of disaggregation, the Statistics Canada inter-provincial model identifies 191 industries and 602 goods and services. At the highest aggregation level there are 16 industries and 49 goods and services. Eleven regions are represented: the ten provinces, with the two territories comprising the eleventh region. The following charts describe the structure of the model.

CHART 1

Production of Goods and Services by Industry and Province

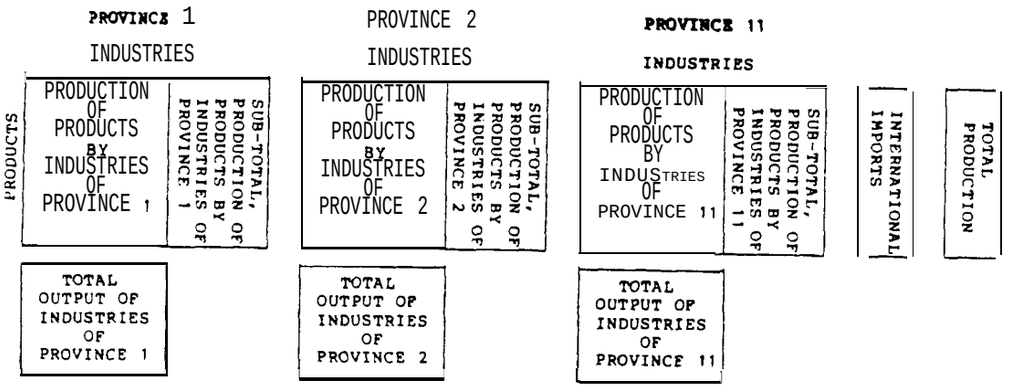

Chart 1 shows the supply aspect of the model. Goods and services are produced by industries in the provinces in question or imported from abroad. The total of each row, by province, represents the total production of each commodity, while the total of each column, by province, represents the output of each industry.

Chart 2 shows the utilization of goods and services by industries as well as final demand for the provinces. For industries, this means utilization of goods required for production of other goods; for final demand, it means final consumption by consumers, government, etc. As in the previous chart, a sub-chart corresponds to each province. The total for each row gives total utilization of each good by all industries plus the province's final demand, while the total for each column indicates the utilization of all goods by each industry.

CHART 2

Utilization of Goods and Services
by Industry and for Final Demand, by Province

PRODUCTS	PROVINCE 1			PROVINCE 1			PROVINCE 11				
	INDUSTRIES	FINAL DOMESTIC DEMAND		INDUSTRIES	PINAL DOMESTIC DENAND		INDUSTRIES	PINAL DOMESTIC DEMAND		INTERNATIONAL EXPORTS	TOTAL USE OF PRODUCTS
	UTILIZATION OF PRODUCTS BY INDUSTRIES OF PROVINCE 1	UTILIZATION OF PRODUCTS FOR FINAL DEMAND IN PROVINCE 1	SUB-TOTAL, USE OF PRODUCTS IN PROVINCE 1	UTILIZATION OF PRODUCTS By INDUSTRIES OF PROVINCE 2	UTILIZATION OF PRODUCTS FOR FINAL DEMAND IN PROVINCE 2	SUB-TOTAL, USE OF PRODUCTS IN PROVINCE 2	UTILIZATION OF PRODUCTS BY INDUSTRIES OF PROVINCE 11	UTILIZATION OF PRODUCTS FOR FINAL DEMAND IN PROVINCE 11	SUB-TOTAL, USE OF PRODUCTS IN PROVINCE 11		
	PRIMARY INPUTS			PRIMARY INPUTS			PRIMARY INPUTS				
	TOTAL INPUT BY INDUSTRIES IN PROVINCE 1			TOTAL INPUT BY INDUSTRIES IN PROVINCE 2			TOTAL INPUT BY INDUSTRIES IN PROVINCE 11				

To complete the structure of the model, Statistics Canada added to it a series of inter-provincial trade tables like the one illustrated in chart **3**. The rows show the destination of in-province production of a specified commodity while the columns trace the origin of a given commodity used in the province. For each of the goods and services included in the model there is a corresponding inter-provincial trade table.

CHART 3

Interprovincial Trade in a Specified Good

	NFLD.	N.S.	N.B.	P.E.I.	QUE.	ONT.	MAN.	SASK.	ALTA.	B.C.	Y./N.W.T.	EXPORTS TO OTHER COUNTRY	TOTAL PRODUCTION BY PROVINCE
NFLD.													
N.S.													
N.B.													
P.E.I.													
QUE.													
ONT.													
MAN.													
SASK.													
ALTA.													
B.C.													
Y./N.W.T.													
IMPORTS FROM OTHER COUNTRY													
TOTAL USE BY PROVINCE													

The three series of tables provide a very detailed accounting of the Canadian economy. Using these tables, Statistics Canada estimates a series of "input-output coefficients". These associate production in a given sector to the sectors supplying it with the inputs needed for production. More specifically, each of these coefficients indicates the quantity of input coming from sector n of region j purchased per dollar of output by sector m of region i. Statistics Canada then computes other coefficients, e.g. to relate employment or labour income to the output of each commodity or industry in each province.

These coefficients taken together in fact form the substance of the inter-provincial input-output model. They make it possible to monitor through the economic system the effects of an increase of x dollars in demand for a specific good for a specified province, while at the same time indicating income generated and jobs created.

1.2 Limitations of the Model

Although the Statistics Canada inter-provincial input-output model is an excellent tool for economic analysis, there are a number of limitations that must be taken into consideration when using the model. There are thus inaccuracies in the input-output coefficients resulting, for example, from the simple structure of the model, the use of arbitrary accounting conventions and the quality of statistical data.

To begin with the latter, there are no statistical data on inter-provincial trade flows for services. To make the model operational, Statistics Canada identified two types of services: local services (personal services, construction, retail sales) and national (finance, transportation, wholesale trade). Statistics Canada assumes that "local" services were produced and used within the province; for national services, it used trade in manufactured goods as an indicator of service flows.

Some data on the utilization and production of goods and services by industry and province (see charts 1 and 2) are also unavailable. Statistics Canada therefore weighted the national data using total regional production for the sectors in question to obtain estimates. Similarly, some national sectors, such as transportation, are not represented at the provincial level. In such cases, the national input-output model was used.

For a number of sectors, those located in the smaller provinces for example, the employment coefficients were derived from very small samples. The estimate of the number of jobs may in such cases be inaccurate because of the number of part-time workers or the presence of unpaid workers, such as family members, which tends to be common in small business. When employment data are unavailable, Statistics Canada estimates them using national statistics.

Since the model requires data on savings, provincial savings account data are used. The use of these data give rise to a number of problems because the savings rates are a residual item in the provincial accounts and are therefore sensitive to errors in other statistics. Moreover, since personal taxes are not taken into account by the inter-provincial input-output model, the amounts reintroduced by consumers into the economy in the form of purchases of various goods are overestimated, Thus the economic impact associated with households is also overvalued,

Because the statistics available almost never allow the inter-provincial input-output coefficients to be constructed directly, special estimating methods must be used to infer them. For example, to break down interprovincial flows among the industries, Statistics Canada uses the "Chenery-Moses" approach, which assumes that:

lst - each production sector of region j imports from region i the same proportion of commodity k as the average of production sectors for region j.

2nd - as soon as there is a flow of commodity k between a region of origin i and a destination region j, all sectors producing commodity k in region i ship some to region j in proportion to the ratio of their output of commodity k to the total regional output of commodity k.

In many instances, such hypotheses are not realistic. The lack of data nevertheless often forces statisticians to adopt them.

Another limitation inherent in the use of the inter-provincial input-output model is the age of data used to construct it. In this report, for example, the model considered further on is based on 1979.[1] One must therefore assume that the structure of the economy has remained

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1 The 1979 version of the inter-provincial input-output model is available from May 1984. The earlier model was based on 1974 data.

unchanged, an unlikely hypothesis given the major structural changes that have taken place in key industries (including the oil and automobile industries) . A number of adjustments are therefore called for by the use of more recent data. Some employment data need to be adjusted because they are based on $10,000 of purchasing power in **1979**. Because the value of production has since increased, the $10,000 figure must be inflated to reflect the value of current year dollars.

The base year of the input-output model must also be considered a typical or exemplary year, because 1979 production did not encounter any serious short-tern problems. If there is a major strike in an industry or if production is stopped because of large inventories, this affects the industry's exchanges with other industries and alters the flow of goods and services between provinces. Statistics Canada does not correct these source data to take such events into account.

Similarly, the 1979 consumption pattern for households must be considered typical. During a period of recession, households tend to increase savings and decrease their consumption of goods and services, which causes income growth to slow down. No adjustments are made to these data.

The classification of commodities and industries into a relatively small number of categories sometimes makes it difficult to appreciate the impact of capital expenditures for a given commodity or sector. For example, the industrial classification “non-residential building construction” is used to evaluate the economic impact of building a visitor reception centre, which assumes, other things being equal, that building a visitor reception centre has the same effect on the economy as building a trade centre, factory office building or hospital.

To counter this problem, it is recommended that the version of the inter-provincial model with the highest level of disaggregation be used. While this might not eliminate the problem altogether, it certainly minimizes it.

Finally, the structure of the input-output model is based on a number of assumptions that restrict the ways in which it can be used. The major ones are as follows :

the level of employment is determined solely by the needs of business, which means that companies can hire all the workers they need at current wage levels;

the level of production for a specified commodity is solely a function of the needs of the users of this commodity, which assumes that firms producing it do not adjust their levels of production to the selling price of the commodity and that their are no restrictions on their production capacity;

consumption of a commodity is a linear function of disposable income and does not depend on the relative price of the commodity;

production inputs for a given commodity are used in fixed proportions, whatever the level of production;

no consideration is given to dynamic effects such as capital expenditures resulting from increased demand for goods and their subsequent impact on the level of production;

the cost of producing a commodity does not vary with the level of production of the commodity, which assumes that it is possible to produce 100 or 1,000 units at the same unit cost;

government is viewed as exogenous to the analysis, with duties and taxes not considered to be reintroduced into the economy in the form of purchases of goods and services and various payments to households.

Despite these criticisms, the inter-provincial input-output model remains a valuable tool for estimating the economic impact of capital investment projects. Although aware of the limitations of inter-regional input-output models, Statistics Canada chose them over any other possible alternatives, and put a great deal of effort into their development. It took over two years, for example, to prepare the latest version of the inter-provincial input-output model.

CHAPTER 2

USING TEE STATISTICS CANADA INTER-PROVINCIAL INPUT-OUTPUT MODEL

This chapter specifically considers how the Statistics Canada inter-provincial input-output model can be used. The data resulting from the model is first described, followed by a description of the ways in which it can be used and a simple approach for applying it.

2.1 Data from the Model

The coefficients estimated in this input-output model are essentially useful for analyzing economic impact. Economic impact is defined here as total benefits in all sectors of the provincial economies resulting from specified Parks Canada expenditures.

These economic benefits must be broken down into direct, indirect and induced effects, The differences between these types of economic impacts may be illustrated by considering the series of events that results when production increases, for example, as a result ofParks Canada demand for goods and services. First of all, industry production rises following demand for goods and services by Parks Canada, and income rises in the regions where these industries are located; these are called direct effects. But the production of these industries cannot increase without an increase in production of the industries supplying intermediate goods . Thus when production rises for the latter to fill these new orders , additional income is generated in one or more regions; these are called indirect effects. The process then becomes somewhat more complex as incomes, which are increasing due to the direct and indirect effects, lead households to increase their purchases of goods and services, which will repeatedly cause both production and income to rise; the chain of cumulative effects generated by householder income is called induced effects.

To meet specific Parks Canada requirements, the inter-provincial input-output model calculates economic impact as a function of three interesting aggregates. It determines the economic impact on employment of a specified investment, indicates the labour income generated in the economy by this new injection of funds and makes it possible to estimate the resulting change in gross domestic product. These aggregates are given for the province in which the project is implemented and also for

other provinces. Employment means the number of additional person-years generated in the economy by a specific injection of funds.

Labour income is the amount paid to wage-earners, supplementary labour income and net income of unincorporated I usinesses. It approximates worker income, whether salaried employees or self-employed. Wage-earner pay consists of employee wages and salar: es : it includes payment in kind such as lodging, as well as commissions tips and taxable benefits (unemployment and sick leave payments, etc.).

Supplementary labour income also includes other employer expenditures that can be considered to be payments to salaried employees: it includes employer contributions to pension plans, employees' health care plans, unemployment insurance and worker's compensation. The fina! category, net income of unincorporated businesses, includes net income of farming operations and other unincorporated businesses, including rent, benefits and other investment income of unincorporated businesses.

Adding net income of unincorporated businesses gives gross domestic product (GDP). GDP measures the value of production resulting within the geographical boundaries of each province. In the inter-provincial input-output model it is calculated at factor cost; indirect taxes less subsidies are excluded from the production calculation. GDP may also be calculated in a different way, with the difference between the value of goods and services produced and goods and services purchased from other firms used as production inputs. The concept of value added is also used in computing GDP.

It goes without saying that the inter-provincial input-output model identifies direct, indirect and induced effects for the employment, labour income and GDP aggregates. Let us take as an example a capital investment project located in Alberta to build a visitor reception centre . The inter-provincial model could be used to calculate the direct , indirect and induced impacts of the capital project on employment, labour income and GDP in Alberta and in the other Canadian provinces.

2.2 **Goods and Services Space and Industry Space**

The coefficients calculated by Statistics Canada may be classed into two categories. The first relates to goods and services space and the second consists of industry space. The major difference between the two categories is not the classification of coefficients in terms of

industries on the one hand and goods and services on the other, but rather the location of the direct impact of expenditures: industry space describes the impacts in terms of total output in a province while goods and services space takes inter-provincial commodity flows into account. Thus production does not come only from the province in which the project is implemented but also from other provinces and possibly other countries.

The distinction is important because the impact on the province of production, i.e. the province in which the goods and services are produced, may differ from the impact on the purchasing province if the province in question has a low self supply ratio for a given commodity. An example would be a province A whose production of commodity i supplied only 20% of its utilization of the commodity. If a capital project requires commodity i, the use of the coefficients associated with industry space would assume that commodity i would be supplied entirely by province A industries and that the direct impact on the various aggregates would be confined to the province. Using the coefficients for goods and services space would reduce the direct impact considerably because the model would then assume that only 20% of purchases of the commodity would be in the province, with the remainder imparted from other provinces. The indirect and induced effects in province A would also be much smaller.

The Parks Canada capital investment policy is to encourage business and commodity production within the target province. Nevertheless, for certain goods for which the province's self supply level is low, the in-province policy cannot be followed. This is often the case for business services (engineering, architecture, etc.). In such instances, the goods and services space coefficients are used. In all other instances, the industry space coefficients are used.

2.3 **Ways of Using the Model**

The inter-provincial input-output model can be used in many different ways. The most thoroughgoing is to establish an accurate expenditure structure for the capital project and then to submit it to Statistics Canada Client Services for an exhaustive simulation. The expenditure structure is a table that displays project costs in terms of the various commodities to be used, e.g. $500 for concrete, $300 for asphalt, $200 for wood, etc. The commodity categories must moreover be consistent with the Statistics Canada commodity classification. Establishing such an expenditure structure is a costly exercise and the data required are not always available to Parks Canada managers.

In addition, it costs $75 and takes a week for Statistics Canada to carry out each simulation. Finally, the simulation results are often too detailed for the needs of Parks Canada.

The above, as well as the fact that Parks Canada would have to do many impact studies for its capital projects, would appear to justify a simpler approach. The approach finally adopted, whose results are less complex and less accurate than those of the above model, is nevertheless readily applicable because it requires only a limited quantity of data, can be used by Parks Canada managers and requires little time.

In the following pages, the approach is described in detail and a number of examples illustrating its approach are given. The examples are taken from capital projects being reviewed, implemented or both at the same time.

2.4 **A Simple Approach**

2.4.1 Impact Tables

The proposed approach is based essentially on a series of simulation tables from the inter-provincial input-output model.

Of the 602 categories of goods and services considered in the model, eight goods and services were identified as being capable of covering most of the commodities included in Parks Canada capital projects. They are:

1. Repair Construction
2. Residential Construction
3. Non-residential Construction
4. Road Construction
5. Repair and Maintenance of Roads
6. Other Engineering Construction
7. Business Services
8. Furniture and Fixtures

"Non-residential construction" includes construction of visitor reception centres, garages, workshops and service buildings, while parks, landscaping, pools and exterior recreational facilities are included under the "other engineering construction" heading. The architectural, engineering and field surveying services are under "other engineering construction" . Appendix 1 gives a detailed description of each of the eight goods and services and their classification in the input-output model.

Despite the fact that the goods selected for the model are identified at the highest level of disaggregation, i.e. classification, 602 commodities, there may nonetheless be a degree of inaccuracy in estimating the impact of capital expenditures. This is one of the limitations of the model, and it was discussed in section 1.2. It occurs in "other engineering construction" and "business services". The former includes, in addition to items related to park works, marine, waterworks and sewage systems engineering; the latter includes, in addition to architectural and engineering services, the services of lawyers, notaries and accountants.

The eight goods and services identified are in no way the only ones permissible in the approach. If the need were felt in the future to add one or more categories, there would be no problem in doing so.

An impact table is associated with each of these goods and services. For those relating to construction, Statistics Canada assumes that they are goods produced locally; there is thus no difference between goods and services space and industry space. For the other goods, the tables relate to goods and services space. All data included in these tables come from simulations using the inter-provincial input-output model. Table 1 is an example of an impact table. The results from all the impact tables are combined in Appendix 2.

TABLE 1

Labour Income, GDP and Employment Generated in Province of Impact, per Dollar of Purchase, for Good No. 3 (Non-residential (instruction), 1979.*

AGGREGATES	PROVINCES										
	NFLD .	P.E.I.	N.S.	N.B.	QUE.	ONT.	MAN.	SASKK..	ALTA..	B.C..	Y-N.W.T
Labour Income											
Direct	0.35	0.32	0.33	0.35	0.37	0.38	0.33	0.35	0.36	0.37	0.36
Indirect + Induced	0.27	0.16	0.22	0.19	0.38	0.41	0.24	0.20	0.26	0.33	0.09
Total	0.62	0.48	0.55	0.56	0.75	0.79	0.57	0.55	0.62	0.70	0.45
GDP											
Direct	0.38	0.35	0.37	0.41	0.42	0.43	0.37	0.39	0.40	0.42	0.40
Indirect + Induced	0.41	0.24	0.35	0.32	0.56	0.62	0.38	0.31	0.45	0.49	0.11
Total	0.79	0.59	0.72	0.73	0.98	1.05	0.75	0.70	0.85	0.91	0.51
Employment											
Direct	0.17	0.20	0.17	0.16	0.16	0.15	0.17	0.12	0.14	0.12	0.03
Indirect + Induced	0.15	0.09	0.14	0.13	0.21	0.24	0.15	0.10	0.14	0.18	0.05
Total	0.32	0.29	0.31	0.29	0.37	0.39	0.32	0.22	0.28	0.30	0.08

Source: Statistics Canada, Input-Output Division

* For employment, a purchase of $10,000 is involved.

This table shows direct, indirect and induced, and total impacts of the expenditure of one dollar of the "non-residential construction" good in each province in terms of labour income and GDP. For example, if $1 is spent on this good in Newfoundland, 35 cents of direct labour income are generated, as well as 27 cents of indirect and induced labour income. Thus a total of 62 cents of labour income are generated in Newfoundland. The interpretation of GDP results is identical.

For employment, the table gives the impacts in person-years of work created by the purchase of $10,000 of the good. If, for example, $50,000 of the good "non-residential construction" is purchased in Newfoundland, then 1.6 person-years (($50,000 - $10,000) x 0.32) of work are created in the province.

The table shows that direct effects vary from one province to another for many different reasons, including differences in labour

productivity, in costs of materials and in the union structure of the construction industry, etc. Similarly, the indirect and induced effects vary considerably from province to province. The more diversified the province's economy, the better able it is to meet the needs of its industries and consumers and the less it is susceptible to losses of goods and services sales to firms outside the province. The result is greater indirect and induced impacts.

.411 the tables refer to the 1979 year. Those for construction and repair (1 to 6) come directly from Statistics Canada Input-Output Division. The tables for "business services" and "furniture and fixtures" were adjusted somewhat. Because the 1979 tables for goods and services were not yet available, industry space tables were used and adjusted using the various provinces' self-supply coefficients.2 According to Michel Bedard, of the Input-Output Division's Client Services, empirical checks showed that the adjustment was satisfactory and that the final result should accurately mirror actual 1979 data.

The economic impacts in provinces other than the one in which the project is implemented are given in Table 9 of Appendix 2. This table shows total impacts, i.e. the total direct, indirect and induced effects in terms of labour income, GDP and employment for all other provinces and for each of the eight goods and services. Thus the 0.58 coefficient for good number three (non-residential construction) for Newfoundland and for GDP indicates that for each dollar spent on good number three in Newfoundland, 58 cents of GDP will be generated in the other Canadian provinces.

Since the coefficients of the inter-provincial model do not yet allow the impacts in other provinces to be deduced, the coefficients included in the table were calculated by Parks Canada. They were obtained by subtracting the coefficients associated with the province in which the project is being implemented from the national input-output coefficients. According to Michel Bedard, this procedure should produce coefficients close to those that will soon become available from within the inter-provincial input-output model framework.

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2 The algebraic formula for this coefficient is as follows:

$$\frac{\text{Provincial production of good i used in the province}}{\text{Provincial utilization of good i}}$$

These data also come from the Statistics Canada Input-Output Division.

2.4.2 The Different Stages in the Approach

As in any impact study, the first stage consists of determining all project costs to be considered. These obviously must include all goods and structures to be built, but they must also include architectural, engineering construction site supervision and consultant's services. Contingency charges should be included, but land acquisition costs and costs for purchasing used buildings, equipment and machinery must be left out.

This stage identifies the cost of each structure or component rather than the cost of each material required for the project as a whole. Thus in considering the construction of a visitor reception centre, the following components should be identified: cost of building the reception centre, cost of professional services (engineering, construction site supervision, architects, etc.), cost of parking lot and access roads, cost of landscaping, cost of furniture and interpretation media. Costs for these components usually come from the M.O.P.P. form or the project officer.

In the second stage, each component is associated with one of the eight goods and services considered in the approach, which were described in the preceding section. Appendix 1, which describes each good, is particularly useful for this purpose. The amounts given for each good are then added together. Each capital project is thus defined in terms of a maximum of eight standard goods and services.

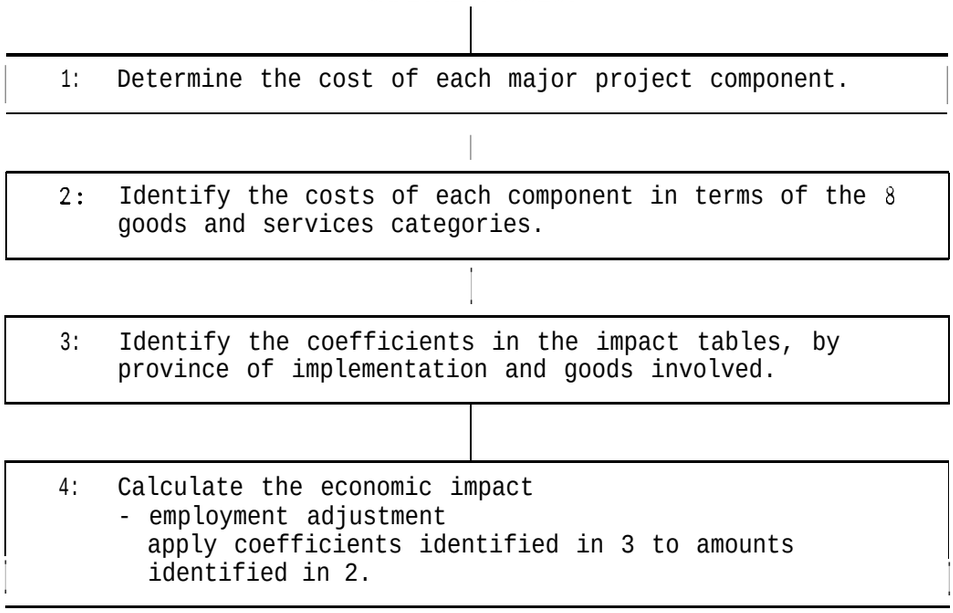
Stage three involves identifying in the impact tables (given in Appendix 2) the coefficients that are required in the impact study for each of the goods and services included in the project and for the province in which the project is to be implemented.

Finally, the fourth stage combines the calculations of the economic impacts on labour income, GDP and employment. It consists of applying the coefficients identified in the third stage to the amounts estabLished in the second stage. The results of these calculations are then added together to give the total impacts.

As was mentioned earlier, the estimate of the impact on employment requires an additional adjustment at the beginning of stage four. It will be discussed in the following section. Chart 4 gives a diagrammatic representation of the various stages involved in the approach.

CHART 4

Stages in a Capital Project Economic Impact Study Following a Simple Approach



2.4.3 Employment Adjustment

In the inter-provincial input-output model, the employment created (number of person-years of work generated) is calculated using the "employment/value of production" ratio. Since 1979, the model's reference year, the value of production has grown as a result of increased labour productivity, rising material and labour costs, increased demand for certain goods, technological change, etc. The worker who produced $1,000 worth of a specified commodity in 1979 produces perhaps $1,100 or $1,200 worth in 1984.

The data on increased production come from Statistics Canada catalogue 62-007 (construction cost statistics). The index used is the output price indicator of non-residential construction: institutional building, for selected Canadian cities. For example, the cost of institutional building in Montreal rose by 38.8 per cent (1,000 to 1,388) from 1979 to 1983.

TABLE 2

OUTPUT PRICE INDICATOR OF NON-RESIDENTIAL CONSTRUCTION: INSTITUTIONAL BUILDING, 1979 = 100

YEAR	CITY				
	HALIFAX	MONTREAL	TORONTO	CALGARY	VANCOUVER
1979	1,000*	1,000	1,000	1 ,000*	1,000
1980	1,083*	1,092	1,126	1,095*	1,104
1981	1,202*	1,250	1,290	1,205*	1,314
1982	1,288	1,359	1,426	1,288	1,430
1983	1,326	1,388	1,479	1,254	1,445

Source: Statistics Canada, Catalogue 62-007, April 1984.

* Since selling price indices were not available, input price indices were used.

Several hypotheses are required before the data can be used. On the one hand, it must be assumed that increases in Parks Canada construction costs are the same as for institutional building. Then it must be assumed that the cities selected are representative of their provinces and regions . Finally, because some data were not available for 1979-1980-1981, the input price index had to be substituted; this means that it must be assumed that input and output prices behaved in the same manner.

Since the non-residential construction output price indicator is published over two quarters late, adjusting the value of production may be a problem in periods of rapidly rising inflation. For the recent months for which the construction price index is unavailable, an index published earlier may be used. In view of the current low rate of inflation, the correction is not needed.

Despite these comments, the non-residential construction output price indicator is the most accurate gauge of increases in the value of production.

CHAPTER 3

EXAMPLES OF APPROACH APPLICATIONS

The examples given in this chapter make it possible to understand how the proposed approach works. They come from capital projects currently being reviewed, implemented, or both, and cover different projects implemented in different provinces in various years. Each example is described and then followed by an application of the approach and an explanation.

3.1 Example 1

National Park: Banff
Province: Alberta
Year of Estimate: 1982
Type of Project: Construction of visitor reception centre

Stage 1 - Determine cost of each major program component:

- Construction of the centre: $ 2,697,000
- Consulting fees: $ 705,000
- Information Media: $ 700,000

  Total: $ 4,102,000

Stage 2 - Identification of various goods:

- Cost of building visitor reception centre:
  $ 2,697,000
  good 3: non-residential construction

- Consulting fees:
  $ 705,000
  good 7: business services

- Information media:
  $ 700,000
  good 8: furniture and fixtures

  Thus : good 3: $ 2,697,000
  good 7: $ 705,000
  good 8: $ 700,000
  Total : $ 4,102,000

Stage 3 - Identification of impact matrix coefficients for goods 3, 7, 8, for the Province of Alberta in 1982

Aggregates	Good 3	Good 7	Good 8
Labour income			
Direct	0.36	0.36	0.10
Indirect + induced	0.26	0.14	0.03
Total	0.62	0.50	0.13
GDP			
Direct	0.40	0.38	0.16
Indirect + induced	0.45	0.26	0.09
Total	0.85	0.64	0.25
Employment			
Direct	0.14	0.10	0.07
Indirect + induced	0.14	0.08	0.04
Total	0.28	0.18	0.11
Out of province			
Labour income	0.37	0.77	0.74
GDP	0.52	1.06	1.05
Employment	0.31	0.86	0.49

Employment adjustment coefficient: 1.288

Stage 4 - Application of coefficients to amounts identified in 2:

Aggregates	Good 3	Good 7	Good 8	Total
Labour Income				
Direct	970,900	253,800	70,000	$1,294,700
Indirect + induced	701,200	98,000	21,000	$ 820,900
Total	1,672,100	352,500	91,000	$2,115,600
GDP				
Direct	1,078,800	267,900	112,000	$1,453,700
Indirect + induced	1,213,700	183,300	63,000	1,460,000
Total	2,292,500	451,200	175,000	2,918,700
Employment				
Adjustment	209.39	54.74	54.35	
Direct	29,3	5.5	3.8	38.6
Indirect + induced	29.3	4.4	2.2	35.9
Total	58.6	9.9	6.0	74.5
Out of Province				
Labour income	997,900	542,900	518,000	2,058,800
GDP	1,402,440	747,300	735,000	2,884,700
Employment	64.9	47.1	26.6	138.6
Canadian Total				
Labour income				4,174,400
GDP				5,803,400
Employment				213.1

3 .1.1 Comments

In this project, three main components were identified in stage 1. The costs of each of these components generally come from the M.O.P.P. form or the project officer. In the second stage, these components were associated with three of the eight goods considered in the approach as given in Appendix 1. In stage 3, the coefficients for goods 3, 7 and 8 for the Province of Alberta were taken from the tables in Appendix 2. Similarly, the employment adjustment coefficient for Alberta in 1982 was taken from Table 2 of the previous section.

Finally in stage 4, the impact coefficients identified in stage 3 were applied to the amounts identified in stage 2. For good 3, for example:

$ 2,697,000 x 0.36 = $ 970,900
$ 2,697,000 x 0.26 = $ 701,200
$ 2,697,000 x 0.62 = $ 1,672,000

and so on. For employment, the adjustment for the value of production must be taken into account, as well as the fact that a $10,000 purchase is involved. For good 3, for example, the calculation is as follows:

$ 2,697,000 - ($ 10,000 x 1.288) = 209.39

This calculation consists of evaluating the number of $10,000 blocks there are in $ 2,697,000, while at the same time taking into account the fact that the value of the $10,000 has increased since 1979. It is to the 209.39 figure, which is moreover found in the table for stage 4, that the employment coefficients are applied.

Once these operations are completed, all that remains is to estimate the total effects by adding together all the amounts entered on a given line. For example, to obtain direct total labour income in the province of impact, the amounts entered on the first line must be added together:

$ 970,900 + $ 253,800 + $ 70,000 = $ 1,294,700

The data entered under “total” represent the final result of the impact study. Thus the project will have created 38.6 direct and 35.9 indirect + induced person-years of work. Overall, the project will have generated 74.5 person-years of of work in 1982 in the Province of Alberta and 138.6 person-years of work in other provinces.

In all, 213.1 person years of work will have been associated with the project for Canada as a whole.

3.2 Example 2

National Park: Riding Mountain
Province: Manitoba
Year of Estimate: 1983
Type of Project: Construction of a new visitor reception centre

---

Stage 1 - Determine cost of each major program component:

- Construction of the building:	$ 120,000
- Parking:	$ 65,000
- Landscaping:	$ 35,000
- Public facilities:	$ 10,000
- Consulting and engineering fees:	$ 35,000 $ 31,000
- Sub-total:	$ 291,000
- Contingencies - 10%:	$ 29,000
Total:	$ 320,000

Stage 1.1 - Adjustment of contingencies fund:

- Building construction:	$ 131,900
- Parking:	$ 71,500
- Landscaping:	$ 38,500
- Public facilities:	$ 11,000
- Interpretation media:	$ 33,000
- Consulting and engineering fees:	$ 34,100
Total:	$ 320,000

Stage 2 - Identification of various goods:

- Cost of building reception centre:
  $ 131,900
  good 3: non-residential construction

- Parking:
  $ 71,500
  good 4: road construction

- Landscaping:
  $ 38,500
  good 6: other engineering construction

- Public facilities:
  $ 11,000
  good 3: non-residential construction

- Interpretation media:
  $ 33,000
  good 8: furniture and fixtures

- Consulting and engineering fees:
  $ 34,100
  good 7: business services

Thus : good 3: $ 142,900 ($131,900 + $ 11,000)
good 4: $ 71,500
good 6: $ 38,500
good 7: $ 34,100
good 8: $ 33,000
Total : $ 320,000

Stage 3 - Identification of impact matrix coefficients for goods 3, 4, 6, 7, 8, for the Province of Manitoba in 1983:

Aggregates	Good 3	Good 4	Good 6	Good 7	Good 8
Labour Income					
Direct	0.33	0.31	0.33	0.18	0.11
Indirect + induced	0.24	0.24	0.26	0.09	0.07
Total	0.57	0.55	0.59	0.27	0.18
GDP					
Direct	0.37	0.41	0.39	0.38	0.15
Indirect + induced	0.38	0.39	0.42	0.15	0.12
Total	0.75	0.80	0.81	0.35	0.27
Employment					
Direct	0.17	0.15	0.15	0.08	0.08
Indirect + induced	0.15	0.16	0.17	0.06	0.05
Total	0.32	0.31	0.32	0,14	0.13
Out of Province					
Labour income	0.42	0.35	0.37	1.00	0.69
GDP	0.62	0.54	0.56	1.35	1.03
Employment	0.27	0.23	0.25	0.90	0.47

Employment adjustment coefficient: 1.254

Stage 4 - Application of coefficients to amounts identified in 2:

Aggregates	Good 3	Good 4	Good 6	Good 7	Good 8	Total
Labour Income						
Direct	47,200	22,200	12,700	6,100	3,600	91,800
Indirect + induced	34,300	17,100	10,000	3,100	2,300	66,800
Total	81,500	39,300	22,700	9,200	5,900	158,600
GDP						
Direct	52,900	29,300	15,000	6,800	4,900	108,900
Indirect + induced	54,300	27,900	16,200	5,100	4,000	107,500
Total	107,200	57,200	31,200	11,900	8,900	216,400
Employment						
Adjustment	11.40	5.70	3.07	2.72	2.63	
Direct	1.9	0.9	0.5	0.2	0.1	3.7
Indirect + induced	1.7	0.9	0.5	0.2	0.1	3.4
'Total	3.6	1.8	1.0	0.4	0.3	7.1
Out of Province						
Labour income	60,000	25,000	14,200	34,100	22,800	156,100
GDP	88,600	38,600	21,600	46,000	34,000	228,800
Employment	3.1	1.3	0.8	2.4	1.2	8.8
Canadian Total						
Labour income						314,700
GDP						445,200
Employment						15.9

3.2.1 Comments

In this Manitoba project, the engineers identified the components in more detail. They introduced the headings “parking lot” and “landscaping”. They also included a $ 29,000 contingency fund, which was applied to each component as a function of its relative importance; for building construction, for example:

$$\frac{\$\ 120,000}{\$\ 291,000} \times \$\ 29,000 + \$\ 120,000 = \$\ 131,900$$

In the second stage, five goods were identified. Two of the main components of the project, the building of the visitor reception centre and public facilities, were combined under good 3 (non-residential construction) .

3.3 **Example 3**

National Park: Kluane
Province: Yukon
Year of estimate: 1983
Type of project: Construction of two visitor reception centres

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Stage 1 - Determine cost of each major program component:

- Construction of first centre: $ 550,400
- Parking lot for first centre: $ 93,000
- Construction of second centre: $ 514,000
- Surveying: $ 39,600

Total: $ 1,197,000

Stage 2 - Identification of various goods:

- Construction of first centre:
  $ 550,400
  good 3: t-ton-residential construction

- Parking lot for first centre:
  $ 93,000
  good 4: road construction

- Construction of second centre:
  $ 514,000
  good 3: non-residential construction

- Surveying:
  $ 39,600
  good 7: business services

Thus : good 3: $ 1,064,400 ($550,400 + $514,000)
good 4: $ 93,000
good 7: $ 39,600
Total : $ 1,197,000

Stage 3 - Identification of impact matrix coefficients for goods 3, 4, 7, for the Yukon in 1983:

Aggregates	Good 3	Good 4	Good 7
Labour income			
Direct	0.36	0.29	0.04
Indirect + induced	0.09	0.14	0.02
Total	0.45	0.43	0.06
GDP			
Direct	0.40	0.41	0.05
Indirect + induced	0,11	0.13	0.02
Total	0.51	0.54	0.07
Employment			
Direct	0.03	0.02	0.02
Indirect + induced	0.05	0.07	0.01
Total	0.08	0.09	0.03
Out of province			
Labour income	0.54	0.47	1.21
GDP	0.86	0.80	1.63
Employment	0.51	0.45	1.01

Employment adjustment coefficient: 1.445

Stage 4 - Application of coefficients to amounts identified in 2:

Aggregates	Good 3	Good 4	Good 7	Total
Labour Income				
Direct	383,200	27,000	1,600	$ 411,800
Indirect + induced	95,800	13,000	800	$ 109,600
Total	479,100	40,000	2,400	$ 521,400
GDP				
Direct	425,800	38,100	2,000	$ 465,900
Indirect + induced	117,100	12,100	800	$ 130,000
Total	542,900	50,200	2,800	$ 595,900
Employment				
Adjustment	73.66	6.44	2.74	
Direct	2.2	0.1	0.1	2.4
Indirect + induced	3.7	0.5	0.0	4.2
Total	5.9	0.6	0.1	6.6
Out of Province				
Labour income	574,800	43,900	47,900	$ 666,600
GDP	915,400	74,800	64,500	$1,054,700
Employment	37.6	2.9	2.8	43.3
Canadian Total				
Labour income				1,188,000
GDP				1,650,600
Employment				49.9

3 .3.1 Comments

This capital project located in the Yukon is different because out of a total investment figure of almost $ 1,200,000, barely $ 600,000 is generated in the GDP and only seven jobs are created. With only one-third the investment, the Manitoba project (example 2) created as many jobs in the province as the Kluane Park project. Because the Yukon does not have a diversified industrial structure, many of the human and physical resources have to be imported from other provinces. As a result, the impact coefficients are low and the economic impact weak.

The Yukon data must be treated with caution. With employment coefficients as low as those observed, the labour income coefficients for the territory should be lower than they are.

3.4 Example 4

National Park:	Gros Morne
Province:	Newfoundland
Year of Estimate:	1979
Type of Project:	Road construction and repair

Stage 1 - Determine cost of each major program component:

- Immediate repairs:	$ 370,000
- Engineer's fees:	$ 90,000
- Reconstruction of road:	$ 2,800,000
Total:	$ 3,260,000

Stage 2 - Identification of various goods:

- Immediate repairs:
  $ 370,000
  good 5: repair and maintenance of roads

- Engineer's fees:
  $ 90,000
  good 7: business services

- Reconstruction:
  $ 2,800,000
  good 4: road construction

Thus :	good 4:	$ 2,800,000
	good 5:	$ 370,000
	good 7:	$ 90,000
	Total :	$ 3,260,000

Stage 3 - Identification of impact matrix coefficients for goods 4, 5, 7, for Newfoundland in 1979:

Aggregates	Good 4	Good 5	Good 7
Labour income			
Direct	0.33	0.22	0.18
Indirect + induced	0.29	0.21	0.10
Total	0.62	0.43	0.28
GDP			
Direct	0.41	0.56	0.19
Indirect + induced	0.47	0.34	0.15
Total	0.88	0.90	0.34
Employment			
Direct	0.15	0.08	0.08
Indirect + induced	0.17	0.13	0.05
Total	0.32	0.21	0.13
Out of province			
Labour income	0.28	0.25	0.99
GDP	0.46	0.30	1.36
Employment	0.22	0.21	0.91

Employment adjustment coefficient: 1.00

Stage 4 - Application of coefficients to amounts identified in 2:

Aggregates	Good 4	Good 5	Good 7	Total
Labour Income				
Direct	924,000	81,400	16,200	$1,021,500
Indirect + induced	812,000	77,700	9,000	$ 898,700
Total	1,736,000	159,100	25,200	$1,920,300
GDP				
Direct	1,148,000	207,200	17,100	$1,372,300
Indirect + induced	1,316,000	125,800	13,500	$1,455,300
Total	2,464,000	333,000	30,600	$2,827,600
Employment				
Adjustment	280.00	37.00	9.00	
Direct	42.0	3.0	0.7	45.7
Indirect + induced	47.6	4.8	0.5	52.9
Total	89.6	7.8	1.2	98.6
Out of Province				
Labour income	784,000	92,500	89,100	965,600
GDP	1,288,000	111,000	122,400	1,521,400
Employment	61.6	7.8	8.2	77.6
Canadian Total				
Labour income				2,885,900
GDP				4,349,000
Employment				176.2

3.4.1 Comments

This is an interesting example because it involves a project which is very different from the earlier ones: the building and renovation of a road. Since the project took place in 1979, it is not necessary to adjust the value of production and the employment adjustment coefficient is 1.00. All that is required then is to calculate the number of $10,000 amounts for each good.

3.5 **Example 5**

National Park: Jasper
Province: Alberta
Year of Estimate: 1979
Type of Project: Renovation of facilities

Stage 1 - Determine cost of each major program component:

Engineer's fees:	$ 181,000
Campgrounds:	$ 825,000
Lodging for personnel:	$ 190,000
Pool :	$ 1,046,000
Public facilities:	$ 316,000
Parking:	$ 267,000
Picnic areas:	$ 27,000
Site renovation:	$ 234,000
Total:	$ 3,086,000

Stage 2 - Identification of various goods:

Engineer's fees:
$ 181,000
good 7: business services

Campgrounds:
$ 825,000
good 6: other engineering construction

Lodging for personnel:
$ 190,000
good 2: residential construction

Pool :
$ 1,046,000
good 6: other engineering construction

- Public facilities:
  $ 316,000
  good 3: non-residential construction

- Parking:
  $ 267,000
  good 4: road construction

- Picnic areas:
  $ 27,000
  good 6: other engineering construction

- Site renovation:
  $ 234,000
  good 6: other engineering construction

Thus :

good 2:	$ 190,000	
good 3:	$ 316,000	
good 4:	$ 267,000	
good 6:	$ 2,132,000	($825,000 + $1,046,000 + $27,000 + $234,000)
good 7:	$ 181,000	
Total :	$ 3,086,000	

Stage 3 - Identification of impact matrix coefficients for goods 2, 3, 4, 6, 7, for the Province of Alberta in 1979:

Aggregates	Good 2	Good 4	Good 4	Good 6	Good 7
Labour income					
Direct	0.32	0.36	0.37	0.31	0.36
Indirect + induced	0.24	0.26	0.26	0.26	0.14
Total	0.56	0.62	0.63	0.57	0.50
GDP					
Direct	0.39	0.40	0.53	0.47	0.38
Indirect + induced	0.43	0,45	0.51	0.45	0.26
Total	0.82	0.85	1.04	0.92	0.64
Employment					
Direct	0.11	0.14	0.12	0.12	0.10
Indirect + induced	0.13	0.14	0.15	0.14	0.08
Total	0.24	0,28	0.27	0.26	0.18
Out of province					
Labour income	0.38	0.37	0.37	0.39	0.77
GDP	0.52	0.52	0.30	0.45	1.06
Employment	0.34	0.31	0.27	0.31	0.86

Employment adjustment coefficient: 1.00

Stage 4 - Application of coefficients to amounts identified in 2:

Aggregates	Good 2	Good 3	Good 4	Good 6	Good 7	Total
Labour Income						
Direct	60,800	113,800	98,800	660,900	65,200	999,500
Indirect + induced	45,600	82,200	69,400	554,300	25,300	776,800
Total	106,400	195,900	168,200	1,215,200	90,500	1,776,300
GDP						
Direct	74,100	126,400	141,500	1,002,000	68,800	1,412,800
Indirect + induced	81,700	142,200	136,200	959,400	47,000	1,366,500
Total	155,800	268,600	277,700	1,961,400	115,800	2,779,400
Employment						
Adjustment	19.00	31.60	26.70	213.20	18.1	
Direct	2.1	4.4	3.2	25.6	1.8	37.1
Indirect + induced	2.5	4.4	4.0	29,8	1.4	42.1
Total	4.6	8.8	7.2	55.4	3.2	79.2
Out of Province						
Labour income	72,200	116,900	72,100	831,500	139,400	1,232,100
GDP	98,800	164,300	80,100	959,400	191,900	1,494,500
Employment	6.5	9.8	7.2	66.1	15.6	105.2
Canadian Total						
Labour income						3,008,400
GDP						4,273,900
Employment						184.4

3.5.1 Comments

This is an important project because it combines a number of components which were not present in the earlier examples. Thus several outdoor development projects are included, and they all combined under good 6 (other engineering construction). Included are campgrounds, a pool, picnic areas and site renovation.

3.6 Provincial Differences

It is difficult to distinguish provincial differences in the economic impacts in the above examples. The components of each project and the amounts involved vary, as does the year of the estimate. In order to identify features specific to the various provinces, a capital project was applied to the 10 Canadian provinces. Table 3 gives the results of these evaluations.

TABLE 3

Total GDP and Employment (Person-years) Generated for a Specified Capital Investment Project, by Province, 1982.

PROJECT: CONSTRUCTION OF A VISITOR RECEPTION CENTRE				
Visitor reception centre:	$ 2,700,000			
Consulting fees:	$ 700.000			
Information media:	$ 700,000			
Total:	$ 4,100,000			
	AGGREGATES			
	G.D.P.		EMPLOYMENT (P-Y)	
PROVINCES	$	RANK	NUMBER	RANK
NFLD .	$2,392,000	6	74.7	5
P.E.I.	$1,740,000	10	64.0	9
N.S.	$2,238,000	7	74.3	7
N.B.	$2,202,000	8	68.4	8
QUE.	$3,591,000	2	105.0	1
ONT.	$3,773,900	1	102.7	2
MAN .	$2,459,000	5	81.8	3
SASK.	$2,100,000	9	52.1	10
ALTA .	$2,918,000	4	74.5	6
B.C.	$3,101,000	3	76.2	4
AVERAGE	$2,651,000		77.4	

This table shows that the impact on GDP and employment (person-years of work) varies considerably from province to province for this specific capital project. The impact is greatest in Quebec and Ontario, with British Columbia and Manitoba in second place and Alberta and Newfoundland in third. The three Maritime provinces (P.E. I., N.S., N.B.) and Saskatchewan benefit much less than the other provinces.

The results of this exercise must not be generalized to include all capital projects because the combination of components varies from one project to another. They nevertheless make it possible to get a rough picture of which provinces benefit most and least from the economic impacts of such projects.

CHAPTER 4

COMPUTERIZING THE APPROACH

To make it easier to use the proposed approach, a program was developed for use on an IBM-PC computer. It makes it much simpler to estimate the economic impacts of a given capital project, and the user need have no prior knowledge of programming. It identifies the impact coefficients and does the subsequent calculations for stages 3 and 4. The user therefore determines which of the eight goods and services identified in the approach are to be included in the capital project.

Since the program is interactive, the user enters project data in response to screen prompts. There are five sections in the program: the first requires identifying the province in which the project is to be implemented; the second asks for the year of evaluation; the third asks for data on the type of project and the name of the national park where the project will be implemented; in section 4, the costs associated with one or more of the eight goods are entered; in the final section, the user is asked to enter the total capital cost for the project.

There are two alternative ways of introducing the costs associated with the various goods in section 4: they may be entered for each of the eight categories or only for those required by the program. Entering only those required is faster if there are no more than three or four goods categories involved. The other method is more rapid, however, if there are 6 or 7 goods associated with the project.

There are several verification stages at which the user can indicate whether he wishes to alter the data he has just entered. The user may also press the "↵" key to move the cursor back one character if an error was made in entering data from the keyboard and "return" has not yet been pressed.

The user should have the following data at hand to use the program:

- current date;
- province in which the project is to be implemented;
- year for which the project is being analyzed;
- project name;
- name of national park in which project is to be implemented;
- costs associated with each of the eight goods included in the approach;
- total capital investment amount.

4.1 A Tutorial Session

To better understand how the program works, one of the capital projects described in chapter 3 (example 3.4) was simulated. The tutorial for this exercise is described in the following pages.

The data for this tutorial are shown in the data entry form below. It includes data to identify the project and the costs associated with each of the eight goods and services included in the model.

DATA ENTRY FORM

Capital Project Economic Impact Model
Socio-Economic Branch, P.H.Q.

Today's Date:	20 October 1984
Province of Project:	Newfoundland
Year Analyzed:	1979
Project Name:	Road Construction and Repair
Park/Historic Site of Project:	Gros Morne

Goods and Services	Estimated Expenditure
1. Repair Construction	0
2. Residential Construction	0
3. Non-residential Construction	0
4. Road Construction	2800000
5. Repair and Maintenance of Roads	370000
6. Other Engineering Construction	0
7. Business Services	90000
8. Furniture and Fixtures	0
Total	3260000

To use the computer program, insert the program diskette into the disk drive and turn on the computer, monitor and printer. The program will be ready to run after approximately 50 seconds. A description and example of what you will see on the IBM-PC screen is given below. The information you will be entering from the keyboard is underlined. The bracketed numbers do not appear on the screen. They are shown here to simplify the process of describing the program.

(1) GOOD DAY. THIS PROGRAM CALCULATES THE ECONOMIC IMPACT OF CAPITAL PROJECTS .

(2) WHAT IS TODAY'S DATE?
TYPE THE DATE AND PRESS RETURN? **OCTOBER 20 1984**

(3) THE PROVINCES CONSIDERED BY THE PROGRAM ARE:
NEWFOUNDLAND: 1
PRINCE EDWARD ISLAND: 2
NOVA SCOTIA: 3
NEW BRUNSWICK: 4
QUEBEC: 5
ONTARIO: 6
MANITOBA: 7
SASKATCHEWAN: 8
ALBERTA: 9
BRITISH COLUMBIA: 10
YUKON-N.T. : 11

(4) IN WHAT PROVINCE WILL THE PROJECT BE IMPLEMENTED?
INDICATE THE NUMBER OF THE PROVINCE AND PRESS RETURN? 1

(5) THE PROVINCE CONSIDERED WILL BE NEWFOUNDLAND
DO YOU WANT TO CHANGE THE PROVINCE? ANSWER Y OR N. N

(6) THE YEARS CONSIDERED BY THE PROGRAM ARE:
1979 : 1
1980 : 2
1981 : 3
1982 : 4
1983 : 5
1984 : 6

(7) WHAT YEAR DO YOU WANT?
INDICATE THE NUMBER FOR THE YEAR AND PRESS RETURN? 1

(8) THE YEAR CONSIDERED WILL BE 1979
DO YOU WANT TO CHANGE THE YEAR? ANSWER Y OR N. N

(9) WHAT IS THE PROJECT?
TYPE THE PROJECT NAME AND PRESS RETURN? **REP. AND CONSTRUCTION OF A ROAD**

(10) IN WHAT NATIONAL PARK OR HISTORIC PARK/ SITE WILL THE PROJECT BE UNDERTAKEN?
TYPE THE NAME AND PRESS RETURN? GROS MORNE

(11) YOU CAN ENTER THE VALUE OF THE GOOD CATEGORIES TWO WAYS:
ENTER THEM AS YOU WANT: 1
ENTER THEM AS THE PROGRAM ASKS YOU: 2

(12) INDICATE THE NUMBER OF THE APPROACH YOU WISH TO USE, AND PRESS RETURN? 1

(13) THE GOOD CATEGORIES CONSIDERED BY THE PROGRAM ARE:
GOOD CATEGORY # 1 REPAIR CONSTRUCTION
GOOD CATEGORY # 2 HOUSING CONSTRUCTION
GOOD CATEGORY # 3 NON-RESIDENTIAL CONSTRUCTION
GOOD CATEGORY # 4 ROAD CONSTRUCTION
GOOD CATEGORY # 5 ROAD REPAIR AND MAINTENANCE
GOOD CATEGORY # 6 OTHER ENGINEERING CONSTRUCTION
GOOD CATEGORY # 7 PROF. SERVICES TO BUSINESS
GOOD CATEGORY # 8 FURNITURE AND FIXTURES

(14) HOW MANY OF THESE CATEGORIES WILL YOUR PROJECT HAVE?
TYPE THE NUMBER AND PRESS RETURN? 3

(15) GOOD CATEGORY # 1 REPAIR CONSTRUCTION
GOOD CATEGORY # 2 HOUSING CONSTRUCTION
GOOD CATEGORY # 3 NON-RESIDENTIAL CONSTRUCTION
GOOD CATEGORY # 4 ROAD CONSTRUCTION
GOOD CATEGORY # 5 ROAD REPAIR AND MAINTENANCE
GOOD CATEGORY # 6 OTHER ENGINEERING CONSTRUCTION
GOOD CATEGORY # 7 PROF. SERVICES TO BUSINESS
GOOD CATEGORY # 8 FURNITURE AND FIXTURES

INDICATE THE NUMBER OF THE FIRST GOOD CATEGORY TO BE USED, AND PRESS RETURN? 4

(16) WHAT $ AMOUNT IS ASSOCIATED WITH THE GOOD CATEGORY 4 ?
TYPE THE AMOUNT AND PRESS RETURN? 2800000

(17) THE VALUE OF THE GOOD CATEGORY ROAD CONSTRUCTION IS $2,800,000
DO YOU WANT TO CHANGE THE VALUE OF THIS GOOD? ANSWER Y OR N. N

(18) GOOD CATEGORY # 1 REPAIR CONSTRUCTION
GOOD CATEGORY # 2 HOUSING CONSTRUCTION
GOOD CATEGORY # 3 NON-RESIDENTIAL CONSTRUCTION
GOOD CATEGORY # 4 ROAD CONSTRUCTION
GOOD CATEGORY # 5 ROAD REPAIR AND MAINTENANCE
GOOD CATEGORY # 6 OTHER ENGINEERING CONSTRUCTION
GOOD CATEGORY # 7 PROF. SERVICES TO BUSINESS
GOOD CATEGORY # 8 FURNITURE AND FIXTURES

INDICATE THE NUMBER OF AN OTHER GOOD CATEGORY TO BE USED, AND PRESS RETURN? 5

(19) WHAT $ AMOUNT IS ASSOCIATED WITH THE GOOD CATEGORY 5 ?
TYPE THE AMOUNT AND PRESS RETURN? 370000

(20) THE VALUE OF THE GOOD CATEGORY ROAD REPAIR AND MAINTENANCE IS $370,000
DO YOU WANT TO CHANGE THE VALUE OF THIS GOOD? ANSWER Y OR N. N

(21) GOOD CATEGORY # 1 REPAIR CONSTRUCTION
GOOD CATEGORY # 2 HOUSING CONSTRUCTION
GOOD CATEGORY # 3 NON-RESIDENTIAL CONSTRUCTION
GOOD CATEGORY # 4 ROAD CONSTRUCTION
GOOD CATEGORY # 5 ROAD REPAIR AND MAINTENANCE
GOOD CATEGORY # 6 OTHER ENGINEERING CONSTRUCTION
GOOD CATEGORY # 7 PROF. SERVICES TO BUSINESS
GOOD CATEGORY # 8 FURNITURE AND FIXTURES

INDICATE THE NUMBER OF THE LAST GOOD CATEGORY TO BE USED, AND PRESS RETURN? 7

(22) WHAT $ **AMOUNT** IS ASSOCIATED WITH THE GOOD CATEGORY 7 ?
TYPE THE AMOUNT AND PRESS RETURN? 90000

(23) THE VALUE OF THE GOOD CATEGORY PROF. SERVICES TO BUSINESS IS $90,000
DO YOU WANT TO CHANGE THE VALUE OF THIS GOOD? ANSWER Y OR N. N

If you answer at the bracket (12) that you want to enter the value of the good categories as the program asks you, YOU must answer at the sequence (25)-(26) for each of eight goods.

(24) WHAT $ VALUE IS ASSOCIATED WITH EACH GOOD CATEGORY OF THE PROGRAM?
TYPE THE VALUES AS THE PROGRAM ASK'S, AND PRESS RETURN?

(25) GOOD CATEGORY # 1 REPAIR CONSTRUCTION: 0

(26) THE $ VALUE OF THE GOOD CATEGORY REPAIR CONSTRUCTION IS $0.
DO YOU WANT TO CHANGE THE VALUE OF THIS GOOD CATEGORY? ANSWER Y OR N. N

After you have entered the value associated with the last good asked by the program the sequence (27) appears.

(27) WHAT IS THE TOTAL AMOUNT OF THE PROJECT?
TYPE IT AND PRESS RETURN? 3260000

(28) THE TOTAL AMOUNT CONSIDERED IS $3,260,000
DO YOU WANT TO CHANGE THIS VALUE? ANSWER Y OR N. N

(29) THE RESULTS WILL BE PRINTED IN ONE MOMENT.

After about 20 seconds the simulation results are printed out. When printing is complete, sequence (30) appears.

(30) THE PROGRAM IS FINISHED:
DO YOU HAVE ANOTHER PROGRAM TO EVALUATE?
ANSWER Y OR N. N

If you had answered yes to this question, the program would have returned to (3) and another capital project would have been analyzed. Since the answer is N for this example, sequence (31) appears.

(31) PLEASE TURN OFF COMPUTER.

4.2 **Error Messages**

Error messages appear when you introduce wrong data; for example alphabetical term at the place of numbers, the letter O when the computer asks Y or N, if you enter 7 when the program only accepts a number between 1 and 6. Each time the error message appears, the user must reintroduce the last information. These are examples:

:(4) IN WHAT PROVINCE WILL THE PROJECT BE IMPLEMENTED?
INDICATE THE NUMBER OF THE PROVINCE AND PRESS RETURN? 12

You answer 12 to sequence (4) but the program only accepts 1 - 11 so, the following error message appears:

PLEASE USE THE NUMBERS 1 TO 11.

and the program returns to sequence (4).

:(4) IN WHAT PROVINCE WILL THE PROJECT BE IMPLEMENTED?
INDICATE THE NUMBER OF THE PROVINCE AND PRESS RETURN? N

You answer N to sequence (4) but the program only accepts numbers so, the following error message appears:

PLEASE USE NUMERALS ONLY.

and the program returns to sequence (4).

:(8) THE YEAR CONSIDERED WILL BE 1983
DO YOU WANT TO CHANGE THE YEAR? ANSWER Y OR N. F

You answer F to sequence (8) but the program only accepts Y or N so, the following error message appears:

YOU MUST REPLY Y OR N.

and the program returns to sequence (8).

:(18) INDICATE THE NUMBER OF ANOTHER GOOD CATEGORY TO BE USED, AND PRESS RETURN? 2

You answer with a number which you have already used so, the following error message appears on the screen:

YOU HAVE ALREADY USED THE GOOD CATEGORY # 2.
PLEASE CHANGE THE NUMBER OF THE GOOD CATEGORY.

and the program returns to sequence (18).

On the other hand, if the total expenditure amount you entered at the sequence (24) does not correspond with the amount you entered for each goods at the sequences (22)-(23), the following error message appears:

THE AMOUNT YOU HAVE GIVEN DOESN'T EQUAL THE SUM OF THE GOOD CATEGORIES YOU GAVE EARLIER.
YOU MUST START OVER BY ENTERING THE VALUE OF THE GOOD CATEGORIES.

and the program returns to the beginning of the goods identification, sequence (13).

4.3 **Simulation Results**

The results of this impact study, as they appear on the printout , are shown on the following page.

Following the date are the identification of the model, the data entered by the user to describe the project, and the results of the impact study. It should be remembered that the impact study results include only the capital project costs. Impacts resulting from operation and maintenance of new facilities and any additional visitors they may attract are not included.

As with the examples given in chapter 3, economic impacts are measured in three ways: labour income, GDP and employment. For the province in which the project is located, direct, indirect and induced, and total impacts are identified. The total impact for all other provinces is then given. Finally, adding the total impact in the project province and in the other provinces, we obtain the national impact. It is given on the last line.

TABLE 4

Simulation Results

20 OCTOBER 1984

****

ECONOMIC IMPACT MODEL FOR CAPITAL PROJECTS
SOCIO-ECONOMIC BRANCH, HQ.
SEPTEMBER 2984 VERSION.

****

PROJECT: REP. AND CONSTRUCTION OF A ROAD
GROS MORNE
PROVINCE OF NEWFOUNDLAND
YEAR 1979

GOOD CATEGORY # 4 ROAD CONSTRUCTION : $2,800,000
GOOD CATEGORY # 5 ROAD REPAIR AND MAINTENANCE : *370,000
GOOD CATEGORY # 7 PROF. SERVICES TO BUSINESS : %90,000

TOTAL ALL GOOD CATEGORIES : %3,260,000

****

ECONOMIC IMPACT IN NEWFOUNDLAND AND THE OTHER PROVINCES :

TYPE OF IMPACT	LABOUR 1 NCOME	G.D.P.	PERSONS-YEARS
NEWFOUNDLAND			
DIRECT	%1,021,600	S1,372,300	45.7
INDIRECT AND INDUCED	$898,700	$1,455,300	52.9
TOTAL	$1,920,300	S2,827,600	9s.5
OTHER PROVINCES			
TOTAL	%965,600	$1,521,400	77.6
NEWFOUNDLAND AND THE OTHER PROVINCES			
TOTAL	82,S85,900	%4,349,000	176.1

****

CONCLUSION

The greatest advantage of the model described in this report is its simplicity. It allows the user to do a rapid assessment of the economic impact of any capital project and the meaning of the aggregates used to estimate the impacts is easy to understand.

In view of the limitations of the input-output model, the results should be treated with caution. The real impact of GDP or employment (person-years) could even, in some cases, vary considerably from the modelling results. The reliability of the results will also depend on the effort given to identifying the project components and their costs.

Moreover, this sort of analysis, in identifying significant impacts on various aggregates, does not indicate the economic performance of Parks Canada capital projects. To do so would require, for example, comparing the impact of the capital project investments in question to the impacts of other projects, whether government or private sector. An economic impact study of a project should also not be confused with a profitability study, which in economics would be called a cost-benefit analysis.

Finally, it would be interesting in the future to examine some aspects of the model. On the one hand, once a number of simulations have been completed, the structure of the goods and services considered in the model should be checked to see if it provides a satisfactory description of the investment projects, On the other hand, a careful study of the degree to which Parks Canada implements the regional purchasing policy should be carried out.

BIBLIOGRAPHY

Audet, M. "L'impact socio-économique du pare national de Kouchibouguac sur son environnement immédiat et sur l'ensemble de la province du Nouveau-Brunswick" , Halifax, 1981. 137 p.

Pares Canada, "Evaluation de l'impact sur l'économie canadienne des dépenses attribuables aux emplacements patrimoniaux nationaux administrés par Pares Canada. Volume 1: méthodologie et principaux résultats". Préparé par Alain Charlebois, Direction socio-économique, avril 1983. 34 p.

Parcs Canada, "Analyse de l' impact économique des projects d'investissement à l'aide du modèle interprovincial d'entrées-sorties de Statistique Canada". Préparé par Francine Couture, Direction socio-économique, juin 1984. 60 p.

Statistique Canada, "Standard Industrial Classification". 1980.

Statistique Canada, "La structure par entrées-sorties de l'économie canadienne, 1971-1978", Catalogue 15-201F. Avril 1982.

Statistique Canada, "Les comptes nationaux des revenus et des dépenses, volume 3". Catalogue 13-549F. Septembre 1975. 464 p.

Statistique Canada, "Faits saillants du modèle interprovincial d'entrées-sorties de 1974". Décembre 1980. 100 p.

Statistique Canada, "Statistique des prix de la construction". Catalogue 62-007.

Statistique Canada, "La construction au Canada, 1982-1984". Catalogue 64-201.

Statistique Canada, Division des entrées-sorties, données non publiées.

APPENDIX 1

Description of Goods and Services Used

TABLE 1

Goods and Services Used and Corresponding Classification

Good	Goods and Services	Classification (level L) of Statistics Canada Input-Output Division
1	Repair construction	522
2	Residential construction	523
3	Non-residential construction	524
4	Construction of roads	525
5	Repair and maintenance of roads	541
6	Other engineering construction	529
7	Business services	566
8	Furniture and fixtures	204-208

Description of the Goods and Services considered by the Model

#	Type	Definition
1.	Renovation/Repair Construction	Any regular maintenance work aimed at reconditioning a building or another type of construction (excluding road system repairs). Historic buildings restoration. Structures stabilization.
2.	Residential Construction	Single, detached, semi-detached, duplexes, apartments, row housing, etc.
3.	Non-Residential Construction	Industrial buildings: factories, plants, workshops, etc. Commercial buildings: stores, hotels, restaurants, office buildings, garages and service stations, theatres, arenas, recreational buildings etc. Institutional buildings: schools, hospitals, etc. Other building construction: farm buildings, broadcasting stations, passenger terminals, bus boat, laboratories, etc. Registration kiosk and other services building, e.g. water treatment.
4.	Road Construction	Highways, roads and streets (grading, scraping, oiling, filling). Parking lots and resting areas. Sidewalks and paths. Runways, landing fields.
5.	Road Repair and Maintenance	Road, bridge and tunnel maintenance and repair services. Pothole filling. Snow clearing. Tarring roads.

Description of the Goods and Services considered by the Model

#	Type	Definition
6.	Other Engineering Construction	Marine constructions : docks , wharves, piers, breakwaters, retaining walls, embankments, canals and waterways, etc. Waterworks and sewage systems: tile drains, storm sewers, water mains, water pumping stations, filtration plants, water storage tanks, etc. Other engineering construction: bridges, overpasses, tunnels, parks, landscaping, sodding, swimming pools, tennis courts, golf courses, campgrounds, outdoor recreation facilities, fences, snowsheds , signs, guard rails, etc. Electrical power system. Development of play areas. Trails and signage. Preliminary works on a construction site.
7.	Service to Industries -	Offices of accountants, lawyers and notaries. Offices of architects, engineers, and other scientific and technical services (surveying, archeology, etc.) Construction site coordination and supervision.
8.	Furniture and Fixture -	Household, camping and lawn, furniture. Office, restaurant and institutional furniture. Interpretive and exhibit materials (such as displays, showcases, interpretive stations along a trail, etc.) Lamps and lightbulbs. does not include plastic and concrete furniture.

APPENDIX 2

Labour Into-e, GDP and Employment Generated in Province of Impact, per Dollar of Purchase for Selected Goods, by Province, 1979.

TABLE 1

Labour Income, GDP and Employment Generated in the Province of Impact, per Dollar of Purchase, for Good No. 1 (Repair Construction), 1979.*

F	PROVINCES										
	NFLD .	P.E.I.	N.S.	N.B.	QUE.	ONT .	MAN .	SASK.	ALTA .	B.C.	Y./N.W.T.
Labour income											
Direct	0.37	0.31	0.34	0.32	0.35	0.37	0.32	0.35	0.37	0.32	0.31
Indirect + induced	0.27	0.17	0.23	0.19	0.36	0.38	0.22	0.20	0.24	0.33	0.09
Total	0.64	0.48	0.57	0.51	0.71	0.75	0.54	0.55	0.61	0.65	0.42
GDP											
Direct	0.43	0.32	0.37	0.35	0.39	0.43	0.35	0.38	0.40	0.36	0.36
Indirect + induced	0.40	0.26	0.36	0.32	0.55	0.58	0.36	0.32	0.44	0.50	0.13
Total	0.83	0.58	0.73	0.67	0.94	1.01	0.71	0.70	0.84	0.86	0.49
Employment											
Direct	0.20	0.23	0.20	0.18	0.18	0.18	0.19	0.14	0.16	0.14	0.03
Indirect + induced	0.15	0.10	0.14	0.14	0.21	0.22	0.16	0.11	0.14	0.17	0.06
Total	0.35	0.33	0.34	0.32	0.39	0.40	0.35	0.25	0.30	0.31	0.09

Source: Statistics Canada Input-Output Division.

* Employment uses a $10,000 purchase.

TABLE 2

Labour Income, GDP and Employment Generated in the Province of Impact, per Dollar of Purchase, for Good No. 2 (Residential Construction), 1979.*

AGGREGATES	PROVINCES										
	NFLD.	P.E.J..	N.S.	N.B.	QUE.	ONT .	MAN .	SASK.	ALTA .	B.C.	Y./N.W.T.
Labour income											
Direct	0.33	0.29	0.33	0.32	0.32	0.33	0.33	0.33	0.32	0.32	0.33
Indirect + induced	0.24	0.15	0.21	0.19	0.38	0.40	0.21	0.18	0.24	0.33	0.09
Total	0.57	0.44	0.54	0.51	0.70	0.73	0.54	0.51	0.56	0.65	0.42
GDP											
Direct	0.37	0.32	0,39	0.37	0.36	0.40	0.40	0.39	0.39	0.37	0.38
Indirect + induced	0.36	0.23	0.34	0.31	0.57	0.59	0.34	0.29	0.43	0.51	0.10
Total	0.73	0.55	0,73	0.68	0.93	0.99	0.74	0.68	0.82	0.88	0.48
Employment											
Direct	0.14	0.16	0.14	0.12	0.12	0.12	0.13	0.10	0.11	0.10	0.02
Indirect + induced	0.13	0.09	0.13	0.14	0.22	0.23	0.15	0.09	0.13	0.18	0.05
Total	0.27	0.25	0.27	0.26	0.34	0.35	0.28	0.19	0.24	0.28	0.07

Source: Statistics Canada Input-Output Division.

* Employment uses a $10,000 purchase.

TABLE 3

Labour Income, GDP and Employment Generated in the Province of Impact, per Dollar of Purchase, for Good No. 3 (Non-residental Construction), 1979.*

AGGREGATES	PROVINCES										
	NFLD .	P.E.I.	N.S.	N.B.	QUE.	ONT .	MAN .	SASK.	ALTA .	B.C.	Y./N.W.T.
Labour income											
Direct	0.35	0.32	0.33	0.37	0.37	0.38	0.33	0.35	0.36	0.37	0.36
Indirect + induced	0.27	0.16	0.22	0.19	0.38	0.41	0.24	0.20	0.26	0.33	0.09
Total	0.62	0.48	0.55	0.56	0.75	0.79	0.57	0.55	0.62	0.70	0.45
GDP											
Direct	0.38	0.35	0.37	0.41	0.42	0.43	0.37	0.39	0.40	0.42	0.40
Indirect + induced	0.41	0.24	0.35	0.32	0.56	0.62	0.38	0.31	0.45	0.49	0.11
Total	0.79	0.59	0.72	0.73	0.98	1.05	0.75	0.70	0.85	0.91	0.51
Employment											
Direct	0.71	0.20	0.17	0.16	0.16	0.15	0.17	0.12	0.14	0.12	0.03
Indirect + induced	0.15	0.09	0.14	0.13	0.21	0.24	0.15	0.10	0.14	0.18	0.05
Total	0.32	0.29	0.31	0.29	0.37	0.39	0.32	0.22	0.28	0.30	0.08

Source: Statistics Canada Input-Output Division.

* Employment uses a $10,000 purchase.

TABLE 4

Labour Income, GDP and Employment Generated in the Province of Impact, per Dollar of Purchase, for Good No. 4 (Road Construction), 1979.*

AGGREGATES	PROVINCES										
	NFLD.	P.E.I.	N.S.	N.B.	QUE.	ONT.	MAN.	SASK.	ALTA.	B.C.	Y./N.W.T.
Labour income											
Direct	0.33	0.41	0.32	0.27	0.36	0.39	0.31	0.26	0.37	0.30	0.29
Indirect + induced	0.29	0.19	0.24	0.18	0.35	0.38	0.24	0.21	0.26	0.32	0.14
Total	0.62	0.60	0.56	0.45	0.71	0.77	0.55	0.47	0.63	0.62	0.43
GDP											
Direct	0.41	0.53	0.41	0.34	0.42	0.47	0.41	0.44	0.53	0.42	0.41
Indirect + induced	0.47	0.31	0.41	0.33	0.54	0.57	0.39	0.33	0.51	0.49	0.13
Total	0.88	0.84	0.82	0.67	0.96	1.04	0.80	0.77	1.04	0.91	0.54
Employment											
Direct	0.15	0.18	0.14	0.14	0.14	0.14	0.15	0.11	0,12	0.11	0.02
Indirect + induced	0.17	0.11	0.13	0.13	0.20	0.21	0.16	0.11	0.15	0.17	0.07
Total	0.32	0.29	0.27	0.27	0.34	0.35	0.31	0.22	0.27	0.28	0.09

Source: Statistics Canada Input-Output Division.

* Employment uses a $10,000 purchase.

TABLE 5

Labour Income, GDP and Employment Generated in the Province of Impact, per Dollar of Purchase, for Good No. 5 (Road/Bridge Construction), 1979.*

AGGREGATES	PROVINCES										
	NFLD.	P.E.I.	N.S.	N.B.	QUE.	ONT.	MAN.	SASK.	ALTA.	B.C.	Y./N.W.T.
Labour income											
Direct	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Indirect + induced	0.21	0.15	0.19	0.15	0.32	0.28	0.19	0.17	0.19	0.25	0.13
Total	0.43	0.37	0.41	0.37	0.54	0.50	0.41	0.39	0.41	0.47	0.35
GDP											
Direct	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
Indirect + induced	0.34	0.25	0.31	0.26	0.41	0.42	0.30	0.28	0.37	0.38	0.16
Total	0.90	0.81	0.87	0.82	0.97	0.98	0.86	0.84	0.93	0.94	0.72
Employment											
Direct	0.08	0.09	0.08	0.09	0.08	0.09	0.07	0.08	0.08	0.08	0.07
Indirect + induced	0.13	0.11	0.12	0.12	0.20	0.16	0.13	0.10	0.12	0.13	0.07
Total	0.21	0.20	0.20	0.21	0.28	0.25	0.20	0.18	0.20	0.21	0.14

Source: Statistics Canada Input-Output Division.

* Employment uses a $10,000 purchase.

TABLE 6

Labour Income, GDP and Employment Generated in the Province of Impact, per Dollar of Purchase, for Good No. 5 (Other Engineering Construction), 1979.*

AGGREGATES	PROVINCES										
	NFLD.	P.E.I.	N.S.	N.B.	QUE.	ONT.	MAN.	SASK.	ALTA.	B.C.	Y./N.W.T.
Labour income											
Direct	0.39	0.38	0.33	0.29	0.35	0.34	0.33	0.34	0.31	0.33	0.32
Indirect + induced	0.29	0.21	0.25	0.22	0.39	0.42	0.26	0.24	0.26	0.35	0.11
Total	0.68	0.59	0.58	0.51	0.74	0.76	0.59	0.58	0.57	0.68	0.43
GDP											
Direct	0.54	0.40	0.39	0.32	0.44	0.43	0.39	0.38	0.47	0.38	0.38
Indirect + induced	0.43	0.33	0.40	0.36	0.58	0.63	0.42	0.38	0.45	0.54	0.13
Total	0.97	0.73	0.79	0.68	1.02	1.06	0.81	0.76	0.92	0.92	0.51
Employment											
Direct	0.15	0.17	0.15	0.14	0.13	0.13	0.15	0.10	0.12	0.10	0.02
Indirect + induced	0.15	0.13	0.16	0.15	0.23	0.24	0.17	0.13	0.14	0.20	0.06
Total	0.30	0.30	0.31	0.29	0.36	0.37	0.32	0.23	0.26	0.30	0.08

Source: Statistics Canada Input-Output Division.

* Employment uses a $10,000 purchase.

TABLE 7

Labour Income, GDP and Employment Generated in the Province of Impact, per Dollar of Purchase, for Good No. 7 (Business Construction), 1979.*

AGGREGATES	PROVINCES										
	NFLD.	P.E.I.	N.S.	N.B.	QUE.	ONT.	MAN .	SASK.	ALTA .	B.C.	Y./N.W.T.
F	0.18	0.09	0.18	0.12	0.37	0.33	0.18	0.14	0.36	0.33	0.04
	0.10	0.04	0.09	0.05	0.22	0.20	0.09	0.06	0.14	0.19	0.02
	0.28	0.13	0.27	0.17	0.59	0.53	0.27	0.20	0.50	0.52	0.06
GDP											
Direct	0.19	0.11	0.20	0.14	0.40	0.36	0.20	0.16	0.38	0.36	0.05
Indirect + induced	0.15	0.07	0.14	0.08	0.34	0.31	0.15	0.10	0.26	0.30	0.02
Total	().34	0.18	0.34	0.22	0.74	0.67	0.35	0.26	0.64	0.66	0.07
Employment											
Direct	0.08	0.02	0.08	0.05	0.18	0.17	0.08	0.06	0.10	0.18	0.02
Indirect + induced	0.05	0.03	0.05	0.04	0.13	0.12	0.06	0.03	0.08	0.11	0.01
Total	0.13	0.05	0.13	0.09	0.31	0.29	0.14	0.09	0.18	0.29	0.03

Source: Statistics Canada Input-Output Division. Processed at Parks Canada.

* Employment uses a $10,000 purchase.

TABLE 8

Labour Income, GDP and Employment Generated in the Province of Impact, per Dollar of Purchase, for Good No. 8 (Furniture and Fixtures), 1979.*

AGGREGATES	PROVINCES										
	NFLD	P.E I	N.S.	N.B.	QUE.	ONT.	MAN.	SASK.	ALTA.	B.C.	Y./N.W.T.
Labour income											
Direct	0.01	0.01	0.03	0.04	0.21	0.23	0.11	0.01	0.10	0.09	0.01
Indirect + induced	0.01	0.01	0.03	0.03	0.26	0.25	0.07	0.02	0.03	0.09	0.00
Total	0.02	0.02	0.06	0.07	0.47	0.48	0.18	0.03	0.13	0.18	0.01
GDP											
Direct	0.02	0.02	0.05	0.07	0.33	0.35	0.15	0.02	0.16	0.14	0.01
Indirect + induced	0.01	0.01	0.03	0.04	0.28	0.32	0.12	0.02	0.09	0.12	0.01
Total	0.03	0.03	0.08	0.11	0.61	0.67	0.27	0.04	0.25	0.26	0.02
Employment											
Direct	0.01	0.01	0.03	0.03	0.17	0.17	0.08	0.01	0.07	0.05	0.01
Indirect + induced	0.00	0.00	0.01	0.02	0.13	0.13	0.05	0.01	0.04	0.06	0.00
Total	0.01	0.01	0.04	0.05	0.30	0.30	0.13	0.02	0.11	0.11	0.01

Source: Statistics Canada Input-Output Division. Processed at Parks Canada.

* Employment uses a $10,000 purchase.

TABLE 9

Labour Income, GDP and Employment Generated in all Other provinces, per Dollar of Purchase, for Various Goods, 1979*

GOOD	AGGREGATES	PROVINCES										
		NFLD.	P.E.I.	N.S.	N.B.	QUE.	ONT.	MAN.	SASK.	ALTA.	B.C.	Y./N.W.T.
1.	Labour income	0.29	0.45	0.36	0.42	0.22	0.18	0.39	0.38	0.32	0.28	0.51
	GDP	0.50	0.75	0.60	0.66	0.39	0.32	0.62	0.63	0.49	0.47	0.84
	Employment	0.22	0.24	0.23	0.25	0.18	0.17	0.22	0.32	0.27	0.26	0.48
2.	Labour income	0.37	0.50	0.40	0.43	0.24	0.21	0.40	0.43	0.38	0.29	0.52
	GDP	0.61	0.79	0.61	0.66	0.41	0.35	0.60	0.66	0.52	0.46	0.86
	Employment	0.31	0.33	0.31	0.32	0.24	0.23	0.30	0.39	0.34	0.30	0.51
3.	Labour income	0.37	0.51	0.44	0.43	0.24	0.20	0.42	0.44	0.37	0.29	0.54
	GDP	0.58	0.78	0.65	0.64	0.39	0.32	0.62	0.67	0.52	0.46	0.86
	Employment	0.27	0.30	0.28	0.30	0.22	0.20	0.27	0.37	0.31	0.29	0.51
4.	Labour income	0.28	0.30	0.34	0.45	0.19	0.13	0.35	0.43	0.27	0.28	0.47
	GDP	0.46	0.50	0.67	0.52	0.38	0.30	0.54	0.57	0.30	0.43	0.80
	Employment	0.22	0.25	0.27	0.27	0.20	0.19	0.23	0.32	0.27	0.26	0.45
5.	Labour income	0.25	0.31	0.27	0.31	0.14	0.18	0.27	0.29	0.27	0.21	0.33
	GDP	0.30	0.29	0.33	0.38	0.23	0.22	0.34	0.36	0.27	0.26	0.48
	Employment	0.21	0.22	0.22	0.21	0.14	0.17	0.22	0.24	0.22	0.21	0.28
6.	Labour income	0.28	0.37	0.38	0.45	0.22	0.20	0.37	0.38	0.39	0.28	0.53
	GDP	0.40	0.64	0.58	0.69	0.35	0.31	0.56	0.61	0.45	0.45	0.86
	Employment	0.27	0.27	0.28	0.28	0.21	0.20	0.25	0.34	0.31	0.27	0.49
7.	Labour income	0.99	1.14	1,00	1.10	0.68	0.74	1.00	1.07	0.77	0.75	1.21
	GDP	1.36	1.52	1.36	1.48	0.96	1.03	1.35	1.44	1.06	1.04	1.63
	Employment	0.91	0.99	0.91	0.95	0.73	0.75	0.90	0.95	0.86	0.75	1.01
8.	Labour income	0.85	0.85	0.81	0.80	0.40	0.3')	0.69	0.84	0.74	0.69	0.86
	GDP	1.27	1.27	1.22	1.19	0.69	0.6	1.03	1.26	1.05	1.04	1.28
	Employment	0.59	0.58	0.56	0.55	0.30	0.29	0.47	0.58	0.49	0.49	1.59

Sources: Statistics Canada Input-Output Division. Processed At Parks Canada.

* Employment uses a $10,000 purchase.