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Statistics Canada
National Accounts and Analytical Studies
System of National Accounts
Input-Output Division

Input-Output Accounts of the Canadian Economy:
Concepts, Definitions and National Economic Accounting Structure

Volume One:
Background and Uses

By

P.S.K. Murty

 # 93

August, 2001

DRAFT

Research Document Series No. 93

Input-Output Accounts of the Canadian Economy

CONCEPTS, DEFINITIONS AND NATIONAL ECONOMIC ACCOUNTING STRUCTURE

Volume One: Background and Uses

By

P.S.K. Murty, Ph. D.
Chief of Research and Development
System of National Accounts
Input-Output Divison

August, 2001

AUTHOR'S PREFACE

Scope and Style

This is a reference compendium dealing with the Input-Output Accounts of the Canadian economy. It consists of the following three volumes.

- Volume One: Background and Uses
- Volume Two: Concepts and Accounting Structure
- Volume Three: Historical Revision, 1961-1992

The Input-Output Accounts are prepared and published annually for economic analysis particularly for the content analysis of production and disposition of goods and services. The three volumes of this compendium explain, in simple language, the background and uses, concepts, definitions and the national economic

accounting structure of the Input-Output Accounts along with highlights of the recent historical revision.

They have been written in a style different from the traditional presentation, which generally gives a mere narrative and descriptive account without any detailed explanation of the uses and applications of the databases.

I have chosen the different style for three main reasons.

- First, the information should be useful for a larger audience and presented to the readers in a way that makes it indispensable even for elementary study by college students and beginners in economic analysis.
- Second, the presentation should be simple, unambiguous, and easily understood.
- Third, it should give, where possible, illustrations, tabular information, charts and analytical context to make it well understood by the broader audience to encourage more application of the Input-Output Accounts in economic and business analysis.

Goals

I have two goals in preparing this document.

- My first goal is to try and embody my extensive in-depth knowledge and experience in a detailed manner, rather than in broad generalities, to preserve the institutional memory of the discipline. Consequently, besides other uses, this document is designed as a reference tool primarily to train the professional

and technical support staff by making the style and manner of presentation easy to follow and suitable for teaching purposes.

- My second goal is not to limit the use of this document to only a few sophisticated readers such as the professional staff who are already well acquainted with the subject, but rather, to extend the benefits even to the beginners by giving extensive narrative descriptions where needed, and by answering simple questions that are normally posed by all those who are interested in learning more about economic analysis by using the key data of the Input-Output Accounts.

The Accounts may sound like a mystery for those who do not have familiarity with the details such as 'what' they are, 'why' they are produced and 'how' they can be used for different analytical needs. My primary goal is to demystify the position and change the perception by explaining clearly 'what' the Accounts are meant to accomplish, 'why' they are created and 'how' they can be used in many situations to answer various questions. Let me elaborate on some of the driving forces for the underlying theme of presentation to place the subject in a better perspective.

Generally speaking, presenting the information on the Input-Output Accounts to the audience in an interesting and useful way by keeping the aforesaid objectives in mind is always a challenge, because the authors are faced with the problem of how to begin the study. As the information on the Input-Output Accounts is massively wide and deep which has to be compressed into some meaningful and practical generalities, one can begin the presentation with the explanation indicating the

need for such Accounts, their practical usage and applications for different studies, and their conceptual framework within the internationally used national economic accounting system, which is called the System of National Accounts. There is indeed so much to know for a better understanding of the Input-Output Accounts.

One can also begin the study with a mere narrative and descriptive summary of the existing presentation only, without providing any answers to questions such as those starting with 'what', 'why' and 'how', and without writing anything about the numerous changes that occurred in the recent historical revision program which reshaped the past structure and modernized the Accounts.

A mere narrative and descriptive account presented in this manner without any mention of the past nor any mention about the underlying need of the Input-Output Accounts is inevitably a dull collection of facts.

Readers want to know, for example:

- What are the Input-Output Accounts?
- Why do we produce them in the first place?
- How are they put together?
- What are their concepts and definitions?
- What is their national economic accounting structure?
- Why did we change the previous concepts and definitions?
- Why did we introduce changes to the previous structure of the accounting framework?

- Which specific items in the concepts and accounting structure did we change in the modernization program?

Answers to these questions would make the topic more interesting, illuminating and inspiring to the beginners as well as other readers. While answering those questions, it is also desirable to give examples of numerous uses and applications along with the inherent limitations, so that a clear and unbiased view of the subject could emerge in such a theme. Then, the subject would be transformed from a dull nature to an interesting and thought - provoking type. Such a manner of presentation is user - friendly and would also attract the attention of many new readers, since the information would be more palatable and useful to them. That is the style and type of approach that would indeed instill the interest and fire up the appetite of the readers for more information on the related issues. Also, the reinforcement of the interest of the readers, on the subject at the beginning in the first volume would ensure a better reception of the more complicated information on concepts, definitions, and structure of the national economic accounting framework, which is presented in the second volume.

There is also another advantage. By generating more interest among the readers on the various ways of applying the data to different issues at the very outset, the basic empirical knowledge needed for economic analysis could be disseminated more easily to a larger audience. As a consequence, many readers would be well-informed. That kind of approach would facilitate the training of a broad spectrum of well-informed new analysts in the long-run. The upshot of such a step would be

certainly beneficial to the community at large, because the newly trained analysts could be able to utilize the databases and evaluate the emerging events in the economy. Thus, eventually, the interests of the broader audience would be well served. These are just a few illustrations of advantages that would flow from the different style adopted here.

Having explained my two goals which prompted me to write this document in a style different from the traditional pattern of presentation, let me also explain the need and the benefits of a broader audience.

Benefits of a Broader Audience

One may question why this document with three volumes should be focussed for a broader audience at this time. In answer to this question, I wish to highlight a few important benefits that would accrue by following such an approach.

- First, a broader audience including trainees and beginners is needed now to develop and strengthen a knowledge - based economy in Canada. Such an audience would be able to benefit from this reference compendium by understanding one of the important and currently available basic tools of economic analysis.
- Second, we would be able to increase the analytical potential in human resources to fill the gaps that are constantly created by the retirement of senior professionals.
- Third, the training programs of government statistical offices would be able to use this document for teaching purposes.

- Fourth, universities and colleges, which desire to introduce both short-term and long-term courses on the subject in the field of applied economics ranging from say, three weeks to three months, would have a ready-made textbook for their needs.
- Fifth, a flagship course in macro-economic input-output analysis could be developed in any statistical organization such as Statistics Canada using this document as the basic text book. Such a course would be enormously beneficial not only for beginners, but also for those who have already been working in the area to strengthen their basic knowledge and to sharpen their analytical and research skills.
- Sixth, this compendium has been written taking into account the Input-Output Accounts in general although, for the sake of examples, reference is made to the Accounts of the Canadian economy in particular. Since the Canadian Accounts follow closely the international Accounts recommended in the 1993 System of National Accounts of the United Nations and other major international organizations, this compendium is relevant for a reference document as well as for a text book not only in Canada but also in other countries of the world which have a system similar to the international system.

Courses

Then, the next question that follows is: Where can we have such a specialized course at the present time to obtain all those benefits?

We know that universities and colleges teach the basic theories in Economics. However, specialized fields of applications such as the National Economic

Accounts and their components (e.g., Input-Output Accounts) are generally left to the government departments which have the responsibility to produce those accounts. Therefore, at the present time, only the government offices which eventually get the benefit of knowledge in those specialized areas would have to introduce a training course tailored primarily to specific programs of work where such specialized knowledge is required using this as a text book.

Therefore, no matter how one looks at it, it is inarguable that a reference document such as this compendium outlining the details of the concepts, definitions and the national economic accounting structure with some answers to questions starting with 'what', 'why' and 'how' is highly desirable, timely, and useful for a broader audience. This conclusion appears to be very relevant at this stage, and the goal to provide conceptual knowledge and analytical know-how for all users, including trainees, in the new millennium, which is one of the driving forces of this publication, is not out of place.

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I am hopeful that this compendium would serve the interests of various users in their quest for knowledge on the much-desired quantifiable type of economic analysis not only in Canada but also in other countries and would also provide them with an important analytical tool for use in special studies on technological changes as well as in the general economic analysis in this new millennium.

System of National Accounts
Input-Output Division
Statistics Canada
Ottawa, Ontario
August 2001

P.S. K. Murty, Ph.D
Chief of Research and Development

STRUCTURE OF THE BOOK

Volume One: Background and Uses

Volume Two: Concepts and Accounting Structure

Volume Three: Historical Revision 1961-92

Note: Detailed contents for each volume follow.

Detailed Table of Contents

Volume One: Background and Uses

CHAPTER I

INTRODUCTION

CHAPTER II

WHAT ARE INPUT-OUTPUT ACCOUNTS?

Page

LIST OF TABLES

CHAPTER II

TEXT TABLES

LIST OF CHARTS

CHAPTER II

TEXT CHARTS

CHAPTER III

WHY HISTORICAL REVISIONS?

CHAPTER IV

USES AND APPLICATIONS

LIST OF TABLES

CHAPTER IV

TEXT TABLES

LIST OF CHARTS

CHAPTER IV

Volume One:

Background and Uses

I

INTRODUCTION

1. PURPOSE OF THE COMPENDIUM

The purpose of this compendium with three volumes is to produce reference documents containing a complete record of the revised Input-Output Accounts based on the recent historical revision[1] of the Canadian System of National Accounts (CSNA)[2]. The historical revision undertook and completed a comprehensive review of concepts, definitions and statistics, along with the national economic accounting

[1] Although the period covered for the database of the recent historical revision was 32 years from 1961 to 1992, the concepts, definitions and the national economic accounting structure adopted in this revision and explained in this compendium are applicable to the subsequent years also until further changes are made. Such changes will also be documented in similar publications, as needed.

[2] The Canadian System of National Accounts is composed of Economic Accounts for the country. As such, it is also called 'The Canadian National Economic Accounts' to give clear relevance to the 'economic' aspect of the Accounts. The simple term of 'national accounts' may sometimes be mistaken to mean 'national social accounts' also. The term 'national economic accounts' will clear any ambiguity in this regard.

structure in which data of all parts contained in the CSNA[3] are compiled and presented for economic analysis.

In addition to explaining the changes that resulted from the historical revision, this document discusses the revised concepts, definitions and the national economic accounting structure as they relate to the Input-Output Accounts of the Canadian economy. As such, this compendium supersedes all previous publications on concepts, definitions and the national economic accounting structure employed in the Input-Output Accounts[4] of Canada.

It may be recalled here that the historical revision program covered a period of 32 years from 1961 to 1992 and the revised statistical estimates of the Input-Output Accounts that resulted from this program were published in a separate document at a very aggregated level[5].

[3] The CSNA consists of Economic Accounts in four different parts: Input-Output Accounts; Income and Expenditure Accounts; Gross Domestic Product by Industry which is produced in constant prices; and Balance of International Payments. Each part has its own publication as will be highlighted later in the text.

[4] In Canada, the Input Output Accounts are available from 1961 onwards.

[5] In the Input-Output Acounts, we have four different levels of aggregation. They are: Worksheet (W); Link (L); Medium (M) and Small (S). Each of these levels has a different grouping with a specific number of 'industries', 'final demand categories', and 'goods and services' as shown in page 15 of the publication: *The Input-Output Structure of the Canadian Economy, 1961-1992: Historically Revised Data* (Catalogue Number 15-201 XPB), Statistics Canada, October 1998. While the aggregation at the W level has the largest number of items, the S level has the smallest. In accordance with our publication policy, the level of aggregation published was at the Small (S) level with 21 industries 13 final demand categories and 57 goods and services including primary inputs. However, it should be noted that the actual production work is always undertaken at a more detailed level, namely, Worksheet (W) level of aggregation. For example, the W level aggregation categories contain 243 industries, 162 final demand categories and 679 goods and services including primary inputs from 1986 onwards with some variation for the earlier period as mentioned in that publication.

The revised basis of the program was extended to the subsequent years in the current production and the data for the periods covering 1993-1995 and 1995-1996 were also produced on the new basis and published in two separate issues[6]. Similarly, the data for other years will also be on the same new basis in the current production program until further revisions are introduced at a later date.[7]

It is hoped that this reference compendium will enlighten the users and serve their purposes in this new millennium until revisions of a similar nature are undertaken in future.

2. BACKGROUND FOR THE HISTORICAL REVISION

Before presenting the main theme of this document, some background information for the historical revision is given in this section for a better understanding of the issues involved in later chapters.

In general, historical revisions are periodically undertaken by statistical agencies in order to implement the accepted practice of maintaining statistical time-series on a consistent basis, so that the data would facilitate proper analysis and detection of turning points in the evolution of economic and social phenomena.

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[6] *The Input-Output Structure of the Canadian Economy, 1993-1995,* (Catalogue Number 15-201-XPB), Statistics Canada, Ottawa, March 1999; and for 1995-1996 with the same catalogue number dated June 2000.

[7] In fact, effective 1997, the structure of some industries and commodities has been changed due to the introduction of the North American Industry Classification System (NAICS). These changes will be documented in a similar follow-up publication explaining the new structure along with sources of data and methods of estimation which will cover two parts: one part for 1961 to 1997; and the other part for 1997 onwards.

One of the main driving forces of our historical revision was the publication of the revised international System of National Accounts which is called the System of National Accounts 1993[8] sponsored and approved by all major international organizations and being adopted worldwide. In addition to the implementation of the international system, we have several other reasons which are fully discussed in Chapter III.

The coverage of the historical revision program was indeed for a long period of 32 years from 1961 to 1992. Although the final publication of the data was at a very aggregated small (S) level as stated earlier, the actual production work is always undertaken at the most detailed level at which the basic data are available. The basic data are then transformed into the Worksheet (W) level of aggregation. In view of this, the historical revision was a very time-consuming exercise involving a massive amount of data for the thousands of cells that needed to be reviewed, revised and integrated within the overall framework of the Accounts. The project relating to the revision program was started in 1994 and it took about five years to complete. It covered all the four sub-systems of the CSNA:

- the Input-Output Accounts;
- the Income and Expenditure Accounts;
- the Gross Domestic Product by Industry; and
- the Balance of International Payments and Financial Flows.

[8] In 1993, the United Nations and four other international organizations i.e., Commission of the European Communities – Eurostat; International Monetary Fund; Organization for Economic Cooperation and Development; and World Bank -- published a revised international *System of National Accounts, 1993*, Brussels/Luxembourg, New York, Paris, Washington, D.C., 1993.

It is worth noting that this extensive project involved the most thorough review of concepts, definitions, methods and statistics undertaken by Statistics Canada since the introduction of the National Economic Accounts of Canada in the 1940's. The results of the historical revision have been thoroughly discussed in the third part of this publication which provides a link between the past and the present. Those who are interested in learning more about the historical evoluation will find it illuminating as it provides considerable relevant details and illustrates appropriate analytical approaches needed to analyze changes in the revision program.

It should be recalled here that the previous reference document on the Input-Output Accounts was published in December 1987[9]. Since that time, a number of major developments took place and they were reflected in the historical revision. This publication consolidates in a single volume all those conceptual and statistical revisions which were associated with the various developments that took place since the last reference document of 1987. As such, this document will serve as a reference compendium not only for those who want to learn more about the Input-Output Accounts for the first time, but also for those who have already used the data in the past. In addition, those who are involved in producing the various statistical products of the Input-Output Accounts can also benefit from this document in their day-to-day operations.

[9] *The Input-Output Structure of the Canadian Economy, 1961-1981 (Revised Data)* - Catalogue 15-510 Occasional, Statistics Canada, Input Output Division, Ottawa, 1987.

3. ORGANIZATION OF THE COMPENDIUM

The discussion in this compendium is kept as clear as possible, so that beginners in the economic analysis who are unfamiliar with the Input-Output Accounts can also get the benefit of this publication. The thrust is to provide adequate information aimed at building the knowledge-based economy that will give Canada an edge in the global market place not only in the production of goods and services, but also in the techniques to evaluate and analyze the data about the production process of the country.

In order to better serve the needs of a variety of users, this compendium is divided into three volumes with a total of eleven chapters.

The first volume contains four chapters (I to IV) and provides a setting to the discussion that follows. More specifically, Chapter I contains an introduction, while Chapter II gives an explanation on 'what' Input-Output Accounts are about and 'what' they portray. Chapter III deals with a general question on the need for historical revisions and Chapter IV points to various uses and applications in order to acquaint the readers with the multitude of questions that can be answered by using these Accounts. With the help of the illustrations that are provided in Chapter IV, the users can see it for themselves 'why' the Input-Output Accounts are necessary for economic analysis and 'how' several type of studies can be carried out by using the database depending on various requirements. Along with 'Uses and Applications', the Chapter IV highlights some structural limitations and gives a balanced view of the utility function of the Input-Output Accounts.

The second volume contains three chapters (V to VII). In Chapter V, it discusses the concepts and definitions. In Chapter VI, it looks at the national economic accounting structure specifically related to the Input Output Accounts. In Chapter VII, some challenges that lie ahead of us are highlighted to illustrate some areas which need further attention in the on-going research and developmental projects to make the Input-Output Accounts more user-oriented, innovative, and dynamic.

Rather than being simply operational, the chapter VII on challenges gives some introspective views and addresses some of the existing problem areas to achieve two objectives.

- Internally, the professionals concerned can plan the future developmental work in the relevant areas and make necessary improvements in the next round of revisions.
- Externally, the users too can be aware of the concerns related to the existing database, which they will be able to take into account in their evaluations and interpretations. Then, it will be possible to draw conclusions in the analytical studies with a balanced view keeping in mind the inherent limitations.

The third volume contains four chapters (VIII to XI) and focuses on the results of the recent historical revision. It provides the link between the past and the present. Chapter VIII gives an overview of the revisions, summarizes the changes that occurred by providing several statistical tables and provides charts showing the historical time-series of the commonly used components of the gross domestic product to serve as the link between the past and the present databases. While the

changes that occurred specifically for the components of the Income-based gross domestic product are discussed in Chapter IX, the changes that occurred in the components of the Expenditure-based gross domestic product are explained in Chapter X. The structural changes that occurred in the accounting framework are highlighted in Chapter XI.

Thus, this publication provides a new thrust, broadens its content and explains one of the complex economic analytical tools in non-technical terms. It is hoped that the techniques of using and analyzing the information will be available to a wider audience and the training of skilled professionals will be accelerated by using this document for teaching purposes. While preparing this document, it is realized that the knowledge-based skills concerning the field of economic research and analysis are, and also will be, very essential in the years-to-come not only for the government sector but also for other sectors of the economy in this new millennium.

If, however, the readers are not interested in the results of the historical revision, they can skip the third volume altogether and deal with other aspects of the Accounts discussed elsewhere in the first and second volumes. Needless to say that the third volume, which bridges the gap between the past and the present is also important for those who have used the previous database in their studies, because it provides valuable and detailed information on the changes that resulted from the revision program. Due to the separation and grouping of the chapters on the historical revision into the third volume of the document, the readers are in a position to get acqainted not only with the current concepts and definitions, but also with the historical

evolution. Such historical knowledge will enable the users to evaluate the time-series in a better perspective. The information provided in the third volume is therefore indispensable for anyone interested in gaining sufficient in-depth knowledge on the Canadian economy for the last four decades.

The text of the third volume is arranged in the sequence generally used for economic analysis dealing with Gross Domestic Product (GDP) which is presented in two parts: Income-based Gross Domestic Product and the Expenditure-based Gross Domestic Product. The results of the historical revision as well as the conceptual framework in which the data are compiled and published are also presented here in terms of the GDP series to facilitate better understanding of the present position as well as the past.

Thus, if all the chapters in the three volumes are completely reviewed together, the reader will get a firm grip on the evolution, content and the multitude of uses and applications of the Input-Output Accounts.

4. USERS OF THE INPUT-OUTPUT ACCOUNTS

The Input Output Accounts are used nationally and internationally as valuable analytical tools in the evaluation of economic conditions of any country. The users of Input-Output Accounts are not confined to any particular sector, but are within all sectors of the economy. They can be in business establishments, governments, manufacturers' associations, colleges and universities, households, or other

stakeholders. They can also be policy makers, policy analysts, students of economics, and other researchers, etc.

It is not out-of-place to recall here briefly the historical background of the Input Output Accounts, which gives an idea of the international importance. The first Input-Output tables were developed by Professor Wassify Leontief for the U.S. economy in 1936 for the years 1919 and 1929. Since then, other countries started developing their own Input-Output tables. Later, Professor Richard Stone integrated the Input-Output framework as an integral part of the United Nations *System of National Accounts*[10] which was published in 1968. In 1973, Professor Leiontief won the Nobel prize for his developmental work. In 1984, Professor Stone also won the Nobel prize for his contribution to the development of a United Nations international system of national accounts which integrated the Input-Output tables within its framework and enhanced the basis for empirical economic analysis. Thus, the Input-Output Accounts had the significant contributions of two Nobel prize winners in Economics and they are regarded as essential tools for in-depth economic analysis of any country. Consequently, there is considerable interest in the database of the Input-Output Accounts across all countries of the world. Such is the international importance of the Accounts for various analytical purposes.

In view of the widespread interest in the Input-Output Accounts across all nations, an attempt has been made here to keep the discussion at a non-technical level as far as possible in order to have it well understood by trainees, analysts, researchers, students

[10] United Nations, *A System of National Accounts*, Studies in Methods, Series F, No. 2, Rev. 3, New York, 1968.

of economics, business executives, and other potential users who wish to evaluate the economic conditions with the help of the published information.

In this general context, readers who are just introduced to the subject generally wish to know the answer to a simple question: what is the utility function of the Input-Output Accounts? This question is answered in this compendium to provide a meaningful perspective in general terms. Although some of the specific uses and applications are discussed extensively in Chapter IV, they can be summarized that the usefulness of the Accounts is rather very extensive in the field of applied economies.

A simple answer to the question is that the Input-Output Accounts provide information on production and its disposition with a breakdown by industries, goods and services,[11] and final demand categories[12]. Because the breakdown provided in the Accounts constitutes a central framework of economic statistics with considerable detailed information, several types of studies can be made using that information as explained in Chapter IV.

It is generally acknowledged that the Input Output Accounts are essential for various purposes, such as appraising economic performance, charting the course of the

[11] The terms 'commodities' and 'goods and services' are interchangeably used in this publication to mean the same thing. The term 'commodities' means 'products' which can be either 'material products' (e.g. furniture) or 'service products' (e.g. accounting services) and both of them are called 'commodities' or 'goods and services'.

[12] Final Demand categories consist of the following:
Personal Expenditure on Goods and Services;
Government net Current Expenditure on Goods and Services;
Gross Fixed Capital Formation;
Value of Physical Change in Inventories
Exports; and
Imports (negative item as they do not form part of domestic production)

economy and evaluating the pattern of economic developments by industry as well as by final demand categories. These Accounts are also used for economic decision-making and policy analysis in a variety of fields, such as commodity taxation, government assistance to industries (i.e., subsidies by industry), and numerous other studies dealing with areas such as impact of changes in demand and supply of goods and services in the Canadian economy. It is not an exaggeration to say that, in fact, they are widely used and accepted as the most detailed set of integrated economic data useful for numerous purposes.

In Canada, the Input-Output Accounts are also used as benchmarks for other sub-systems (or parts) of the Canadian System of National Accounts, namely, 'the Income and Expenditure Accounts' and 'Gross Domestic Product by Industry' which contain information on the Gross Domestic Product. This is because, the Input-Output Accounts contain comprehensive details of commodities and industries depicting production and disposition of goods and services for each commodity and industry instead of broad aggregates for specific categories such as those used in the 'Income and Expenditure Accounts' and 'Gross Domestic Product by industry'. Also, more time and resources for research and analysis are used in compiling, analyzing, balancing and finalizing the Input-Output Accounts. This is attributable to the fact that, after the initial compilation, the data are subjected to a thorough review. For example, the data of production are balanced with disposition at the most detailed level by each commodity and industry. The data of indirect taxes (i.e., taxes on products and taxes on production) in the Accounts are balanced with the relevant control totals of collections by the three levels of government -- federal, provincial,

and local. Individual industry information published elsewhere outside Statistics Canada are also brought into the research and analytical work.

Generally speaking, in the process of the review and commodity - balancing work, several inconsistencies and problems are detected in the basic data and eliminated through extensive interaction between the staff of the Input-Output Division and basic data suppliers, which are mostly other divisions within Statistics Canada or other government agencies and departments. When the data are made available by the suppliers, the professional and technical support staff of the Input Output Division examine, classify, edit, research, integrate, analyze and ensure in the final analysis that all aspects of the various data are conveying the same kind of signals and messages. Naturally, all these steps take considerable time and resources to complete them. The publication of final data follows soon after the analysis is completed along with the commodity - balancing work between production and disposition.

In view of these large number of intervening steps that are absolutely necessary for the completion of the Input Output Accounts, the final product that comes out of the entire process turns out to be a high quality product for economic analysis. It usually takes about three years to complete and finalize the Accounts for any reference period partly due to the time required by data suppliers to collect, compile, analyze and provide us with the required data and partly due to the usual thorough review and analysis done by the staff of the Input Output Division.

In contrast, both the Income and Expenditure Accounts[13] and the GDP by industry series[14] are more timely than the Input-Output Accounts and they are published with a lesser time-lag from the reference period. These two sub-systems of the CSNA work with aggregates of main categories while the Input-Output Accounts work with considerable details as well as aggregates. Also, they are designed to produce quarterly data with a time lag of two months from the reference period and the emphasis is placed more on timeliness with as much thoroughness as possible within the time-constraints of their production deadlines. While more thoroughness in compilation, research and analysis is important and needed at the detailed commodity and industry levels in producing the Input-Output Accounts, more timeliness is important and emphasized for the other two sub-systems of CSNA.

The upshot of this clear distinction between the Input-Output Accounts and other parts of the CSNA is the higher quality data of the Input-Output Accounts, which is clearly the upside of the long analytical exercise. Consequently, the higher quality data are considered as more suitable for use as benchmarks in both the 'Income and Expenditure Accounts' and the 'Gross Domestic Product by Industry'. On the downside, however, due to the lengthy time required to prepare and finalize the data for use in the Accounts, the relevance of the data is sometimes brought into question. This is understandable as there is a lag of at least 34 months from the reference year to the actual release of the data. This lag is, of course, closely watched to ensure, on one hand, that enormous delay does not take place while, on the other hand, efforts

[13] These are produced and published by the Income and Expenditure Division.
[14] These are produced and published by the Industry Measures and Analysis Division.

are made to achieve and maintain the higher quality of data for which the Accounts are meant for.

With the foregoing general introduction of the subject, let us see in the next chapter what these Accounts portray for economic analysis.

II

WHAT ARE INPUT-OUTPUT ACCOUNTS?

1. INPUTS AND OUTPUTS

Input Output Accounts provide some of the basic macro-economic analytical tools to understand and analyze the economy with special reference to production and disposition of goods and services.

As the name implies, the Accounts consist of 'inputs' and 'outputs' in the form of double-entry bookkeeping for recording 'production' and 'disposition' of 'goods and services' in a given economy. In short, the 'goods and services' are also called 'commodities'.

In the business accounting, the double-entry principle is based on the fact that each transaction consists of an exchange of values. Let us take a simple example to illustrate this principle. If a business establishment sells goods for $100 cash, it is apparent from this transaction that in the books of that establishment, the asset 'cash' increases by $100 as there is a credit of a corresponding amount. The asset 'goods' decreases by a corresponding value of $100 as there is a debit of the same value. In other words, for every 'credit', there must be a corresponding 'debit'.

By applying the same principle to the Input-Output Accounts, one can see that for each 'input', there must be a corresponding 'output' of the same value. Hence, by this type of accounting, the value of 'inputs' must equal to the value of 'outputs' also.

Since the inputs and outputs deal with production and disposition of goods and services in the economy, the input-output accounting also shows, besides 'inputs' and 'outputs', how the value of 'production' of goods and services is accounted for by its 'disposition'. This, in essence, is what the Input-Output Accounts provide for the in-depth analysis of economies in terms of 'inputs' and 'outputs' as well as 'production' and 'disposition' of goods and services. In essence, then, the Input-Output Accounts summarize a multitude of transactions and classification systems into a manageable format using specific terminology. As we will see in later chapters, both inputs and outputs are identified by specific goods or services. In short, the inputs are 'goods and services' that are used in the 'process of production' while the outputs are those that come out of that production process for disposition.

In other words, the outputs are the 'produced' goods and services and they are simply identified, as 'production'.

The production is utilized, either within the country or outside the country. In addition, the goods not utilized are stored away in 'inventories'. The utilization within the country and outside the country as well as the stored goods in inventories represent the total 'disposition' of the production.

Therefore, the terms 'inputs', 'outputs', 'production', and 'disposition' are the key terms used in the Input Output Accounts. These Accounts are technically balanced in the sense that 'inputs' are equated to the 'outputs' while 'production' is equated to its 'disposition' by using the same double-entry bookkeeping illustrated earlier.

In other words, if there is an entry in inputs for a certain value, there will be a corresponding entry of the same value in outputs also even though it need not necessarily be the same 'good' or 'service'. Similarly, if there is an entry in 'production' for a certain value, there ought to be a corresponding entry of the same value in 'disposition' also. This type of accounting for the total economy as a whole is also similar to a double-entry bookkeeping method used in the business accounting practices. The details of this kind of double entry accounting will be more apparent in later chapters where comprehensive information is provided for the measurement of production and disposition of goods and services in the Canadian economy.

2. PRODUCTION OF GOODS AND SERVICES

The production of goods and services is generated by establishments. These establishments are grouped into industries based on a standard classification system. For example, prior to 1997, Statistics Canada developed a Standard Industrial Classification (SIC)[15] for use across all the Divisions. Effective 1997, the SIC is replaced by the North American Industrial Classification System (NAICS). As the NAICS is of a recent origin, and as it is in the early stages of its implementation, the examples provided in this publication are those of the SIC-based industries and commodities. Any changes that resulted due to the introduction of NAICS will be discussed in a follow-up volume with a detailed description of sources of data and methods of estimation based on the new system of classification.

Generally speaking, in the Divisions of Statistics Canada which conduct surveys, establishments surveyed are assigned to specific industries based on the classification system that is followed.

For the purpose of the Input-Output Accounts, however, the industries originally allotted in the surveys are further re-grouped into 'Input-Output industries' in order to build-up a more manageable industry structure to display goods and services involved in the production and disposition processes.

[15] The industry classification used centrally across all the Divisions of Statistics Canada is called the Standard Industrial Classification (SIC). Effective 1997, this classification system is replaced by North American Industrial Classification System (NAICS). This new classification has resulted in some changes to the already existing commodity and industry structures of the Input Output Accounts. These changes along with the sources of data and methods of estimation will be discussed in a follow-up volume entitled 'Sources and Methods of the Input Output Accounts'.

Similar to the Standard Industrial Classification for industries, Statistics Canada developed a Standard Commodity Classification (SCC) for goods. This SCC was used within Statistics Canada by all divisions for classification of goods from 1950s until 1987.

In 1988, the SCC was replaced by a Standard Commodity of Goods (SCG). The SCG was based upon the Harmonized Commodity Description and Coding system (Harmonized System, or HS). The HS is an international standard commodity description and coding system with six-digit goods classification and it was developed under the auspices of the Customs Corporation Council (CCC) for external trade.

The SCG of Statistics Canada, however, extended the six-digit HS coding system by an additional two digits to provide more statistical detail for goods manufactured in Canada, for the materials used in their manufacture, and for imports and exports of goods.

In order to derive the Input Output goods, the categories of both SCC and SCG were regrouped into relevant goods categories similar to the industrial regrouping used to derive the Input Output industries mentioned earlier. The regrouping of Input Output goods took into account the need for consistency and the linkage required between the 'Input Output industrial classification' and the 'Input Output goods classification'.

For international trade, however, different classification systems were used in Statistics Canada:

- The Canadian International Trade Classification (CITC) for Imports; and
- Exports Commodity Classification (XCC) for exports.

These two classifications were used within Statistics Canada until 1987. They were replaced in 1988 by the Harmonized Commodity Description and Coding system (Harmonized System or HS) mentioned already. Here again, the categories of the CITC, XCC and HS were also regrouped into Input Output goods by maintaining the required consistency and linkage with the Input Output industries.

Thus, the aforesaid classification system, and the regrouped Input Output goods facilitated the accounting of goods not only those that are generated in the Canadian economy, but also those that are routed through external trade.

Thus far, we have seen how several classification systems were used for goods, and how the categories of goods in those classification systems were regrouped into Input Output goods. For services, however, there is no similar classification system so far within Statistics Canada for service commodities. In view of this, the Input Output Division developed its own relevant service commodities taking into account the consistency and linkage required with the Input Output service industries.

In this exercice, the general guidelines of the international classification of the United Nations,[16] were also used as needed.

Generally speaking, these service commodities are the primary products generated by the relevant service industries. The service commodities identified by the Input Output Division are the primary products that are normally generated by the 'Input Output Service industries'[17].

Thus, the production of all goods and services is accounted for in terms of the Input Output industries and Input Output goods and services.

3. DISPOSITION OF GOODS AND SERVICES

The accounting for the disposition, however, is somewhat different from what has been described for production in the previous section and it needs special mention. The disposition of goods and services has two parts, namely:

- 'intermediate use'; and
- 'final use'.

The intermediate use is also called 'intermediate inputs' while the final use is also called 'final demand'.

[16]For the international standard commodity classification of all goods and services, please see: United Nations Secretariat, *Draft International Standard Commodity Classification of All goods and Services*, ST/STAT.47, Statistical Office of the United Nations, New York, 25 June 1970.

[17] Service industries are those that normally produce specific service products. The service products are those that are primarily produced by the service industries. For example 'legal services' are produced by lawyers; 'medical services' are produced by doctors; 'accounting services' are produced by accountants; etc. The identification of service products is based on the type of service-producing establishment or industry as illustrated here.

The goods and services produced in the economy are partly used by producers or industries themselves as their 'inputs' in the form of raw materials etc. which go into the production process of other goods and services. Such inputs are called 'intermediate' inputs.

There are also other users who can be broadly grouped, into four main categories, namely, persons[18], governments, businesses, and non-residents. These groups are also called sectors and they are defined further in Chapter V. They too partly utilize the goods and services for their own requirements. This type of use by the sectors is called the 'final use' or 'final demand,' because these users consume on a final basis, as opposed to intermediate basis, without incorporating the purchased goods and services in other goods and services. For example, persons purchase and use food products produced by industries. Businesses and governments use machinery and equipment and capitalize them for continuing use. Construction companies purchase heavy equipment, such as bulldozers, and use in their production processes. In this case, although the capital equipment is used to generate other services like road and highway construction, the bulldozers themselves are not incorporated into some other goods. This type of use is called 'gross fixed capital formation' as a 'final use' and is picked up as expenditure by the sector concerned. It is routed through the appropriate final demand category indicating the disposition of production.

[18] The term 'persons' includes households also.

In essence, then, the disposition of goods and services is partly accounted for in the 'inputs' of industries and partly in the final demand of the sectors as one of the categories of final use.

The final demand categories in the Input Output Accounts are determined based on the type of spending by the purchasers concerned. For example, the expenditures by households is identified as 'Personal Expenditure on goods and services'. The net expenditure of government (i.e. after deducting sales revenues from total expenditures) is identified as 'government net current expenditure on goods and services. The expenditure on capital equipment and new construction is identified as 'Gross Fixed Capital Formation'.

Thus, if the inputs by industries and the final demand by all the other users are combined together, both of them account for the total disposition as a part of the double entry bookkeeping mentioned earlier.

In terms of presentation, the inputs are shown in the Use (Input) matrix, while the outputs are shown in the Make (output) matrix. The final use is presented in the Final Demand matrix. Taken together, these three matrices show the production of goods and services on one side and the disposition on another side in the form of double-entry bookkeeping. The process of the accounting in the matrices of the Input Output Accounts can also be explained as snapshots of the economy at a particular point in time.

4. PRESENTATION OF MATRICES

Let us suppose that the production and disposition of goods and services in the economy along with the transactors and transactions can be presented in some meaningful snapshots of a photographer. In such a case, what kind of snapshots can be expected? The photographer would produce three pictures.

In the first snapshot, he would show a group of industries which produced various goods and services. This would contain all outputs in one snapshot as shown in Chart A, Make (Output) Matrix (see page 45).

As the industries utilize several 'inputs' such as raw materials and several others to generate goods and services, which are otherwise called the 'Output', he would produce the second snapshot showing all 'inputs' namely, goods and services that are used to generate various other goods and services as illustrated in Chart B, Use (Input) Matrix (see page 46).

In the production process, industries use two types of inputs. They are:

- intermediate inputs; and
- primary inputs.

The intermediate inputs are those goods and services that are produced and supplied by other producers. The primary inputs are essentially 'services that are provided by labour, capital and government' to the producing industry to facilitate the production

process. They are 'primarily' required by the industry and as such they are called 'primary inputs'. They are essentially three following types:

- labour services;
- capital services; and
- government services.

The labour services are provided by employees, while the capital services are provided by the capital funds and entrepreneurial services associated with the business establishments.

The government services are provided by the government departments in return for the revenue collected through indirect taxation for the provision of common community services such as licensing the business activity, providing sanitary services, fire protection services, police services etc. The provision of services may not necessarily be in direct proportion to the level of indirect taxes as they are collective services common to the entire community. These government services are also primarily required by the producers to operate the business. For example, if the licence fees, which are a part of the indirect taxes, are not paid by the business establishment, the business cannot be operated. In this case, the government, registers the establishments, grants licences to operate and ensures that the business establishments adhere to certain codes of conduct, so that there will be an orderly business atmosphere. Another example is the payment of property taxes which are also a part of the indirect taxes. In this case, the government provides fire protection

services and sanitary services, etc. to the community which includes businesses operating within the community.

Such are the essential government services to run the business establishments and they are indeed primarily required for the processes of production. Thus, the indirect taxes, which are costs associated with government services, are primary inputs and added on to the total cost of production by the establishments concerned.

In some cases, governments give 'transfer payments' or 'grants' to the business establishments and thus share their costs of production. Such transactions are called 'subsidies'. As these subsidies constitute money flows from government to business and as they are not considered as production in the Economic Accounts, they are shown as negative entries to offset the indirect taxes paid by the businesses. In other words, if indirect taxes and subsidies are combined together, the resulting item is called 'net indirect taxes' or 'indirect taxes less subsidies' which indicates the net cost to the business for the government services.

In the Input-Output Accounts, these primary inputs are identified as follows at the Worksheet level of aggregation.

- Wages and salaries;
- Supplementary labour income;
- Mixed income;
- Other operating surplus;
- Indirect taxes; and
- Subsidies.

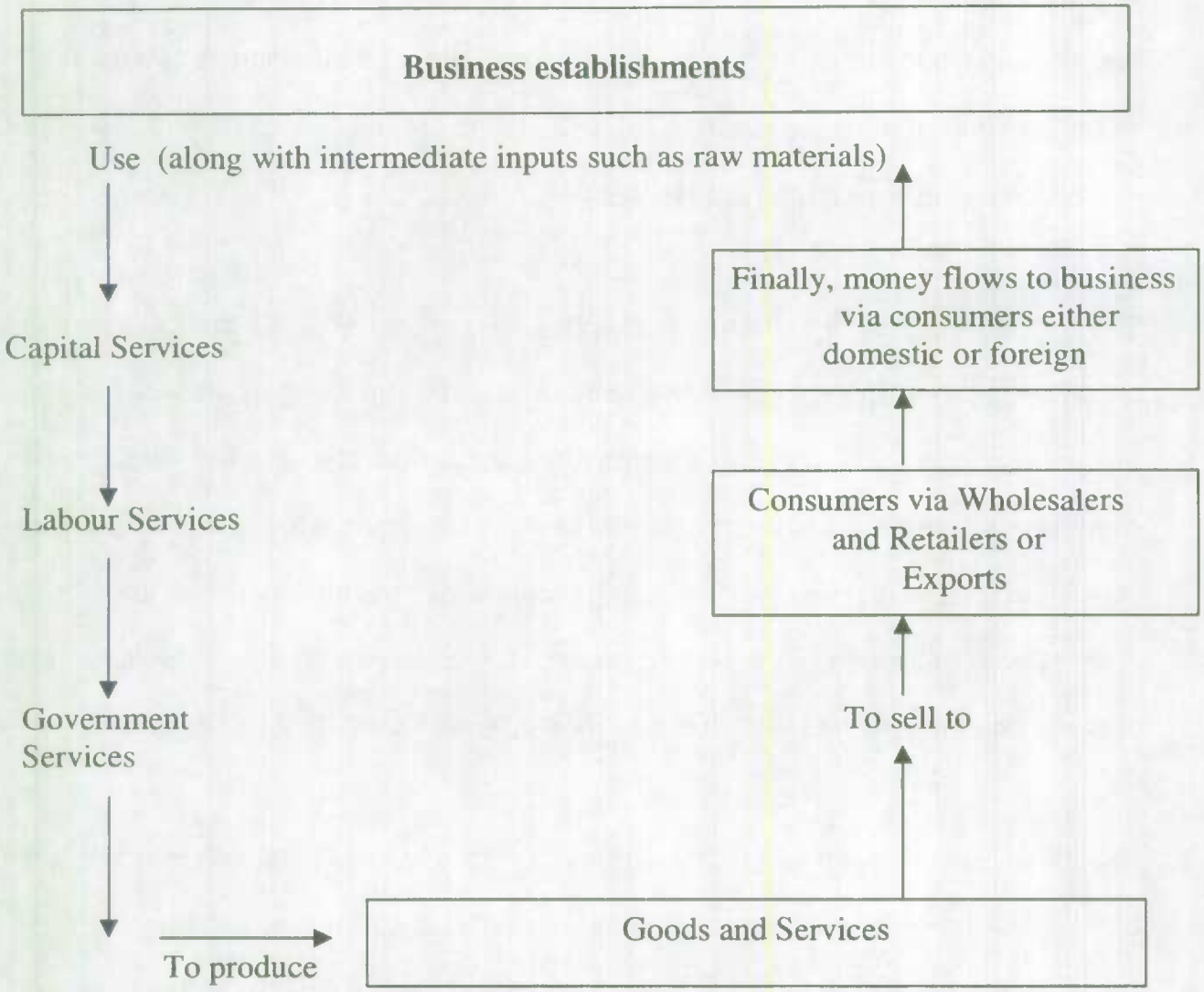
In other words, the services of labour, capital, and government are associated with different terminology of the Input Output Accounts as follows:

Kinds of Primary Input Services	Primary Input Services represented in the Input Output Accounts
• Labour Services:	Wages and Salaries; and Supplementary labour income;
• Labour and Capital services:	Mixed income of unincorporated business and farmers;
• Capital services	Other operating surplus covering private corporations and government business enterprises;
• Government regulatory and other general services	Indirect taxes (positive entry as they are transactions involving money-flows to government; and they are offset by Subsidies (negative entry which are transactions involving money flows to the business establishments from government).

Thus, labour service inputs are represented by wages and salaries and supplementary labour income. Labour and capital services, which cannot be separated in the case of unincorporated business and farmers, are represented by the item called 'Mixed income'. All other capital services including entrepreneurial and managerial services are represented by the item called 'Other operating surplus' and this covers private corporations as well as government business enterprises. The net cost of government services, which, in effect, is the net cost associated with the essential general services provided by government, is represented by indirect taxes paid by the producer offset by subsidies received by the producer.

In essence, then, the business establishments utilize, among other things, labour services and capital services as well as the government services to produce goods and services for sale to consumers who can be either within the country or in foreign countries. The circle of production and consumption, which, in actual practice, is rather complex, will be completed with the participation of the consumers as can be exemplified in the following simple diagram.

Example of
Circular Money Flows to Business



Although the terms used in primary inputs will be defined more clearly in Chapter V which deals exclusively with concepts and definitions, it is important to mention at this point that the wages and salaries, and supplementary labour income represent the returns to the 'labour' services employed in the production process. Mixed income represents returns to both labour and capital services of the self-employed while the

'other operating surplus' represents the return to the services of capital employed in the process of production. It should be noted, however, that the term 'other operating surplus' used here includes not only 'returns to capital' (i.e., profits)[19], but also returns of capital (i.e., depreciation or capital consumption allowances of capital assets such as buildings, and machinery and equipment) employed by both corporations and unincorporated business.

The 'return of capital' arises as the industries use the capital assets such as buildings, machinery and equipment in addition to materials and supplies and the value of such use goes directly into the value of the manufactured products. In other words, such capital assets employed in the production process are depreciated as a certain portion is used up indirectly in the production. Hence, the depreciation or the capital consumption of assets is considered as an input in the production process and it is one of the primary inputs included in the category called 'other operating surplus'.

In the third snapshot, the photographer would show the goods and services consumed by various groups of transactors, which are called sectors, such as persons, government, and foreigners (non-residents) as illustrated in Chart C, Final Demand Matrix (see page 47).

[19] In the Input Output Accounts, the interest paid by industries is considered as a transfer of income similar to dividend payments. Hence, profits or other operating surplus is gross of interest payments which means the profits are measured before deducting interest payments. This will be explained later in the concepts Chapter V.

As consumers, the households and government[20] shown in the Final Demand matrix utilize the goods and services for their own consumption. Generally speaking, the purchases by foreigners are defined as exports while the sales by foreigners to Canadian residents are defined as imports. Exports form a part of consumption by foreigners as far as the Input-Output Accounts are concerned. It is possible that some of the exports such as the lumber can also be utilized for intermediate consumption by foreign industries to produce other goods such as furniture. As that production activity occurs in the foreign countries which imported goods and services produced in Canada, we show exports in the accounting system as a final consumption by foreigners as far as Canada is concerned. The imports from other countries are shown as a negative entry in the final demand to reflect 'net' exports of Canada (i.e., exports less imports).

The snapshot simile described here can be translated into the actual products of the Input Output Accounts in the form of matrices.

Similar to the three snap shots, the Input-Output Accountants produce what are called 'matrices'[21] which display the commodity and industry structure of economic production and disposition with a special focus on the relationships between the

[20] Government is now treated as a producer of goods and services in the industries of the Input Output Accounts. It is only the net cost of producing the government services, which in the business accounting terminology represents the 'loss' (ie., Expenditure less revenue), that is reflected in the final demand matrix. In other words, total government expenditure on goods and services less revenues derived by the government for sale of goods and services equals the net cost of producing the government services. This net cost is routed to the final demand. This change has been discussed fully elsewhere in the chapter on new accounting structure (Chapter VI).

[21] These matrices are also called 'Tables'.

various transactors (i.e., 'industries' or 'producers' on one hand, and the 'final use' or 'final demand categories' on the other hand).

The first one is the 'Make' matrix which shows the outputs of goods and services. It is also called the 'Output' matrix and it is much similar to the first snapshot of the photographer (Chart A). The second matrix is called the 'Use' matrix containing all inputs in order to generate other goods and services. This is also called the Use (Input) matrix which is much similar to the second snapshot of the photographer mentioned earlier (Chart B).

The principle involved in the Make and Use matrices is that the total values of inputs in the Use Matrix must equal to the total value of outputs in the Make matrix for every industry. This is because 'what it cost to the industries' (see Use matrix) is 'what is charged by the producers' (see Make matrix) at the total industry level as well as for the total economy. This principle is also known as the 'industry identity'.

The third matrix is called the 'Final Demand' matrix showing the final disposition of goods and services either by way of final consumption or additions to inventories or foreign trade such as exports to foreign countries and imports from foreign[22] countries as indicated by each of the categories in the matrix. This is similar to the third snapshot of the photographer mentioned earlier (Chart C).

[22] Exports from foreign countries to Canada are called 'imports' from foreign countries into Canada as shown in the matrix.

So, one can say that the Input-Output accountants produce three snapshots of the economy as measured in a given calendar year and they are what are called the Input-Output Accounts. In fact, the Accounts can be called 'Input, Output and Final use Accounts'. However, for simplicity in normal usage, they are called Input Output Accounts. This is a simplified answer to the question 'what are Input-Output Accounts?' posed earlier. In actual practice, however, there are several tables at the Worksheet level with several steps in producing the final set of Input-Output Accounts. Those steps and the complexities introduced will be more apparent to the reader as the details are unfolded in the chapters that follow.

5. ACCOUNTING RELATIONSHIP OF THE MATRICES

The next question that may arise in the minds of the users is: what is the accounting relationship of the three matrices? To answer this question we need to look at the accounting framework which integrates these three matrices and provides different analytical measures such as the Gross Domestic Product at Market Prices.

A simple chart showing the accounting framework of the Input-Output Accounts of Canada is provided in Chart D (see page 48). It contains three columns - one for each of the three matrices. The explanation of symbols and the terms used in Chart D follows.

Commodities: A commodity is defined as a 'good or service'.

Industry: An industry is defined as a group of operating units (establishments) engaged in the same or similar kind(s) of economic activity, for example, coal mines, clothing factories, department stores, laundries. An establishment is defined as the smallest unit that is a separate operating entity capable of reporting all elements of basic industrial statistics, namely, the main elements of inputs and outputs. It is typically a factory, mine, store, farm, airline, hotel or similar unit and in most cases it is a separate company.

Final Demand categories are:

Personal Expenditure on Goods and Services

Government Net Current Expenditure on Goods and Services

Gross Fixed Capital Formation

- Business
- Government

Value of Physical Change in Inventories

Exports of Goods and Services

Imports of Goods and Services

V^T: is a matrix showing the values of domestic output of goods and services by industries. The rows show the goods and services while the columns indicate the industries which produced them as shown in Chart A. It is called the Make (or Output) matrix.[23] The gross output of an industry is the aggregate value of goods and

[23] The output matrix is normally identified as V in algebra if the rows show the industries with goods and services in the columns. However, in the examples shown in Charts A, B, C and D, the normal structure has been altered or transposed

services produced by the industry. It is equal to the value of industry's sales plus any increase (less any decrease) in the value of physical change in stocks of finished products and work in progress.

U: is a matrix of the values of intermediate inputs of goods and services of industries. In this matrix, the industries and commodities are shown as in Chart B.

YI: is a matrix of the values of primary inputs of industries. Primary inputs are those inputs which are employed by the industries or the final demand categories themselves. Hence, they are not outputs of any other industries. They are: wages and salaries; supplementary labour income; mixed income of unincorporated businesses and farmers; other operating surplus; indirect taxes; and subsidies (negative entry). These items are shown in Charts B and C.

F: is a matrix of the values of goods and services purchased by final demand categories which are: personal expenditure on goods and services; government current net expenditure of goods and services; gross fixed capital formation of business and government; value of physical change in inventories; exports of goods and services; and imports of goods and services. These items are shown in the Final Demand matrix as in Chart C.

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by showing goods and services in the rows with industries in columns. Due to this alteration from the normal practice, the output matrix is identified as V^T (i.e. V transposed) in Chart D.

YF: is a matrix of the values of primary inputs associated with final demand categories. In the revised structure, only the items showing 'indirect taxes on products' and other indirect taxes on production' appear in YF because all other primary inputs such as 'wages and salaries', 'supplementary labour income', 'mixed income of unincorporated business and farmers', 'other operating surplus', and 'subsidies' (negative entry) are articulated in the Use (Input) matrix as shown in Chart B.

g: is the value of total industry outputs while g^1 is the value of intermediate inputs and primary inputs. Then, by construction, g, which is the industry outputs, is equal to the value of total industry inputs g^1 that is derived by adding together intermediate inputs (U) and primary inputs (Y1).

G1: is the value of Expenditure-based GDP at market prices broken down by each final demand category; and

G2: is the value of Income-based GDP at market prices broken down by each primary input.

Thus, V^T is the Make matrix for outputs; U and YI are the inputs in the Use matrix and finally F and YF are the final expenditures in the Final Demand matrix. The accounting relationships are the following:

i) Total of outputs (g) is equivalent to total of all inputs g^1, that is, both intermediate and primary inputs combined.

ii) Gross Domestic Product (GDP) at market prices which is the unduplicated value of goods and services in the market place can also be derived from this framework in two ways. This will be defined, in detail in Chapter V. However, for the understanding of accounting relationships, it is important to note at this stage the following equations:

- The first way is to measure the value that the sectors of the economy paid for the final products, which can be obtained by adding together all the final expenditure items in the Final Demand matrix (F and YF). This is called the Expenditure-based GDP at market prices and is identified in the chart as G1.
- The second way is to measure the unduplicated cost of making the product by adding together all the primary inputs of both industries and Final Demand categories in the Use and Final Demand matrices (YI and YF). This is called the Income-based GDP at market prices and is identified in the chart as G2. It should be noted that the intermediate inputs are not added in the measure to avoid duplication. This point will also be discussed at length in the chapter on concepts and definitions (Chapter V).
-

iii) Then, the equations that can be summarized from this accounting framework illustrated in chart D are:

- g (total of outputs V^T) = g^1 (total of inputs U+YI)
- V^T represents V transpose showing industries in the columns on the top with commodities in the rows on the left side.

- G1 (Expenditure-based GDP at market prices) = G2 (Income-based GDP at market prices)
- YI + YF = G2
- F + YF = G1
- Therefore, YI = F

In other words, the sum of primary inputs of industries is equivalent to the final expenditures on goods and services of the Final Demand categories. If we know the aggregate of one (say Y1 for example), the other namely, F can also be known in aggregate form. This kind of relationship is very useful in models and their applications.

These are the simple main accounting relationships of the three matrices discussed here.

6. WHY ARE THE INPUT OUTPUT ACCOUNTS PRODUCED?

As we can see from the proceeding sections of this chapter, the Input Output Accounts portray considerable detailed information on the production and disposition of goods and services. They are needed to understand 'who' produced and 'how' the production was utilized in the economy in a particular period, usually the current period. The economic analysts and policy makers would like to know the answers to the familiar questions such as what was the total production of goods and services in the country and how it was utilized, so that appropriate policy decisions for human and material resources could be made. In other words, the Input-Output Accounts

help the analysts and policy markers to understand what is happening in the economy in the current period, so that they will be able to assess the future course with all the detailed information of the Accounts. This is, of course, the main purpose of the Accounts, but there are several others. In order to deal with many known uses and applications of the Accounts, a separate Chapter (IV) is devoted to the subject. Suffice it to say at this stage that the Accounts are produced for many uses in the field of Applied Economies.

Also, under section 3 of the *Statistics Act*[24], Statistics Canada should, among other things, "collect, compile, analyze, abstract and publish statistical information relating to the commercial, industrial, financial, social, economic and general activities and conditions of the people". The Input Output Accounts fall under this general mandate of Statistics Canada as they are essential tools to understand the economic activities of the people of Canada.

Thus far, considerable explanation was provided to answer questions such as: what the Input-Output Accounts are about, how they measure production and disposition of goods and services in the form of double-entry bookkeeping procedures, how the entries in the Accounts are internally integrated with meaningful inter-relationships, and why the Accounts are produced in the first place.

Also, as mentioned earlier in the introductory chapter, this compendium contains, among other things, a complete record of the revised Input Output Accounts based on

[24] Office Consolidation, Statistics Act, March 1992, P.1.

the recent historical revision. Let us then see why the historical revisions are necessary and what their accomplishments are.

Chart A: Example of Make (Output) Matrix*

	Business Sector				Non-Business Sector		Total
Commodities	Agriculture	Manufacturing	Accommodation	Others	Non-Profit Organizations in Personal Sector 5 industries (see table R)	Government Sector 8 industries (see table R)	
Grains							
Primary Metal Products							
Machinery and Equipment							
Motor							
Petroleum and Coal							
Business and Computer Services							
Accommodation Services and Meals							
Others							
Total							

*This is the domestic output matrix.

Note 1: Normally, the output matrix is identified as V in algebra if the rows show the industries with goods and services in the columns. For the sake of analytical convenience, the contents of this chart are organized differently. Goods and services are shown in the rows while industries are shown in the columns. Due to this alteration from the normal practice, the matrix is identified as V^T (i.e. V transposed).

Note 2: For Non-Business Sector, See the details of industries in Table R.

Chart B: Example of Use (Input) Matrix							
Commodities	**Business Sector**				**Non-Business Sector**		**Total**
	Agriculture	Manufacturing	Accommodation	Others	Non-Profit Organizations in Personal Sector	Government Sector 8 sub-sectors (see table 33)	
					5 industries (see Table 33)		
Intermediate Inputs							
Grains							
Petroleum and Coal Products							
Others							
Primary Inputs							
Wages and Salaries							
Supplementary Labour Income							
Mixed Income							
Other Operating Surplus							
Indirect Tax on Products							
Indirect Tax on Production							
Subsidy on Products							
Subsidy on Production							
Total							

Note: When the primary inputs are combined at the bottom of the Use matrix as shown in Chart B, the resulting Use matrix is normally called the "augmented Use Matrix". However, in practice, the term "augmented" is omitted without repeating it every time the Use matrix is referred in the text.

Chart C: Example of Final Demand Matrix

Commodities	Personal Expenditure on goods and services	Government Net Current Expenditure on goods and services	Machinery and Equipment	Construction	Value of Physical Change in Inventories	Exports	Imports (Negative)	Total
Grains								
Machinery and Equipment								
Furniture and Fixtures								
Other								
Primary Imputs								
Wages and Salaries		These do not apply to the Final Demand matrix in the revised Input-Ouput Structure.						
Supplementary Labour Income		They apply only to the Use (Input) matrix as shown in Chart B.						
Mixed Income								
Other Operating Surplus								
Indirect Tax on Products								
Indirect Tax on Production								
Subsidy on Products		These do not apply to the Final Demand matrix in the revised Input-Output Struture.						
Subsidy on Production		They apply only to the Use (Input) matrix as shown in Chart B.						
Total								

Chart D: Summary Details of the Accounting Framework used in the Input-Output Accounts of Canada

Commodities	Industries		Final Demand Categories							Total of Primary Inputs of both Industries and Final Demand Categories
	Industry Output	Industry Inputs	Personal Expenditure on Goods and Services	Government Net Current Expenditure on Goods and Services	Gross Fixed Capital Formation		Value of Physical Change in Inventories	Export of Goods and Services	Imports of Goods and Services (Negative)	
					Business	Government				
Goods and Services*	Make Matrix V^T	Use Matrix U	Final Demand Matrix F							
Primary Inputs, namely:		YI	YF							G2=YI+YF
Wages and Salaries										
Supplementary Labour Income										
Mixed Income										
Other Operating Surplus										
Indirect Tax on Products										
Indirect Tax on Production										
Less Subsidy on Products										
Less Subsidy on Production										
Total of Goods and Services and Primary Inputs	g	g'	G1=F+YF							

Income-based GDP at Market Prices

Expenditure-based GDP at Market Prices

*Goods and services are used by industries as well as Final Demand categories.

Note: The output matrix is normally identified as V in algebra if the rows show the industries with goods and services in the columns. However, in the examples shown in Charts A, B, C and D, the normal structure has been altered or transposed by showing goods and services in the rows with industries in columns. Due to this alteration from the normal practice, the output matrix is identified as V^T (i.e., V transposed) in Chart D.

Table R: Non-Business Sector Industries and Commodities

Industry Number	Description	Commodity Number	Description
	Personal Sector		
231	N.B.-P. Religious organizations	650	ReligiousOrganizations services
232	N.B.-P. Welfare organizations	651	Welfare organizations services
233	N.B.-P. Sports and recreational clubs	652	Non-profit sports and recreational services
234	N.B.-P. Educational institutions	653	Non-profit educational services
235	N.B.-P. Other organizations[59] institutions	654	Other non-profit educational services[25]
236	N.B.-G. Hospitals	655	Government funding of hospitals
	Government Sector		
237	N.B.-G. Resident Care facilities	656	Government finding of residential care
238	N.B.-G. University education	657	Government funding of Universities

Note: ("N.B." means "Non-business"; "P" means "Personal Sector; and "G" means "Government Sector")

[25] 'Others' organizations consist of all those other than the ones that are specifically identified, namely, 'religious', 'welfare', 'sports and recreation', and 'education' types.

Table R: Non-Business Sector Industries and Commodities (Concluded)

Industry Number	Description	Commodity Number	Description
	Government Sector		
239	N.B.-G. Other educational services	658	Government funding of other education
240	N.B.-G. Defence services	659	Defence services
241	N.B.-G. Other municipal government services[26]	660	Other municipal government services[60]
242	N.B.-G. Other provincial and territorial government[60]	661	Other provincial government services[60]
243	N.B.-G. Other federal government services[60]	662	Other federal government services[60]

[26] The term "other" is used here for industries 241, 242, and 243 for hospitals (except defence hospitals), because "educational" institutions and "hospitals" are excluded and classified elsewhere as industries in 236 for hospitals (except deference hospitals) and in 238 and 239 for education. Due to the practical difficulties in isolating the data of the defence hospitals from the total defence expenditures, industry 240 – defence services" includes defence hospitals also.

III

WHY HISTORICAL REVISIONS?

1. Why are historical revisions necessary?

Users of the Input-Output Accounts are often perplexed by periodic historical revisions to the statistics. The question that frequently arises is: why are historical revisions necessary from time to time? There are several reasons for any historical revision depending on the time-period in which the revision is undertaken. Provided here are some objectives which, relate to this revision as well as to general situations for a better understanding of the historical revision program. Chief among them are:

- incorporation of new data sources;
- maintenance of consistency among diverse data sets;
- adherence to new international standards;

- incorporation of structural changes such as development of new industries and new products, that occurred in the economy;
- implementation of new techniques to improve the quality of estimates; and to meet with new emerging requirements in the economy such as the introduction of Federal Goods and Services Tax (GST) in 1991;
- re-basing the data to a more recent period for constant price estimates; and
- creation of a link between the past and the present after incorporating all the changes and improvements.

These are elaborated further in the next section.

Specific Reasons

2. Need for Consistent Time-Series

Generally speaking, statistical estimates need to be reviewed constantly in the context of emerging new international standards and concepts along with new data sources and improved estimating techniques. If such a review warrants a change in the underlying statistical estimates, there are three options available to statistical agencies.

The first option is to incorporate the required change as and when it is essential. This procedure introduces a break in the time-series and ignores the inherent need for consistency in producing relevant data. Consistency in data is essential to inform the public on the events that occurred in the past and therefore, this is not a good option,

as it defeats the very purpose for which consistent statistics in time-series are developed in the first place.

The second option is to link the old estimates to the new estimates by partially incorporating the change to reflect only the trend, but not the actual level. This is only a short-term solution to deal with the problem of maintaining consistency in the data. It merely reflects the movement in data from one period to the other, but the absolute levels of figures are left out for the time being. This too is not a satisfactory solution for a longer term.

The third option is to accumulate all the changes and incorporate them all at one time for the past time-series as well as for the present series. This is a satisfactory solution, as it produces consistent data. Although the changes are relevant at the time they took place, analysts and model builders would like to know how the changes would have affected the past had they been implemented in the previously produced statistical estimates. This is called the historical revision as it deals with the past history. The analytical usefulness is preserved and improved in this procedure. This option would help the analysts and the public to understand the trends without any statistical breaks. Hence, the periodic incorporation of changes calls for a major historical revision of the Canadian System of National Accounts like the recent one for which data were published on the revised basis in a series of documents[27].

[27] For the Input Output Accounts data, see the Input Output Structure of the Canadian Economy 1961-1992, Historically Revised Data, Statistics Canada, Input Output Division, Ottawa, catalogue no. 15-201-XPB, October 1998;

For the National Economic and Financial Accounts data, see National Economic and Financial Accounts, 1961-1992, Statistics Canada, Income and Expenditure Division, Ottawa, catalogue no. 13-001-SPB, November 1998;

3. Adhering to International Standards

Statistics Canada is committed to producing economic data, particularly those that are incorporated in the Canadian System of National Accounts, using an internationally accepted conceptual framework, as far as possible, in order to generate data for both national and international uses. This commitment gives rise to the need to undertake periodic revisions to the concepts, sources of data and methods of estimation and to keep abreast of international developments. These revisions are meant to maintain the Canadian System of National Accounts and all its sub-systems (or parts) such as the Canadian Input-Output Accounts more closely to the latest international practices and standards recommended by the United Nations and other international organizations.

In 1993, the United Nations and four other international organizations, namely, Commission of the European Communities – Eurostat; International Monetary Fund; Organization for Economic Cooperation and Development; and World Bank, published a revised international *System of National Accounts, 1993*[28] and it contained several changes to the existing system. Also, the International Monetary Fund published a revised *Balance of Payments Manual, 5th edition, 1993* (BPM-5). These two international documents outlined some new standards which have an impact on the statistical systems. It became essential for Statistics Canada to implement the recommended changes, as far as possible, taking into account the

For the Gross Domestic Product by Industry estimates, see Gross Domestic Product by Industry, 1961-1992, Statistics Canada, Industry Measures and Analysis Division, Ottawa, catalogue no. 15-512-XPB, September 1998; and

For the the Balance of Payments data, see Canada's Balance of International Payments, 1926 to 1996 and First Quarter 1997, Statistics Canada, Balance of Payments Division, catalogue no. 67-001-XPB, July 1997.

[28] *System of National Accounts, 1993*, United Nations and other international agencies, New York, 1993.

Canadian institutional arrangements in order to maintain consistency in standards at the international level and to enable comparison of data with other countries of the world.

4. Consistency Among Diverse Data Sets

Different Divisions within Statistics Canada produce different data to meet their own specific mandates. Such production of different data without a common and well-integrated framework of concepts can hinder proper economic analysis, which is usually done with consistency in data. Therefore, for the purpose of proper economic analysis, Statistics Canada strives, as far as possible, to improve internal consistency among its various Divisions by various means, such as deciding on common definitions, classifications, and coverage which can be used by all the relevant Divisions. In this context, the recent historical revision provided a special opportunity to review and resolve several internal inconsistencies that existed in the four sub-systems of the CSNA[29].

An example of internal inconsistency is the definition of Public Sector. The statistics of this sector are compiled and presented in two separate systems, namely, the Canadian Financial Management System (FMS) and the Canadian System of National Accounts (CSNA), which are different from one another. There is a need to

[29] The four sub-systems of the SNA are: Input-Output Accounts; Income and Expenditure Accounts; Gross Domestic Product by industry; and Balance of Payments and Financial Flows.

harmonize both these systems and also to reconcile them with the Public Accounts[30] of the federal, provincial and territorial governments.

Why do we need to harmonize and reconcile in the first place? Because, although they are two different systems designed for different purposes, they both use the same basic data sources (that is, the Public Accounts of federal, provincial and territorial governments), for such data as wages and salaries, interest, sales revenues, etc. If they call the items in the same way, there should be no differences in their content also. In other words, identical items must have the same concepts and definitions in both the systems. If, however, differences are noticed, the situation calls for harmonization and reconciliation between the two systems. In fact, such differences existed before the historical revision and they have now been reconciled. The historical revision is the best time to harmonize the two systems in such cases. Let us look at the details of these systems.

The Financial Management System (FMS) is designed to establish uniformity and consistency in data relating to government financial transactions, because governments employ differing accounting practices to suit their own purposes. For example, some provincial governments may produce their accounts on a cash basis while some others may produce them on an accrual basis. Some uniformity is needed here, before the accounts of all provinces are aggregated into the provincial government accounts covering all transactions of the provincial governments, to

[30] The Federal and Provincial Governments publish every year their own accounts from which basic data for both the FMS and CSNA are compiled by the Public Institutions Division of Statistics Canada.

ensure analytical usefulness. Some government departments present their reports on a net basis, partially or wholly, after deducting sales revenues from expenditures. Others report on a gross basis for both revenues and expenditures. In these cases, as consistency in basic data is required to practices as illustrated above, it is essential to make appropriate adjustments, where needed, and produce uniform and consistent data for the whole government sector for analytical purposes and for inter-governmental comparisons by eliminating divergences in reporting practices. The FMS is designed for such a purpose of maintaining consistency in the government sector's database for the entire economy.

The Canadian System of National Accounts (CSNA), on the other hand, is designed to produce national economic accounts covering, among other things, production and disposition of goods and services in the total economy of the country[31] including business, government, persons, and non-residents. This system has its own concepts and framework of data presentation for economic analysis of individual countries and for international comparative studies.

Illustrations of this type are numerous. As the pieces of information to construct the National Economic Accounts of Canada are collected in different divisions of Statistics Canada, considerable resources are devoted in the System of National Accounts Branch of Statistics Canada to make the basic data sets consistent and comparable not only in concept, but also in the content and coverage by eliminating

[31] The provincial dimension of the System of National Accounts such as the Income and Expenditure Accounts and the Input-Output Accounts show separate data for each of the provinces and territories in the Provincial Income and Expenditure Accounts, and the Provincial Input-Output Accounts.

the inconsistencies and divergences as far as possible. This is like putting together a complex jigsaw puzzle for the country's economy. Since income and expenditure data of business, government, persons (or households), and non-residents are needed to produce the National Economic Accounts, and since the data for these sectors are produced using information available from different sources, they should be edited and adjusted where needed in order to put them together in a consistent framework. For such a complex exercise of putting together the jigsaw puzzle, it is no wonder why considerable resources are utilized in the System of National Accounts Branch of Statistics Canada not only to review and analyze the basic data before they are incorporated into the accounts, but also to balance the accounts after the data are finally put together in the required framework such as the Input-Output Accounts which is the subject of this chapter. The steps followed in this regard will be more apparent to the readers in the chapters that follow. Suffice it to say at this stage that maintenance of consistency in concepts, definitions and content of diverse data sets is one of the many driving forces for the historical revision.

5. Structural Changes in the Economy

i) As new industries producing new goods and services spring up in the economy, due recognition should be given to them in statistical systems and particularly in the industries of the Input-Output Accounts, which provide, among other things, details for the production and disposition of goods and services. This is essential because statistical systems have to reflect and respond to the emerging changes which are taking place in the economy such as existence of

new industries producing goods and services or introduction of new kinds of goods or services.

ii) Time-series analysis and modeling require measurement of consistently defined phenomena at regular intervals to observe and analyze trends. As the Input-Output Accounts exist in Canada from 1961 onwards, and as the classification systems were changed during the last four decades, it is essential to maintain consistency in the definition of time-series variables to promote analytical usefulness. This requirement involved development of new classification structures and new data that are detailed and consistent for industries, commodities, and final demand categories. By regrouping items and by creating, where needed, new industries, commodities and final demand categories, consistent new series have been developed in two different periods as shown below:

	First Period	**Second Period**
	1961-80	**1981- onwards**
Total number of Industries (SIC based)[32]	203	243
Total number of Final Demand Categories	138	162

[32] The industries discussed here are all based on the *Standard Industrial Classification (SIC)* of Statistics Canada which is valid until 1997. Effective 1997, a new classification system called the North American Industry Classification System (NAICS) is used to formulate the industry and commodity classification systems of the Input Output Accounts. The impact of this new system will be discussed in a follow-up volume called 'Sources and Methods of Input Output Accounts'. That volume will contain detailed changes resulting from the introduction of NAICS and the links between the SIC based industries and the NAICS based industries.

	1961-85	1986 - onwards
Total number of Commodities and Primary Inputs. These are essentially goods and services used for inputs i.e., both intermediate inputs and primary inputs.	615	679

Thus, the historical revision facilitated the regrouping of two dimensions for the cells in the Input-Output Accounts and maintained continuity for analytical purposes for each of the two dimensions.

iii) The Public Sector is composed of general government, government business enterprises, and non-profit institutions controlled and mainly financed by the government. Some changes do occur in government policies from time to time and they impact on the classification of the entities in the Public Sector. Therefore, the composition of this sector needs constant review depending on the changes in the government policies and functions assigned to the entities. Unless a common definition, classification, and universe is developed in a central place such as the Public Institutions Division for implementation across all the Divisions, it is possible to have some differences in data produced by various Divisions of Statistics Canada (e.g., Labour Division; Investment and Capital Stock Division, etc.). In order to eliminate these differences, a new

definition of the Public Sector Universe[33] has been developed based on international standards to provide a consistent structure for use by all the data producing and using Divisions within Statistics Canada. Based on this new definition, other changes have been made in the classification and coverage of universe. Also, new data have been developed and incorporated in the historical revision for the Public Sector.

6. Improvement of Quality in Estimates

As the Input-Output Accounts contain important economic indicators, such as the Gross Domestic Product at factor cost by industry, which are used extensively for economic research, analysis and modeling, it is essential to update these accounts periodically by incorporating changes in concepts, statistics, and accounting structure as needed. Such a revision should incorporate the latest available data taking into account the emerging new international guidelines to preserve the richness of the database for use in the 21st century. In the present revision, it became necessary to incorporate new source data such as the following:

- revisions carried out in the Agriculture Division on data for inter-census years; and
- new data of the Services Division on charitable and non-profit institutions which became available for the first time.

[33] For further information on the Public Sector Universe, please see "Guide to the Public Sector of Canada 1999", Public Institutions Division, Automation and Dissemination Section, Statistics Canada, Ottawa, Ontario, K1A OT6.

In addition, statistical series required the maintenance of consistency in the time-series for qualitative analysis. In this context, statistical breaks in the time-series have been eliminated at the time of the recent revision, as those breaks would jeopardize the analytical usefulness of the data.

7. Policy Changes

A new Goods and Services tax was introduced in Canada effective January 1, 1991. The categories of goods and services used in the Input-Output Accounting structure would have to satisfy, as far as possible, the new tax structure in order to facilitate analysis of this new tax and its implications. The creation of the new commodity structure took this requirement into account in the historical revision.

8. Surveys and Censuses

While surveys are based on a sample, censuses usually aim to cover the universe, as far as possible, with 100% coverage. Generally speaking, data quality is therefore higher in censuses, because of better coverage and absence of sampling errors. Consequently, if the census data are available for a particular category such as housing or manufacturing or trades etc., the estimates which, were originally based on surveys have been replaced with the census data. The resulting changes impacted on several other series in the Accounts and they too have been conveniently incorporated in the time series at the time of the recent revision.

9. New Techniques

Sometimes, methods to collect, assemble, edit and produce basic data result in better data for incorporation in the National Economic Accounts. Rather than introducing a break in the time series by incorporating the new data as and when they became available and create inconsistencies in the time-series, it is a better policy practice to incorporate the revised series produced on the basis of new techniques at the time of the historical revision. This is what was done.

10. Summary

In summary, then, several reasons such as those highlighted here constituted the driving forces behind the recent historical revision. These are the same kind of reasons that generally exist for all other historical revisions also.

The end result of this major revision program, as far as the Input-Output Accounts are concerned, was the elimination of the known problems and inconsistencies inherent in the databases by producing a revised consistent time-series from 1961 onwards[34]. Also, the revised time - series facilitated the reconciliation with the Income and Expenditure Accounts for the entire period. Thus, the historical revision has achieved, among other things, the objective of producing consistent and comparable series across all the CSNA Divisions of Statistics Canada. The revised Accounts enhanced the analytical usefulness of the macro-economic accounts for decision-

[34] In Canada, the data of the Input-Output Accounts are available from 1961 onwards.

making purposes and international comparisons. Such were the accomplishments of the recent historical revision.

Hopefully, the background information provided in this chapter has given a bird's eye view of the Input Output Accounts and paved the way for a more thorough study in later chapters. The next chapter contains various uses and applications and it will be followed by the second volume dealing with the concepts, definitions and the national economic accounting structure relating to the Input-Output Accounts.

IV

USES AND APPLICATIONS

1. WHAT ARE THE USES AND APPLICATIONS OF THE INPUT-OUTPUT ACCOUNTS?

Two general questions, namely, 'what are Input-Output Accounts?' and 'why historical revisions?' have been answered in the previous chapters. Another similar general question that arises in the minds of the readers is: What are the uses and applications of the Input-Output Accounts? More specifically, readers would like to know what is in the Input-Output Accounts that can be advantageously used by them for their own needs. In order words, people generally look for answers to general simple questions such as: 'what is in it for me? Why should I use Input-Output Accounts?'.

The simple answer to this question is that there is a mine of information embodied in the Input-Output Accounts in the form of several statistical tables. In order to elaborate this simple answer, it seems appropriate to outline the multitude of uses and applications for general information, so that users and potential users alike can see how they can profitably utilize these data. In other words, this entire chapter tries to answer the general question: what is in the Input-Output Accounts that can be utilized by a variety of users or potential users in the context of their specific requirements?

Following is a description of areas illustrating multitude of uses and applications of the Input-Output Accounts. Although more specific uses and applications will become evident in later chapters, which deal in detail with particular areas, it might be useful in this chapter to provide a brief summary of some current uses and applications.

Users and potential users who are interested in the subject of analyzing the economy, can focus their attention either on the total economy or a particular segment of the economy such as an industry, or a particular level of government by using the Input-Output Accounts. In other words, both macro-economists and micro-economists who are interested in the economic analysis can benefit by using the data of the Input-Output Accounts as illustrated in the uses and applications discussed here in this chapter.

2. GENERAL USES AND APPLICATIONS

General Description of the Economy

Input-Output Accounts attempt to construct a statistical counterpart of the real economy by measuring the flows of production and disposition of all goods and services in the economy at a particular time for a specific duration (say for example, a year). They provide the general description of the economy. In other words, they provide statistical snap-shots of the economy in the form of three different matrices, namely, (i) Make matrix; (ii) Use matrix; and (iii) Final Demand matrix. The content of these matrices is briefly described here, although it is somewhat repetitive, to show how it is useful for the general description of the economy.

It is important to note that although basically the Input Output Accounts are the tools to analyze the economy at the macro-level, they do provide considerable details at the micro-level also, say, by type of industries and by type of goods and services. This dual use is elaborated further in the text that follows, which provides, among other things, some recapitulation and clarification on the content of different matrices, so that the beginners can understand the intricate points of potential usage. For the benefit of the beginners, some definitions are also repeated here to understand the terminology better.

(i) Make Matrix

This matrix provides the most detailed accounting for all goods and services produced in the Canadian economy by each industry. This is called the 'Make' or Output matrix to reflect its real function.

(ii) Use Matrix

The use matrix provides details of all inputs needed to generate the output reflected in the Make Matrix. More specifically, it contains two categories of inputs:

- Intermediate inputs; and
- Primary inputs.

The goods and services used by industries in order to produce other goods and services constitute the 'intermediate inputs'. The intermediate inputs are also called 'intermediate use'. This intermediate use is recorded in the 'Use' (Input) matrix and includes all goods and services purchased from others such as other industries and exporters of other countries.

The 'Use' matrix also provides information on the payments made by industries for inputs that are not purchased from others. These inputs are called 'Primary Inputs'. They include wages and salaries, supplementary labour income, mixed income, operating surplus, indirect taxes and subsidies. They are defined here briefly to show their general importance in the production process and their role in the measurement of Gross Domestic Product at Market Prices. The complete definitions of the terms are given in Chapter V.

• Wages and Salaries; and • Supplementary Labour Income	Wages and Salaries, and Supplementary Labour Income are called "Labour Income" as they constitute income to "labour" component consisting of all employees. They are also called "employee compensation" or employee remuneration".
• Mixed Income (including Net Income of Unincorporated Business and Farmers)	Income consists of inseparable payments to owners of unincorporated businesses (e.g., Self-employed persons and farmers). The payments represent combined remuneration to both capital and labour which are employed in the production process. It also includes government subsidies as a part of income which, reflects eventually in the "mixed income".
• Other Operating Surplus[35]	Other Operating surplus includes several items, such as profits of all business corporations and of government business enterprises, before income taxes; Plus: Capital consumption allowances of corporations and unincorporated businesses; Plus: interest paid by both corporations and unincorporated businesses; Minus: interest received by both corporations and unincorporated businesses; Plus: Inventory valuation adjustment for both corporations and unincorporated businesses to remove

[35] The general definition provided here is mainly intended to show its general content to understand the use and aplication of the item for analytical purposes. In fact, the financial intermediates such as banks have some different adjustments to account for the 'imputed service revenue' and chapter V deals with these and other details.

gains and losses on inventories due to price fluctuations which get included in profits of corporations and Mixed Income of unincorporated businesses.

Thus, it is a mixture of items involving both corporations and unincorporated businesses. The inventory valuation adjustment is needed in order to measure the value of production at the current market prices of the period covered by the measurement. This is because of the fact that the inventories contain goods produced in previous years and their value in the books of the businesses usually reflects the gains caused by the price fluctuations in the market. The inventory valuation adjustment is the difference between the value of physical change in inventories and the change in the book value of the businesses. This is a simple definition, but it involves a very complicated exercise to calculate by commodities and industries.

It should also be noted that government subsidies are a part of income to business establishments and these subsidies eventually reflect in the "other operating surplus" similar to "mixed income".

- Indirect Taxes

'Indirect taxes' are payments to government by all sectors of the economy. They are not related to income, but normally levied on either 'processes of production' (e.g., licences and property taxes) or

sales of specific goods and services (e.g., sales taxes). As such, indirect taxes are classified into two categories:

- Non-commodity taxes; and
- Commodity taxes.

In the former structure, the taxes on the processes of production were called 'Non-commodity taxes' as they are not related to any particular commodity. The taxes on specific products (on goods and services) were called 'commodity taxes' as they are related to specific commodities.

In the new structure, however, these two types of indirect taxes are called differently. While the 'taxes on the processes of production' are now called 'other taxes on production', the 'taxes on specific goods and services' are called 'taxes on products'.

The taxes on production are essentially levied on the means of production such as buildings, machinery and equipment. Eg., property taxes and licences.

The taxes on products are levied on specific commodities, i.e., goods and services. Eg., Goods and Services Tax (GST); Provincial Sales Taxes on specific goods and services; etc.

It should be noted here that taxes that are levied on income are called 'direct taxes' (e.g., income taxes) and they are not measured as such in the Input-Output Accounts, because the income

items mentioned in the primary inputs are measured on a gross basis, that is, inclusive of the direct taxes. In other words, the personal and corporate income taxes levied directly on income and capital gains are not measured separately in the Input Output Accounts as they are already included in the components concerned such as wages and salaries, profits and net income on which they are levied.

- Subsidies (Negative Item)

Subsidies are transfer payments from government to businesses which should not be measured as part of production. As they are already included in 'Mixed Income' and 'Other Operating Surplus' they are shown as a negative entry in this separate item merely to offset the transfer receipts by industries from government.

It is important to note here that indirect taxes are payments made to government in the form of sales taxes, property taxes and the like by all sectors of the economy. Subsidies, on the other hand, are payments received by industries from government as transfer payments. In other words, while the indirect taxes are revenues to the government, the subsidies are revenues to industries.

Thus, we can see from the Use matrix that it provides information on all the inputs needed to generate the output. Of all those inputs, the primary inputs which represent the income items of labour, capital and government constitute the Income-based Gross Domestic Product (GDP) at market prices and they are

extensively used for economic analysis both individually and in conjunction with the overall measure of GDP at market prices.

(iii) Final Demand Matrix

In addition to the Make and Use matrices, the Input-Output Accounts provide a separate matrix showing 'final use' and it is called the 'Final Demand Matrix'. It shows details of the purchases of goods and services by persons, government and non-residents, as well as the purchase of investment goods (e.g., machinery and equipment; buildings) by industries and governments. As the Final Demand categories in the matrix represent the expenditures contributing to the Gross Domestic Product at market prices, it is also called the 'Expenditure-based Gross Domestic Product'. The categories in this matrix, which are listed below for ready reference, provide details of goods and services finally utilized in the economy for consumption or investment or exports.

- Personal expenditure on goods and services;
- Government net current expenditure on goods and services;
- Gross fixed capital formation of business;
- Gross fixed capital formation of government;
- Value of physical change in inventories (VPC);
- Exports of goods and services; and
- Imports of goods and services. (Negative entry as the goods and services are produced outside Canada and they do not form part of the domestic production).

In the Input-Output Accounts, all these categories contain sub-categories within them and they will be discussed in Chapters V and VI. These sub-categories contain data for goods and services and they can also be aggregated into the above seven main categories for analytical purposes. Thus, as the Final Demand matrix contains data for goods and services contained in the Expenditure-based Gross Domestic Product, it can also be used, among other things, to study the commodity composition of Gross Domestic Product at market prices.

It is possible to disaggregate the Input-Output Accounts by province or territory and produce a provincial dimension for each of the three matrices discussed earlier. The provincial dimension of the Final Demand matrix in the Input-Output Accounts facilitates studies for identifying the different levels of utilization of goods and services in the provinces and territories as well as in the total economy of the country at the national level.

The purchases of goods and services imported into Canada from abroad are shown here as a negative entry as these goods and services originate outside the domestic production, but are used up in other categories of final consumption such as personal expenditure, government expenditure, gross fixed capital formation, exports, and inventories, in addition to intermediate inputs of industries. As we have to measure only the domestic production for the 'Gross Domestic Product',

we need to deduct these 'imports' which are already embodied in all the other categories of the final demand matrix.[36]

Although exports and imports are shown in the Final Demand matrix, one should note that the imports, by definition, can be used either by the domestic industries for their intermediate use or by the final demand categories for their final consumption. However, exports, as well as some imported goods which are normally called 're-exports', are the final disposition of the Canadian production as far as Canada is concerned. In the importing country, both the exports and re-exports of Canada can be used in the foreign countries either by industries for their intermediate use or the final demand categories for their final consumption or disposition. This distinction has to be kept in mind for economic analysis of the data presented in the Final Demand matrix.

Thus, the Input-Output Accounts provide three matrices in three different tables and give a basic statistical picture of the key economic processes and tell us how the resources of the economy are allocated among various uses. In so doing, they depict the remuneration or income generated by 'labour services' and 'capital services' (which are technically called the 'primary' factors of production) in the

[36] One could argue that, strictly speaking, this matrix should be called 'Final Demand and Imports matrix' because it reflects not only the final use of production by domestic sectors, but also imports by way of a deduction (i.e. a negative entry as they are produced by other countries). Imports might have been used partly by industries for their intermediate inputs and partly by final demand categories for their final consumption. The argument says that although imports are used by industries as well as other sectors, they are subtracted only from the final demand matrix to derive the GDP and hence the change of title is required for this Final Demand Matrix. To counter this argument, one could reply that the present title as it stands (i.e. Final Demand matrix) is perfectly justified on the ground that 'Exports less imports' reflect the 'net final demand' of goods and services from the non-resident sector while the other categories in the matrix reflect 'the final demand' from other domestic sectors of the economy. Based on this reasoning, the existing title is valid and retained without any change to the existing structure.

form of 'Labour Income' and 'Operating Surplus' respectively. They also portray indirect taxes (i.e., taxes on products as well as other taxes on production) which are payments made to government, and subsidy receipts[37] by industries from government.

While the 'Use' matrix provides items needed for measuring Income-based Gross Domestic Product, the Final Demand matrix provides the items needed for measuring Expenditure-based Gross Domestic Product.

As explained earlier, Gross Domestic Product[38] is an unduplicated measure of total value of goods and services produced in the economy. Since it is the central concept in the System of National Accounts, it is extensively used for economic analysis as the key indicator of the aggregate performance.

It is clear from the foregoing that the content of the Input Output Accounts gives a very detailed general description of the economy like a snap shot for a period of time, say, one year and hence they are widely used to answer many questions on the functioning of the economy.

[37] As subsidies are government transfer payments to the industries and are not part of production, they are shown as negative entries in the matrix. The rationale for this treatment will be explained in detail in the fifth chapter dealing with concepts and definitions of the Input-Output Accounts.

[38] This measure will also be explained in detail in Chapter V dealing with concepts.

Structural Analysis

A good deal of information on the structure of the economy is revealed in the Input-Output Accounts. They reveal, for example, information relating to the following areas which are normally used for structural analysis of the economy:

- commodity composition (i.e., product mix) of both production and disposition to study supply and demand;
- composition of intermediate and primary inputs in terms of specific identities;
- industry composition of production in terms of specific goods and services;
- commodity tax structure showing indirect taxes on specific goods and services;[39]
- government assistance to industries by way of subsidies;
- business investment spending;
- patterns in the government spending on capital goods;
- business inventory investment and changes thereof; and
- patterns of household consumption of goods and services.

Such details enable researchers, analysts, and policy makers to identify structural changes in production by each industry, demand for products, spending patterns and the changing roles of the government sector, the changing pattern of business investment decisions and so on.

[39] For example, special studies were done on the previous data for 1984-1986 as explained in technical papers by Murty, P.S.K., 'Commodity Indirect Taxes in the Canadian Input-Output Accounts, 1984' (Technical Series No. 19); and 'Commodity Indirect Taxes in the Canadian Input-Output Accounts, 1984-1986', (Technical Series No. 25), Input-Output Division, Statistics Canada, Ottawa. Copies of these papers can be obtained from the Consulting and Marketing Section of the Input-Output Division, Statistics Canada.

The Input-Output Accounts provide data on both producer prices and purchaser prices of goods and services. They also provide margins between producer and purchaser prices. The producer prices represent the values received by the producers, namely, industries for their goods and services produced and sold in the economy. The purchaser prices, however, represent the values paid by the purchasers of goods and services in the market place. Usually, the purchaser prices are higher than the producer prices, because of the additional costs needed to bring the products to the market place. The difference between the producer prices and purchaser prices is called the 'margins' which consists of several categories:

- wholesale margin;
- retail margin;
- storage margin;
- pipeline margin;
- gas margin;
- transportation margin; and
- tax margin for commodity indirect taxes (which are essentially taxes on products).

As the data for these margins are available only in the Input-Output Accounts, analysts and policy makers use these accounts to study the relationships in the market place between the producers and purchasers by each commodity, industry, and Final Demand category. For example, the governments can study the

commodity tax revenues in relation to their tax policies. Also, from 1986 onwards[40] the subsidies are broken down into two categories:

- commodity subsidies (i.e., subsidies on products); and
- non-commodity subsidies (i.e., other subsidies on production).

In view of this additional information, the Input-Output Accounts can be used to study the impact of government assistance to industries in terms of their subsidy programs.

Model-Building

The Input-Output Accounts are now widely used in the construction of Input-Output models designed for various purposes:

- to simulate the impact of changes in the economy;
- to identify the share by industry of direct and indirect value added which ends up in exports;
- to take account of feedback effects of one part of the system on another; and
- to assess the changes in demand and supply of goods and services in the total economy.

Some of the models used in this connection are the following:

- Output determination model;
- Price model;

[40] Prior to 1986, subsidies were shown as one category only and they were allocated to industries which received them.

- Net price index model;
- Growth decomposition model;
- Employment model; and
- Energy model.

Because of the various details such as commodity taxes (i.e., taxes on products) available in this system, finance departments of the Federal and Provincial Governments use the details of the Input-Output Accounts for simulation models on the implications of new taxes and new tax rates, etc. Also, Tourism Satellite Accounts, Environment Accounts, and several analytical studies such as productivity measures have been using the details of the Input-Output Accounts for their purposes.

Forecasting

Governments, business and educational establishments periodically undertake to assess future economic prospects in their planning activities. Normally, short-term and long-term forecasting economic trends are done using econometric models with various sets of assumptions. Generally speaking, the Input-Output Accounts, among other things, are important components of such econometric models, because the database provides the integrated macro-economic accounts with micro-data on industries and products along with considerable other details on the economy such as indirect taxes and subsidies.

Benchmarks for the Canadian System of National Accounts

Input-Output Accounts are produced using the most detailed information on economic activities within the established national economic accounting framework. They are balanced for production and disposition of each commodity by each industry in the economy. In other words, these Accounts are checked and balanced for all commodities and industries for their production and disposition. The rigorous balancing techniques of the Input-Output Accounts at a more detailed level such as the industry and commodity dimensions permit the system to identify and resolve problems concerning data quality and comprehensiveness in coverage. As such, the final estimates tend to be of a high quality and they are appropriate to be used as benchmarks for the other sub-systems of the Canadian System of National Accounts (CSNA). This does not mean that the other systems of the CSNA are less qualitative. It should be recognized in the first place that the availability of the Input-Output Accounts has a lag of about two and half years from the reference period while the other parts (or sub-systems) are produced for the more current period using all the available information such as surveys and estimates based on related indicators, etc. However, the detailed information needed for the Input-Output Accounts, such as the annual censuses and detailed commodity structure of some surveys, are available only with a considerable time-lag, which is also reflected in the preparation and publication of the Input-Output Accounts.

Commodity Balancing and Data Integration

The Input-Output Accounts are produced using a variety of data sources and they focus attention on details of goods and services produced and consumed in the economy. While producing the Input-Output Accounts, a thorough analysis is done in order to balance the production of each commodity with its disposition. This exercise is called the 'commodity balancing'. More specifically, this exercise equates supply of each kind of 'good' or 'service' to its disposition using any one of the following two equations shown in Charts E and F.

The resulting high quality of data is one side of the coin. The other side is the necessary time-lag that is associated with the multitude of steps needed to generate the quality product. It is this side that is closely watched to ensure that undue delays do not occur in the process by adhering to strict deadlines mutually agreed between the data - suppliers and the staff directly involved in producing the Input Output Accounts.

If one examines closely the production process of the Input Output Accounts, it looks like a 'conveyor - belt type' operation, in the sense that, at different stages, the output of one stage becomes the input of the succeeding stage and so on until the final stage of analysis is reached.

Also, it should be noted that the analysis needed at each stage of the process can only be accomplished by trained and knowledgeable human resources consisting of

analysts and researchers[41] who are well-versed in the concepts, definitions and the national economic accounting structure. Needless to say that such analysis cannot be achieved by mechanical means of automation. Surely, automation of certain mechanical processes such as calculations, presentation in tabular formats, and recalling of various sets of data, etc., must be automated to cut down the possible human errors and to speed up the production. But, it is certainly not the complete answer to cut down the time-lag which is required for the intellectual operations, such as research and analysis, involved at various stages of the actual production. The distinction of certain tasks which can be accomplished only by human resources has to be recognized in evaluating and commenting on the time-lag discussed earlier.

[41] Normally, it takes at least 7 years of experience in the area to become a very effective analyst or a researcher in the area of Input-Output Accounts.

Chart E: Commodity Balancing Equation Number One

Total supply	Total Domestic Output Plus Imports Plus Withdrawals from inventories (they relate to previous production) Plus Used cars and equipment As well as metal scrap including iron & steel scrap Plus All margins[42]

Equals

Total Disposition	Industry purchases Plus Consumers' expenditure on goods and services Plus Government net current expenditure on goods and services Plus Capital expenditure by businesses and government Plus Addition to inventories Plus Exports of goods and services

Note: In normal practice, however, the emphasis is placed on 'total domestic output' plus all margins of the current period. Because of this, the balancing can be done by shifting 'imports', 'withdrawals from inventories' and 'used cars and equipment as well as metal scrap including iron and steel scrap' to the disposition side and showing them as negative items using the formula shown in Chart F.

[42] The margins are: Wholesale margin; Retailing margin; Storage margin; Pipeline margin; Gas margin; Transportation margin; and Tax margin showing commodity taxes or taxes on products.

Chart F: Commodity Balancing Equation Number Two

Total Supply	Total Domestic Output Plus All margins[43]

Equals

Total Disposition	Industry Purchases Plus Consumers' expenditure on goods and services Plus Government net current expenditure on goods and services Plus Capital expenditure by businesses and government Plus Addition to inventories Plus Exports of goods and services Minus Imports Minus Withdrawals from inventories Minus Expenditure on used cars and equipment Including metal scrap and Iron and steel scrap

[43] The margins are: Wholesale margin; Retailing margin; Storage margin; Pipeline margin; Gas margin; Transportation margin; and Tax margin showing commodity taxes or taxes on products.

In other words, the supply of each kind of 'good' or 'service' is equated to its disposition and the data which are compiled from various sources are subjected to this exercise. In such an exercise, any inconsistencies and inaccuracies in the basic data of the categories come to the surface for attention and elimination. The statistical series finally derived after the elimination of such inconsistencies and inaccuracies become more reliable. As such, the Input-Output Accounts provide an integrating and audit role in this respect for all the basic data sources that are used in their preparation. For example, a survey that is on a sample basis may not yield the levels of goods and services for measuring the universe. Since the Input-Output Accounts measure the universe of the economy, the sample data of the surveys indicate the shortfalls for rectification in the commodity balancing exercise. This represents the audit role of the Input-Output Accounts.

Besides the balancing and equating of total supply and disposition, the output of each industry is also equated and balanced with its inputs consisting of primary inputs and intermediate inputs. After these two sets of balancing exercises are completed internally within the Input Output Division, the final data of primary inputs of all industries and Final Demand categories are grouped together. The total of such a grouping of primary inputs is the Income-based Gross Domestic Product (GDP) at Market Prices. The total of the disposition excluding industry purchases is the Expenditure-based Gross Domestic Product at Market Prices. These two GDP numbers are compared, with those independently produced by the

Income and Expenditure Division[44] in the form of tables C and D within the Economic Accounts Branch of Statistics Canada. The data used in tables C and D relate to 1992 as an example. The same structure is valid for any other year. If differences are noticed between these sets of data, both Divisions re-examine their numbers and conduct the necessary research to reconcile them. When once these numbers are fully reconciled, they will become final Input Output Accounts for release to the users. Thus, the Input Output Accounts and other parts of the Canadian System of National Accounts are fully reconciled and integrated after the commodity - balancing and the annual reconciliation exercises are completed.

The aforesaid items of work require considerable professional thinking and decision - making processes. They are by no means mechanical and monotanous as they require considerable knowledge and experience in the areas concerned to resolve the problems that normally arise in such processes of balancing and reconciling work[45].

Feedback to Basic Data Sources

Due to the review and research of the basic data in the commodity balancing exercise, the Input-Output Division identifies specific problem areas which are

[44] The items of these GDP numbers between the two Divisions are available in Table C (at P. 115) for the Income-based GDP and in Table D (at P. 117) for the Expenditure-based GDP with dtaa for 1992 for an illustration.

[45] The points mentioned here will dispel the myth that the work relating to the Input Output Accounts is mainly mechanical and monotanous with the false notion that the accounts simply take the data produced and supplied by others and incorporate them in the cells concerned. In fact, the Accounts are very much research and analysis oriented and they are not mechanical. Also, they offer considerable interesting and thought - provoking situations to the professional and technical staff and there is never a dull moment in the operations of the Accounts.

detectable and communicates those areas to the Survey Divisions for necessary action to eliminate weaknesses and to strengthen the estimates.

For example, if the output of a particular commodity is higher than its disposition, it raises fundamental questions on the components that are involved in the commodity balancing exercise. Normally, such areas are reviewed in consultation with the Survey Divisions involved. With the co-operation and participation of the Survey Divisions, Input-Output Division had in the past eliminated several areas of weaknesses in the basic data. This is an important application of the Input-Output techniques for producing high quality estimates by all concerned.

Teaching Economics

The studies of the sources of economic growth are typically carried out by using the framework of the System of National Accounts in general as it contains all the essential parts explaining the components of the economy. The Canadian System of National Accounts (CSNA) contains four sub-systems (or parts). They are: the Input-Output Accounts;

- the Income and Expenditure Accounts;
- the Gross Domestic Product by industry; and
- the Balance of International Payments and Financial Flows

While the Balance of International Payments and Financial Flows sub-system explains the transactions of Canada with the rest-of-the-world, the other three sub-

systems contain the central concept of GDP and explain the transactions within Canada as well as with the rest-of-the-world and provide the ingredients needed for further analysis. Of these three sub-systems, however, only the Input-Output Accounts provide details of goods and services along with the industries that produced them as well as the Final Demand categories which consumed the production in the economy.

In summary, then, the structural analysis of the Input-Output Accounts illustrates shifts in the growth patterns of industrial output and consumption of goods and services. Such a growth analysis based on the Input-Output Accounts is indispensable for policy makers who make decisions to chart the course of the economy. It is also important for analysts to assess quantitatively the relative significance of the emerging new trends in the economy by using the database of the Input-Output Accounts.

As the Input-Output Accounts contain the statistical framework for understanding and interpreting economic transactions, teaching institutions[46] such as colleges and universities will find them useful as an expository device. The three types of matrices, (namely, Input; Output; and Final Demand) explained earlier will provide ready answers to several questions that the students may have about the Canadian economy, its industrial structure, and various other related details. For example,

[46] The need to incorporate the National Accounts System as a full course subject was explained in a technical paper by Murty, P.S.K., 'International Comparability of Domestic Economies: Recent Successes and Future Challenges', (Technical Series No. 80), Input-Output Division, Statistics Canada, Ottawa. Copies of this paper can be obtained from the Consulting and Marketing Section of the Input-Output Division, Statistics Canada.

one can find answers to commonly asked questions such as: what is the total expenditure of the Federal Government for services provided to the community in relation to other levels of government (i.e., provincial and local)?

Labour income, which consists of employee compensation, is generally the largest component of the total costs of producing goods and services. A comparative study of the wage component across industries would be very informative for businesses as well as students of labour economics.

In this connection, the questions that arise for teaching purposes are the following:

- What are the goods and services produced in the economy?
- How are the goods and services allocated among various uses?
- What is the relative share of labour input into the productive activities of industries? Which industry has the largest share of labour in their expenditure patterns? In other words, which industry is more labour-intensive and which one is capital - intensive?
- What is the commodity on which the largest amount is spent by the Personal sector of the economy?
- What is the relative importance of the goods and services in a particular period as well as in the time series?
- What are the imported goods and services in relation to the domestically produced goods and services? What is the relative international competitiveness among industries?

- What are the exported goods and services in relation to the domestic consumption?
- What is the total expenditure of the federal government for service provision in relation to other levels of government (i.e. provincial and local)?

Colleges and Universities can find the data of the Input-Output Accounts useful to answer these and other questions in their courses on Applied Economics.

Impact Matrices

One of the contributions of the Input-Output Accounts to economic analysis is that they permit analysts to measure the impact or repercussions that changes of final uses will have on industries and available goods and services, both directly and indirectly. By using the information on the inputs, outputs, and final demand of goods and services, Impact Matrices are generated for use in such studies to answer specific questions on the anticipated repercussions in the total economy if a particular variable of demand changes.

For example, a permanent increase in consumer demand for computers will initially have a direct effect that will either increase the production of computers or increase the imports for computers, or both. This direct demand will in turn have indirect effects, which will be translated into increased demand for all the inputs that go into the production of computers, such as integrated circuits, printed

circuits, semi-conductors, copper wiring, etc. It is possible to trace the chain of these indirect effects throughout the economy by the use of the Input-Output Model, which quantifies these effects in coefficient tables. In other words, these Impact tables can be used to determine the impact of a given change such as an increased demand or lack of demand for specific goods and services.

Similar analysis can be done for the supply side also using another model similar to the one used for demand analysis. That analysis can answer questions concerning the anticipated repercussions on the supply of goods and services in the total economy if a particular variable of supply changes.

Administrative Uses

Effective April 1, 1997, the Provincial Retail Sales Taxes and the Federal Goods and Services Tax (GST) in Nova Scotia, New Brunswick, and Newfoundland (and Labrador) have been replaced by a single Harmonized Sales Tax (HST). The HST has the same basic operating rules as the GST and is applicable at a single rate of 15 percent to the same base of goods and services consumed in those three provinces. Of the 15 percent HST, 7 percentage points represent the federal component and the remaining 8 percentage points represent the provincial component.

This move towards a Harmonized Sales Tax by the federal and three provincial governments is a significant policy change in the collection of tax revenues as it consolidates the taxes paid to federal and provincial governments into one single tax with one set of rules and forms and one administrative arrangement to collect the tax. In this connection, the federal government and the three provincial governments entered into an agreement to share the collected Harmonized Sales Tax using the data of the Input-Output Accounts where basic information on goods and services consumed in the three provinces will be available.

This new agreement for tax sharing arrangements added a new mandate for Statistics Canada to produce Annual Provincial Input-Output Accounts from 1997 onwards to facilitate the tax sharing arrangements between the federal government and the three provinces (i.e. Nova Scotia, New Brunswick, and Newfoundland and Labrador). Since this new mandate required the development of a higher quality provincial database, a new project called PIPES (Project to Improve Provincial Economic Statistics) was created to initiate new surveys for obtaining data, where needed, for the provincial dimension of national data and to incorporate the needed improvements to the Provincial Input-Output Accounts.

The new administrative tax sharing arrangement using the basic data of the Input-Output Accounts is an additional new application of the Input-Output Accounts. This is a significant change in the utilization of this important source of

information. The data of the Provincial Input-Output Accounts would help these harmonizing provinces to monitor and analyze the relevant tax collections.

The National Input-Output Accounts are a good source for detailed information on production and disposition of goods and services in the national economy of the country. By adding the provincial dimension to the annual National Input-Output Accounts on a continuing basis for the purposes of a new administrative tax sharing arrangement, all the advantages that exist for the National Input-Output Accounts will be equally enjoyed by all the provinces and territories. More specifically, the establishments and governments located within the individual provinces and territories will be able to use the data with reference to their particular needs. Of course, there will be some limitations to the answers due to the confidential information that may not be available for research due to restrictions under the Statistics Act.

For example, if a manufacturing establishment in a province or the government of a particular province desires to find answers to the following questions, the new provincial dimension of the Input-Output Accounts will be very useful.

- How are the profit margins of the industries within that province comparable to the experience of that establishment?
- How is the pattern of inputs concerning the production process of that establishment comparable to that of the same industry to which that establishment belongs?

- What are the types of goods and services produced by the industry to which the establishment belongs? How is the output structure of that establishment comparable to that of the industry to which the establishment belongs?
- How strong is the demand for the products of that establishment in the economy of the province concerned as well as other provinces and territories?
- How is the demand for the products of that establishment met? Is the demand met fully by local production or imports from other provinces and abroad?
- What is the export potential of the products produced by that establishment to other provinces and abroad?
- How significant is the government assistance to industries in terms of subsidies compared to the government assistance received by that establishment?
- How large is the labour component of the input structure compared to that of the industry to which the establishment belongs? How does it compare to that of the other industries in the Canadian economy?

There are several other questions that can be studied by any establishment using the provincial dimension of the concerned databases of the Provincial Input-Output Accounts. In fact, the Consulting and Marketing Section of the Input-Output Division receives several requests to tailor special tabulations to answer individual questions of the type mentioned here. That section, with the assistance of the individual experts of the Input-Output Division and other data-producing Divisions of Statistics Canada, provides special tabulations and consultation services to answer the kinds of questions such as those mentioned here.

Basic Inputs Versus Additional Costs

Consumers and the institutions dealing with the interests of consumers can study the Use (Input) Matrix of the Input-Output Accounts which contains details for the various costs that enter into the pricing structure of goods and services. For example, producers use in the manufacturing process the basic inputs involving mostly raw materials (i.e., goods and services) essential to manufacture various products. In addition, they use other goods and services such as those needed for packaging, advertising, travelling, entertainment, and marketing which are additional costs to bring the products to the market. All these additional costs enter into the input structure of the products as well as in the pricing policies of the industries concerned. The proportions of additional costs versus basic inputs needed in the production process can also be studied using the data of the Input-Output Accounts.

Time Series Analysis

As the Input-Output Accounts of the Canadian economy have a time-series from 1961 onwards, the trends in the demand for individual goods and services can be observed and analyzed to draw meaningful conclusions in the context of economic, social and political events that took place over the last four decades.

3. SPECIFIC USES AND APPLICATIONS

Studies on the Sources of Economic Growth

The Input-Output Accounts provide details of goods and services produced in the economy by industries. They also provide details for the disposition of goods and services either as intermediate use by the industries or the final use by the Final Demand categories. The structural analysis of the Input-Output Accounts illustrates shifts in the growth patterns of industrial output, industrial growth, and consumption of goods and services. Such a growth analysis based on the Input-Output Accounts is indispensable for policy makers. It is also important for analysts to assess, quantitatively, the relative significance of the emerging new trends in the economy by using the database of the Input-Output Accounts.

Productivity Related Studies[47]

Because of the availability of data on goods and services in the Input-Output Accounts, it is possible to deflate the values and derive constant price series that represent the volume measures. Comparisons of these volume measures over the years facilitate studies to determine growth or lack of it. It is also possible to distinguish how much of the growth can be accounted for by the growth in the volume of inputs and how much is attributable to increased productivity.

[47] Measuring productivity is a field by itself and it is outside the scope of this publication. However, it is important to note that basic data for the productivity related studies can be derived from the Input Output Accounts.

Inter-Industry Dependency Studies

Businesses can assess the inter-dependency of their industries with others by using the data of the Input Output Accounts. In the database, one can see the intermediate inputs needed for each industry for its production process, which are supplied by other industries in order to generate the outputs. They also can compare and contrast their own input structure with that of the industry to which they belong or to the total of all industries combined. Such inter-industry comparisons can, in addition, be made for their outputs in terms of specific goods and services and finally, the profit margins of industries for inter-industry comparisons.

Such a list for inter-industry comparative studies is endless as they can be tailored depending on their specific requirements and research objectives.

Public Sector Market Studies

As the Input-Output Accounts contain details of goods and services produced and consumed in a particular geographical boundary, be it a nation, province or territory in a nation, and as these details are divided into categories of consuming institutions such as governments, the Input-Output Accounts can be used to study and evaluate the procurement policies of governments.

Such studies indicate the level of goods and services consumed by the governments and their enterprises. They facilitate to answer many questions such as:

- which industries are the beneficiaries of Public Sector's purchases;
- how much employment is generated; and;
- What is the estimated 'import' content of such purchases and so on;
- What policies are necessary for import substitution and development of domestic resources;.

These studies can also throw some light on the type of new industries to meet the demand of goods and services in the economy. In other words, the Input-Output Accounts can be used for studies concerning industrial development policies of governments and business establishments. Three such studies[48] were already done for 1974, 1979 and 1983.

The methodology developed in those studies was used to produce databases at the request of the then Federal Department of Supply and Services. Those databases were analyzed by the Department of Supply and Services[49] and the findings were incorporated in an internal comprehensive report called "Canadian Public Sector

[48] Special studies on the Public Sector Market were done for 1974, 1979 and 1983 as explained in three different technical papers by Murty, P.S.K., 'Methodology for Derivation of Public Sector's Purchases of Goods and Services, 1974', (Technical Series No. 82); 'Size and Structure of the Public Sector Market, 1979: Sources and Methods' (Technical Series No. 83); 'Size and Structure of the Public Sector Market, 1983, Soruces and Mehtods' (Technical Series No. 5), Input-Output Division, Statistics Canada, Ottawa. Copies of these papers can be obtained from the Consulting and Marketing Section of the Input-Output Division, Statistics Canada.

[49] For further information, Sami Sourani of that department can be consulted.

Market" which showed, among other things, the type of goods and services purchased by the Public Sector for the three levels of government, crown corporations, Universities and Hospitals for each province and for total Canada. That comprehensive report[50] showed the following four main characteristics of the Public Sector Market:

- the type of industry in each province that benefited by the Public Sector Market;
- the estimated level of foreign content within each type of industry for the Public Sector Market;
- the number of jobs lost as a result of the estimated import content of the Public Sector Market; and
- the number of jobs generated or maintained by each type of industry;

Our correspondence has revealed that, because of the unique nature of that report, considerable interest was demonstrated in its findings not only by the Canadian federal government departments, but also by provincial governments and some foreign governments. Also, it served as one of the basic reference documents in the Free Trade Negotiations between Canada and the United States, such as North American Free Trade Agreement (NAFTA). In addition, several Graduate Students at the Ph.D level from Universities in England, France, and Australia used the database for their dissertations. This study was also used for discussions with the World Trade Organization (WTO). Such was the impact of this important

[50] For further information, please contact Public Works and Government Services Canada, Hull, Quebec (Attention: Sami Sourani).

unique study which illustrates the practical application of the Input-Output database to answer some difficult and complex policy - oriented questions.

Export Promotion Studies

As the Input-Output Accounts contain details of exported goods and services, the data can be used to identify the specific industries that are export-oriented. One can also identify the share by industry of direct and indirect "value added" which ends up being exported. Based on such studies, the governments can introduce incentives to promote such export-oriented industries depending on their priorities and policies concerning foreign-exchange earnings and international trade.

Import Substitution Studies

The details of imported goods and services available in the Input-Output Accounts can facilitate studies for import substitution. For example, if a particular imported commodity is also available in the domestic economy but not sufficient to meet the demand, steps can be taken to meet the demand levels of the domestic economy by increasing the domestic supply.[51] This can, in turn, translate into increased employment in the domestic economy. In other instances, where there is no domestic industry which can meet the demand, new industries have to be started to produce such imported goods and services. All these studies will be able to use the

[51] For example, a special study was done on the Public Sector Purchases of Goods and Services – both from domestic production and imports – for 1983 as explained in the technical paper by Murty, P.S.K., "Size and Structure of the Public Sector Market, 1983, Sources and Methods" (Technical Series No. 5), Input-Output Division, Statistics Canada, Ottawa. Copies of these papers can be obtained from the Consulting and Marketing Section of the Input-Output Division, Statistics Canada.

rich information on imported goods and services available in the Input-Output Accounts.

Consumer Demand Studies

As the Input-Output Accounts provide details of goods and services consumed by the Personal Sector of the economy, studies to evaluate the demand can be conducted using the details of 'Personal Expenditure on Goods and Services' in this valuable source. The commodity - balancing technique used to produce the Input-Output Accounts generates the required data for such supply-and demand-studies.

Capital Investment Studies

In any economy, the capacity to generate goods and services depends largely on the level of capital investments made in the past and current periods. Such levels of capital investments can be related to the capacity to generate the current levels of domestic goods and services by a model. The data available in the Input-Output Accounts on Gross Fixed Capital Formation by industries can be used in such studies.

Studies on Government Assistance to Industries [52]

Data on government subsidies received by each industry are available in the Input-Output Accounts. The government grants programs giving subsidy assistance to

[52] 'Non-business industries' are essentially 'Non-commercial industries'. These two terms are used interchangeably to mean the same thing.

industries can be evaluated by using this information to identify which industries are the beneficiaries of the government assistance programs.

Also, as the subsidy data are allocated to commodity[53] and non-commodity categories, the data can be used to identify the particular commodity for which the government assistance is given.

Unincorporated Business Studies

The 'Mixed Income' category of the Input Matrix represents the 'net income of unincorporated business' and farmers. Self-employed people, such as doctors and lawyers, fall into this category. As data for this category are available by industry, it is possible to study the evolution of unincorporated business in the economy by studying the trends and levels of the 'Mixed Income' available in the Input-Output Accounts.

Employment Studies

The data on labour income which is composed of two primary inputs (namely, wages and salaries; and supplementary labour income) can be related to employment levels in an industry or total economy. Taking a simple example, if an industry paid $100 million for labour income and employed 2000 people, the average labour income per person will be $50,000, other things being equal. If,

[53] A brief description of the methodology followed in the classification of subsidies between "Commodity' and "Non-commodity" categories was explained in the technical paper by Murty, P.S.K., "Commodity Subsidies in the Canadian Input-Output Accounts, 1986-1989", (Technical Series No. 89), Input-Output Division, Statistics Canada, Ottawa. Copies of these papers can be obtained from the Consulting and Marketing Section of the Input-Output Division, Statistics Canada.

due to fluctuations, in demand for the goods and services produced by that industry, the anticipated labour income payments increased to $125 million, then the anticipated requirements for employees would be 2500 which can be derived with the following formula:

Existing position:		Anticipated position:	
$100,000,000 / 2000 Employees	= $50,000 average;	$125,000,000 / $50,000 average	= 2500 employees.

This anticipated requirement is the direct employment which is the total number of employees directly employed by the industry concerned. However, there is also the indirect employment as the industry would require some inputs produced by other industries. For example, the car manufacturing industry employs workers directly in its operations to manufacture cars. For its operations, the car manufacturing industry requires tires and tubes that are manufactured elsewhere in the 'tire and tube manufacturing industry'. That tire and tube manufacturing industry also employs workers directly in its operations. In this example, the requirements of the car manufacturing industry are called the 'direct' employment requirements for the car manufacturing industry itself while those of the tire and tube manufacturing industry are called the 'indirect' employment requirements as far as the total employment requirements for car manufacturing are concerned.

By using the Input-Output model, the indirect employment and the anticipated other requirements can be calculated similar to the direct employment. Such direct and indirect effects on other commodities as well as the GDP can also be calculated by using the relevant models.

Using such relationships, we can also study the effects of changes in demand and supply of other goods and services on the employment levels of the labour force.

Studies on Commodity Values Before and After Government Subsidies

In the recent historical revision, the Input-Output Accounts provided a new dimension for government subsidies. Formerly, subsidies were allocated only to industries that received them. They were not allocated to goods and services that were covered by such subsidy payments. In the historical revision, a change was made to this practice and subsidies were disaggregated into two categories, namely, 'subsidies on products' and 'other subsidies on production' from 1986 onwards. The data for the period 1961-1985 were allocated to industries as before, and no change was made in this procedure for that period. While subsidies on products represent the 'commodity subsidies' that can be allocated to specific commodities for which government gave subsidies to industries, the other category of subsidies that relates to total production represents the 'non-commodity subsidies', as it cannot be allocated to any specific identifiable commodities. Consequently, in the Input-Output Accounts, the subsidies on products were allocated to the related goods and services for which subsidies were utilized in the

pricing structure from 1986 onwards while other subsidies on production were allocated to the industries which received them. Using this information for subsidies on products, we can determine the prices of goods and services if subsidies were not given by the government.

An example is the subsidies paid for public transportation by the government sector.

What would be the full cost of public transportation if the regional municipalities did not give the subsidies or if the subsidy levels are reduced? Questions such as this can be studied and answered using the revised subsidy data of the Input-Output Accounts.[54]

Studies on Employment Benefits

Employment benefits consist of several categories of costs to employers such as contributions to employee pensions, workers' compensation, that are incurred on behalf of employees. These benefits are classified to a special category called 'Supplementary labour income' in the Primary Inputs of Use (Input) matrix. This information is available by industry. The proportions of supplementary labour income to the total cost of all inputs or to the total wages and salaries by each industry and for total economy provide useful indicators to the labour and

[54] In fact, a special study was done during 1991 on the previous data as explained in the technical paper by Murty, P.S.K., "A New Paradigm to Analyze Commodity Indirect Taxes and Subsidies, 1986-1989" (Technical Series No. 35), Input-Output Division, Statistics Canada, Ottawa. Copies of these papers can be obtained from the Consulting and Marketing Section of the Input-Output Division, Statistics Canada.

management in collective bargaining negotiations. For example, predominant use of contract labour or term employees without these benefits tend to reduce the proportions of supplementary labour income to the total wages and salaries or to the total input cost. If, however, these benefits are increased in a particular industry, the proportion of supplementary labour income to the total cost or to the total wages and salaries tends to rise in that industry in relation to other industries. Such analytical results will be very valuable for industries to monitor the condition of employment in the total economy of the country.

Studies on Non-Business Industries[55]

In the Input-Output Accounts, non-business industries which have no profit-oriented commercial operations, are identified separately for analytical purposes. The output of these institutions is disaggregated into the following industries in the Make (Output) matrix.

Worksheet Level

- Industry 231: Religious organizations
- Industry 232: Welfare organizations
- Industry 233: Sports and recreation clubs
- Industry 234: Educational institutions
- Industry 235: Other organizations
- Industry 236: Hospitals
- Industry 237: Residential care facilities
- Industry 238: University education

[55] 'Non-business industries' are essentially 'Non-commercial industries'. These two terms are used interchangeably to mean the same thing.

- Industry 239: Other educational services
- Industry 240: Defence services
- Industry 241: Other municipal government services
- Industry 242: Other provincial and territorial government
- Industry 243: Other federal government

The data of these non-business industries can be used to study the role of non-commercial operations of the Business Sector in the economy.

Studies on Non-Profit Institutions in the Personal Sector

Data on current operating expenditures of non-profit institutions are separately shown in the Personal Sector of the Input-Output Accounts in the Final Demand Matrix under 'PE 47 Operating Expenditures of non-profit organizations'. The data of this category can be used to derive the total expenditure levels of Personal Sector excluding the non-profit institutions in order to study the patterns of spending exclusively by households only.

Government Sector Studies

Government Sector[56] is divided into the following six categories in the Input-Output Accounts for analytical use.

- Hospitals;
- Education (universities, colleges and schools);
- Defence;

[56] Government sector does not include Government Business Enterprises as they are included in the Business sector.

- Other municipal government (i.e., Other than hospitals and education);
- Other provincial and territorial government (i.e., Other than hospitals and education); and
- Other federal government (i.e., Other than hospitals and education).

The net current operating expenditures (i.e., gross expenditure on goods and services less sales revenues) of these categories are separately shown in the Final Demand matrix. By using these data, one can study the role of these categories either individually for each final demand category (e.g., government net current expenditure on goods and services)[57] or collectively for all categories separately along with that of the total government sector covering all these categories.

Per Capita Expenditure Studies

By using population data, one can obtain per-capita expenditure patterns, such as per-capita consumer expenditure, and observe the trends in the consumption patterns. Such trends can indicate whether there is any shift in the consumption patterns of the population. For example, for health reasons, people may consume more vegetables and fruits. In other instances, people may be preferring public transportation instead of using their cars for transportation in order to reduce pollution. Such shifts in consumption patterns can be observed from the per capital analysis of the Input Output database.

[57] For example, a special study was done on the government sector as explained in the technical paper by Murty, P.S.K., 'Government Expenditures on goods and Services and Transfer Payments in Canada 1961-1985' (Technical Series No. 23), Input-Output Division, Statistics Canada, Ottawa. Copies of these papers can be obtained from the Consulting and Marketing Section of the Input-Output Division, Statistics Canada.

Functional Studies

The data of the Final Demand matrix can be regrouped into functional categories such as health, education, entertainment, etc., by selecting the specific goods and services that are normally used for such functions and adding them up to obtain estimates for expenditure on those functions for analytical purposes. For example, the data of commodities 614 'Other Health and Social Services' and 615 'Health Practitioners and Laboratory Services' at the worksheet level[58] can be added together to obtain the total expenditure on health care services.

Studies on Commodity Content of Final Domestic Demand and Gross Domestic Product

'Final Domestic Demand' represents the expenditures of the resident sectors of the economy as reflected in the Final Demand matrix. If the commodity content of the Final Domestic Demand is desired, the data can be obtained in two ways depending on the starting point for calculations. We can start with the 'total expenditure-based Gross Domestic Product at Market prices by commodity', and use the following formula[59] to derive commodity content of the Final Domestic Demand.

[58] For a detailed list of goods and services, see Appendix II in the Second Volume of this compendium.
[59] This formula is valid for the following reasons: First, we remove the exports as they are consumed by foreigners, but not by domestic sectors. Second, we add back the imports as they are consumed by domestic sectors in some form or other. Third, inventories are not yet purchased by anybody and so they should be deducted.

Take: Expenditure-based Gross Domestic Product at market prices by commodity

Deduct: Exports of goods and services by commodity

Add: Imports of goods and services by commodity

Deduct: Value of physical change in inventories by commodity

Equals: Final Domestic Demand by commodity

Alternatively, we can also add up the purchases of the domestic sectors of the economy and derive the same total as follows:

Take: Personal expenditure on goods and services by commodity;

Add: Government net current expenditure on goods and services by commodity;

Add: Gross Fixed Capital Formation of Business by commodity; and

Add: Gross Fixed Capital Formation of Government by commodity

Equals: Final Domestic Demand by commodity

In other words, the commodity information of domestic purchases can be grouped together into the above four categories and analyzed for trends and differences in their demand functions. Special studies on sectoral consumption patterns can also be made using these and other data.[60] As the commodity content of Gross

[60] For example, see the special studies on the Public Sector Market done for 1974, 1979, and 1983 in technical papers by Murty, P.S.K., 'Methodology for Derivation of Public Sector's Purchases of Goods and Services, 1974', (Technical Series No. 82); 'Size and Structure of the Public Sector Market, 1979: Sources and Methods' (Technical Series No. 83); 'Size and Structure of the Public Sector Market, 1983, Sources and Methods' (Technical kSeries No. 5), Input-Output Division, Statistics Canada, Ottawa. Copies of these papers can be obtained from the Consulting and Marketing Section of the Input-Output Division, Statistics Canada.

Domestic Product is readily available in the Input Output Accounts, studies on fluctuations in the utilization of goods and services can be carried out by using this source of information.

International Trade Studies

The Input-Output Accounts provide details of goods and services exported to other countries and their values as well as similar details of imported goods and services from other countries. If research and analysis are needed on the magnitude of net international trade (i.e., exports less imports) in terms of net exported values by commodity, the relevant commodity matrices of the Input-Output Accounts can be utilized for this purpose.

Summary

In summary, then, there are numerous uses and applications that are available by using the data of the Input-Output Accounts. This list of uses and applications is by no means exhaustive since it contains only illustrations that give an introductory understanding of the potential use in analytical and research studies of various dimensions. Such usefulness is mainly due to the fact that the Input-Output Accounts touch upon all economic activities and provide considerably more detail than any other subsystem of the Canadian System of National Accounts.[61]

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[61] In fact, our Consulting and Marketing Section receives several hundreds of requests for advice on several questions and for providing special tabulations of data for various studies.

4. ARE THERE LIMITATIONS TO USES AND APPLICATIONS OF THE INPUT-OUTPUT ACCOUNTS?

Despite the several uses and applications illustrated here, there are some fundamental limitations also for Input-Output Accounts. In order to give a balanced view, these fundamental limitations are highlighted in this section. It should be noted that the limitations discussed here are not related to data. They pertain only to the general limitations that arise due to the way the Input-Output Accounts are designed, structured and presented. They are listed here as the users will be aware of the fundamental constraints within which the Input-Output accounting system operates.

Macro-Economic Accounting Framework

As already mentioned earlier, the Canadian System of National Accounts, which contains the macro-economic accounting framework, consists of the following four parts:

- the Input-Output Accounts;
- the Income and Expenditure Accounts;
- the Gross Domestic Product by Industry.
- the Balance of International Payments and Financial Flows; and

As we can see from the foregoing, Input-Output Accounts are one of the four parts of the macro-economic accounting framework which is simply called the System of National Accounts.

As the Input-Output Accounts cover only production and disposition of the total goods and services produced and consumed in the economy, they do not provide the answers to all questions that arise in the evaluation and analysis of the total economy including savings, transfer payments, assets and liabilities etc. Other parts of the system have to be consulted for answers depending on the type of questions. Let me elaborate this point.

The Balance of International Payments provide the accounts for transactions between Canadians and the rest-of-the-world, and the Financial Flows provide information on flows of funds from one sector to the other within the domestic economy as well as those relating to international transactions. In terms of the current production and disposition of goods and services, the data of the Balance of Payments provide information on exports and imports which are two of the several categories measured for the Expenditure-based Gross Domestic Product at market prices.

The other three parts of the Canadian System of National Accounts (namely, the Input-Output Accounts, the Income and Expenditure Accounts, and the Gross Domestic Product by Industry) measure the Gross Domestic Product which is the comprehensive and unduplicated measure of goods and services produced in the economy. These three parts provide complementary information and no one single system can provide answers to all the questions that arise in dealing with economic analysis. Although these three parts touch upon the Gross Domestic Product, there

are differences. The availability of comparable aggregates of each part is shown in Table A1, for information. A broad comparison of the four parts by salient features is shown in Table A2 for 25 main items just to illustrate that the database of each part has its own special advantages and limitations. Consequently, users have to consult those databases of the four parts for their specific needs keeping in mind the inherent limitations in each case.

In the context of evaluating the inherent limitations, it should be understood that the System of National Accounts is designed within a specified macro-economic accounting framework that attempts, in general, to measure the production and disposition of goods and services in a given economy. The central concept in the measurement is the Gross Domestic Product at market prices.

This measurement is accomplished through two different approaches:

- the 'sum of income arising in productive activity', which is called the income-based approach; and
- the 'sum of expenditure arising from the consumption and disposition of the production', which is called the expenditure-based approach.

As will be described later in Chapter V dealing with the conceptual framework, these two approaches should provide equal figures. This two-approach method is followed in Canada in order to arrive at a reasonably reliable level of production as measured by Gross Domestic Product at Market Prices.

If certain questions arise in evaluating the economy which are outside the scope of the conceptual framework (for example, welfare or poverty) that exists at the present time, the macro-economic accounting system cannot directly answer them. However, it can perhaps throw some light leading to the answers.

Table A1: Parts of the Canadian System of National Accounts and their published aggregates

		Divisions within Statistics Canada			
		Input-Output Division	Income and Expenditure Division	Industry Measures and Analysis Division	Balance of Payments Division
		Published data			
		Input-Output Accounts	Income and Expenditure Accounts	GDP at factor cost by Industry	Balance of Payments and Financial Flows
Available Aggregates	Gross Domestic Product at factor cost by Industry	Current dollar values broken down by industry as well as total economy; Annual publication; Publishing lag of 30-34 months.	Not published; Available for total economy only, but not by industry.	Constant dollar values only, but not broken down by component; Monthly publication; Publishing lag of 2 months.	Not applicable
	Gross Domestic Product: Income and Expenditure components of the Income and Expenditure Accounts	Available for total economy as well as by industry and final demand categories; Data not available by sector; Annual publication; Publishing lag of 30-34 months.	Available for total economy and by sector; Quarterly and annual publications; Publishing lag of 2 months for quarterly.	Not published	Not applicable

Table A2: Broad Comparison of Four Parts of the Canadian System of National Accounts in Terms of Salient Features

	Divisions within Statistics Canada			
	Input Output Division	Income And Expenditure Division	Industry Measures And Analysis Division	Balance of Payments Division
	Published data			
Reference to Published information	**Input Output Accounts**	**Income And Expenditure Accounts**	**Gross Domestic Product by Industry**	**Balance of International Payments and Financial Flows**
1. Publication catalogue (a) For historical data 1961-92.	15-201–XPB, Oct. 1998 for 1961-92 data	13-001–SPB, November 1998 for 1961-92 data	15-512–XPB, September 1998 For 1961-92	67-001–XPB, July 1997 1926 – 1996 data
(b) For current on-going Data	15-201–XPB	13-001–XPB	15-001–XPB	67-001–XPB
2. Gross Domestic Product at Market Prices				
(a) Income-based	Not published explicitly; categories have to be added together	Yes	No	No
(i) aggregate		Yes	No	No
(ii) categories	Yes	Yes	No	No
(b) Expenditure-based				
(i) aggregate	Yes; in Final Demand Matrix	Yes	No	No
(ii) categories	Yes; in Final Demand Matrix	Yes	No	No
(iii) exports				
(a) Total Goods	Not aggregated In publication	Yes	No	Yes
(b) Total Services	Not aggregated In publication	Yes	No	Yes
(iv) Imports				
(a) Total Goods	Not aggregated In publication	Yes	No	Yes
(b) Total Services	Not aggregated In publication	Yes	No	Yes

Table A2: Broad Comparison of Four Parts of the Canadian System of National Accounts in Terms of Salient Features (Continued)

	Divisions within Statistics Canada			
	Input Output Division	Income and Expenditure Division	Industry Measures And Analysis Division	Balance of Payments Division
	Published data			
Reference to Published information	**Input Output Accounts**	**Income And Expenditure Accounts**	**Gross Domestic Product by Industry**	**Balance of International Payments and Financial Flows**
3. Gross Domestic Product At factor cost				
(i) Total economy	Not explicitly published; can be obtained by adding items in Use Matrix	Yes	Yes	No
(ii) By industry	Not explicitly published; can be obtained by adding items in Use Matrix	No	Yes; in constant Dollars only	No
4. Commodity content of Gross Domestic Product at Market Prices				
Total economy	Yes in Final Demand Matrix	No	No	No
5. Gross Domestic Product at Market Prices in volume indexes	No	Yes	No	No
6. Sector Accounts				
(a) Persons and unincorpo-Rated Businesses	No	Yes	No	No
(b) Corporations and Government Business Enterprises	No	Yes	No	No
(c) Government	No	Yes	No	No
(i) Federal	No	Yes	No	No
(ii) Provincial	No	Yes	No	No
(iii) Local	No	Yes	No	No
(iv) Canada and Quebec Pension Plans	No	Yes	No	No
(v) Non-residents	No	Yes	No	No

Table A2: Broad Comparison of Four Parts of the Canadian System of National Accounts in Terms of Salient Features (Continued)

	Divisions within Statistics Canada			
	Input Output Division	Income and Expenditure Division	Industry Measures And Analysis Division	Balance of Payments Division
	Published data			
Reference to Published information	**Input Output Accounts**	**Income And Expenditure Accounts**	**Gross Domestic Product by Industry**	**Balance of International Payments and Financial Flows**
1. Savings, Investment and Net Lending				
(a) For total economy	No	Yes	No	No
(b) For each sector	No	Yes	No	No
2. Personal Expenditure on Consumer Goods and Services				
(a) Total	Yes	Yes	No	No
(b) Main categories	No	Yes	No	No
(c) By commodity	Yes	Yes	No	No
3. Personal Expenditure on Consumer Goods and Services At 1992 prices				
(a) Total economy	No	Yes	No	No
(b) Main categories	No	Yes	No	No
4. Investment in Residential Structures				
(a) Total economy	Yes	Yes	No	No
(b) Detail such as:				
(i) New construction	No	Yes	No	No
(ii) Renovations	All combined together	Yes	No	No
(iii) Transfer costs		Yes	No	No
5. Investment in Residential Structures at 1992 prices	No	Yes	No	No
6. Investment in Non-Residential Structure and Equipment				
(a) Total economy	Yes	Yes	No	No
(b) Main categories	Yes	Yes	No	No
7. Investment in Non-Residential Structures and Equipment at 1992 prices				
(a) Total economy	No	Yes	No	No
(b) Main categories	No	Yes	No	No

Table A2: Broad Comparison of Four Parts of the Canadian System of National Accounts in Terms of Salient Features (Continued)

	Divisions within Statistics Canada			
	Input Output Division	Income and Expenditure Division	Industry Measures And Analysis Division	Balance of Payments Division
	Published data			
Reference to Published information	**Input Output Accounts**	**Income And Expenditure Accounts**	**Gross Domestic Product by Industry**	**Balance of International Payments and Financial Flows**
8. Exports and Imports of Goods and Services				
(a) Main categories	No	Yes	No	Yes
(b) Balance of trade	No	Yes	No	Yes
(c) Commodity details	Yes	No	No	Yes
(d) At 1992 prices	No	Yes	No	No
9. Business investment in Inventories				
(a) By Main categories of durable, non-durable and farm	No	Yes	No	No
(b) At 1992 prices	No	Yes	No	No
10. Implicit price indexes of Gross Domestic Product at Market prices	No	Yes	No	No
11. Corporation Profits Analysis Showing undistributed Profits	No	Yes	No	No
12. Supplementary aggregates For total economy				
(a) Net Domestic Product At factor cost	No	Yes	No	No
(b) Gross National Product at Market Prices	No	Yes	No	No
19. Final Domestic Demand	No	Yes	No	No
20. Net National income at factor cost	No	Yes	No	No
21. Industry outputs by commodity	Yes	No	No	No
22. Industry inputs by commodity	Yes	No	No	No

Table A2: Broad Comparison of Four Parts of the Canadian System of National Accounts in Terms of Salient Features (Concluded)

	Divisions within Statistics Canada			
	Input Output Division	Income and Expenditure Division	Industry Measures And Analysis Division	Balance of Payments Division
	Published data			
Reference to Published information	**Input Output Accounts**	**Income And Expenditure Accounts**	**Gross Domestic Product by Industry**	**Balance of International Payments and Financial Flows**
23. Final Demand Categories by commodity	Yes	No	No	No
24. Gross Domestic Product at factor cost by industry in Constant dollar (1992) prices				
(a) Total Economy	No	No	Yes	No
(b) By Province	No	No	Yes	No
(c) Monthly	No	No	Yes	No
(d) Quarterly	No	No	Yes	No
(e) Annual	No	No	Yes	No
25. Data on International Payments and Receipts Between Canada and Other Countries	No	No	No	Yes

Each of these four parts is managed by a separate Division within Statistics Canada as indicated at the top of Table A1. For example, the part dealing with the Gross Domestic Product by Industry provides data for "Gross Domestic Product at factor cost by Industry" in prices of a specific base year (e.g., 1992 prices) which represents a constant price measure of production by each industry for the total economy of the country. In the historical revision[62], these industry production measures in constant dollars are published in 1992 prices for every month for the 1961-1992 period by each industry with totals for all industries combined. Besides the total for Gross Domestic Product (GDP) at factor cost by industry, no other background details of categories consisting of the GDP such as the 'wages and salaries' and 'operating surplus', are published in this source. This source does not provide data for GDP at Market Prices[63] either. However, the Gross Domestic Product at factor cost by industry is published monthly with a more current period and the time lag is only two months from the reference period. Users who are interested only in the numbers of total GDP by industry on a monthly basis with no background details will find this source useful for their economic analysis. The major limitation of this source is the lack of other details that are found in other parts, namely, the Input-Output Accounts and the Income and Expenditure Accounts.

[62] See *Gross Domestic Product by Industry* (1992 = 100), 1961-1992, Statistics Canada, Catalogue No. 15-512-XPB, September 1998.

[63] The difference between the 'Factor cost' GDP amd the 'Market price' GDP is the sum total of 'Indirect taxes less subsidies' according to the definitions of these terms which are provided in Chapter V.

While the Input-Output Accounts provide commodity and industry details for the production and disposition, with all the relevant details making up the GDP 'at factor cost', as well as 'at Market Prices', the Income and Expenditure Accounts deal with the main categories that make up the GDP with no commodity and industry details[64]. It can be seen from tables A1 and A2 that the three parts of the SNA dealing with the GDP are complementary to one another and they are useful for the objectives they are designed for. This is the general limitation, because no one part can answer all the questions that arise in the course of economic analysis and they have to be supplemented with information from other parts as needed. With the understanding of this general limitation, users can see how specific questions cannot be answered by the Input-Output Accounts as discussed next in this section.

Operating Surplus

Table B presented here illustrates the items of the GDP covered by both the Input-Output Accounts and the Income and Expenditure Accounts for 1992. It can be seen from this table that the category called 'other operating surplus' of the Input-Output Accounts is comparable to a total of six items explicitly shown in the Income and Expenditure Accounts as summarized in the following table.

[64] For the historical revision, the Income and Expenditure Accounts are published in catalogue No. 13-001 – SPB entitled *National Economic and Financial Accounts, 1961-1992.*

Table B: Comparison of "Operating Surplus" of the Input-Output Accounts with the corresponding items of the Income and Expenditure Accounts.

Input-Output Accounts		Income and Expenditure Accounts
Other Operating Surplus =	(i)	Corporation profits before taxes
		Plus
	(ii)	Government Business Enterprise (GBE) profits before taxes
		Plus
	(iii)	Interest and miscellaneous investment income
		Plus
	(iv)	Inventory valuation adjustment
		Plus
	(v)	Capital consumption allowances
		Plus
	(vi)	Statistical discrepancy

As the 'other operating surplus' of the Input-Output Accounts is inclusive of several items of the Income and Expenditure Accounts, separate analysis of each of these items is not possible with the data of the Input-Output Accounts. In this case, the information of the Income and Expenditure Accounts has to be used for such an analysis.

Mixed Income

Table C shows that the 'Mixed Income' category of the Input-Output Accounts consists of two categories of the Income and Expenditure Accounts, namely, 'accrued net income of farm operators from farm production' and 'Net income of unincorporated business including rent'. If analysis of these two categories is desired separately for each one of them, it will not be possible with the data of the Input-Output Accounts. This separate analysis will be possible only with the details of the Income and Expenditure Accounts.

Net Domestic Product at Factor Cost

'Net Domestic Product at factor cost' is the measure provided only in the Income and Expenditure Accounts. It is not available in the Input-Output Accounts.

However, it can be derived by applying the following formula to the data of the Input-Output Accounts as shown in Table C.

Table C: Comparison of Income-based GDP between "Income and Expenditure Accounts" and "Input-Output Accounts", 1992

		$ Millions				Rouding Difference
	Income and Expenditure Accounts (Source: National Economic and Financial Accounts,			Input-Output Accounts (Source: The Input-Ouput Structure of the Canadian Economy,		
Item	Description		Item	Description		
1	Wages, salaries and supplementary labour income	387,788	1	Wages and salaries	343,069	
			2	Supplementary labour income	44,720	
				Total	387,789	1
5	Accrued net income of farm operators from farm production	1,730				
6	Net income of non-farm unincorporated business, including rent	39,398				
	Total of items 5 and 6	41,128	3	Mixed Income (ie. Net income of unincorparated business and farm operators)	41,128	
	Operating surplus items: Excluding Capital consumption allowances					
2	Corporation profits before taxes;	31,978				
3	Government business enterprise profits before taxes;	5,971				
4	Interest and miscellaneous investment income;	52,742				
7	Inventory valuation adjustment; and	-3,285				
11	Statistical discrepancy	1,533				
	Total Operating Surplus excluding Capital consumption allowances	88,939				
10	Capital consumption allowances	86,424				
	Total Operating Surplus including Capital consumption allowances	175,363	4	Other Operating surplus	175,363	
			5	Indirect taxes	106,588	
			6	Subsidies	-12,323	
9	Indirect taxes less subsidies	94,265		Total	94,265	
12	Gross Domestic Product at market prices	698,544	7	Gross Domestic Product at market prices	698,543	1
				By using the data of Income and Expenditure Accounts:		
				Deduct: Capital Consumption allowances	-86,424	
				Deduct: Statistical discrepancy	-1,533	
				Deduct Indirect taxes less subsidies	-94,265	
8	Net Domestic Product at factor cost	516,322		Equals: Net Domestic Product at factor cost	516,321	1

Gross Domestic Product at market prices (from Input-Output Accounts)

Minus

Capital consumption allowances (from Income and Expenditure Accounts)

Minus

Net indirect taxes (i.e. Total Indirect taxes less subsidies from Income and Expenditure Accounts)

Minus

Statistical Discrepancy (from the Income and Expenditure Accounts)

Equals

Net Domestic Product at factor cost.

If this measure is needed, users have to refer to the Income and Expenditure Accounts.

International Trade in Services

Table D shows the comparison of Expenditure-based GDP between the Income and Expenditure Accounts and the Input-Output Accounts. It can be seen from this table that analysis for services component of exports and imports is possible with the use of the Income and Expenditure Accounts as the details in that ready-made format such as 'total goods', and 'total services' are not available in the Input-Output Accounts. However, as the commodity details are available in the Input–Output Accounts, specific commodities of services component can be defined, isolated and added together in order to derive the 'total services' for both exports and imports. Since the Income and Expenditure Accounts publish the data of exports and imports disaggregated into goods and services, this source can be used for such an analysis unless more details of commodity content are needed.

Table D: Comparison of Expenditure-based GDP between "Income and Expenditure Accounts" And "Input-Output Accounts", 1992

	$Millions					
	Income and Expenditure Accounts (Source: National Economic and Financial Accounts,		**Input-Output Accounts (Source: The Input-Output Structure of the Canadian Economy**			**Rounding Difference**
Item	**Description**		**Item**	**Description**		
1	Personal expenditure on consumer goods and services	**412,940**	1	Personal expenditure on goods and services	**412,939**	**1**
2	Durable goods	48,808	2	Durable goods	48,808	
3	Semi-durable goods	38,129	3	Semi durable goods	38,129	
4	Non-durable goods	108,307	4	Non durable goods	108,306	
5	Services	217,696	5	Services	217,696	
6	Government current expenditure on goods and services	**169,262**	6	Government current expenditure on goods and services	**169,262**	
7	Government gross fixed capital formation	**18,836**	7	Government gross fixed capital formation	**18,836**	
			8	Construction	14,327	
			9	Machinery and equipment	4,509	
9	Business gross fixed capital formation	**108,209**	10	Business gross fixed capital formation	**108,209**	
10	Residential structures	39,903	11	Housing non government construction	39,903	
11	Non-residential structures and equipemnt	68,306	12	Non-residential structures and equipment	68,306	
12	Non-residential structures	29,654	13	Non-government construction	29,655	1
13	Machinery and equipment	38,652	14	Non- government machinery and Equipment	38,651	1
8	Government investment in inventories	– 40				
14	Business investment in inventories	– 6,522	15	Inventories (government and business)	**– 8,094**	
15	Non-farm	– 5,810				
16	Farm	– 712				
23	Statistical discrepancy	– 1,532				
	Total of items 8, 14 and 23	**– 8094**				
17	Exports of goods and services	**189,784**	16	Exports of goods and services	**189,783**	**1**
18	Goods	163,464				
19	Services	26,320				
20	Deduct: Imports of good and services	**– 192,393**	17	Imports of goods and services	**–192,394**	**1**
21	Goods	154,428				
22	Services	37,965				
24	Gross Domestic Product at market prices	**698,544**	18	Gross Domestic Product at market prices	**698,543**	**1**

Note: The items of the concerned table in Income and Expenditure Accounts have been reorganized in this table just to show their comparison with the corresponding items of the Input Output Accounts.

Sector Analysis

Analysis of data by each sector is generally done for several components such as (a) inventories, (b) income and expenditure, (c) savings, and (d) transfers between sectors. The limitations of Input-Output Accounts in this regard are briefly described here.

(a) Inventories

In the Input-Output Accounts, data on value of physical change in inventories are available only in two categories:

Worksheet Level

i) Final Demand Category 152: finished goods and goods in process.

ii) Final Demand Category 153: raw materials and goods purchased for resale.

However, they are not disaggregated into sectors such as farm, non-farm and government, which own them as shown in Table D. This disaggregated information of inventories by sector can be readily obtained from the Income and Expenditure Accounts for analysis. Alternatively, this information can be tabulated by defining the specific sectors such as farm, non-farm business and government and aggregating the commodities involved in the Final Demand Categories 152 and 153 mentioned earlier.

(b) Income and Expenditure

In the Canadian System of National Accounts, the economy is divided into four main sectors containing transactors of categories having similar characteristics. They are: Corporations and Government Business Enterprises; Government Sector; Personal and unincorporated businesses; and Non-resident Sector. Each of the four sectors represents a similar class of transactions on the basis of the particular role that it plays in the economy.

Thus, the corporations and government businesses enterprises sector, covers transactors, whether they are privately or publicly owned, who produce goods and services for sale at a price not only to cover costs but also to yield a profit.

The government sector encompasses all levels of government (federal, provincial, and local). All non-profit institutions mostly funded by the government such as hospitals, universities, schools and colleges, and residential care facilities (RCF), are included here. This government sector exerts a powerful influence on the level and direction of economic activity by its spending patterns and financing arrangements. It not only provides goods and services to the community, but also re-distributes income by transfer payments and regulates economic activity through fiscal and monetary policies.

The persons and unincorporated business sector contains all households and unincorporated businesses. It is essentially concerned with the transactions of the members of the community in their capacity as final consumers. The unincorporated businesses contain incomes and expenditures that include elements of both personal nature and business nature which cannot be separated at this time due to lack adequate data. Hence, both persons and unincorporated businesses are combined together in one sector. This will be elaborated further in Chapter V which deals with concepts and definitions.

These three sectors (namely, business, personal, and government) are called resident sectors. They deal among themselves and also with the rest-of-the-world outside Canada. The transactions that take place between them and the rest-of-the-world are grouped together and called the 'non-resident' sector in the CSNA in order to show the inter-relationship between the domestic sectors and foreign countries. For example, if the Canadian resident sectors buy goods and services from other countries, the transactions appear in imports. Conversely, if they sell to other countries, the transactions appear in exports. These imports and exports appear in the non-resident sector accounts of the Income and Expenditure Accounts and also in the data of international trade flows of the Balance of Payments Accounts.

As the Input-Output Accounts provide commodity and industry details for production and disposition, users tend to pose a question concerning the utilization of the Input-Output Accounts for the four sector analysis of the economy. As the Input-Output Accounts do not provide sector accounts, the analysis for each of the four sectors is not feasible with the Input-Output Accounts as such sector accounts are available only in the Income and Expenditure Accounts. In view of this limitation of the Input-Output Accounts, the analyst seeking data for transactions by each sector has to use only the Income and Expenditure Accounts for his analysis, rather than the Input-Output Accounts.

(c) Savings

Another question that is generally posed by users is on savings. Is it possible to use the Input-Output Accounts for analysis of savings by sectors? Here again, the answer is negative. The Input-Output Accounts do not provide estimates for savings. Such data on savings by sectors or for the whole economy are available in the Income and Expenditure Accounts and it is possible to do the savings analysis either for the total economy or for each sector by using that source.

(d) Transfers Between Sectors

In the economy, transactors or sectors not only exchange goods and services, but also transfer resources such as cash or goods and services for no

payment in return. Such transactions are called 'transfers'. In a transfer transaction, the net worth of the donor declines while the net worth of the recipient increases to the extent of such a transfer. In this context, another question that is posed by users is on transfer payments and receipts.

Is it possible to analyze such transfers between sectors using the Input-Output Accounts? The answer to this question is negative. This is because, the Input-Output Accounts do not capture data for transfers,[65] except in the case of subsidies, as no exchange of goods and services takes place in transfer transactions. It is a one-way transaction as the donor does not get back anything in return for the transfer of resources directly. The Input-Output Accounts reflect the data on subsidies in order to measure the production properly by deducting from the receiving industries' operating surplus. In essence, then, the Input-Output Accounts measure only the exchange economy, but not the grant economy where transfers are measured. However, the data of transfers are available in the Sector

[65] Transfers include 'direct taxes' which are levied on income. They do not include 'indirect taxes' which are called 'taxes on products' and 'taxes on production' in the new national accounting structure. The 'taxes on products' are included as a part of consumers' purchase prices in the market and hence they are a part of the Gross Domestic Product at Market Prices. The 'taxes on production' such as the property taxes are included in the cost by the producers and they are also a part of the Gross Domestic Product at Market Prices. Hence, the indirect taxes are not considered as transfers, but as a part of the market price relating to the production. The purchasers of the goods and services get the 'goods and services' for the all-inclusive prices and hence, there is a quid pro quo in such transactions for the values paid for. In constrast, the direct taxes such as the income taxes are considered as transfers as the donor does not get anything in return from the government directly.

Accounts of the Income and Expenditure Accounts and the analysis for transfers can be made with this source only.[66]

Capital Stock Analysis

It should be noted that, the term 'capital' covers two parts, namely, physical and human. The first part represents the physical capital, which covers investments in structures such as buildings, roads, dams etc. as well as in machinery and equipment such as trucks, computers etc. The second part represents the human capital, which covers investment in education and knowledge accumulation by training and work-experience.

The 1993 international System of National Accounts does not recognize the expenditures on education as capital expenditures.[67] It clearly stated that the expenditures on education should be treated as current expenditures, but not as capital expenditures. This is, of course, a debatable point, but for the purpose of the measurement of capital stock in Statistic Canada, this international guideline is followed for the present.

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[66] For example, see the special study contained in the technical paper by Murty, P.S.K., "A New Approach to Analyze Public Sector Grants: a case study of Canada" (Technical Series No. 53), Input-Output Division, Statistics Canada, Ottawa. Copies of this paper can be obtained from the Consulting and Marketing Section of the Input-Output Division, Statistics Canada.

[67] *1993 System of National Accounts*, op.cit., P. 10.

Is it possible to do analysis of capital stock using the data of the Input-Output Accounts?

In answer to the question about analysis of capital stock, the database which is based on Perpetual Inventory Method of accumulating data is available in another Division called 'Investment and Capital Stock Division' of Statistic Canada. That database also shows additions to stock, and other depletions by way of depreciation for each year. The publications of that Division, which show these details for each year have to be consulted for necessary analysis of capital stock.

The Input-Output Accounts do not provide data on accumulation of capital stock. They only provide data for capital expenditures on construction of structures and investment in machinery and equipment in a particular year, namely, in the year of the Accounts concerned.

Land Sale Analysis

Is it possible to analyze land sales using the Input-Output Accounts? The System of National Accounts and its parts do not measure value of land and other natural resources such as forests as no production is involved in the sales of land or other natural resources. If, however, improvements are done on land and natural resources, such as clearing the forest and leveling the land, the value of such improvements constitutes production, and it is

measured as a part of Gross Domestic Product in the categories concerned. The mere transfer of land by the sale for some value does not constitute production; it only reflects a change in ownership from one institution to the other, but no value is added in this transaction.

Functional Analysis

Are the Input-Output Accounts useful for functional analysis such as research and development (R&D), health, education, tourism, environmental cleaning? The Input-Output Accounts and also the Income and Expenditure Account do not provide specific data by function. However, as the Input-Output Accounts provide substantial details by commodity and industry, the relevant commodities can be identified, grouped together under the specific functions, and tabulated for functional analysis such as research and development, health, education, tourism, environmental cleaning, and others.

Are Goods which are relatively new in the market such as Laser-Discs and Cellular Phones Reflected in the Input-Output Accounts?

As the Input-Output Accounts are produced with a time lag of at least 3 years from the reference period, new products such as laser-discs and cellular phones are captured in the relevant commodities and industries with a time lag. It should be remembered, however, that the arrival of new products in the market does not automatically allow the Input-Output system

of classification to reflect the necessary changes in the classification system. This calls for commodity classification changes, creation of new commodities and division of the existing commodities, etc. This process takes time and until the changes in the classification system are incorporated, new products are shown in the relevant commodity of the existing system of classification. Because of the rigidity of the system of classification, it is not possible to see them separately until and unless the classification system is revised and incorporated in a historical revision such as the one that is described in this publication.

Are all the Input-Output Commodities Identifiable as such in the Market Place of the Economy?

At the worksheet level, Input-Output Accounts contain 243 industries[68] which use a total of 678 commodities (both intermediate and primary inputs) at the most detailed (i.e. worksheet) level of aggregation. Among them, there are 'fictive' (dummy) commodities which are not identifiable in the market place of the economy.

Each fictive industry produces a fictive commodity. The fictive commodities are not "real" and they are not identifiable in the market place as such. They are listed in table E.

[68] Although the complete definition of industries and commodities is discussed in Chapter V, it is worth noting here that an industry is a combination of establishments producing mostly similar products (i.e., goods and services) while a commodity is basically a product generated by the industry.

Table E: Fictive Commodities[69] and Industries of the Input-Output Accounts (Worksheet Level)

"Fictive" commodity industry number	Fictive commodity and industry title	Fictive number
643	Operating supplies such as spare parts and maintenance supplies	224
644	Office supplies	225
645	Cafeteria supplies	226
646	Transportation margins	230
647	Laboratory equipment and supplies	227
648	Travelling and entertainment	228
649	Advertising and promotion	229

[69] These categories are mostly reported by business establishments under catch-all categories such as 'miscellaneous' or 'Other' without a breakdown for details.

These fictive commodities are catch-all categories for which precise content for each purchasing industry is unknown. These are artificial constructs unique in the Input-Output Accounts to route a group of goods and services inputs whose precise purchasers are not known. Therefore, the detailed commodity purchases represented by these fictive industries have to be identified by referring to the Use (Input) matrix of the corresponding fictive industry. For example, the fictive commodity 'Office supplies' is produced by the fictive industry 'Office supplies' by using paper, envelopes, paper clips etc as its inputs. The analytical usefulness of these fictive industries and commodities in the Input-Output Accounts is mainly to balance the commodity production with its disposition particularly for those falling in those categories. This technique of routing some commodities through this mechanism is necessary because some establishments do not report expense details for these catch all categories and the information needed to estimate their content is not available.

There are also construction industries and construction commodities as shown in Table F-1 which are types of construction rather than types of activities. In these cases, several inputs are included in those Input-Output construction commodities. What comes out of the production processes are the outputs in the form of types of construction such as residential construction. It should be noted in this connection, that the 'own-account construction' expenditures of the industries concerned are removed from

those industries and assigned to the relevant 'construction industries' and their commodities (see Table F-1). The output generated in the construction industries is re-assigned to the original industries, and routed as their consumption.

Table F-1: Construction Commodities and Industries of the Input-Output Accounts (Worksheet Level)

Construction Commodity number	Commodity and industry title	Industry number
543	Repair construction	163
544	Residential construction	164
545	Non-residential building construction	165
546	Road, highway and airport runway construction	166
547	Gas and oil facility construction	167
548	Electric power, dams and irrigation construction	168
549	Railway and telecommunication construction	169
550	Other engineering construction	17

The commodities shown in the left-hand side of the above table are essentially categories of work-put-in-place which are produced by the industries shown in the right hand side of the table. In essence, then, each type of construction activity is gathered together into a commodity with a corresponding industry which produces one type of construction commodity representing the specific type of activity. This is one of the peculiarities of the Input-Output Accounts. If, however, it is essential to identify the real commodities (i.e. goods and services) contained in these construction activity-based groups of commodities, one should look at the input structure of the industries, which produce them. Because of the direct link of the construction commodities to the corresponding construction industries explained above, the market-oriented commodities can be obtained, by referring to the input structure of the relevant construction industries. Also, the end result of the specific type of construction is a marketable product. For example, highway construction is not a real commodity, but a highway is a real product.

Thus, for example, the repair construction industry (163) produces repair construction commodity (543) by using other inputs, such as lumber (202), plywood and veneer (206), cement (417), as its inputs. The above eight construction commodities are not market-oriented goods and services. In this sense, they are unique and specially designed for the Input-Output Accounts. The articulation of the construction commodities in the Input-

Output Accounts based on the types of work-put-in-place in the economy gives a better ready-made picture of the functional data of the construction activity and this is a convenient way of presenting data for economic analysis.

Confidentiality of Data

Although Statistics Canada collects detailed information from the respondents, it is not possible to disseminate the information in the same level of detail that is used to collect the data in the surveys due to confidentiality. Under the Statistics Act, there are restrictions for the dissemination of specific individual data in order to protect the identification of the respondents. Therefore, the confidential information is suppressed in such a way that the respondents are not identifiable in the released information. This is, of course, one of the several limitations and it emanates from the legal restrictions of the Statistics Act.

Users of the data are assured, however, that the data made available in the Accounts at aggregate levels are based on the micro-data provided by individual respondents to various surveys. The resulting product of Statistics Canada in aggregate form is an excellent estimate of economic activity. Unfortunately, however, there are many areas where the micro-data cannot be shared with users due to the confidentiality restrictions of the existing legislation. This problem is overcome by providing aggregations,

where needed, to ensure the confidentiality of the respondents. Again, confidentiality is a fundamental principle of data collection and dissemination at Statistics Canada and all efforts are made to uphold and safe-guard this principle.

Is it possible to find data for total Grants Economy and net grant receipts by each sector in the Input-Output Accounts?

The answer is negative. However, Input-Output Accounts provide data on subsidies by industry broken down into two categories:

- Commodity subsidies which are called 'subsidies on products or goods and services'; and
- Non-commodity subsidies, which are called 'other subsidies on production'.

While the commodity specific subsidies are allocated to the concerned goods and services, the non-commodities are allocated to the industries receiving them.

Subsidies by definition, are only one segment of total grants as they are simply current transfers by government to industries. There are also capital transfers and they are not available in the Input-Output Accounts. However, the data on both current transfers and capital transfers from government to

industries are available in aggregate form in the Income and Expenditure Accounts.

In addition to the aforesaid types of government grants, there are also others, such as the following:

- Government transfer payments to the persons;
- Government transfer payments to the non-residents;
- Personal sector's transfer payments to the government and vice versa;
- Business sector's transfer payments to the government;
- Non-resident sector's transfer payments to government and vice versa;
- Business transfer payments to the personal sector;
- Business transfer payments to the non-residents;
- Non-residents sector's transfer payments to the persons;
- Non-resident sector's transfer payments to the business sector; and
- Net transfer receipts by each sector.

The information on all these categories is not available in the Input-Output Accounts as they are outside the scope of measuring production. An exception is, however, the subsidy data, because the subsidies are related to the measurement of production. They are the only transactions relating to government grants that are reflected in the Input-Output Accounts. The data for all other inter-sectoral transfers listed above are available in the Income and Expenditure Account within the existing conceptual framework.

However, the net transfer receipts by each sector, are not readily available as they have to be calculated by using the aggregates of the transfer components concerned.

Such data can only be found if a System of Grant Accounts is developed similar to the System of National Accounts as recommended in a special study on the subject.

In this connection, a preliminary paper was prepared and presented at one of the international conferences[70]. It can be used for the data development of grants economy and analysis thereof[71], if desired, as it also highlights some data gaps for a new conceptual framework of grants economy.

Until such a system of grants accounts is implemented at least periodically say, every 5 or 10 years, there will be a data-gap for analysis of grants economy.

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[70] See "A System of Grants Accounts" by P.S.K. Murty, presented at the Annual Meetings of the Allied Social Science Associations in Boston, USA in a joint session of the American Economic Association and the Association for the study of Grants Economy held January 3-5, 1994. Copies of this paper can be obtained from Input-Output Division of Statistics Canada by quoting technical series No. 59, September 1993.

[71] For an illustration of such a special study, see the technical paper by Murty, P.S.K., presented at the Fifth Annual Convention of the Congress of Political Economists (COPE) International, January 8-14, 1994, 'A New Approach to Analyze Grants Economy' (Technical Series No. 62), Input-Output Division, Statistics Canada, Ottawa. Copies of this paper can be obtained from the Consulting and Marketing Section of the Input-Output Division, Statistics Canada.

Do the Input-Output Accounts provide data for income tax studies by sectors?

As the income items in the Primary Inputs of the Input-Output Accounts are gross of any deductions for income taxes, the data for income taxes are not separated in the Input-Output Accounts. However, these income tax data are available in the Income and Expenditure Accounts for each sector (see Sector Accounts of Government in *National Economic and Financial Accounts,* catalogue No. 13-001. For example, see table 9 of that publication for 1961-1992 to obtain data of Direct Taxes).[72]

These several illustrations of general fundamental limitations of the Input-Output Accounts are by no means exhaustive. They only give an idea of the extent of constraints that have to be understood by the users along with several uses and applications. More specific limitations will be apparent in the later chapters where the structure, concepts and sources of data are discussed. It is hoped that this brief description of multitude of uses and some limitations provides a balanced view of the usefulness of the present Input-Output Accounts of Canada.

[72] A study using these data from 1961 to 1997 was done on the "Net taxation trends" by each sector in the technical paper No. 90 by Murty, P.S.K., 'Net Taxation Trends in the Canadian Economy, 1961-1997', Input-Output Division, Statistics Canada.

Even though, we have some limitations such as those discussed here, the Input-Output data have numerous uses and applications as explained in this chapter. For example, students of economics and statistics in Colleges and in Universities can profitably use the data for term papers, theses, and dissertations and gain insight of the real world. Business people can also use the data for evaluating their operations. In addition, Governments at various levels can analyze the impact of their budgets by using the Input-Output data and make decisions on their revenues and expenditures. Researchers and analysts can assess the past trends based on the detailed Input-Output data and try to foresee the future trends.

In summary, then, this first volume has provided an introduction with the relevant background information, answered the questions on what constitutes the Input-Output Accounts and why historical revisions are made, and finally looked at a multitude of uses and applications for the benefit of the users. With this information in mind, which has given a bird's-eye view, let us examine in the next volume, the concepts and definitions that provide the core information in the production process of the Input-Output Accounts. The understanding of the concepts and definitions is very essential not only for the collection of the required data but also for the preparation of estimates required for the three matrices discussed earlier.