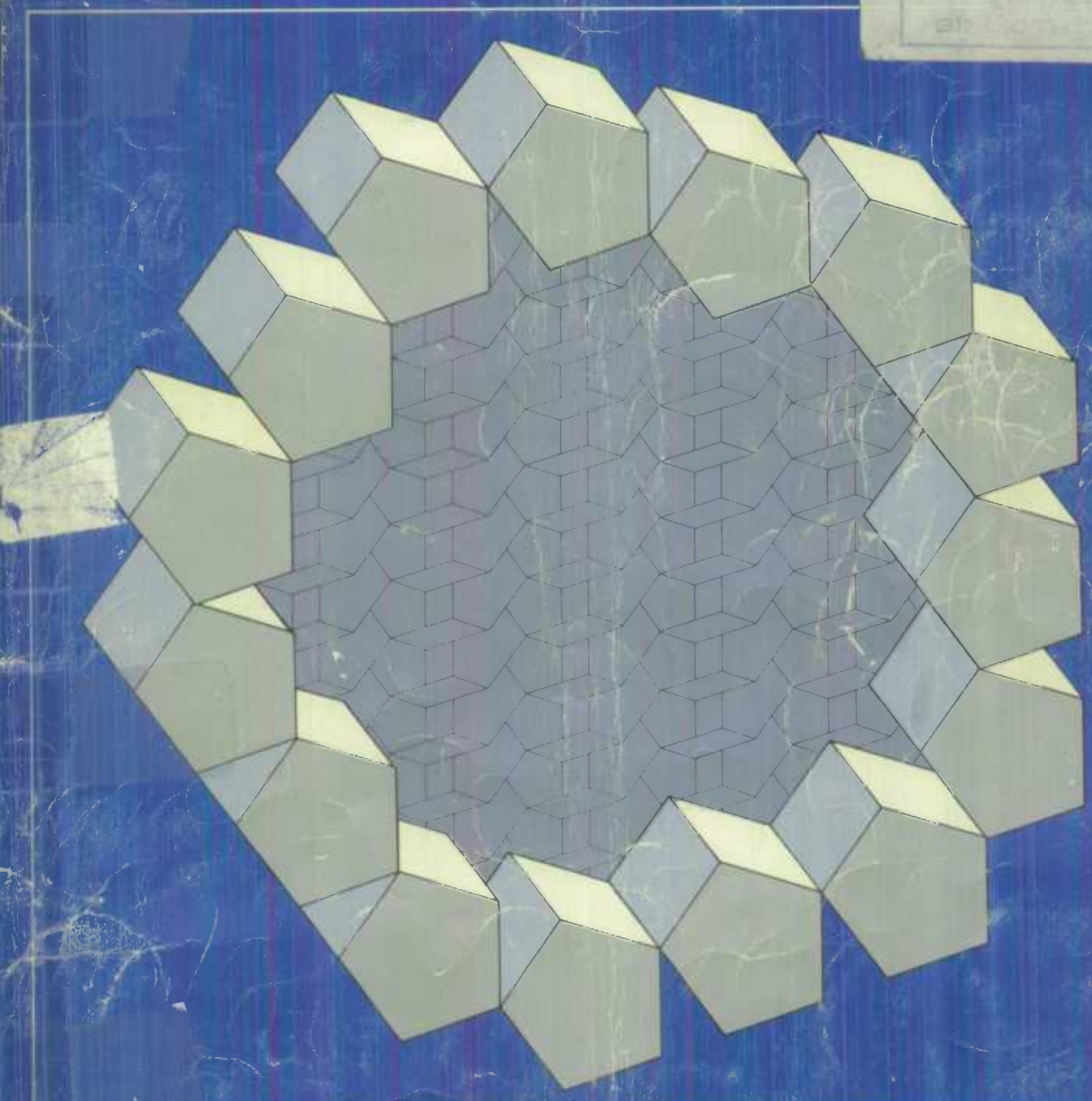
Catalogue 13-603E, No. 1 — Occasional

Income and Expenditure Accounts
Sources and Methods Series

1

Guide to the Income and Expenditure Accounts



Statistics Canada
Statistique Canada

Canada

Data in Many Forms . . .

Statistics Canada disseminates data in a variety of forms. In addition to publications, both standard and special tabulations are offered on computer print-outs, microfiche and microfilm, and magnetic tapes. Maps and other geographic reference materials are available for some types of data. Direct access to aggregated information is possible through CANSIM, Statistics Canada's machine-readable data base and retrieval system.

How to Obtain More Information

Inquiries about this publication and related statistics or services should be directed to:

System of National Accounts,
Income and Expenditure Accounts Division,

Statistics Canada, Ottawa, K1A 0T6 (Telephone: 951-9158, 951-3797 or 951-9155) or to the Statistics Canada reference centre in:

St. John's	(772-4073)	Winnipeg	(983-4020)
Halifax	(426-5331)	Regina	(780-5405)
Montreal	(283-5725)	Edmonton	(495-3027)
Ottawa	(951-8116)	Calgary	(292-6717)
Toronto	(973-6586)	Vancouver	(666-3691)

Toll-free access is provided in all provinces and territories, **for users who reside outside the local dialing area** of any of the regional reference centres.

Newfoundland and Labrador	1-800-563-4255
Nova Scotia, New Brunswick and Prince Edward Island	1-800-565-7192
Quebec	1-800-361-2831
Ontario	1-800-263-1136
Manitoba	1-800-542-3404
Saskatchewan	1-800-667-7164
Alberta	1-800-282-3907
Southern Alberta	1-800-472-9708
British Columbia (South and Central)	1-800-663-1551
Yukon and Northern B.C. (area served by NorthwesTel Inc.)	Zenith 0-8913
Northwest Territories (area served by NorthwesTel Inc.)	Call collect 403-495-2011

How to Order Publications

This and other Statistics Canada publications may be purchased from local authorized agents and other community bookstores, through the local Statistics Canada offices, or by mail order to Publication Sales, Statistics Canada, Ottawa, K1A 0T6.

1(613)951-7277

Facsimile Number 1(613)951-1584

National toll free order line 1-800-267-6677

Toronto
Credit card only (973-8018)

Statistics Canada

System of National Accounts
Income and Expenditure Accounts Division

Guide to the Income and Expenditure Accounts

Sources and Methods Series
ISSN 1180-5102

Published under the authority of the Minister
of Industry, Science and Technology

November 1990

Canada: $35.00
United States: US$42.00
Other Countries: US$49.00

Catalogue 13-603E, No. 1

ISBN 0-660-13607-4

Ottawa

Version française de cette publication disponible sur demande (13-603F, nº 1 au catalogue.)

Canadian Cataloguing in Publication Data

Main entry under title:

Guide to the income and expenditure accounts /
Statistics Canada, System of National Accounts Branch,
Income and Expenditure Accounts Division

(Sources and methods series)
Issued also in French under title: Guide des comptes des revenus et dépenses.
Includes bibliographical references.
ISBN 0-660-13607-4
CS13-603E no. 1

1. National income – Canada – Accounting. 2. National income – Canada – Accounting – Statistical methods. 3. National income – Canada – Handbooks, manuals, etc. I. Statistics Canada. System of National Accounts Branch. II. Statistics Canada. Income and Expenditure Accounts Division. III. Series.

HB141.5.G84 1990 339.371 C90-098024-9

Preface

This publication provides an overview of Canada's Income and Expenditure Accounts. It is the first in a series which Statistics Canada intends to publish over the next few years which together will fully document the national and provincial accounts. Other volumes in the series will deal with particular parts of the system in greater depth. The set will update and extend the previous documentation on the National Income and Expenditure Accounts which was published in September 1975.

This first volume in the new series presents an outline of concepts and definitions, a brief explanation of the sources of information and statistical methods used in constructing the estimates and a broad compilation of other facts about the accounts. A full chapter is devoted to an assessment of the quality of the estimates. The book is intended as a reference guide for users of the Income and Expenditure Accounts. Those wishing to study the subject in greater depth should consult the numerous references cited in this volume and the other books in this series which will soon appear.

During the fifteen years since the previous set of reference volumes was published, the Income and Expenditure Accounts have been substantially developed and improved. New benchmark data have become available and have been incorporated during the historical revision of 1986. The base year for the estimates at constant prices was changed to 1981 at the time of the historical revision and has been updated to 1986 this year. Gross Domestic Product at Market Prices was adopted as the central aggregate of the system instead of Gross National Product at Market Prices. Estimation methods have been improved and the accounts have been integrated more thoroughly with the other parts of the Canadian System of National Accounts: the Input-Output Accounts, the Monthly Estimates of Gross Domestic Product by Industry, the Balance of International Payments and the Financial Flow and Balance Sheet Accounts. Increased computerization has permitted both the publication of more information and the adoption of a fixed release date schedule. Fixed-weighted and chain price indexes were introduced into the accounts to supplement the implicit price indexes. Provincial Economic Accounts have been developed and now include estimates at constant prices as well as at current prices. The presentation of the accounts has been improved in several ways. These new features are explained in this volume.

While there have been many enhancements since the mid-1970s, the accounts' basic structure has required very little change since then. National accounts statisticians of today owe a large debt to their predecessors for the remarkably sound system that has been passed on to them. The present volume borrows heavily from previous sources.

This report was planned and written by the staff of the Income and Expenditure Accounts Division, under the direction of Philip Smith. Kishori Lal, Director-General of the System of National Accounts Branch, read and commented extensively on the various drafts and Stewart Wells, Assistant Chief Statistician, National Accounts and Analytical Services Field, lent his support and encouragement throughout the project.

Ivan P. Fellegi
Chief Statistician of Canada

The System of National Accounts

In Canada, the National Accounts have been developed since the close of the Second World War in a series of publications relating to their constituent parts. These have now reached a stage of evolution where they can be termed a "System of National Accounts". For purposes of identification, all publications (containing tables of statistics, descriptions of conceptual frameworks and descriptions of sources and methods) which make up this System carry the term "System of National Accounts" as a general title.

The System of National Accounts in Canada consists of several parts. The annual and quarterly Income and Expenditure Accounts (included with catalogue nos. carrying the prefix 13) were, historically speaking, the first set of statistics to be referred to with the title "National Accounts" (National Accounts, Income and Expenditure). The Balance of International Payments data (catalogue nos. with prefix 67) are also part of the System of National Accounts and they, in fact, pre-date the Income and Expenditure Accounts.

Greatly expanded structural detail on industries and on goods and services is portrayed in the Input-Output Tables of the System (catalogue nos. with prefix 15). The catalogue nos. carrying the prefix 15 also provide measures of the contribution of each industry to total Gross Domestic Product at factor cost as well as Productivity Measures.

Both the Input-Output tables and the estimates of Gross Domestic Product by Industry use the establishment as the primary unit of industrial production. Measures of financial transactions are provided by the Financial Flow Accounts (catalogue nos. with prefix 13). Types of lenders and financial instruments are the primary detail in these statistics and the legal entity is the main unit of classification of transactors. Balance sheets of outstanding assets and liabilities are published annually.

The System of National Accounts provides an overall conceptually integrated framework in which the various parts can be considered as interrelated sub-systems. At present, direct comparisons amongst those parts which use the establishment as the basic unit and those which use the legal entity can be carried out only at highly aggregated levels of data. However, Statistics Canada is continuing research on enterprise company establishment relationships; it may eventually be feasible to reclassify the data which are on one basis (say the establishment basis) to correspond to the units employed on another (the company or the enterprise basis).

In its broad outline, the Canadian System of National Accounts bears a close relationship to the international standard as described in the United Nations publication: ***A System of National Accounts*** (Studies in Methods, Series F, No. 2, Rev. 3, Statistical Office, Department of Economic and Social Affairs, United Nations, New York, 1968).

Table of Contents

Table of Contents - Continued

Table of Contents - Continued

Tables

Table of Contents - Concluded

Figures

Acknowledgements

This book is the result of the collective effort of the Income and Expenditure Accounts Division. The following staff members have contributed in one way or another:

Karen Ashman
Micheline Auchterlonie
Marcel Beaudry
Wayne Beck
Catherine Bertrand
Denise Bisson
Joyce Burn
John Butterill
Jean-François Carbonneau
Doug Clancy
Vere Clarke
Jacques Delisle
Joel Diena
Célyne Dussault
Dan Finnerty
Rémi Fournelle
Kevin Fredrickson
Gylliane Gervais
Michel Girard
Bob Godkin
Jim Hines
Laurie Jong
Roger Jullion
Katharine Kemp
Normand Lamothe
Stan LeFort
Evelyn Leroux
Deborah MacDonald
David McDowell
Jo Ann MacMillan
Yvele Paquette
Nona Park
Michel Pascal
René Piché
Luc Provençal
Lise Prud'homme
Philippe Rhul
Luke Rispoli
Mitzi Ross
Marie Saulnier
Earl Scott
Edith Sederis
Chris Sham
Pat Sherar
Philip Smith
Jerome Ste Marie
Stewart Taylor
Jamie Temple
Veronica Utovac
Michel Vallières
Sylvain Venne
Lois Whitmore
Karen Wilson

Gylliane Gervais edited the English version of the text with the utmost care and translated it into French with great clarity and precision. Doug Clancy and Karen Wilson painstakingly read and corrected numerous drafts.

Introduction

The four chapters and four appendixes in this report together present a comprehensive picture of Canada's Income and Expenditure Accounts (IEA),[1] viewed from several perspectives.

The first chapter begins with a short section summarizing the structure of the IEA. This is followed by a discussion of who the IEA's users are and how they typically use the estimates. The next part of the chapter summarizes the production and publication schedules of the accounts and the sequence of revisions they normally go through for a given reference period. The accounts' alternative publication formats are also reviewed. The chapter then moves on to a brief examination of the interrelationships between the IEA and the other parts of the System of National Accounts (SNA). It ends with an account of the changes introduced in the IEA at the time of the historical revision in 1986.

The second chapter of this book considers the concepts and definitions in the accounts. It begins with a discussion of the various dimensions of the production concept. A second part explains the sector accounts, while the third and fourth parts deal with concepts relating to the constant price estimates and the IEA price indexes. A final section in Chapter 2 discusses the important conceptual and statistical issues arising in the Provincial Economic Accounts (PEA).

The third chapter provides a summary of the data sources and methods used in compiling the estimates. Much of the chapter is focussed on the current and constant price estimates for the summary aggregates in IEA Tables 1, 2 and 3.[2] A concluding section reviews the seasonal adjustment methods used in the quarterly accounts.

Chapter four is devoted to a discussion of the quality of the IEA estimates. The subject is addressed from several points of view. First the final estimates are judged in terms of the reliability of the underlying data sources and methods. The preliminary estimates are then assessed in terms of the magnitude of their subsequent revisions. Historical patterns in the accounts' statistical discrepancy between the income- and expenditure-based estimates of Gross Domestic Product (GDP) are examined. Finally, the relative variability of the major components of the accounts, yet another dimension of reliability, is also examined in this chapter.

The four appendixes provide a list of data sources for the accounts aggregates, a glossary of principal terms, a list of abbreviations and an extensive bibliography.

---

[1] The phrase "Income and Expenditure Accounts" (IEA) is used throughout this book to refer collectively to the quarterly and annual National Income and Expenditure Accounts (NIEA) and Provincial Economic Accounts (PEA). All abbreviations in the text, such as IEA, NIEA and PEA, are defined in Appendix III.

[2] In the *national* version, these three tables are published on a quarterly basis in Statistics Canada Catalogue 13-001 and on an annual basis in Catalogue 13-201. The *provincial and territorial* version is published annually in Catalogue 13-213P and 13-213.

1. What are the Income and Expenditure Accounts?

1.1 A Brief Overview

All groups in society have various sources of income, which they spend to acquire goods and services. Families, social organizations, businesses, governments and other groups have income from such sources as wages, profits, interest payments, dividends, rents, social security benefits and, in the case of governments, tax revenues. These groups spend some or all of this income to acquire food, clothing, shelter, entertainment, capital equipment and other goods and services.

It is common for such groups to keep financial records wherein their incomes and expenditures are carefully itemized over time. Household budgets, business financial statements and government public accounts are examples of such records. These financial records lie at the root of the IEA described in this volume. The IEA show how households as a group, businesses as a group and governments as a group raise revenue and expend that revenue to purchase goods and services. For the economy as a whole, they show how all of these groups together generate income and how they use it.

The central concept in the IEA is *Gross Domestic Product at Market Prices* (GDP).[1] It denotes the value of the total unduplicated production of goods and services within Canada's boundaries. To better understand the GDP concept and the "unduplicated" qualifier used in its definition, consider the following example.

Imagine an economy with just three businesses, one producing wheat, another flour and the last one bread. The wheat-producing company (Firm 1) operates farms which grow wheat. It imports seed and fertilizer and pays wages and salaries to its workers. Some of its wheat output is sold to a milling company (Firm 2) and the rest is exported. The wheat company earns a profit after deducting expenses from its sales revenue. The milling firm, in turn, uses the wheat it purchases from Firm 1 to produce refined flour. It sells some flour to a third firm, and some directly to final consumers. Like Firm 1, it pays wages and salaries to its employees and earns a profit after deducting expenses from revenues. Finally, the third firm which purchases refined flour from the second company uses it to make bread for sale to final consumers. Table 1.1 below depicts this hypothetical economy.

Total production in this economy can be derived in three different but equivalent ways. The first, known as the *sum of incomes* approach, involves adding up all the factor incomes (wages and salaries plus profits) generated in the production process. In the second, known as the *sum of final expenditures* approach, all sales to final users (domestic consumption plus exports) are added up. Finally, in the third method, known as the *sum of net values added* approach, the individual contributions of all firms to the final value of products sold are summed. These individual contributions, known as values added, can be calculated by taking the gross value of sales by each firm and subtracting each firm's costs of production in the form of purchases from other firms (including imports). If the latter deduction were not made, some output would be counted twice or more, and it is in this sense that GDP is defined as the value of *unduplicated* output. In principle, these three methods for adding up production should all yield the same total. Table 1.2 shows how this is so, using the data from Table 1.1.

This example illustrates, in a simplified way, how Canada's GDP is calculated. The sum of incomes and sum of final expenditures methods are both used in the IEA and they yield two essentially independent estimates of GDP. The discrepancy between them is halved, with one half being subtracted from the higher estimate and the other added to the lower one. The sum of net values added method is used in the Input-Output Accounts and provides a third estimate of GDP. As is explained later, the Input-Output estimate is ultimately reconciled with the IEA estimate.

---

[1] Formerly, the central concept in the IEA was Gross National Product rather than Gross Domestic Product. The distinction between these two production concepts is discussed further in Chapter 2.

Table 1.1
Hypothetical Three-Firm Economy

Costs of production	Millions of dollars	Gross value of production	Millions of dollars
Firm 1 (Wheat Grower)			
Imports of seed and fertilizer	15	Sales to Firm 2	100
Wages and salaries	115	Exports	50
Profits	20		
Total	150	Total	150
Firm 2 (Flour Miller)			
Purchases of wheat from Firm 1	100	Sales to Firm 3	130
Wages and salaries	45	Sales to consumers	35
Profits	20		
Total	165	Total	165
Firm 3 (Bread Baker)			
Purchases of flour from Firm 2	130	Sales to consumers	200
Wages and salaries	60		
Profits	10		
Total	200	Total	200

Table 1.2
Total Production: Three Calculation Approaches

Sum of Incomes Approach			
Firm 1	115 + 20	=	135
Firm 2	45 + 20	=	65
Firm 3	60 + 10	=	70
Total incomes earned in current production			270

Sum of Final Expenditures Approach	
Firm 1	50
Firm 2	35
Firm 3	200
Sub-total	285
Less: imports	15
Total final sales of current production	270

Sum of Net Values Added Approach			
	Gross value of production	Purchases from other firms and imports	Net value added in production
Firm 1	150	15	135
Firm 2	165	100	65
Firm 3	200	130	70
Total	515	245	270

However, understanding the modern economy involves a great deal more than simply calculating aggregate output and its components. Underlying the derivation of the basic aggregates are numerous transactions which take place among different groups within the economy. These transactions are the vital source of information on which the IEA are based. To interpret this information, it must be reduced to a manageable set of statistics suitable for analysis. Toward this end, the IEA also comprise a full set of *sector accounts* depicting the interrelationships among the following four broad economic sectors:

- Persons and unincorporated businesses
- Governments
- Corporations and government business enterprises
- Non-residents

As is explained more fully in Chapter 2, there are income (revenue) and expenditure (outlay) accounts for each of these sectors. Also defined is a set of Capital Finance Accounts, where the sources (origin) and disposition (use) of savings are recorded for each sector.[2]

Table 1.3
Consolidated Production Account, Primary Expenses

	Millions of dollars in 1985	% Share of total
Wages, salaries and supplementary labour income:		
Business	185,091	38.7
Government:		
On current account	61,319	12.8
On capital account	687	0.2
Persons	10,421	2.2
Accrued net income of farm operators from farm production:		
Net income received by farm operators from farm production	2,366	0.5
Adjustment on grain transactions	442	0.1
Net income of non-farm unincorporated business, including rent	26,447	5.5
Profits and other investment income	89,792	18.8
Inventory valuation adjustment	-1,760	-0.4
Indirect taxes	58,789	12.3
Less: subsidies	11,577	2.4
Capital consumption allowances:		
Persons and unincorporated business	15,313	3.2
Government	7,092	1.5
Corporate and government business enterprises	33,521	7.0
(of which: Government business enterprises)	4,268	0.9
Statistical discrepancy	45	0.0
Gross Domestic Product at Market Prices	477,988	100.0

When the production accounts for the four sectors are combined, a set of consolidated production accounts is obtained. These accounts, presented in Table 1.3 and Table 1.4,[3] portray the economy as it might be seen by a business accountant, with output shown as the sum of modified revenue and expense accounts of productive units in the economy. In contrast, the summary income- and expenditure-based estimates shown in Table 1.5 and Table 1.6,[4] which also sum to GDP at Market Prices, are displayed as they might be seen by an economic accountant, with expenditures shown as components of aggregate demand and incomes, as returns to factors of production. Primary expenses in the consolidated production account, such as wages, salaries and supplementary labour income, are recorded as factor incomes in the income-based

[2] The complete set of sector accounts is available in the annual *NIEA*. See Tables 10-29 in the publication ***National Income and Expenditure Accounts, Annual Estimates, 1977-1988***, Catalogue 13-201, annual. Much of the sector information also appears in the quarterly *NIEA*. See, for example, Tables 5, 6, 9, 15 and 20 in ***National Income and Expenditure Accounts***, Catalogue 13-001, fourth quarter 1989.

[3] See also Tables 10 and 11 in the annual *NIEA* (Catalogue 13-201).

[4] See also Tables 1 and 2 in the quarterly and annual *NIEA* (Catalogue 13-001 and 13-201).

estimates of GDP, and conversely, revenues in the production account from such items as sales are recorded in the expenditure-based estimates as outlays on consumption and investment. These summary income- and expenditure-based estimates exist for Canada and for each province and territory.

Table 1.4
Consolidated Production Account, Revenue

	Millions of dollars in 1985	% Share of total
Sales by business:		
To persons	257,959	54.0
To government:		
Current expenditure	37,895	7.9
Less: Sales by government to business	11,746	2.5
Capital expenditure	12,199	2.6
Investment in inventories	-64	0.0
To corporate and government business enterprises:		
Investment in fixed capital	54,385	11.4
Investment in non-farm inventories	1,997	0.4
To unincorporated business:		
Invastment in fixed capital	26,927	5.6
Investment in farm inventories and grain in commercial channels	348	0.1
To non-residents	134,919	28.2
Less: Purchases from non-residents	116,202	24.3
Sales by persons to persons of direct labour services	10,421	2.2
Sales by government to government:		
Direct labour services:		
On current account	61,215	12.8
On capital account	687	0.1
Consumption of capital	7,092	1.5
Statistical discrepancy	-44	0.0
Gross Domestic Product at Market Prices	477,988	100.0

While inter-sectoral transfers (such as unemployment insurance benefits, pensions, charitable donations and taxes) figure prominently in the income and outlay accounts, they disappear in the consolidated accounts because they are not part of economic production. If transfers were included in the consolidated production accounts, an element of double-counting would be implied. Similarly, on the expenditure side of the ledger, while the sector accounts show purchases of goods and services by one sector from another for use in producing other goods and services, such intermediate expenditures are removed from the consolidated accounts to avoid double-counting. The consolidated income and expenditure accounts comprise only those incomes, called factor incomes, which flow directly from economic production and only those expenditures, called final expenditures, which involve the acquisition of goods and services for final consumption.

The income-based estimates (Table 1.5) show factor incomes (that is, earnings accruing to labour and capital) generated as part of the production process. The largest source of factor income is wages, salaries and supplementary labour income, accounting for over half of GDP. The other income components are corporation profits before taxes, interest

and miscellaneous investment income, the accrued net income of farm operators from farm production, net income of non-farm unincorporated business, including rent, and the inventory valuation adjustment. Together these six aggregates add up to Net Domestic Income at Factor Cost. GDP at Factor Cost is derived by adding capital consumption allowances, and GDP at Market Prices is calculated by adding indirect taxes (such as sales and excise taxes) less subsidies (such as payments to farmers) and the statistical discrepancy. Each of these terms is explained more fully later in this report.[5]

Table 1.5
Gross Domestic Product, Income Based

	Millions of dollars in 1985	% Share of total
Wages, salaries and supplementary labour income	257,518	53.9
Corporation profits before taxes	49,490	10.4
Interest and miscellaneous investment income	40,302	8.4
Accrued net income of farm operators from farm production	2,808	0.6
Net income of non-farm unincorporated business, including rent	26,447	5.5
Inventory valuation adjustment	-1,760	-0.4
Net Domestic Income at Factor Cost	374,805	78.4
Capital consumption allowances	55,926	11.7
Gross Domestic Product at Factor Cost	430,731	90.1
Indirect taxes less subsidies	47,212	9.9
Statistical discrepancy	45	0.0
Gross Domestic Product at Market Prices	477,988	100.0

In the expenditure-based estimates (Table 1.6), GDP is broken down into the categories of final purchases of goods and services. The major aggregate is personal expenditure on consumer goods and services, accounting for close to 60% of GDP. Government current expenditure on goods and services is a second component and government and business investment spending is a third.[6] The sum of these components of the summary expenditure account is referred to as final domestic demand.[7] To move from final domestic demand to GDP, the value of physical change in inventories, net exports of goods and services (that is, exports minus imports) and the statistical discrepancy are added.[8]

[5] Key national accounts terms are also defined in a glossary in Appendix II.

[6] Economists will recognize these aggregates as elements of the closed-economy neo-Keynesian model: $Y = C + G + I$. See John Maynard Keynes, ***The General Theory of Employment, Interest and Money***, London: MacMillan and Company, 1936, and, for example, Paul A. Samuelson, ***Economics, An Introductory Analysis***, Toronto, New York and London: McGraw-Hill, third edition, 1955.

[7] Final domestic demand includes a mixture of domestic and foreign production, since imports are not excluded. On the other hand, it does not encompass all domestic production or all imports, since the value of physical change in inventories and exports are also excluded.

[8] Two other aggregates are sometimes employed, although they do not appear in the published IEA. "Total domestic demand" is defined as final domestic demand plus the value of physical change in inventories, and "total demand" as total domestic demand plus exports.

Table 1.6
Gross Domestic Product, Expenditure Based

	Millions of dollars in 1985	% Share of total
Personal expenditure on consumer goods and services	274,503	57.4
Government current expenditure on goods and services	95,519	20.0
Government investment in fixed capital	12,886	2.7
Business investment in residential construction	25,222	5.3
Business investment in non-residential construction	26,747	5.6
Business investment in machinery and equipment	29,343	6.1
Final Domestic Demand	464,220	97.1
Government investment in inventories	-64	0.0
Business investment in non-farm inventories	1,997	0.4
Business investment in farm inventories and grain in commercial channels	348	0.1
Exports of goods	119,061	24.9
Exports of services	15,858	3.3
Less: Imports of goods	102,670	21.5
Less: Imports of services	20,718	4.3
Statistical discrepancy	-44	0.0
Gross Domestic Product at Market Prices	477,988	100.0

The accounts are designed as a double-entry system in which the income- and expenditure-based GDP totals should, in principle, be identical. In fact, a difference virtually always arises between them due to errors in the source data, imperfect estimation techniques, differing seasonal adjustment methods and discrepancies in the time at which the incomes and expenditures are recorded. This statistical discrepancy which stems from the estimation procedure is one gauge of the system's overall reliability. However, for reasons which are explained in Chapters 2 and 4, it is a partial and quite insufficient gauge.

1.2 Who Uses the IEA and What For?

The IEA are at the centre of macroeconomic analysis and policy-making in Canada. They are used in a broad assortment of applications by a wide range of persons and groups in society. They are a means by which Canadians can view and assess the performance of the national and provincial economies. The accounts provide both a planning framework for governments and a report card on the results of the plans that governments carry out.

Business people use the accounts as an aid in developing marketing strategies and in planning investments. They depend on the accounts, in conjunction with other information sources, to provide a perspective on the macro economy so they can time their expansion programs in a profitable manner. Some of the larger firms in Canada (and a few of the smaller ones) maintain sophisticated statistical models of the economy which are based largely on the IEA. They issue regular newsletters and other market analyses in which the primary national accounts aggregates are often a focal point. Businesses identify their own interests in terms of their role in the economy, and they monitor trends in the economy through the IEA.

University scholars, particularly professors and students of economics and business, are important users. Textbooks refer to the accounts frequently. Indeed, the accounts' origin lies in the macroeconomic theories of academic economists. Students learn the practical art of macroeconomics by working with real world examples drawn from the historical record of the national accounts. Academic economists working on empirical issues often use the accounts to test alternative hypotheses. Economic historians sometimes adopt the accounts as a framework for their work.

Government ministers and civil servants (including central bankers) use the accounts extensively in economic policy and budget making to help them assess the current state of the economy, determine the relative strength of the different sectors and set the broad stance of fiscal and monetary policies. Tax revenues depend crucially upon labour income, corporation profits, consumer spending and other macroeconomic variables, all of which are national accounts aggregates. Many government spending programs are linked to GDP and its components, or to the GDP implicit price index, in some cases by legislated formulas and in others through less formal arrangements.[9]

The rest of the world views Canada's relative economic capacity and performance largely in terms of the aggregates in the national accounts. International efforts to improve economic prospects through policy cooperation and coordination, such as those by the "Group of Seven" countries,[10] take into account the member countries' GDP or GNP.[11] When international organizations prepare analyses and forecasts on the world economy, they do so largely in terms of the aggregated national accounts of the largest countries of the world. The International Monetary Fund, the World Bank, the Organization for Economic Cooperation and Development and the United Nations all gear the formula establishing each member country's contribution to GDP. The defence spending objectives of the North Atlantic Treaty Organization for its members and foreign aid targets of the United Nations for developed countries are both set as a proportion of GDP.[12]

1.3 Estimation and Release Cycle of the IEA

Efforts are made to produce the IEA estimates both accurately and in a timely fashion. In an attempt to meet the second objective without unduly compromising the first, preliminary quarterly estimates, as well as preliminary annual estimates, are released about 60 days after the reference period. Provincial Economic Accounts estimates are available about 120 days after the reference year. The preliminary estimates are prepared using partial data and these estimates are revised subsequently, when more information becomes available. The estimates are finalized about four years after their initial release, when the Input-Output Accounts estimates are completed. The IEA annual cycle is illustrated in Table 1.7, using the period 1989-90 as an example.

[9] Important examples include the federal Equalization Program and the Established Programs Financing arrangements for federal-provincial cost-sharing in the areas of medicare and post-secondary education.

[10] The Group of Seven includes the largest industrialized market economies: United States, Japan, Germany, France, the United Kingdom, Italy and Canada.

[11] The Gross National Product (GNP) is an alternative national accounts aggregate which is similar, but not identical to GDP. It is defined in Chapter 2.

[12] The formula adopted by the United Nations calls for annual contributions by all member countries equivalent to 0.7% of GDP.

Table 1.7
The IEA Release Cycle in 1989-90

March 1, 1989*	National Income and Expenditure Accounts for fourth quarter 1988 and preliminary 1988
April 28, 1989	Preliminary Provincial Economic Accounts for 1988.
June 20, 1989*	National Income and Expenditure Accounts for first quarter 1989, with revised estimates for 1985-1988.
August 31, 1989*	National Income and Expenditure Accounts for second quarter 1989.
October 12, 1989	Geographical distribution of personal income and National Income and Expenditure Accounts annual detail for 1988, with revised estimates for 1985-1987.
November 30, 1989*	National Income and Expenditure Accounts for third quarter 1989.
February 2, 1990	Revised Provincial Economic Accounts for 1985-1988.
March 1, 1990*	National Income and Expenditure Accounts for fourth quarter 1989 and preliminary 1989 annual.

* Date fixed at the start of the year.

There is a certain tradeoff between timeliness and data quality.[13] The earliest estimates are calculated from limited information since many of the primary sources are unavailable. Taxation and census statistics, for example, are compiled with a considerable lag. Users of the accounts accept a reduction in data quality in the preliminary estimates to have access to them sooner. The quality of the estimates improves over time as additional source data become available and revisions are carried out.[14]

The sequence of revisions to the data for a given period is governed by an established policy. According to this policy, a particular quarter's estimates can be revised in other quarters during the same year, but cannot be revised in subsequent years except at the time the first quarter estimates for those years are published. These annual revisions are limited to four years, after which the estimates are considered final. Thus, taking the estimates for the second quarter of 1989 as an example, revisions would occur at the time of release of the estimates for the third and fourth quarters of 1989 and the first quarters of 1990, 1991, 1992 and 1993.

There are exceptions to this revision policy. On occasion, the estimates have been revised five consecutive years rather than four. More importantly, *historical revisions* are also carried out from time to time. These revisions, which typically occur once per decade or so, provide the occasion to incorporate census information and other benchmark data and to make improvements in methods and review concepts. In historical revisions the entire record of the accounts is open to

[13] See Kirkham (1976) and McNees (1986).

[14] The topics of data revisions and quality assessment are addressed in Chapter 4.

change. This means the annual estimates can be revised back to 1926 and the quarterly estimates, back to 1947.[15,16]

The PEA, produced annually,[17] are integrated with the national accounts and are revised in step with them. The initial PEA estimates are based on the preliminary annual national accounts. The latter are published in early March and the PEA follow in about two months' time.[18] The first revision to the PEA occurs in early February of the following year, when the estimates are made consistent with the revised national estimates released the previous June. Subsequent revisions take place in the month of February in following years. For example, the PEA for 1988 were first released in late April 1989 and were revised in February 1990. They will be subject to further revisions in February 1991, February 1992 and February 1993. The PEA, being relatively new compared to the national accounts, have also been subject to some historical revisions independent of the revision schedule of the latter.

1.4 Publication Formats

The NIEA and PEA are available in alternative publication formats. The handiest and best known are the printed publications. These can be obtained in libraries across Canada and can be purchased from authorized agents, through Statistics Canada offices and by mail order. The publications normally come out about one month after the statistics are released. The data are issued immediately in the ***The Daily***,[19] in computer printouts and in Statistics Canada's on-line computer databank, known as CANSIM,[20] on the official date of release. Microcomputer users can also acquire the NIEA and PEA on diskettes.[21]

The quarterly IEA are published in ***National Income and Expenditure Accounts***, Catalogue 13-001. These quarterly volumes are issued about three months after the reference period. The annual accounts are published in ***National Income and Expenditure Accounts, Annual Estimates***, Catalogue 13-201, and appear approximately 11 months after the reference year. These annual accounts contain considerably more detail than the quarterly accounts, including the complete set of sector accounts (Income and Outlay Accounts, and Capital Finance Accounts), a number of reconciliation statements and supplementary breakdowns by industry and province. Finally, the provincial accounts are published in ***Provincial Economic Accounts, Preliminary Estimates***, Catalogue 13-213P and ***Provincial Economic Accounts, Annual Estimates***, Catalogue 13-213. The first of these two volumes normally appears about 5 months after the reference year and the second, more detailed version, about 14 months after the reference year.

The main aggregates from the IEA are also published in the ***Canadian Economic Observer***,[22] along with a wide range of other economic time series. The quarterly IEA analytical writeup is reprinted in the ***Observer*** about a month after its official release in the ***Daily***.

---

[15] Statistics Canada's IEA originate in 1926, but some less complete estimates are available for earlier years from other sources. The most recent and thorough treatment of the subject is reported in Urquhart (1986) which contains GDP estimates for the period 1870-1926. See also Bertram (1962, 1963, 1973), Buckley (1951, 1958), Coats (1910, 1926, 1932, 1936, 1946), Curtis, Taylor and Michell (1931), Deutsch (1940), Firestone (1951, 1958, 1960), Green (1967, 1971), Hartland (1960), Hay (1967), Hood and Scott (1957), Keyfitz and Greenway (1961), Knox (1936), Leacy (1983), Pickett (1963), Urquhart (1945) and Viner (1924).

[16] In most cases, the annual NIEA series are available from 1926, the quarterly NIEA series from 1947 and the PEA series from 1961.

[17] At present the statistical system is not sufficiently extensive in Canada to permit the development of comprehensive quarterly PEA, although some provincial governments have devised sets of quarterly economic accounts for their province.

[18] These preliminary PEA estimates were first issued in 1989. Prior to that time, the PEA were released once a year only, about 14 months after the reference year.

[19] ***The Daily***, Catalogue 11-001E, daily.

[20] ***CANSIM, Canadian Socio-Economic Information Management System, Mini Base Series Directory***, Catalogue 12-569E, occasional.

[21] For information about computer printouts on the day of release or about microcomputer diskettes, contact the Income and Expenditure Accounts Division.

[22] ***Canadian Economic Observer***, Catalogue 11-010, monthly, and ***Canadian Economic Observer, Historical Statistical Supplement***, Catalogue 11-210, annual.

Table 1.8
IEA Publication Formats

1. Primary publications:
   - ***National Income and Expenditure Accounts***, Catalogue 13-001, quarterly.
   - ***National Income and Expenditure Accounts, Annual Estimates***, Catalogue 13-201, annual.
   - ***Provincial Economic Accounts, Preliminary Estimates***, Catalogue 13-213P, annual.
   - ***Provincial Economic Accounts, Annual Estimates***, Catalogue 13-213, annual.
2. Historical publications:
   - ***National Income and Expenditure Accounts, Quarterly Estimates, 1947-1986***, Catalogue 13-533, occasional.
   - ***National Income and Expenditure Accounts, Annual Estimates, 1926-1986***, Catalogue 13-531, occasional.
   - ***Provincial Economic Accounts, Historical Issue, 1961-1986***, Catalogue 13-213S, occasional.
3. Other publications:
   - ***The Daily***, Catalogue 11-001E, daily.
   - ***Canadian Economic Observer***, Catalogue 11-010, monthly.
   - ***Canadian Economic Observer, Historical Statistical Supplement***, Catalogue 11-210, annual.
4. Microcomputer diskettes
5. Computer printouts
6. CANSIM

1.5 Relation of the IEA to Other Parts of the SNA

The IEA are but one part of a much larger system: the Canadian System of National Accounts.[23] The components of this larger system are:

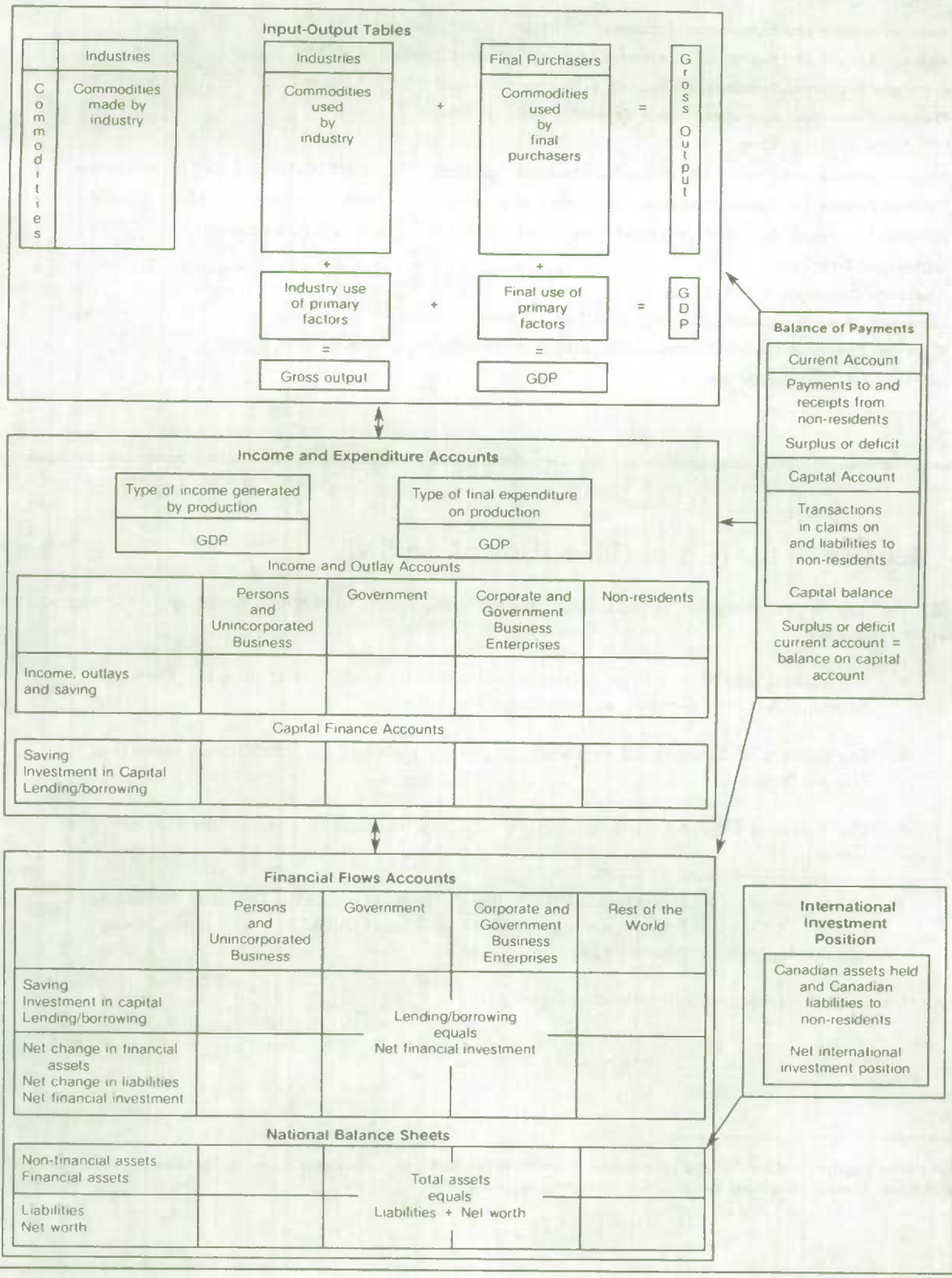
- The Income and Expenditure Accounts (quarterly and annual), including the Provincial Economic Accounts (annual), as presented in this volume
- The Balance of International Payments (quarterly), including the International Investment Position (annual)
- The Financial Flow Accounts (quarterly), including the National Balance Sheet Accounts (annual)
- The Input-Output Accounts (annual), including the Estimates of Gross Domestic Product by Industry at Constant Prices (monthly), the Provincial Input-Output Accounts (quinquennial) and the Aggregate Productivity Measures (annual).

The way these parts interconnect is illustrated in Figure 1.1.

[23] For a fuller description of the Canadian SNA and the interrelationships among its component parts, see *A User Guide to the Canadian System of National Accounts*, Catalogue 13-589E, November 1989, occasional.

Figure 1.1

A Schematic of the Canadian System of National Accounts



The various SNA components listed above are integrated in three distinct ways. First, they are all based on a single, unified set of accounting concepts. Terms such as "Gross Domestic Product", "exports" and "saving" have an identical meaning in all parts of the SNA. Second, the key statistical aggregates are equal through the system. This means, for example, that there is only one official estimate for GDP at Market Prices, or for wages, salaries and supplementary labour income.[24] Finally, the component parts of the Canadian SNA also have an integrated release date schedule. All appear on the same day each quarter.[25]

The Input-Output Accounts encompass not only estimates of factor incomes and final demand by commodity, but also of value added by industry and of production by commodity at a fairly detailed level. The Provincial Input-Output Accounts (PIOA) provide the input-output tables, including estimates of interprovincial and international trade by province in goods and services. However, while the annual estimates of PEA date back to 1961, the PIOA exist only for the three years 1974, 1979 and 1984, mainly due to the lack of data on trade by province.[26,27]

The Estimates of Gross Domestic Product by Industry, produced monthly, provide the earliest picture of economic developments. This industry-based estimate of GDP is measured at factor cost, as opposed to the one derived through the income and expenditure approach which is at market prices.[28] Monthly series are derived by distributing and projecting annual benchmark estimates of value added by industry, taken from the input-output tables, with closely related monthly data. As might be expected given the similarity of the two GDP definitions,[29] the quarterly seasonally-adjusted growth rates in the two measures of real GDP have tended to be quite similar in most quarters.

The non-resident sector estimates of the IEA come from the Balance of International Payments (BOP).[30] Because a part of Canada's current production is sold to non-residents, it is necessary to include in final sales the value of exports of goods and services to arrive at a full accounting of current production. Conversely, because sales to persons, governments, businesses and non-residents include imported goods and services, it is necessary to subtract these in order to arrive at a correct summation of the value of Canadian output. The trade account in the IEA is one of the components of the current account balance in the BOP.[31]

---

[24] This identity of statistical estimates through the SNA did not exist prior to 1986. It was achieved in that year through the development of an internal process for reconciling differing estimates. Now most of the current dollar aggregates are identical through the system, although the estimates for the years prior to 1980 (other than 1961 and 1971) remain unreconciled. In addition, the different treatment of the statistical discrepancy in the IEA and the IOA means that it is not possible to fully reconcile some components. The estimates of GDP at constant prices are not reconciled.

[25] This practice was introduced in 1986, in the case of the first three components of the SNA. The fourth component, the Financial Flow Accounts, came out about two weeks after the others until mid 1989 when it too became part of the single, integrated release. The IOA appear separately. Since 1988, the SNA estimates have also been released according to a fixed schedule. Around December each year, the Communications Division of Statistics Canada publishes a pamphlet listing the release dates for the upcoming year, both for the SNA estimates and for several other key statistics.

[26] Net exports are calculated residually and are included with the statistical discrepancy in the PEA. In the PIOA they are developed by commodity using a range of sources. The most important input data for the PIOA come from the origin and destination of shipments survey which is associated with the Survey of Manufacturing, data which are available once every five years. For more on the input-output system, see ***The Input-Output Structure of the Canadian Economy, 1961-1981***, Catalogue 15-510, occasional, and ***The Input-Output Structure of the Canadian Economy in Constant Prices, 1961-1981***, Catalogue 15-511, occasional.

[27] Another key difference between the annual PEA and the quinquennial PIOA is their treatment of federal indirect taxes. See Chapters 2 and 3.

[28] Conceptually, the difference between the factor cost and market price valuations is indirect taxes less subsidies, as explained in Chapter 2.

[29] See the June issue of ***Gross Domestic Product by Industry***, Catalogue 15-001, monthly, for a review of the sources and methods and for a quality assessment of the monthly Estimates of Gross Domestic Product by Industry.

[30] Strictly speaking, this is true only for the estimates at current prices, which are developed by the Balance of Payments Division and the International Trade Division. The estimates at constant prices are developed by the International Trade Division in the case of the merchandise components and by the Income and Expenditure Accounts Division in the case of the non-merchandise components.

[31] For more information about the Balance of Payments see, ***The Canadian Balance of International Payments and International Investment Position, A Description of Sources and Methods***, Catalogue 67-506E, March 1981, occasional.

Closely allied to the BOP is the statement of Canada's international investment position. This statement reveals the extent to which Canada has been receiving real and financial resources from the rest of the world or supplying them. It shows, at the end of the year, the nature, form and amount of international assets and liabilities of residents.

The quarterly Financial Flow Accounts (FFA) show financial activity as an extention of the IEA. Detailed data for the acquisition or disposition of financial assets and liabilities are presented as a counterpart to saving and investment in non-financial capital for the different sectors of the economy. The presentation shows the interrelationship between financial activity and economic activity and illustrates the financial transactions among sectors. The major linkage points between the IEA and the FFA are saving and investment. The IEA show estimates of net lending or borrowing by each sector, and the FFA give a breakdown for these totals in terms of the associated financial instruments used.[32] The sum of net lending by the four sectors in the IEA, plus the total statistical discrepancy between the income- and expenditure-based estimates of GDP, is necessarily zero since the positive lending of one sector is identically the negative lending (borrowing) of another. The system also includes National Balance Sheet Accounts, which measure the year-end stock of tangible assets, financial assets, liabilities and net worth, all reconcilable to the FFA and the Capital Finance Accounts of the IEA.

1.6 The Historical Revision of 1986

The Canadian System of National Accounts was updated and improved in a number of ways in the 1986 historical revision.[33,34] This revision provided the occasion to change the presentation of the accounts, to rebase the constant price estimates to the year 1981, to incorporate revised and new data into the estimates, to adopt improved estimation methods, to eliminate statistical breaks and to increase the degree of integration among the component parts of the Canadian SNA. Most of the revisions pertained to the period from 1961 to 1985.[35]

The major change in the presentation introduced during the 1986 revision was the adoption of Gross Domestic Product (GDP) in place of Gross National Product (GNP) as the central aggregate of the system. GNP measures the earnings of all Canadian-owned factors of production, whether they are located in Canada or in other countries. It had been the central aggregate of the Canadian SNA since its inception in the late 1940s. GDP measures production originating within the boundaries of Canada, whether the production is attributable to Canadian or non-resident-owned factors of production.[36] Within the main IEA tables the series affected by the switch from GNP to GDP are exports and imports of services, corporation profits before taxes and interest and miscellaneous investment income, all of which are now stated on a domestic basis.

GNP at current prices is still calculated, but GNP at constant prices is no longer estimated. GDP is larger than GNP, by $14 billion or 3% of GNP in 1985, although the year-to-year percentage changes of the two indicators have usually been similar.

The GDP concept is relevant if interest centres on movements in employment, prices and similar domestic variables. The GNP concept is also useful, particularly in analyses of aggregate Canadian income. GDP best measures economic activity within the country while GNP best measures the income of its citizenry. The GDP concept is also central to the PEA.

---

[32] See *A Guide to the Financial Flow and Balance Sheet Accounts, Definitions, Concepts, Sources, Methods*, Catalogue 13-585E, February 1989, occasional.

[33] For additional details on the changes that were incorporated during the 1986 historical revision beyond those mentioned here, see the article in *National Income and Expenditure Accounts, Annual Estimates, 1926-1986*, Catalogue 13-531, June 1988, occasional, pp. xi-xxv.

[34] The results of the previous historical revision were released in 1972; the three volumes of associated documentation (Catalogue 13-531, 13-533 and 13-549E) were published in 1975 and 1976 and are now out of print.

[35] In a few cases the revisions extended back to 1947. In addition, the rebased constant price estimates were rescaled right back to the origin of the accounts in 1926.

[36] The difference between GDP and GNP is discussed further in Chapter 2.

It would be extremely difficult to measure provincial output on a national basis,[37] because there is no effective way to track investment income flows among provinces.

The base year for price deflation was updated from 1971 to 1981 during the historical revision of 1986.[38] As on occasions when the accounts were rebased in the past, historical growth rates for years prior to 1981 were protected by rescaling and adding appropriate "adjusting entries". This Canadian approach contrasts with the procedure in the United States, where rebasing calculations are typically carried right back to the origin of the accounts with consequential effects on real growth rates.[39]

With respect to methodology, particularly important changes were made in the area of personal expenditure on consumer goods and services, where a new approach to benchmarking was adopted. Prior to the revision, final as well as preliminary estimates of consumer expenditure were calculated using an eclectic approach and a variety of sources. About two-thirds of the goods component were derived from retail sales, with adjustments for non-personal use and non-retail purchases, and the results were converted into spending by commodity based on a structural pattern from the 1974 retail commodity survey. The remaining third of expenditures on goods and those on services were either estimated directly or were derived using a commodity flow approach.

In the new approach implemented in 1986, the estimates for all categories of personal expenditure on consumer goods and services are based on a commodity flow balancing system. The preliminary quarterly and annual estimates still depend on the Retail Trade Survey and a collection of other indicators, but the final benchmarked estimates, derived three to four years after the fact, are reconciled with other related commodity data through the Input-Output Accounts.

The new approach, which is now used for several other components of the accounts, revolves around the following identity relating supply and demand for a commodity:

$$\text{Total supply} = \text{Total demand}$$

or

$$\begin{bmatrix} \text{Production} \\ + \text{ Imports} \\ + \text{ Margins} \end{bmatrix} = \begin{bmatrix} \text{Intermediate inputs} \\ + \text{ Final Domestic Demand} \\ + \text{ Exports} \\ + \text{ Additions to Inventory} \end{bmatrix}$$

Comparing separate survey- and Customs-based data on production, imports, margins,[40] intermediate inputs, exports and net additions to inventory with the estimates for final domestic demand provides a consistency check on the estimates. This commodity flow balance is the basis of input-output accounting and promotes a fuller reconciliation of diverse statistical sources. When imbalances are detected, detailed investigations are initiated which involve issues of classification, valuation, timing, coverage and improper reporting. The final, reconciled estimates benefit from the considerable degree of cross-checking inherent in the approach.

As part of the historical revision, a major change was made in the alterations and improvements component of business residential construction. A new benchmark level for spending on this activity was constructed using the results of the 1982 Family Expenditure Survey (FAMEX), containing redesigned questions which met the requirements of the System

---

[37] The oxymoron "provincial output on a national basis" means calculating provincial gross production in a manner analogous to GNP rather than to GDP. It denotes the output of provincially-owned factors of production, rather than the output within the boundaries of a province.

[38] While the conversion to the 1981 base year was undertaken at the time of the historical revision, the accounts are sometimes rebased without there being an associated historical revision. The more recent conversion to the 1986 base year, in June 1990, is a case in point.

[39] For a more extended discussion of rebasing, see Chapter 2.

[40] The term "margins" in this context refers to various markups applied to the price of a commodity after it is produced. It encompasses transportation, wholesaling and retailing markups and sales and excise taxes. It is, therefore, the difference between the producer's price and the final purchaser's price.

of National Accounts.[41] The new benchmark tripled the level of the series in 1982 and this higher level was worked backward and forward in the estimates.

Another major change affected the price index for computer equipment. This commodity had posed difficult price and volume measurement problems in the accounts for many years. The rapid pace of technological change and its complex nature made it difficult to define a standard and consistent unit of measurement for "computer equipment" whose price could be measured over time. The beneficial effects of technological advance, in terms of higher product quality and lower prices, were not being adequately captured by conventional price/volume measurement techniques.

The new method implemented in this area is based on an hedonic price index[42] for computer equipment, developed in 1985 by the Bureau of Economic Analysis (BEA) of the U.S. Department of Commerce for the United States National Income and Product Accounts, in consultation with the International Business Machines Corporation.[43] The index has been adopted by Canada. The sub-components of the BEA computer price index are used as inputs to develop specific deflators for Canadian imports and exports of computers and peripheral equipment, and the related domestic component of machinery and equipment. International trade statistics are used to produce an import price index for computers and data from the Survey of Manufacturing, to weight the domestic and export prices for computers. The prices for imports are adjusted for the exchange rate, with further adjustments for tariffs and federal sales taxes for the domestic investment versions of these deflators.

Once adjusted for quality changes, this revised price index provides a very different indication of price and volume trends for computers. It implies a downward price trend for computer equipment over the period between 1971 and 1989, not just in relative terms but in absolute terms.[44] The previous price index was based on an assumption of little quality change and showed a gradual increase through the 1970s and early 1980s.

Steps were also taken to further integrate the component parts of the Canadian SNA by reconciling the major aggregates in the IEA and IOA systems. The reconciliation process is complicated because the IEA include an explicit statistical discrepancy between the income- and expenditure-based estimates of GDP which has no equivalent in the IOA. Moreover, the "return to capital" components in the IEA, corporation profits before taxes, interest and miscellaneous investment income, the inventory valuation adjustment and capital consumption allowances, have no counterpart in the IOA other than total operating surplus, which conceptually is the sum of the previous four items. Because of these differences in the two systems, on the expenditure side the value of physical change in inventories in the IOA is made equal to the sum of the value of physical change in inventories and the statistical discrepancy in the IEA. On the income side, the IOA's operating surplus is reconciled with the sum of corporation profits before taxes, interest and miscellaneous investment income, the inventory valuation adjustment, capital consumption allowances and the statistical discrepancy in the IEA. GDP at Market Prices is now identical in the IEA and the Input-Output Accounts for the years 1961, 1971 and 1980 forward.

Further, it has not been possible to reconcile the estimates of GDP in constant prices because the deflation methodology is quite different in the two systems. The industry-based estimates at constant prices are calculated in the Input-Output Accounts using a double-deflation procedure in which the deflated value of inputs is subtracted from the deflated value of gross output to yield value added at constant prices. The Monthly Estimates of GDP by Industry are projections of these Input-Output estimates which rely on various series such as employment and deflated gross shipments. The IEA

---

[41] See ***Family Expenditure in Canada***, Catalogue 62-555, irregular.

[42] In the hedonic approach, a complex item such as a microcomputer is considered to be a composite commodity having several characteristics or features (computational speed, quantity of random access memory, quantity of disk storage capacity, display resolution quality, etcetera). The explicit or implicit prices of the individual characteristics are measured over time and weighted in accordance with average proportions from some base period. The resulting aggregate index measures the price of the composite commodity.

[43] See Cartwright (1986), Cartwright and Smith (1988), Cole, Chen, Barquin-Stolleman, Dulberger, Helvacian and Hodge (1986), Triplett (1986) and Young (1989).

[44] While the revisions in this area had an important impact on the estimates for final domestic demand, their impact on GDP was considerably smaller since a large portion of Canadian expenditure on computer equipment is satisfied by imports.

estimates at constant prices, in contrast, are built up largely by deflating final expenditures with commodity-specific deflators.

The annual PEA and the quinquennial Provincial Input-Output Accounts are not reconciled, given their subtantially different frequency.

The integration initiative had many other dimensions affecting all areas of the SNA. All parts adopted a common set of definitions of industries, industry aggregations and sectors, and all converted to the 1980 Standard Industrial Classification.[45]

[45] Other steps taken to further integrate Canada's System of National Accounts are detailed in *A User Guide to the Canadian System of National Accounts*, Catalogue 13-589E, November 1989, occasional.

2. Concepts and Definitions

This chapter describes the structure of the Income and Expenditure Accounts. The concepts are explained and the relationships among the principal aggregates are developed.

Canada's System of National Accounts follows fairly closely, in its structure, concepts and definitions, the recommendations set out by the United Nations. Those recommendations define an integrated framework for understanding and analyzing a national economy. The system is rooted in macroeconomic theory and its major aggregates are closely aligned with concepts found in mainstream textbooks on economics. While it is nearly forty years old, the United Nations SNA has stood the test of time and is used extensively in countries with market-based economies.[1]

2.1 Production

If the accounts could be said to have a single overriding objective, it would be to define and measure total economic production for the country. This concept, the "total economic production for the country", encompasses an extremely broad range of goods and services. However, it does not include absolutely everything that is produced. For example, services performed by persons in the home for no remuneration are excluded. Defining the boundary between what is and is not part of "total economic production" is one of the primary challenges of the accounts.

In fact, there are a number of alternative definitions of total production (or income)[2] built into the accounts. The differences among the definitions turn on whether output is measured at "factor cost" or at "market prices", whether its scope is "domestic" or "national" and whether it is measured gross or net of capital consumption allowances. Table 2.1 summarizes the relationships among these various aggregates. Each definition has its own particular utility. The ideal measure for any particular application depends on the nature of the issue being investigated.

2.2 The Production Concept

In very general terms, the concept of total economic production in the SNA comprises goods and services which are exchanged for money in the market economy. There are some exceptions to this general definition, however. Transactions which involve used goods are excluded, although such goods are exchanged for money in the market economy.[3] Conversely, some output is included within the SNA definition of production even though it is not exchanged for money in the market economy. A primary example is the services provided by owner-occupied housing, for which

---

[1] The original UN system of national accounts was published in *A System of National Accounts and Supporting Tables*, Studies in Methods, Series F, No. 2, Statistical Office, Department of Economic and Social Affairs, United Nations, New York, 1953 with subsequent editions Series F, No. 2, Rev. 1, Rev. 2 and Rev. 3. The last of these revisions to the SNA, expounded by the United Nations in 1968, was developed with the assistance of an international "expert group", with Richard Stone as its chairperson. Currently, a similar group of experts is working on a redefinition of the UN system that will bring its concepts in line with the 1990s. Based on the work done so far, the revision is unlikely to result in major changes to the central concepts and structure of the SNA. Rather, its recommendations will probably focus on refining particular concepts and extending the accounts in some new directions.

[2] The terms "production" and "income" are synonymous in the consolidated national accounts, although not in the sector accounts because of inter-sectoral transfers.

[3] Used goods are excluded because they were counted once already, when originally produced. The accounts seek to avoid such "double-counting". Fees paid for services involving the sale of used goods or equipment, such as real estate commissions, fall within the scope of production. Illegal activities are also excluded, because they cannot be measured effectively.

an "imputation" is made. There are very few imputations in the accounts, however, and in 1985 they accounted for only 5.6% of GDP.[4]

Table 2.1
Relationships Among Major National Accounts Aggregates

PRODUCT/INCOME AT FACTOR COST		
Net domestic:	NDPFC =	WSSLI + PROF + INT + FARM + UNINC + IVA
Net national:	NNPFC =	NDPFC + YNR
Gross domestic:	GDPFC =	NDPFC + CCA
Gross national:	GNPFC =	NNPFC + CCA
PRODUCT/INCOME AT MARKET PRICES		
Net domestic:	NDP =	NDPFC + ITLS
Net national:	NNP =	NDP + YNR
Gross domestic:	GDP =	NDP + CCA
Gross national:	GNP =	NNP + CCA

DEFINITIONS

NDPFC	=	Net Domestic Product at Factor Cost
NNPFC	=	Net National Product at Factor Cost
GDPFC	=	Gross Domestic Product at Factor Cost
GNPFC	=	Gross National Product at Factor Cost
NDP	=	Net Domestic Product at Market Prices
NNP	=	Net National Product at Market Prices
GDP	=	Gross Domestic Product at Market Prices
GNP	=	Gross National Product at Market Prices
WSSLI	=	Wages, salaries and supplementary labour income
PROF	=	Corporate profits before taxes
INT	=	Interest and miscellaneous investment income
FARM	=	Accrued net income of farm operators from farm production
UNINC	=	Net income of non-farm unincorporated business, including rent
IVA	=	Inventory valuation adjustment
CCA	=	Capital consumption allowances
YNR	=	Net investment income from non-residents
ITLS	=	Indirect taxes less subsidies

[4] Imputations are limited to cases where a particular non-market activity has a close parallel in the market economy and where the valuation of that activity is statistically feasible. The main ones cover the services of owner-occupied dwellings, agricultural products consumed directly on farms, services rendered by financial institutions without specific charge and the consumption of government capital. The imputations are listed in Table 62 of the annual *NIEA* publication, Catalogue 13-201. Imputations help keep the measurement of aggregate production invariant to structural, institutional or organizational changes in the economy. For example, if a trend toward greater home ownership at the expense of rental accommodation were to develop, perhaps due to changes in the tax system, the compositional change would not in itself have implications for total production.

The value of unpaid household work such as cooking, cleaning and child care is not included in total production, although a good case can be made that it should be.[5] As a result, very little production as it is defined in these accounts originates in the personal sector. Production here is limited to domestic services provided directly by paid labour. The fact that unpaid work in the home is excluded from the measure of production in the accounts has probably meant that output growth has been overstated to a degree. Women have joined the labour force in increasing numbers and the work they used to do in the home has increasingly been shifted to the market economy, as evidenced by rapid growth in the restaurant business and in commercially provided household services.

Interest payments by businesses are included within the production boundary, while similar payments by governments on public debt and a portion of interest payments by households on consumer debt are not.[6] Interest on the public debt is treated as a transfer payment partly because a large part of government borrowing implicitly finances current rather than capital expenditure, and partly because it is desirable for GDP to be unaffected by changes in government financing policies.[7]

Government activity[8] *is* included within the boundary of production, but the fact that government services, those provided by parliamentarians, the military and police, school teachers, hospital workers and a broad range of other public employees, are not generally sold in the marketplace makes their valuation problematic. This difficulty is resolved by counting the output of government services in terms of the associated production costs. In some cases this may imply an overvaluation while in others, particularly those where productivity increases at a rapid pace, there may be an undervaluation. Production by government business enterprises which operate in a manner similar to private businesses, such as Petro Canada, is defined in the same way as that of private businesses.[9]

By far the greatest share of production, about 83% in 1985, is accounted for by private and government business enterprises. Governments account for most of the remainder and only a very small proportion of production in the accounts, about 2% in 1985, is attributable to the personal sector.[10] This is shown in Table 2.2, which provides a rough indication of the shares of Canada's GDP accounted for by the personal, business and government sectors.[11]

The definition of the production boundary is one area in the accounts with much scope for controversy. How much work in the home, if any, should be included in GDP through imputations? Should not some government services be regarded as intermediate rather than final production and therefore be excluded from GDP? Should some of the interest on the public debt and the transfer portion of interest on consumer debt be viewed as "productive", just like interest on business debt, and therefore be included in GDP? These and several other questions serve to remind that the modern industrial economy does not lend itself easily to a precise statistical portrayal.

---

5 See Oli Hawrylyshyn, *A review of recent proposals for modifying and extending the measure of GNP*, Statistics Canada, Catalogue 13-558, December 1974, occasional and *A User Guide to the Canadian System of National Accounts*, Catalogue 13-589E, November 1989, occasional, chapter 7.

6 Interest on consumer debt is split in two, a portion covering the administrative expenses incurred by financial intermediaries in rendering services to borrowers (the cost of service), and the remainder which is viewed as a transfer between borrowers and lenders. Only the cost of service is considered productive and therefore included in GDP.

7 If interest on the public debt were treated as productive and therefore included in GDP, then governments could raise or lower GDP at will by switching between tax financing (which is indisputably a form of transfer) and debt financing. See Crozier (1959) and Sunga (1967, 1984).

8 Activity in this context does not refer to transfer payments and interest on the public debt. It includes only current expenditure on goods and services and capital expenditure of the government sector.

9 This means that policies of nationalization or privatization of government business enterprises have no effect on the way profits are accounted for in GDP.

10 The personal sector portion is accounted for by directly paid labour services, such as those provided by maids and butlers.

11 Note that the sectoring in this table differs from that in the published IEA, where the sectors are persons and unincorporated businesses, corporations and government business enterprises, governments and non-residents. The relationship between these two sector classifications is explained in Section 2.7.

Table 2.2
Gross Domestic Product by Sector

	Millions of dollars in 1985	% Share of total
Personal sector		
Wages, salaries and supplementary labour income	10,421	2.2
Business sector		
Wages, salaries and supplementary labour income	185,091	38.7
Net income of non-farm unincorporated business	26,447	5.5
Accrued net income of farm operators from farm production	2,808	0.6
Corporation profits before taxes	49,490	10.4
Interest and miscellaneous investment income	40,302	8.4
Inventory valuation adjustment	-1,760	-0.4
Indirect taxes less subsidies*	47,212	9.9
Capital consumption allowances		
Persons and unincorporated business	15,313	3.2
Corporations and GBEs	33,521	7.0
Total	398,424	83.3
Government sector		
Wages, salaries and supplementary labour income	62,006	13.0
Capital consumption allowances	7,092	1.5
Total	69,098	14.5
Statistical discrepancy	45	0.0
Gross Domestic Product at Market Prices	477,988	100.0

* Indirect taxes and subsidies are allocated to the business sector here, although some should in fact be assigned to persons and governments. An example would be import duties paid by persons or governments on purchases directly from abroad.

2.3 Domestic Versus National Production

The central production concept in the IEA is Gross Domestic Product at Market Prices, or GDP. GDP measures the unduplicated value of production originating within the boundaries of Canada,[12] whether the factors of production are owned by Canadians or non-residents.

Prior to the historical revision in 1986 the central production concept in the accounts was Gross National Product at Market Prices, or GNP. This concept comprises the income of factors of production whose owners normally reside in Canada[13] regardless of where the production takes place.[14]

The two alternative concepts of production are easily reconciled. To move from GDP to GNP, add the investment income received from non-residents and deduct the investment income paid to non-residents, as shown in Table 2.3.[15] In 1985 investment income received from non-residents was about $8 billion, investment income paid to non-residents was about $22 billion and GDP was about $14 billion larger than GNP. GDP was $478 billion and GNP was $464 billion, so clearly the largest portion of production in Canada, as in most countries, is common to both the domestic and the national concepts.[16]

Table 2.3
Relationship Between GDP and GNP

		Millions of dollars in 1985
Gross Domestic Product		477,988
Plus:	Investment income received from non-residents	7,574
Less:	Investment income paid to non-residents	21,906
Equals:	Gross National Product	463,656

The decision to shift from GNP to GDP as the central aggregate of the system was made for a number of reasons. Firstly, GDP relates more closely to domestic employment and prices than GNP, which includes earnings of Canadian-owned factors of production remitted from abroad. Secondly, the GDP aggregate provides better linkages between the IEA and the other parts of the SNA. The Provincial Economic Accounts, for example, are centred on GDP and it would

---

[12] Strictly speaking, it is the establishments responsible for the production which must reside in Canada. For example, the output attributable to sales people posted in other countries, but employed by establishments in Canada, is regarded as part of Canadian GDP. By international convention, the earnings of Canadian diplomatic and military personnel stationed abroad are also included in Canadian GDP.

[13] In the United Nations terminology, the concept here is that of "resident economic agents". The residence of an economic agent is not defined in terms of citizenship, but rather according to the country of normal residence. In this regard, one rule of thumb is that residence for more than a year is required for a person or an establishment to be a resident. As noted, diplomatic and military personnel posted abroad for more than a year are an exception to this guideline, continuing to be residents of their country of citizenship. See *A System of National Accounts*, Studies in Methods, Series F, No. 2, Rev. 3, Statistical Office, Department of Economic and Social Affairs, United Nations, New York, 1968, pp. 90-93.

[14] Retained foreign earnings of Canadian enterprises are not included in Canadian GNP, although a good argument can be made for their inclusion. Similarly, accrued but not paid-out earnings of foreign-owned enterprises in Canada arguably could be but are not excluded from Canadian GNP.

[15] See also Table 2.1 above and Table 4 in the two *NIEA* publications, Catalogue 13-001 and 13-201. In principle, there should also be adjustments to account for border-dwelling Canadians working in the United States and Americans in a similar situation. Windsor residents working in Detroit, for example, earn income that should be part of GNP but not part of GDP. In practice, no adjustments of this kind are made. The net adjustment required in this case is small and, in any event, difficult to calculate.

[16] GNP at constant prices can be calculated by deflating the investment income flows using the GDP implicit price index and subtracting the resulting real net investment income outflow from real GDP.

not be feasible to estimate an aggregate analogous to GNP at the provincial level because of the difficulty in measuring interprovincial investment income flows. The adoption of GDP as the central aggregate also conforms more closely with international practice and with the presentation recommended by the United Nations. Most countries now use GDP as the focal point, with the notable exception of the United States which continue to centre their accounts on the GNP concept.

2.4 Gross Versus Net Production

Economic production involves the using up of productive assets, the "consumption" of capital through depreciation and obsolescence. Productive assets as defined in the accounts comprise buildings, engineering structures and machinery and equipment.[17] Because such assets are for the most part highly durable, this "using up" or loss in value is a gradual process, often occurring over many years. Businesses customarily allocate to each period's operating expenses a "depreciation charge" or "capital consumption cost" designed to cover the cost of the wearing out of capital assets during the period in question. Depreciation is therefore a business cost which is included in the market price of goods and services sold to final users.

Consider a shoe manufacturer who purchases a shoe-making machine for $27,000. The value of the machine enters into business gross fixed capital formation, a part of GDP, as an investment in capital assets in the period during which it is purchased (because it was either imported or produced domestically in that period). If the useful life of the machine is expected to be 10 years, the manufacturer may write it off in equal amounts over a ten-year period (the "straight line" depreciation approach), charging $2,700 each year to current operating expenses to allow for the depreciation on the machine. The value of the shoes sold by the manufacturer will then include $2,700 each year for ten years, to cover the "using up" or capital consumption of this asset. Over the full ten-year period, personal expenditure on consumer goods will therefore include $27,000, representing the full cost of the machine. In effect, the original-cost value of the machine will have become embodied in the value of all the shoes produced over the ten-year period.

The chief production concept in the IEA is the GDP, measured either at market prices or at factor cost. This measure is gross in the sense that it includes estimated depreciation charges. There is also an alternative definition of production, known as net domestic income (or product), which excludes depreciation charges (see Table 2.1).

There are three major types of productive assets in the IEA for which depreciation charges are calculated: business plant and equipment, housing and government fixed assets. Quantitatively, depreciation on business plant and equipment investment is the most important of the three.[18]

Depreciation cannot be measured directly, since it is not represented by any actual transaction. Businesses provide estimates of depreciation in their financial accounting statements only by making assumptions about the expected lives of assets in normal operation and about the degree of obsolescence which they are likely to undergo as a result of technical change. Such estimates of depreciation are typically based on the original-cost value of the asset. That is, they provide for the recovery of the original money value of the asset over the period of time in which the asset is gradually written off.

It would be desirable for certain purposes to show depreciation on a "replacement cost" basis which would reflect, period by period, the replacement cost of maintaining capital intact. In periods of rising prices, "book depreciation" based on original cost is likely to significantly understate the actual cost of maintaining capital and to overstate business net incomes or profits. In addition, for some types of economic analysis it would be useful to have estimates of net fixed capital

[17] Productive assets arguably could include other less tangible resources such as computer software, data banks and other stores of knowledge, human capital, corporate "good will" and the like.

[18] There is a breakdown of CCA in Chapter 3. The depreciation charges relate to the total stock of productive assets, not simply to the gross additions to the stock in any particular period.

formation, that is, of the net additions to the nation's stock of capital which are made each period after providing for depreciation on a replacement cost basis.

The estimates of depreciation presented in the IEA for housing (other than housing owned by corporations), for equipment and structures in the agriculture industry, and for government capital assets[19] are in fact based on replacement cost, not on original cost. In these three cases the estimates are imputations. Only for other business plant and equipment are the depreciation charges based on original book values.

The fact that the estimates of depreciation for business plant and equipment continue to be based on the original-cost valuation has both advantages and disadvantages. On the plus side, these estimates of depreciation are firmly anchored to business accounting records[20] and the figures for corporate profits in the accounts are closely related to book profits, which influence and guide much business decision-making. Showing business depreciation on a replacement cost basis in the IEA would necessarily involve certain judgements and arbitrary decisions, and would imply that corporation profits as measured in the IEA would differ significantly from those recorded in business financial statements.[21] Net domestic income would typically be lower because with rising prices, replacement cost depreciation would tend to be higher than original cost depreciation and profits would be correspondingly reduced. GDP would be unaffected.[22] On the minus side, the capital cost allowances reported by firms may not always be an accurate reflection of true economic depreciation. A replacement cost measure would be preferable from this perspective.

---

[19] Capital consumption allowances on government assets are also part of government current expenditure on goods and services on the expenditure side of the accounts. Their inclusion in GDP implies that sales of capital assets from the business sector to the government sector will not affect GDP. However, a good case can also be made for excluding government sector CCA from GDP on the grounds that it does not enter into the price of currently produced goods and services. Since CCA on government assets must be imputed and the imputation is identical on the two sides of the accounts, GDP contains an arbitrary element.

[20] Despite the relationship, depreciation for business plant and equipment in the accounts is not identical to book depreciation since the definition of capital formation in the IEA is not the same as that in business financial statements. Durable goods such as furniture, office equipment and tools are not always capitalized by business, being charged instead as an operating expense. In the IEA these durable equipment items are part of business capital investment (and therefore GDP). To balance the accounts, such capital outlays are also included in capital consumption allowances on the income side, thereby implying they are used up in the year in which they are purchased. On the other hand, the depletion of exhaustible natural resources is not, in principle, regarded as a cost of production in the national income even when it is deducted by businesses as an operating cost. Due to lack of information, however, it is not possible to remove all depletion from the estimates of capital consumption allowances. Similarly, newly discovered resources are not regarded as gross investment in the IEA, nor are known stocks of natural resources included in the National Balance Sheet Accounts.

[21] Depreciation charges are deducted from revenues in calculating profits, so any change to the method of calculating depreciation would have an offsetting effect on profits.

[22] The capital consumption allowances aggregate on the income side of the accounts also contains a number of "miscellaneous valuation adjustments", which are needed to bring information based on business accounting records into conformity with national accounts definitions. One of these adjustments concerns non-capital outlays charged to capital account by business. In some instances, non-tangible items such as brokerage fees are capitalized by business. Such items are excluded from gross investment in the IEA. To keep the accounts in balance a negative capital valuation adjustment must be made on the income side to compensate for this overstatement of business net income. Another adjustment involves the insurance claims paid out to business in order to compensate for fire and other types of losses, which are treated as a form of capital consumption in the accounts. Insurance premiums paid by business enter into the market valuation of goods and services on the expenditure side. The full amount of premiums must therefore be matched on the income side to keep the accounts in balance. The factor incomes generated by insurance companies (in the form of wages and salaries, profits, etc.), representing the cost of service, are automatically in national income. However, the difference between total premiums and this cost of service (that is, the "claim portion") does not appear anywhere on the income side, so an explicit entry must be made in CCA to account for it. A similar adjustment is made for insurance on owner-occupied housing. No specific allowances are made in the IEA for uninsured losses.

2.5 The Measurement of Total Production

The Income and Expenditure Accounts measure GDP in two ways.[23] The first approach is to add up the pre-tax factor incomes resulting from the production of goods and services in Canada,[24] plus indirect taxes net of subsidies, plus capital consumption allowances. The second is to calculate the unduplicated (final) expenditure of Canadians, plus exports, minus imports.[25] The totals obtained in these two ways should, in theory, be the same. In practice they are seldom if ever the same, because of statistical errors.[26] The two totals do provide a very useful check on one another, however, as explained later on.

In the income approach, the following aggregates are added together:

Wages, salaries and supplementary labour income, comprising all earnings from employment of Canadian residents paid for work performed, whether in cash or in kind, and before deductions for income taxes, unemployment insurance, pensions and other social insurance schemes, plus mandatory and non-mandatory employer contributions on behalf of employees for pension funds, social insurance and similar benefits. Wages and salaries also include military pay and allowances, commissions, tips and bonuses, directors' fees and taxable allowances, such as cost-of-living allowances and allowances in respect of holidays and sick leave.

Corporation profits before taxes, including the net earnings from economic activity of corporations. Profits are measured after deducting an allowance for the consumption of fixed capital in the current period.

Interest and miscellaneous investment income, comprising interest and miscellaneous investment income of persons (except dividends), plus government investment income (including profits net of losses of government business enterprises), less net investment income received by persons and governments from non-residents. Because of statistical difficulties, the deduction needed to eliminate from GDP all interest on the public debt and the transfer portion of interest on consumer debt is also made here in its entirety.

Accrued net income of farm operators from farm production, comprising gross proceeds from the sale of farm products, plus the imputed value of farm output consumed by farmers and their families, plus the value of physical change in farm inventories, less farm operating expenses and capital consumption allowances on farm buildings and equipment. It also includes the accrued earnings (both distributed and undistributed) of farm operators arising out of the operations of the Canadian Wheat Board. Other forms of income of farmers, such as net rent or interest receipts, are accounted for in other aggregates of GDP.

Net income of non-farm unincorporated business, including rent, comprising the earnings of unincorporated proprietors from their own businesses, except farming. The net income of independent professional practitioners such as doctors, dentists, lawyers and engineers is included, as is the net rental income of persons (but not corporations) covering paid and imputed rents, after expenses, from the ownership of residential property and net paid rents from the ownership of non-residential property.

---

[23] As explained in Chapter 1, there is a third way to calculate GDP, known as the value-added method. While not used in the IEA, this approach lies at the heart of the Input-Output Accounts and the monthly Estimates of GDP by Industry.

[24] This aggregate is referred to as net domestic income at factor cost. See Table 1.5 in Chapter 1, or Table 1 in the IEA publications, Catalogue 13-001, 13-201 and 13-213.

[25] See Table 1.6 in Chapter 1, or Table 2 in the IEA publications, Catalogue 13-001, 13-201 and 13-213.

[26] Sources of error are numerous: sampling errors, misreporting by respondents, timing problems, inconsistent concepts and definitions, flawed estimation techniques and simple tabulation and calculation errors. This is discussed further in Chapter 4.

Inventory valuation adjustment, which is the difference between the change in inventory book values and the value of physical change in inventories, a measure of the net holding gain or loss which businesses realize on their stocks as a result of price changes. Holding gains and losses on inventories are present in corporation profits before taxes and other income components, and must be removed in order to measure current production.

Indirect taxes less subsidies, comprising all taxes which represent a business cost and which are likely to be reflected in market prices paid by the purchaser, such as sales and excise taxes, import duties and property taxes, less all subsidies from government to business toward current costs of production. Property taxes fall under this heading because they represent a business cost to landlords (including residents of owner-occupied dwellings, who for the purposes of the accounts are considered to be "renting to themselves").

Capital consumption allowances, including an allowance for the using up of capital in the productive process. Also included here are miscellaneous valuation adjustments to bring business accounting records into conformity with national accounting definitions. These valuation adjustments include a deduction for non-capital outlays charged to capital account by business, such as brokerage fees, and an addition for the amounts paid by insurance companies to compensate for fire and other types of losses.

All pre-tax incomes earned as a result of current production activity are included. Transfer payments such as income taxes (transfers to governments) or charitable donations by corporations (transfers to persons) are ignored, to avoid double-counting.

In the expenditure approach, the following major components are summed:

Personal expenditure on consumer goods and services, comprising expenditures of households on goods, such as automobiles, household appliances and furniture, clothing and footwear, food, alcoholic beverages and tobacco, and on services, such as gross rents (including the rental value of owner-occupied housing), recreation, transportation and personal care. Expenditures on travel outside Canada are included here (and then deducted from GDP as part of imports) and expenditures by foreigners traveling in Canada are netted out here (and included instead as part of exports). Personal expenditure on consumer goods and services also includes the operating expenses of universities, churches, labour unions, charitable institutions and other private non-commercial organizations, which are treated as "associations of individuals" in the accounts. Purchases of used goods are excluded although services to facilitate transactions in used goods are included.

Government current expenditure on goods and services, including all current outlays for goods and services by the government sector, covering wages and salaries of government employees and purchases of other non-capital goods and services. This component also includes defence expenditures and an imputation for the capital consumption of government fixed assets. The expenditures are measured net of receipts from sales to avoid double-counting.

Government fixed investment, including expenditures by the government sector on new durable assets such as buildings, waterworks, sewage systems, roads, harbours, airports, and machinery and equipment. Excludes defence construction and equipment, which are defined as current expenditure.

Government investment in inventories, comprising inventories held by federal government marketing agencies, such as the Canadian Dairy Commission, and uranium stocks.

Business fixed investment, comprising expenditures by the business sector on durable tangible goods with an expected service life of one year or more, and on building and engineering construction of all

types. It also includes residential construction by individuals, alterations and improvements made to the stock of buildings and transfer costs paid on the sale of existing fixed assets.

Business investment in inventories, which is the change in the physical volume of stocks valued at the average market prices of the period. The reported book value of business inventories is deflated to remove the effect of price changes and the derived "physical" change is then revalued at average prices of the current period to obtain the value of physical change.

Exports of goods and services, comprising current receipts from exports of merchandise, travel expenditures of non-residents in Canada, freight and shipping credits earned on Canadian account and other receipts from services rendered to non-residents.

Less: Imports of goods and services, including current payments for imports of merchandise, travel expenditures of Canadians abroad, freight and shipping charges incurred by Canada on foreign account and other payments for services rendered by non-residents.

Only final expenditures are included in the total. Intermediate expenditures are excluded to avoid double-counting. This point was illustrated in the example at the beginning of Chapter 1 (see Tables 1.1 and 1.2), in which the miller buys wheat from the farmer and the baker purchases flour from the miller. The price paid by the final consumer would normally be sufficient to compensate the baker for all his costs, including what he paid the miller for the flour. Similarly, the price paid by the baker for the flour would normally be sufficient to compensate the miller for his costs, including what he paid the farmer for the wheat. If the gross totals paid by all four were added together, the farmer's contribution to final output would be counted three times, the miller's twice and the baker's once. Intermediate expenditures, such as those by the miller and the baker, must be excluded from the GDP total and this is accomplished by measuring only final expenditures.[27,28]

Imports are also excluded from GDP, because they are not part of domestic production. They enter final sales both directly, as finished products purchased from abroad, and indirectly as intermediate inputs to the production process. This kind of imports was illustrated in the hypothetical example in Chapter 1, by the farmer who purchased seed and fertilizer from outside Canada. All of the five expenditure components, personal consumption, government current expenditure, government investment, business investment and exports, have some import content as well as some domestically-produced content. It is not feasible to extract the imported element separately from each spending component, because imported goods and services can enter final sales indirectly as well as directly. Accordingly, the total of imports is subtracted as a whole.

2.6 The Statistical Discrepancy

As mentioned earlier, GDP is calculated twice in the IEA, once with the income approach and again with the expenditure approach. The two totals should be the same in principle, but in fact are never so because of statistical errors. The

[27] Since GDP is gross (that is, includes capital consumption allowances), there is another element of double-counting that is not excluded. Investment expenditures are counted twice, once when they are made initially and a second time when the capital is consumed in the production of other goods and services.

[28] The inclusion of the value of physical change in inventories as a part of investment expenditure does not in itself imply any double-counting. Goods entering inventory are counted in GDP during the period in which they are produced. When they are subsequently sold, a reduction in inventories is recorded.

difference that inevitably arises between them is divided in two, half being subtracted from the larger total and the other half being added to the smaller one.[29] This halved difference is known as the statistical discrepancy.[30]

For example, the IEA for 1985 record a statistical discrepancy of $45 million in the income table and -$44 million in the expenditure table. This means the total discrepancy is $89 million, or in other words the income-based measure of GDP is $89 million lower than the expenditure-based measure. While the statistical discrepancy is very small in relation to GDP in this particular year (GDP was $477,988 million in 1985), it is not so for all years. In 1983, for example, the total discrepancy is $4,494 million, representing 1.1% of GDP.

A small statistical discrepancy is a desired result, since it implies that two estimates of GDP derived more or less independently[31] have turned out almost the same. It is important, however, to recognize that a small discrepancy need not imply relatively error-free accounts, since both totals could be in error by similar amounts. Moreover, even if a small discrepancy could be said to imply a relatively accurate estimate of GDP, there would be no implication that the individual components of GDP were necessarily accurate as well, since component errors might be canceling one another in the summation process.[32]

2.7 Sector Accounts

The IEA are structured in terms of four economic "sectors". In this sector framework, the multitude of transactions carried out within the economy every day are viewed as taking place within and among the following basic groups:

- Persons and unincorporated businesses
- Governments
- Corporations and government business enterprises
- Non-residents

This sectoral breakdown is an oversimplification of the modern industrialized economy, but it is a vitally useful analytical tool. The boundaries of the sectors are imprecise, yet they are well-enough delineated, and the behavioural characteristics of the entities grouped under each heading similar enough that the basic idea works remarkably well. A great many striking insights about the functioning of the modern economy have been gained with the aid of this sector-oriented framework. Figure 2.1 provides an overview of the sector accounts.

---

[29] Users of the accounts will have noted that the two halves of the total statistical discrepancy are not always equal. In the estimates unadjusted for seasonality the two parts may differ by $1 million, while in the seasonally adjusted estimates the difference is sometimes $4 million. Differences of this kind arise when the total discrepancy is an odd number, and thus cannot be split equally (without reporting the estimates in units of less than one million dollars). Differences of $4 million occur in the seasonally adjusted estimates because these are scaled up to annual rates.

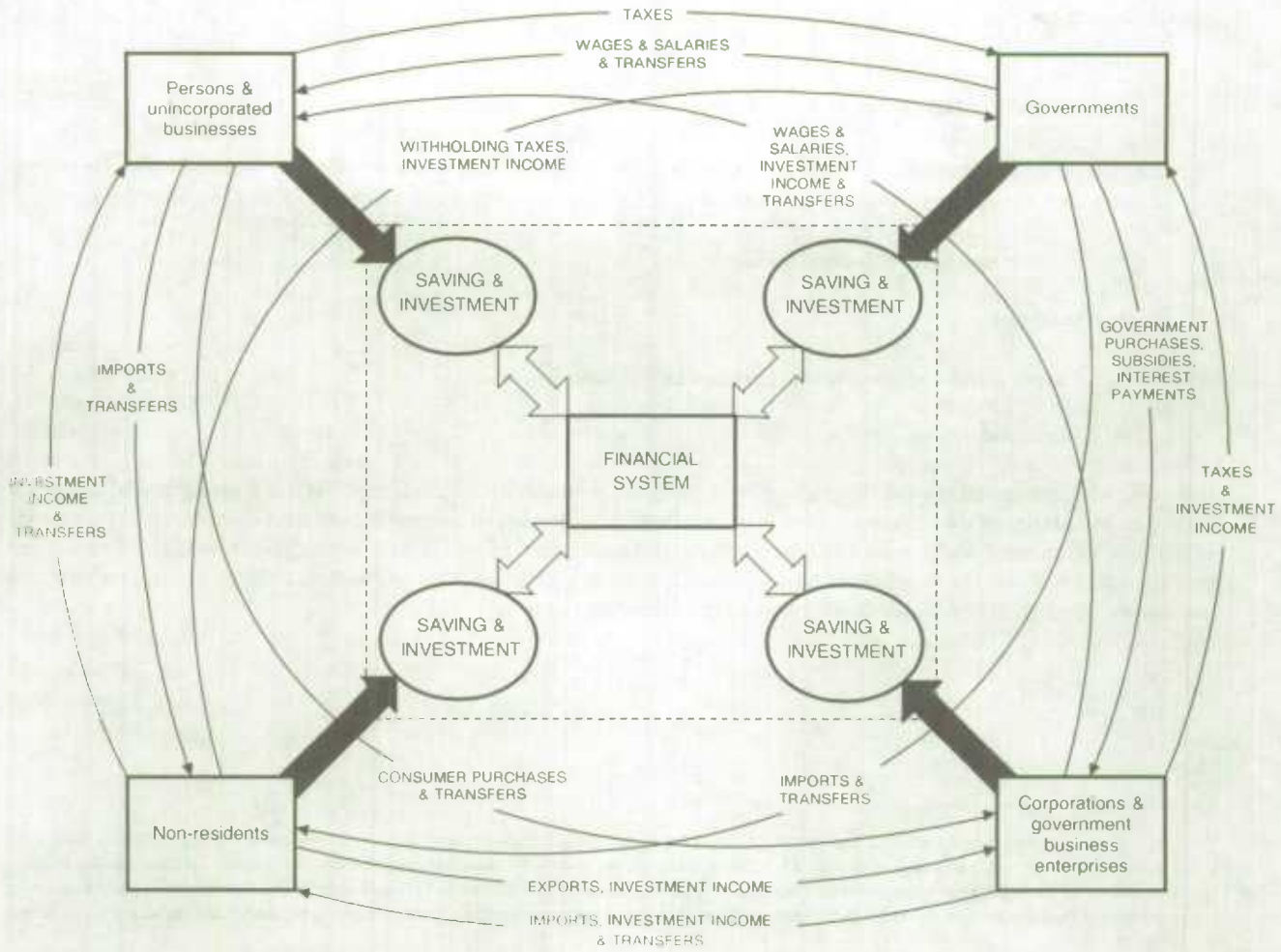
[30] Prior to the historical revision in 1986 the statistical discrepancy was referred to as the residual error of estimate.

[31] The "more-or-less" qualifier applies here because there are some parts of GDP which are identical on both sides of the accounts. One example is the value of physical change in farm inventories on the expenditure side, included in the accrued net income of farm operators from farm production on the income side. Another example, mentioned above, is government capital consumption allowances on the income side which appear in government current expenditure on goods and services on the expenditure side. These are relatively small components, however.

[32] For more on the subject of what the statistical discrepancy implies about the reliability of the IEA, see Chapter 4. See also Adams and De Janosi (1966), Gargantis and Goldberger (1955), McDonald (1972), Smyth (1963), and Smyth and McMahon (1971).

Figure 2.1

A Schematic of the Sector Accounts



Ideally, the first two sectors would be defined differently, unincorporated businesses being consolidated with corporate and government business enterprises instead of with persons. The two sectors would then be known by the simpler and perhaps more familiar terms "personal sector" and "business sector". To accomplish this, however, it would be necessary to distinguish, in the case of unincorporated business, between net income withdrawn for personal consumption and that which is retained for capital purposes. Unfortunately this is not feasible from a statistical standpoint. For some purposes it would also be useful to break out government business enterprises as a separate sector, rather than consolidating them with private corporations. However, this too is difficult to achieve, particularly the separation of government business enterprise interest payments between persons and corporations. Definitions of the primary sectors in the IEA follow.

Persons and Unincorporated Business Sector

The "persons and unincorporated business sector" comprises two categories of transactors: (1) persons, households and private organizations which are not established for the purpose of making a gain and (2) unincorporated businesses. The predominant groups in the sector are persons, households and "associations of individuals", the latter encompassing private non-profit organizations such as charitable institutions, labour unions, universities, private pension funds and similar non-commercial groups. Life insurance companies are also treated as "associations of individuals" insofar as their function of managing personal sector investment monies is concerned.[33] As noted, the transactions of farmers, professional practitioners and other unincorporated businesses are also consolidated with those of persons for the purposes of the sector accounts. The accounts for the persons and unincorporated business sector are recorded as Tables 14-17 in the annual NIEA.

Government Sector

The government sector is defined to include all general government activities of the federal, provincial, territorial and local governments, as well as public hospitals and the Canada and Quebec Pension Plans. The range of activities covered by the sector is generally somewhat broader than indicated in the various governments' audited financial statements, encompassing many non-budgetary items, such as government employee pension funds, as well as budgetary operations. Government-owned enterprises operating for profit in a manner similar to private businesses are included in the corporate and government business enterprise sector, not in the government sector.[34] Tables 18-21 in the annual NIEA contain the accounts for this sector.

Corporate and Government Business Enterprise Sector

The sector of corporate and government business enterprises is a subset of the business sector and includes only incorporated and government-owned but commercially-oriented companies. It comprises transactors which produce goods and services for sale at a price which is intended to cover the cost of production. This sector's accounts are shown as Tables 22-25 in the annual NIEA.

---

[33] With respect to the companies' insurance function, premiums paid and claims received constitute in effect a redistribution of income within the sector. The value of the service provided by life insurance companies in making this redistribution possible is measured by their administrative expenses, equivalent to premiums minus claims, and these are included in personal expenditure on consumer goods and services. The same treatment applies to the cost of services rendered by property and casualty insurance companies.

[34] The dividing line is not very clear between government agencies viewed as non-commercial and kept in the government sector, and those regarded as profit-oriented and classified to the corporate and government business enterprise sector. In part, this is because the mandates GBEs are given by their governments change over time. Government agencies are not normally reclassified from one sector to another without adequate evidence that such a change is warranted.

Non-Resident Sector

Finally, the non-resident sector (or foreign sector) includes transactions of Canadian residents with the rest-of-the-world. For this purpose, the term "Canadian residents" refers to individuals, corporations, unincorporated businesses, non-commercial institutions, and government departments and agencies in Canada. Canadian subsidiaries, affiliates and branches of foreign companies are also viewed as residents. The non-resident sector accounts are recorded as Tables 26-29 in the annual NIEA.

Three Types of Accounts

There are three basic types of accounting statements in the IEA: the Production Accounts, the Income and Outlay Accounts and the Capital Finance Accounts.[35] For the corporate and government business enterprise sector, these statements are closely related to normal business accounting statements. Both the Production Accounts and the Income and Outlay Accounts can be derived by rearranging the typical business income statement, while the Capital Finance Accounts can be established from the information contained in the typical business statement of change in financial position. The accounts for the other three sectors are derived according to the same principles as those of the corporate and government business enterprise sector.

The Production Accounts record expenses incurred in producing goods and services and receipts from the sale of those goods and services to other sectors. They are set up as a double-entry system, with total expenses necessarily equalling total receipts. Net production income after expenses (or "profits", in the case of the corporate and government business enterprise sector) is the key balancing item of the system and gets carried down to the Income and Outlay Accounts. The IEA contain a set of consolidated Production Accounts,[36] from which GDP is derived (since GDP is the consolidated production of all sectors). Production Accounts are not normally developed for the individual sectors.

The Income and Outlay Accounts record income from all sources and current (but not capital) outlays for all purposes. One source of income is net production revenue after expenses, which is carried down from the Production Account. Another is transfers between sectors, which are treated as income for the recipient and as outlay for the payer.[37] Like the Production Accounts, the Income and Outlay Accounts are set up as a double-entry system. In this case the balancing item is the sector's gross saving.

The Capital Finance Accounts show each sector's sources and uses of gross saving. The sources include net saving, carried down from the Income and Outlay Accounts, and capital consumption allowances. The uses encompass gross investment and net lending to other sectors, the latter including the lending sector's net purchase of existing non-financial assets. The Capital Finance Accounts are also a double-entry system, with net lending plus the net purchase of existing non-financial assets as the balancing item.

---

[35] The reader of this section may wish to refer to the sector accounts tables; see Tables 10-29 in the annual *NIEA* publication, Catalogue 13-201.

[36] See Tables 1.3 and 1.4 in Chapter 1 and Tables 10 and 11 in the annual *NIEA* publication, Catalogue 13-201. The two summary tables in the NIEA, Tables 1 and 2, are slight rearrangements of these same Production Accounts (see also Tables 1.5 and 1.6 in Chapter 1).

[37] Transfers are also referred to as "unrequited payments" because they are made unilaterally, with no *quid pro quo*. They can be current transfers, involving a redistribution of income earned from current production, or capital transfers, involving a redistribution of previously accumulated wealth. Almost all transfers recorded in the IEA are current, the only exception being migrants' funds and inheritances which appear in the Capital Finance Account for non-residents. Transfers net out in the consolidated national accounts, which show only requited payments: payments for goods and services and payments to factors of production.

2.8 Personal Income, Personal Disposable Income and Saving

The persons and unincorporated business sector is particularly important in the IEA, as its total income and expenditure are much larger than for any other sector. Because of its importance, three aggregates pertaining directly to the sector are highlighted in the accounts: personal income, personal disposable income and personal saving.

Personal income is defined as the sum of all incomes received[38] by persons residing in Canada whether these represent factor earnings from current production or current transfers from the government and other sectors. Capital gains and losses are excluded. Personal income was $400,199 million in 1985. Its largest component is wages, salaries and supplementary labour income, accounting for 64.3% of the total in 1985. Other major sources include transfers from government[39] (14.6%), interest, dividends and miscellaneous investment income (13.5%) and net income of non-farm unincorporated business (6.6%).

Personal disposable income is defined as the amount left over from personal income after payment of personal direct taxes and various other fees, licences and permits (including hospital and medical insurance premiums but excluding indirect taxes) to government. In 1985 these payments to government totaled $78,862 million, or 19.7% of personal income and personal disposable income was $321,337 million.

Finally, personal saving is the residual amount after deducting personal expenditure on consumer goods and services and personal transfers to other sectors from personal disposable income. Personal saving is often expressed as a percentage of personal disposable income, in which case it is referred to as the personal saving rate. Personal saving was $42,047 million in 1985 and the personal saving rate was 13.1%.[40]

2.9 Constant Price Estimates

All the discussion to this point has been concerned with the accounts' current price estimates, or in other words with estimates expressed in the prices of the period being referred to. For example, the estimate of Gross Domestic Product at Market Prices for 1985 is $477,988 million, meaning that this amount is the unduplicated value of production originating within Canada's boundaries, valued at the market prices prevailing in the year 1985. This is the most natural way to define and measure the national accounts components, since wages, profits, consumer spending and the other aggregates are observed in current prices in the economy itself.

The accounts also provide estimates of GDP that are valued in the prices of another period, the year 1986. The purpose of such calculations is to facilitate the analysis of period-to-period changes, by separating GDP and its sub-aggregates into distinct price and volume components.

---

[38] Personal income includes only income actually received, while the total income of the persons and unincorporated business sector comprises *accrued* income. In practice, the only difference between the two aggregates is the adjustment on grain transactions, which consists of an allocation of earnings arising out of the operations of the Canadian Wheat Board and an inventory valuation adjustment to eliminate any holding gains or losses from these earnings. This difference is very small, amounting only to $442 million or 0.1% of the income of the personal and unincorporated business sector in 1985. In principle, personal income should also be adjusted to exclude the accrued and not yet withdrawn earnings of unincorporated businesses and accrued but not yet paid-out dividends, but this is not currently feasible. A similar statement applies to interest earnings.

[39] Unemployment insurance benefits, old age security payments, family allowances and welfare payments are examples of such transfers. See Table 56 in the annual *NIEA* for details.

[40] See also Barbara Clift, "The Components of Personal Saving," *Canadian Economic Observer*, Catalogue 11-010, monthly, November 1988, pp. 3.1-3.16.

Extracting the Volume Component of GDP

An increase or decrease in GDP from one period to another results from the joint effect of a change in the quantities of goods and services produced and of a change in the prices at which they are sold. The decomposition of the total change into separate price and quantity components is a primary task in national accounting. It is normally accomplished by recalculating GDP in the prices of some base period. The resulting period-to-period changes in these constant price estimates are interpreted as showing the "real" or "inflation-adjusted" growth in the economy.

Since the base year was last updated, with the release of the first quarter 1990 accounts, the IEA constant price estimates are expressed in the prices of the year 1986. Thus, for example, the estimate of GDP at 1986 prices for 1985 is $489,437 million. This estimate is larger than the one at current prices which, as mentioned earlier, is $477,988 million. The difference reflects the fact that the market prices of most goods and services increased between 1985 and 1986. GDP was $505,666 million in 1986, so the increase was $27,678 million or 5.8% measured at current prices and $16,229 million or 3.3% at constant 1986 prices.

Constant Price Estimates as Laspeyres Indexes

The constant price estimates of GDP can be viewed as a fixed-weighted or Laspeyres index, where the market prices of the base period are the fixed weights and the index is scaled to equal the current dollar value of GDP in the base period. This may not be obvious, since the prominent indexes in the statistical system such as the consumer price indexes are those for prices rather than for quantities and are typically scaled to equal an arbitrary round number (most often 100) in the base period. Just as a Laspeyres index of prices is based on "a fixed basket of quantities" and can be interpreted as the cost of that basket in different time periods, so a Laspeyres index of quantities is based on "a fixed basket of prices" and can be viewed as a set of quantities sold in different time periods revalued at the fixed prices in the basket. So the "real GDP" estimates in the Income and Expenditure Accounts are properly viewed as a Laspeyres volume index of economic activity.

Choice of a Base Year

The choice of a base year for the constant price estimates of GDP is arbitrary, but nevertheless important. The level of real GDP and its components for any particular year could be quite different if the base year were altered. The real growth rates could also be significantly different.[41] Moreover, any chosen base year is likely to become less and less representative with the passage of time, as relative prices change.[42]

Therefore, the constant price estimates are "rebased" periodically, to bring them back in line with current relative price relationships. The last such rebasing coincided with the release of the estimates for the first quarter 1990. At that time, the constant price series were shifted from 1981 to 1986 price weights. Table 2.5 provides a list of the base years used previously.

When the accounts are rebased in this manner, the new weights are normally applied from the new base period forward. The estimates for previous years are not normally recalculated using the relative prices of the new base year. Rather, the already calculated constant price estimates for previous years are mechanically linked, or scaled, so as to join up with the new series. Each component series is linked independently and the results are forced to add up through the introduction of "adjusting entry" series. In this way, the growth patterns for earlier years are preserved. Thus the real

---

[41] See Marie Saulnier, "Real Gross Domestic Product: Sensitivity to the Choice of Base Year," *Canadian Economic Observer*, Catalogue 11-010, monthly, May 1990, pp. 3.1-3.19.

[42] It is relative rather than absolute price movements which are important in this context. If all prices were to increase in the same proportion over a certain period, there would be no point in shifting to a new base year at the end of the period. In such a case, changing the base year would affect only the level of real GDP, not the period-to-period growth rates.

introduction of "adjusting entry" series. In this way, the growth patterns for earlier years are preserved. Thus the real GDP estimates are effectively a set of several Laspeyres indexes[43] all chained together, each with a different base year.[44]

There are many alternatives to this "chained Laspeyres" approach to deriving real GDP. The accounts could be rebased more frequently, each year or each quarter, for example. Or alternative index forms such as those proposed by Fisher, Divisia, Törnqvist, Vartia and others could be applied instead of the Laspeyres formula.[45] This is an area which will be receiving increased attention in the future development of the IEA.[46]

Problems in the Deflation Procedure

The estimation of GDP at constant prices is carried out by deflating some 400 commodity categories in the IEA and summing the results to obtain the main aggregates.[47] While a good selection of price indexes is available for these calculations, many difficulties persist in the deflation procedure.

One ongoing problem area is the non-commercial sector, where output is not priced in the marketplace. Governments and private non-commercial institutions both render services to the public either without charge, or by asking user fees that bear little relationship to the basic cost of providing them. While the costs can often be measured quite accurately at current prices, there is typically no good statistical indicator of the volume of services provided.

This problem of deflating non-commercial activities is dealt with by taking a cost-based approach. The output volume of the sector is assumed to be proportional to the real costs incurred, which are broken down into wage and non-wage expenses. Real wage costs are assumed to be proportional to employment and real non-wage costs are derived by deflating nominal expenses in a conventional manner. This approach, while it is consistent with international practice, is deficient from at least two perspectives. On the one hand, it takes no account of labour productivity gains, and on the other it is not subject to any test which would validate the social worth of the output.

A second problem area in the derivation of the constant price estimates is that of unique, non-standard products. Examples include major engineering works such as hydroelectric dams, communication equipment such as satellites, and military equipment such as fighter jets and missiles. For goods of this nature the units of output vary widely between successive periods and it is seldom possible to determine an end-product price for a standard unit of output. Since there is no direct way to construct prices indexes for such goods, deflation must proceed using either a cost-based approach, or a model pricing approach like the one applied to non-residential building construction.

It must be emphasized that there are many other difficulties in the measurement of price change, even in cases where market prices are easily observed. The measurement of quality change has always been a major problem in this respect. Detecting and measuring deviations of transaction prices from list prices is another. The differentiation of existing products or the introduction of new ones on the market is yet another. These and other similar difficulties are dealt with

---

[43] Seven, in fact; see Table 2.5.

[44] An alternative would be to recalculate the constant price estimates right back to the origin of the accounts, using the new relative price weights every time the base year is updated. This alternative approach is the one presently followed in the United States National Income and Product Accounts. It presents the advantage of providing a continuous series of constant price estimates, but at the cost of rewriting history whenever the base year is changed.

[45] See Al, Den Bakker, Balk and De Boer (1986), Allen (1975), Caves, Christensen and Diewert (1982), Diewert (1976, 1981), Fisher (1927), Forsyth and Fowler (1981), Fourastié (1982), Fourastié and Grais (1984), Hill (1988), Hulten (1973), Kemp (1988), Kemp and Smith (1989), King (1930), Kravis, Heston and Summers (1975), Lloyd (1975), Merilees (1971), Rushbrook (1978), Samuelson (1950), Saulnier (1990a, 1990b), Schultz (1983), Stone (1956), Stuvel (1957), Theil (1973, 1974), Törnqvist (1936), United Nations (1977), Usher (1968, 1980), Vartia (1976), Young (1989) and Young and Harkins (1969) for more information about index numbers.

[46] See Marie Saulnier, "Volume Indexes in the Income and Expenditure Accounts," *National Income and Expenditure Accounts*, Catalogue 13-001, first quarter 1990, pp. xxxix-lxiv for real GDP estimates calculated using the chain Laspeyres, Fisher and Vartia index number formulas.

[47] The deflation methods of the accounts are described in Section 3.2.

in the Prices Division of Statistics Canada in constructing the indexes employed in the accounts. But it is in the very nature of these problems that they can never be entirely resolved.

Usefulness of the Constant Price Estimates

GDP in constant prices serves as the main indicator of economic performance in Canada. The quarterly real GDP statistics are used to assess and forecast short-term business cycle developments, while the annual estimates are useful for longer-term studies.

Table 2.4 gives an example of how the annual estimates can be applied in a simple but revealing long-term analysis. In this table the real GDP estimates are combined with time series for population, labour force and employment,[48] yielding a decomposition of Canada's real growth during the post-war period. The analysis is based on the following simple relationship:

$$GDP/POP \equiv \{LFPOP/POP\} \cdot \{LF/LFPOP\} \cdot \{EMP/LF\} \cdot \{GDP/EMP\} \quad [1]$$

where GDP represents Gross Domestic Product at 1986 prices, POP, the total population, LFPOP, the portion of the population eligible to participate in the labour force, LF, the labour force and EMP, total employment. With a multiplicative relationship of this kind, the growth rate of the left-hand-side ratio is approximately equal to the sum of the growth rates of the right-hand-side ratios.

The results indicate that aggregate output (real GDP) per employee, a simple measure of aggregate labour productivity,[49] grew very rapidly in the immediate post-war interval and then moderated to about 2% per annum during the 1957-1973 period. Growth in GDP per employee fell to about half this average rate during the 1974-1981 period, but rebounded to 1.6% in the 1982-1988 period. Table 2.4 also shows that changes in productivity are not always paralleled by the trend in Canada's real GDP per capita, because population and employment do not always move in parallel. In particular, while the employment-to-population ratio increased by 1.5% per annum on average over the 1967-1981 period, growth in this ratio slowed to only 0.6% in the most recent period. This reflects in part demographic developments,[50] and in part the less rapid advance in the overall labour force participation rate in recent years.

---

[48] The labour force and employment series are published in ***The Labour Force***, Catalogue 71-001, monthly; the population estimates come from the Census. These series also appear in the annual ***NIEA***, Catalogue 13-201 (Tables 72 and 73) and 13-531 (Tables 74 and 75).

[49] See ***Aggregate Productivity Measures***, Catalogue 15-204, annual, for productivity estimates by industry.

[50] In the 1967-1981 period the cohort from the post-war baby boom was gradually reaching working age. This meant that the working-age population was growing much more rapidly than the population as a whole.

Table 2.4
Contributions to Real GDP Growth Per Capita, 1947-1988
(Average annual percentage change)

	47-56	57-66	67-73	74-81	82-88
Change in population of labour-force age relative to total population	-0.6	0.0	0.6	0.9	0.2
Change in labour-force participation rate	-0.3	0.3	1.2	1.0	0.4
Change in employment relative to labour force	0.0	0.0	-0.3	-0.3	0.0
Total change in employment relative to population	-0.9	0.3	1.5	1.6	0.6
Change in real GDP per employee	3.5	2.1	2.0	0.9	1.6
Change in real GDP per capita	2.5	2.4	3.6	2.5	2.3

Adapted and updated from the ***Report of the Royal Commission on the Economic Union and Development Prospects for Canada***, Volume 2, Supply and Services Canada, 1985, Table 7-3, page 10.

2.10 Price Indexes

The previous section addressed the topic of measuring GDP in the constant prices of some base period. The resulting estimates of "real GDP" gauge the volume of economic activity. What about the price component of GDP? If a volume component can be extracted from the current price estimates of GDP, can the remainder be interpreted as the price (or inflation) component?

The answer to this question is yes, but the resulting index of prices must be interpreted as a Paasche or variable-weighted index rather than as a Laspeyres index.[51] Dividing the current price series for GDP and its components by the corresponding series at constant prices yields Implicit Price Indexes[52] (IPIs) which, together with the constant price series, in effect decompose GDP at Market Prices into its price and quantity elements.

The variable-weighted nature of IPIs should always be kept in mind, however. Changes in these indexes reflect not just price changes, but also variations in the weights attached to different goods and services. The impact of weight shifts on observed period-to-period changes in the GDP implicit price index can be quite significant. Weight shifts are particularly important in the more volatile GDP aggregates such as exports and imports.

The implicit price indexes have been part of the IEA since their inception.[53] The base year has been updated periodically, as shown in Table 2.5. As mentioned earlier, these rebasings have not been carried back to the origin of the accounts; rather, the new series at constant prices have been linked to the previous ones. The implicit price indexes should therefore be viewed as chained Paasche indexes, with the chaining done as indicated in Table 2.5.

---

[51] For a fuller explanation of this term and others used in this section, see Katharine Kemp and Philip Smith, "A Technical Note on Laspeyres, Paasche and Chain Price Indexes in the Income and Expenditure Accounts," *National Income and Expenditure Accounts*, Catalogue 13-001, fourth quarter 1988, pp. xxi-xxxii.

[52] These indexes are sometimes referred to as "GDP deflators", but this usage is not strictly correct. The indexes are not derived for the purpose of deflating GDP, but rather are an incidental product of the deflation process itself. The calculation of GDP estimates at constant prices takes place at a lower level of aggregation. Indeed, for a few components of GDP there is no deflation at all; rather, the constant price movement is estimated directly using a volume indicator, such as employment. The IPIs are the result of the deflation process.

[53] In 1941, Statistics Canada (at that time called the Dominion Bureau of Statistics) published an initial, experimental set of national income statistics in the prices of 1926, covering the period 1919-1938. See *National Income of Canada, 1919-1938*, Dominion Bureau of Statistics, Catalogue 13-502B, Ottawa, 1941. The source data for the early years were very poor and subsequent issues only covered the period from 1926 forward.

Table 2.5
Price Rebasing Dates

Base year(s)	Introduction date	Period of application
1935-39	annual 1951	1926-1947
1949	1st quarter 1953	1947-1956
1957	1st quarter 1961	1956-1961
1961	2nd quarter 1969	1961-1971
1971	1st quarter 1975	1971-1981
1981	1st quarter 1986	1981-1985
1986	1st quarter 1990	1986-

To facilitate the interpretation of movements in the IPIs, the Income and Expenditure Accounts contain two additional sets of price indexes. One of these sets, the fixed-weighted or Laspeyres price indexes, is best viewed as the price index analogue of the Laspeyres quantity index explained earlier. These indexes measure the cost of the fixed (and rather large!) basket of goods and services that made up GDP in the base year.[54] The other alternative set is that of chain indexes,[55] which are essentially "mini-Laspeyres indexes", each based on the quantity weights of the previous period and all linked together.

The weights of fixed-weighted price indexes are held constant for several years. This practice offers both an advantage, in that it permits comparisons over long periods of time, and a disadvantage, in that the weights become less representative as time passes. For the chain price indexes, on the other hand, the weights are updated every period. They have the advantage of relying on recent spending patterns, but at the same time they are not strictly appropriate for comparisons over longer periods. Each set of price indexes thus presents both strong and weak points.

2.11 Provincial Economic Accounts

Estimates of personal income and its major aggregates for the provinces and territories[56] have appeared in the annual IEA publication since the 1950s. In 1978,[57] the IEA structure was expanded to include a provincial distribution of GDP at Market Prices. This year 1990 marks the release of the first estimates of final domestic demand in constant prices for each province and territory.[58] The Provincial Economic Accounts now comprise the income-based and expenditure-based GDP tables at current prices, a table of the final domestic demand portion of GDP at constant prices, detailed tables on government sector revenue and expenditure and, finally, a breakdown of personal income. They remain less

---

[54] The fixed-weighted indexes are displayed in the quarterly and annual *NIEA*, Catalogue 13-001 and 13-201, Tables 22 and 8 respectively. The weighting formula for these indexes is similar to that of the CPI. See "Fixed Weighted GNE Price Indexes," *National Income and Expenditure Accounts*, Catalogue 13-001, fourth quarter 1976, pp. xvi-xxix.

[55] These chain indexes are set out in Tables 23 and 9 of the quarterly and annual *NIEA* respectively, Catalogue 13-001 and 13-201. For a further explanation of chain price indexes, see Katharine Kemp, "Chain Price Indexes," *Canadian Economic Observer*, Catalogue 11-010, monthly, September 1988, pp. 4.1-4.12.

[56] Prior to 1988, the territories were grouped as a single region in the PEA. In that year new estimates for each territory, extending back to 1977 and developed in close cooperation with the territorial statistical agencies, were released for the first time.

[57] Work to develop the PEA began at Statistics Canada in 1973, under the guidance of the Federal-Provincial Committee on Provincial Economic Accounts.

[58] See "Final Domestic Demand at Constant Prices" and Appendixes I and II in *Provincial Economic Accounts, Annual Estimates 1984-1988*, Catalogue 13-213, March 1990, pp. xx-xxvi and pp. 117-146.

comprehensive than the national accounts. It has not yet proved feasible to produce provincial sector accounts due to a lack of data, especially for the non-resident sector and that of corporate and government business enterprises.

It should be emphasized that the sum of provincial and territorial GDPs is somewhat less than the Canada total. This is because the GDP of Canada includes, on the income side, the labour income of Canadians temporarily stationed abroad (diplomatic and military personnel, and employees of the private sector) and, on the expenditure side, government current expenditure abroad. Thus, there is a portion of Canadian domestic production which does not take place within the boundaries of any province or territory. This portion is simply omitted in the provincial accounts instead of being allocated arbitrarily to one region or another.[59] However, the difference between the GDP of the sum of provinces and territories and that of Canada is extremely small: in 1985, wages, salaries and supplementary labour income earned abroad (including military pay and allowances) amounted to $637 million and government current expenditure abroad, to $1,112 million, in relation to a GDP of $477,988 million for Canada as a whole.

While the conceptual framework of the provincial accounts closely follows that of the national accounts,[60] there are measurement or allocation problems of a conceptual or statistical nature which are peculiar to the provincial accounts, with respect to the federal government, corporate profits, net exports, personal income and personal saving.

The allocation of the revenue and expenditure of the federal government, viewed here as a resident of all provinces and territories, is somewhat arbitrary in a number of instances. In principle, revenues should be allocated to the province where the associated levies are paid and expenditures, where the associated consumption or usage of goods and services takes place. These principles can be easily challenged, however, as not giving proper recognition to the notion of "public goods". Services rendered by Parliament, the Department of National Defence and the National Research Council, for example, benefit all citizens more or less equally and arguably should be prorated over provinces on the basis of population or some similar criterion. In addition to being open to debate, these allocation principles are often difficult to apply in practice. For example, how should mobile transportation equipment, intended to service several provinces and territories, be allocated?

The allocation of the profits of multi-provincial companies poses major problems. In national accounting, profits ought to be allocated in a manner which reflects the location of productive activity. In the case of multi-provincial companies, this implies their profits or losses should ideally be accounted for where they have been realized, not where the head office is located. In practice, due to the manner in which profits are reported, one is often compelled to allocate by province an overall profit or loss for a company, regardless of the financial results in each of its locations. The contribution of the head office to overall profits in terms of planning, research, advertising and other central services should also be captured but is generally improperly allocated due to lack of information.

Another difficulty in the provincial accounts is that of distinguishing the income of residents of the province, or the province's national income, from the income earned in the province regardless of residency, or its domestic income.[61] It arises in the case of labour income which can relate either to province of employment or province of residence. The measurement of production, or GDP, requires that labour income reflect the province of employment. On the other hand, for the concepts of personal income and personal saving to have any relevance, the measurement of personal income requires that labour income, the largest portion thereof, reflect the province of residence. The distinction between the "national" and "domestic" definitions of provincial income is not recognized in the provincial accounts. At present, the labour income estimates in the GDP table and those in the personal income table are identical and reflect the province of

---

[59] More precisely, the abroad portions of income and expenditure are omitted from the GDP tables and in the case of wages, salaries and supplementary labour income, from the personal income table as well. However, government revenue and expenditure abroad are shown separately under a region labelled "Outside Canada" in the government supplementary tables, where they serve as a balancing item, for the relevant aggregates, between "Canada" and the "sum of provinces and territories".

[60] For additional information on regional economic accounting theory and practice see Adler (1970), Central Statistical Office of the United Kingdom (1978), Chari and Frank (1970), Green (1971), Hirsch (1962, 1966), Hochwald (1961), INSEE (1966), Kendrick and Jaycox (1966), Meyer (1965), National Bureau of Economic Research (1957), Richardson (1978), Romans and Graham (1971), Sourrouille (1976), Walters (1987) and Wasserman (1967).

[61] The issue referred to here is the provincial analogue of the national one discussed in Section 2.3.

employment, even though province of residence would be a more appropriate basis for personal income. For Canada as a whole, the difference between the two measures is so small as to be immaterial; for a small province or territory, it could be quite significant.[62]

Provincial exports and imports are the other weak element in the provincial accounts. It is not currently feasible to develop explicit estimates of these flows in the annual provincial accounts and this gap precludes the calculation of provincial GDP in constant prices. One cannot deflate such a heterogeneous lump sum as "net exports plus statistical discrepancy". At this point, only final domestic demand can be deflated by province in a meaningful way. Thus, international exports and imports are recorded by province of lading or clearance, rather than by province of origin or final destination. Further, information on interprovincial trade in goods is limited to occasional surveys, while provincial data on international and interprovincial trade in services are almost non-existent. Provincial estimates of exports and imports have been developed in the Input-Output Accounts for 1974, 1979 and 1984, years for which a survey was carried out on the provincial origin and destination of manufacturing shipments in Canada.[63] To cope with the problem in the Provincial Economic Accounts, net exports are determined residually along with the statistical discrepancy. In effect, the expenditure-based estimate of provincial GDP is forced to be equal to the income-based estimate which is deemed correct.

In addition, again due to lack of information, net expenditure abroad is left out of consumer spending. This contrasts with the national accounts where consumer spending is defined to encompass all outlays by resident households, including their purchases abroad. Expenditures by foreign travellers in Canada, on the other hand, are deducted from total consumer expenditure in the national estimates. This treatment of spending abroad is essential, otherwise the definition of consumer spending would not be consistent with that of personal income; the definition of personal saving would also be inadequate. In the provincial accounts, it has not yet been possible to capture spending related to interprovincial travel or to allocate international travel flows according to the province of origin or destination. As a result, personal expenditure and personal saving are not measured adequately. Given the fact that the measurement of personal income, as explained above, is also somewhat deficient and that saving, obtained residually, is subject to a wide margin of error, the personal saving rate needs a qualified interpretation. Net expenditure abroad in the provincial accounts is implicitly included in the category "net exports plus statistical discrepancy".

To derive the GDP of Canada from the provincial accounts estimates, one must sum the provincial and territorial GDPs and then make adjustments to account for the different treatment of the statistical discrepancy and of wages, salaries and supplementary labour income abroad.

[62] For more on this subject, see *Provincial Economic Accounts, Annual Estimates 1984-1988*, Catalogue 13-213, March 1990, pp. xxx-xxxi.

[63] See *Destination of Shipments of Manufacturers*, Catalogue 31-530, occasional.

3. Sources and Methods

A general review of the main data sources and estimation methods used in constructing the Income and Expenditure Accounts is presented in this chapter.[1] While this review covers the entire accounts, nevertheless it is highly summary. Many aspects of the methodology receive little or no attention here. The intention is to give the reader a broad perspective on the data sources and methods underlying the estimation of the published GDP aggregates.[2,3] The chapter offers an overview of what is, in fact, a much more complex, multifaceted methodology. At the same time, the review is practical in orientation, largely ignoring the conceptual issues examined in Chapter 2. In other words, this chapter is intended for the reader who wishes to learn the basic facts about how the GDP estimates, both quarterly and annual, are calculated.

The first and largest section of this chapter deals with the GDP estimates at current prices, which constitute the core of the system. The Provincial Economic Accounts are referred to briefly here as well. The estimates in constant prices are explained in the next section. Finally, the chapter closes with a discussion of the seasonal adjustment procedures used in the quarterly accounts.

3.1 The Current Price Estimates

Wages, Salaries and Supplementary Labour Income

The largest aggregate of domestic income is wages, salaries and supplementary labour income, commonly referred to as labour income. This aggregate accounts for over half of GDP. The labour income estimates are developed in three dimensions, by industry, province and territory, and broad economic sector as shown partially in Table 3.1.[4]

The Canada total for wages and salaries is based on forms submitted by employers to Revenue Canada — Taxation each year. This total, from what is known as the "T-4 Supplementary" file, is adjusted to conform to the definition of labour income in the national accounts. It is then allocated by industry and province using a variety of sources in addition to the tax data, among which are the Survey of Employment, Payrolls and Hours (SEPH),[5] industry surveys, company financial statements and public accounts. Beginning with 1985, the provincial estimates of wages and salaries are also benchmarked on the "T-4 Supplementary" file total by province of employment.[6]

---

1 For similar information about the national accounts of the United Kingdom and the United States, see Central Statistical Office of the United Kingdom (1985) and Carson (1987).

2 Subsequent volumes in this series will provide a more thorough explanation of the IEA sources and methods.

3 See also the list of data sources for the IEA estimates in Appendix I.

4 Labour income is estimated on a monthly basis in the Labour Division. The detailed estimates appear in *Estimates of Labour Income*, Catalogue 72-005, quarterly. The publication contains additional information on concepts, sources and methods.

5 See *Employment, Earnings and Hours*, Catalogue 72-002, monthly.

6 This improvement was introduced in 1989. Because of the change, there is a break in the provincial labour income series beginning in 1985. The break is quite substantial for the Northwest Territories, but relatively small in most provinces. Estimates on this new basis will be calculated back to 1981 at the time of the next historical revision.

Table 3.1
Wages, Salaries and Supplementary Labour Income

	Millions of dollars in 1985
Wages, salaries and supplementary labour income	257,518
Wages and salaries	229,864
Agriculture, fishing and trapping	2,121
Forestry	1,843
Mines, quarries and oil wells	6,654
Manufacturing	47,969
Construction	13,174
Transport, communication and utilities	24,145
Trade	30,665
Finance, insurance and real estate	17,594
Community, business and personal services	66,084
Public administration	19,615
Supplementary labour income	24,912
Pensions	7,293
Welfare	7,029
Unemployment insurance	5,006
Workers' compensation	2,819
Canada and Quebec Pension Plans	2,765
Military pay and allowances	2,742
Wages, salaries and supplementary labour income	257,518
Business	185,091
Government	62,006
Federal	13,371
Provincial	14,999
Local	22,490
Hospitals	11,146
Persons	10,421

Estimates of supplementary labour income derive mainly from administrative records. Employer contributions to the Canada and Quebec Pension Plans and to unemployment insurance are taken from the Revenue Canada "T-4 Summary" file and their provincial distribution, from the "T-4 Supplementary" file. Employer contributions to workers' compensation are obtained from the annual reports of the various workers' compensation boards, while their contributions to other pension plans are based on the Labour Division Survey of Pension Plans,[7] on government accounting records and on other statistics compiled by the Public Institutions Division. Government and private health insurance plans make up the bulk of the welfare component of SLI. Payroll taxes and premiums for provincial medicare and hospital insurance plans in Quebec, Ontario, Alberta and British Columbia are calculated using the provincial public accounts and reports of the provincial health service commissions. Expenditure on accident and sickness insurance (that is, extended health care plans, dental plans, and short and long term disability insurance) is based on information from the Office of the Superintendent of Financial Institutions (OSFI) and a survey conducted by the Canadian Life and Health Insurance

[7] See *Pension Plans in Canada*, Catalogue 74-401, biennial.

Association. When employer contributions to such plans are not mandatory, the average employer contribution applied to premium revenues is based on tabulations of relevant clauses in collective agreements.

The annual benchmarks for wages and salaries in any given year become available fourteen to fifteen months later and are incorporated in the estimates for the first quarter of the second year after the reference period. The preliminary annual estimates of wages and salaries are projected using a variety of monthly and quarterly series. For public administration, the estimates are based on data obtained by the Public Institutions Division directly from the governments concerned. For other industries, the estimates are projected using SEPH and paid worker employment.[8] Finally, for a limited number of industries where timely indicators are non-existent, the estimates rely on the judgement of the statistician.

Most of the basic data for SLI, as for wages and salaries, are unavailable when the preliminary estimates are prepared, becoming accessible only one to two years after the reference period. Here again, the projectors come from a variety of sources. For unemployment insurance and CPP/QPP contributions, the projections are based on the product of the employer's maximum contribution per employee and paid worker employment from the LFS. The same approach is applied to workers' compensation in the absence of annual reports. Employer contributions to private pension plans are estimated using the quarterly survey of trusteed pension plans.[9] For the welfare component of SLI, projections rely on provincial budget statements in combination with trends in employment and insurance premium rates.

Corporation Profits Before Taxes

The annual benchmarks for corporation profits before taxes come from Revenue Canada corporate taxation data, compiled by the Industrial Organization and Finance Division (IOFD) in collaboration with Revenue Canada — Taxation under the Corporations and Labour Unions Returns Act.[10] Table 3.2 presents a breakdown of corporation profits before taxes by major industry group for the year 1985.

Most of the annual benchmark data for corporation profits are supplied by IOFD after a two to three year delay, with the exception of data from the OSFI on banks and insurance companies, obtained with little lag in the first case and a lag of one to two years in the latter. The preliminary annual estimates by industry are based largely on the results of the IOFD survey of industrial corporations.[11] Other sources include data obtained from the Agriculture Division[12] and from the IOFD quarterly survey of financial institutions other than chartered banks.[13]

Corporation profits before taxes are first estimated by industry on a national basis, that is, including the foreign interest income of Canadian firms and excluding the interest income earned in Canada of firms owned by non-residents. They are then adjusted to a domestic basis by adding back total interest income paid to non-residents and deducting the total received from non-residents. The latter estimates are calculated in the Balance of Payments Division.[14]

---

[8] Paid worker employment comes from the Labour Force Survey (LFS) and can be found in *The Labour Force*, Catalogue 71-001, monthly.

[9] See *Quarterly Estimates of Trusteed Pension Funds*, Catalogue 74-001, quarterly.

[10] Most of the input data used in the accounts appear in *Corporation Financial Statistics*, Catalogue 61-207, annual, and *Corporation Taxation Statistics*, Catalogue 61-208, annual.

[11] See *Industrial Corporations, Financial Statistics*, Catalogue 61-003, quarterly.

[12] See *Agriculture Economic Statistics*, Catalogue 21-603E, annual.

[13] See *Financial Institutions, Financial Statistics*, Catalogue 61-006, quarterly.

[14] See *Quarterly Estimates of the Canadian Balance of International Payments*, Catalogue 67-001, quarterly.

Table 3.2
Corporation Profits Before Taxes

	Millions of dollars in 1985
Corporation profits before taxes, national basis	46,697
Agriculture	262
Forestry	96
Fishing and trapping	23
Mining	9,632
Manufacturing	14,661
Construction	971
Public utilities	1,229
Transportation	1,191
Storage	97
Communications	1,987
Retail trade	2,589
Wholesale trade	3,416
Finance, insurance and real estate	7,084
Other services	3,459
Plus: Investment income paid to non-residents	7,678
Less: Investment income received from non-residents	4,885
Equals: Corporation profits before taxes, domestic basis	49,490

One difficulty encountered in deriving reliable estimates of aggregate corporation profits before taxes is the lack of uniformity in business accounting practices. The manner in which book profits are reported for tax or other purposes may differ substantially from one corporation to the next, or from one year to the next, depending on the treatment of various accounting items over which management exercises discretion. Examples of such items are write-offs, provisions for depreciation and amortization and items of a capital nature charged to current account or vice versa.

The problem of varying accounting practices is dealt with in two stages. The first stage involves the calculation of a standardized version of profit, referred to as base profit, from the detailed financial information collected on corporations. The base profit is equal to a corporation's reported income or loss before income taxes, plus several charges that may have been made against that income,[15] less Canadian dividends received, certain capitalized expenditures on exploration and development,[16] and some other reconciling items.[17] In a second stage, the estimates of base profits are adjusted to the definition of corporation profits before taxes in the national accounts. These further adjustments include the substitution of separate bank and insurance company profit estimates obtained from the OSFI (in the case of the annual benchmarks) and the deduction of capital consumption allowances as calculated in the IEA.

[15] These include exploration and development or drilling charges, land acquisition, leasing and retention costs, depreciation, depletion and amortization charges, various provisions and reserves, unrealized gains or losses on foreign currency holdings and gains or losses on the sale of fixed assets.

[16] Only the so-called "on property" expenses, such as for drilling, are classified as capital outlays in the SNA. The "off property" expenses, such as for geological surveying, land purchase and leasing, are not capitalized.

[17] See *Industrial Corporations, Financial Statistics*, Catalogue 61-003, quarterly, for an explanation of the base profit concept.

The provincial distribution of corporation profits before taxes poses a special problem, because of the lack of sub-national data on companies doing business in more than one province. The Canada totals on a domestic basis are allocated by province using estimates of taxable income, wages and salaries or net operating surplus,[18] depending upon the industry involved.

Interest and Miscellaneous Investment Income

Interest and miscellaneous investment income on a domestic basis is made up of four components: (1) investment income of persons, except dividends, (2) investment income of governments, (3) investment income paid to non-residents by persons, governments and government business enterprises and (4) a deduction of interest on public debt, the transfer portion of interest on consumer debt and investment income received from non-residents (see Table 3.3). As such, it is a rather heterogeneous amalgam.

The first of these components, investment income of persons, is calculated as the sum of many different parts. The annual estimates for bond interest of persons correspond to the difference between that paid by corporations, governments and government business enterprises and that received by these same institutions, insurance companies, pension funds and non-residents. The investment income, excluding dividends, of life insurance companies and fraternal societies is taken from the reports of the OSFI. Total investment income of trusteed pension plans is obtained from the Labour Division; the components are derived by multiplying the assets of the plans by an estimated rate of return.[19] A similar approach is used to calculate interest of persons on chartered bank deposits. Estimates of the deposit interest paid by trust and mortgage loan companies and credit unions are obtained from the IOFD and those for government business enterprises, from annual reports. The portion of interest not paid to persons is deducted.

The banks and other financial institutions fund many of their activities from the excess of interest received over interest paid out to depositors. Explicit service charges do not reflect the total value of the various services rendered. In the IEA, an imputation is made to account for the services provided to the different sectors (persons, governments and businesses). This imputed amount is split among sectors and the portions accruing to persons and governments are included on the income side of the accounts in interest and miscellaneous investment income, and on the expenditure side, in personal and government expenditures. No adjustment is required for the share accruing to corporations and government business enterprises since intra-sectoral transactions cancel out.

The annual estimates for government investment income and interest on public debt come from the public accounts and are compiled by the Public Institutions Division. As mentioned earlier, estimates of investment income paid to and received from non-residents originate in the Balance of Payments Division.

On a provincial basis, bond interest is allocated using bond interest of persons as reported in Revenue Canada's publication ***Taxation Statistics***. The registered retirement savings plan contributions reported in the same source serve to distribute by province the investment income of trusteed pension plans. For life insurance companies and fraternal societies, the provincial distribution is based on the value of life insurance policies in force, taken from the annual report of the OSFI. Deposit interest is distributed provincially on the basis of bank interest as shown in ***Taxation Statistics***.

---

[18] The term "operating surplus" refers to a broader concept of profits in the national accounts, which comprises corporation profits before taxes, interest and miscellaneous investment income, the inventory valuation adjustment and capital consumption allowances. "Net operating surplus" excludes capital consumption allowances.

[19] See ***Trusteed Pension Funds, Financial Statistics***, Catalogue 74-201, annual. Investment income in this case is defined to exclude dividends, estimated separately, and amounts attributable to segregated funds which have been included with the investment income of life insurance companies.

Table 3.3
Interest and Miscellaneous Investment Income

	Millions of dollars in 1985
Interest and miscellaneous investment income (*NIEA* Table 1)*	
Investment income of persons from domestic sources	45,020
Interest on bonds	5,505
Interest on mortgages	1,568
Deposit interest, trust companies	4,714
Deposit interest, mortgage loan companies	2,516
Deposit interest, credit unions	2,722
Deposit interest, banks and similar institutions	7,654
Imputed interest, trust companies	478
Imputed interest, mortgage loan companies	174
Imputed interest, credit unions	560
Imputed interest, banks and similar institutions	2,192
Yield on Treasury bills	1,156
Government annuities	76
Royalties	1,302
Investment income of life insurance companies	6,287
Investment income of fraternal societies	136
Investment income of trusteed pension plans	8,057
Profits and interest of mutual non-life insurance companies	-77
Plus: Interest receipts of persons from non-residents	1,468
Plus: Government investment income	31,435
Less: Interest on the public debt	40,183
Less: Transfer portion of interest on the consumer debt	4,233
Equals: Interest and miscellaneous investment income, national basis	33,507
Plus: Interest payments to non-residents by persons, governments and GBEs	9,484
Less: Interest receipts from non-residents by persons, governments and GBEs	2,689
Equals: Interest and miscellaneous investment income, domestic basis	40,302
Interest, dividends and miscellaneous investment income of persons (*NIEA* Table 6)*	
Interest and miscellaneous investment income, domestic basis	40,302
Less: Government investment income	31,435
Less: Interest payments to non-residents by persons, governments and GBEs	9,484
Plus: Interest receipts from non-residents by persons, governments and GBEs	2,689
Plus: Canadian dividends received by persons	7,645
Plus: Interest on the public debt	40,183
Plus: Transfer portion of interest on the consumer debt	4,233
Equals: Interest, dividends and miscellaneous investment of persons	54,133

* Interest and miscellaneous investment income on a domestic basis appears in Table 1 of the quarterly ***NIEA*** (Gross Domestic Product, Income Based) while interest, dividends and miscellaneous investment income of persons on a national basis appears in Table 6 (Sources and Disposition of Personal Income).

With respect to the quarterly estimates, bond interest is projected with interest paid on Canada Savings Bonds and marketable government bonds. The investment income of life insurance companies comes from the quarterly survey of financial institutions, and that of the trusteed pension funds, from the quarterly survey of the same name. The investment income of fraternal societies is a simple trend projection. Data on deposits and interest rates from the Bank of Canada and the Public Institutions Division are employed to calculate deposit interest paid by the chartered banks and GBEs. Other deposit interest received by persons is derived from the quarterly survey of financial institutions. Government investment income and interest on public debt are measured with data from the Department of Finance and the Department of Supply and Services in the case of the federal government, and from information supplied by the provincial and local governments.

Accrued Net Income of Farm Operators From Farm Production

The accrued net income of farm operators from farm production is equal to gross farm revenues including the value of physical change in farm-held inventories,[20] less farm production expenses including depreciation, plus the accrued earnings of the Canadian Wheat Board. Most farm income is earned by unincorporated businesses, the rest going to incorporated firms. The estimation method involves calculating total net farm income and then subtracting the profits of incorporated farming operations, which fall under the heading "corporation profits before taxes" in the IEA. The method follows the one employed in the Agriculture Division, with a few adjustments specific to the national accounts.[21] The farm income calculations are summarized in Table 3.4.

Gross income consists of monetary receipts from the sale of farm products, agriculture subsidies paid by governments, an imputation for farm products consumed directly by farm households (that is, income in kind) and the accrued income represented by the change in inventories accumulated on farms during the reference period.

Farm cash receipts[22] are estimated mainly on the basis of data from Agriculture Canada and the Canadian Grain Commission. They cover the whole range of crops, livestock and livestock products. Grain refers to wheat, oats, barley, rye, flaxseed, rapeseed, soyabean and corn. Payments to farmers from the Canadian Wheat Board and the Ontario Wheat Board are included here, not only the cash receipts from direct sales. Among the important non-grain crops are sugar beets, potatoes, fruits, vegetables, floriculture and nursery products, tobacco and maple products. Other cash receipts come from sales of cattle, calves, hogs, sheep and lambs, dairy products, eggs, poultry and other livestock products. Subsidies consist of monies paid under a variety of programs such as price stabilization and crop insurance and other *ad hoc* federal and provincial government payments. Certain types of subsidies, tax credits and fuel tax rebates for example, are netted directly against expenses rather than appearing on a gross basis in cash receipts.

Farm income in kind consists of the estimated value, at farm prices, of the food and forest products grown and consumed on farms. It does not include the imputed rents on owner-occupied farm dwellings, as these are accounted for elsewhere in the IEA under the heading "net income of non-farm unincorporated business, including rent".

---

[20] Farm production which is not sold immediately, and therefore becomes an addition to inventory, is recorded as income during the period in which it occurs. When the products are sold in a subsequent period, cash receipts are larger than the value of current production. Adding the associated negative change in inventories to cash receipts at that time again serves to adjust income to the appropriate level.

[21] See Table 64 in the annual *NIEA*, Catalogue 13-201, for a reconciliation of net farm income according to the Agriculture Division with the accrued net income of farm operators from farm production in the IEA.

[22] See ***Farm Cash Receipts***, Catalogue 21-001, quarterly.

Table 3.4
Accrued Net Income of Farm Operators from Farm Production

	Millions of dollars in 1985
Total gross income	19,734
Farm cash receipts	18,896
Grain	5,239
Other crops	1,973
Livestock and livestock products	9,794
Subsidies (direct payments)	1,890
Western Grain Stabilization payments	522
Crop insurance	635
Provincial income stabilization payments	295
Dairy payments	282
Deficiency payments (price stabilization)	16
Other payments	140
Income in kind	202
Farm inventory change	636
Additions to grain stocks	7,458
Less: Depletion of grain stocks	6,748
Additions to potato stocks	372
Less: Depletion of potato stocks	351
Tobacco inventory change	208
Livestock inventory change	-303
Less: Total expenses	17,107
Wages of farm labour	1,593
Seed, fertilizer, pesticides, irrigation	2,440
Feed, livestock, veterinary expenses	2,841
Electricity, telephone, fuels	1,917
Rent	726
Interest on indebtedness	1,835
Insurance	418
Property taxes and stabilization levies	395
Depreciation	2,657
Building and fence repairs, wire, custom work and miscellaneous expenses	2,285
Less: "Corporation profits before taxes" in agriculture	261
Equals: Net income of farm operators from farm production	2,366
Plus: Adjustment on grain transactions	442
Canadian Wheat Board earnings	631
Less: Canadian Wheat Board payments	189
Equals: Accrued net income of farm operators from farm production	2,808

Farm inventory changes are estimated crop by crop, using quantities valued at the market prices prevailing during the reference period.[23,24] Separate calculations are made for each type of grain for instance. Withdrawals from stocks are subtracted from harvested additions to stocks to arrive at the inventory change estimate.[25] The same approach is applied to the potato crop. For tobacco and livestock, inventory changes are obtained directly from surveys.[26]

Farm production expenses are quite varied, as seen in Table 3.4. They are estimated by the Agriculture Division on an annual basis, using a number of sources.[27] Total annual expenses are distributed quarterly on the basis of proportions established in a 1982 study conducted by the Income and Expenditure Accounts Division.

The accrued net income of farm operators from farm production includes an adjustment whereby profits of the Canadian Wheat Board are attributed to farmers when they are made, regardless of when they are paid out to them. The adjustment is necessary because Gross Domestic Product measures earnings arising out of current production rather than current receipts of income.

The annual estimates for the accrued net income of farm operators from farm production and for the value of physical change in farm inventories are built up by province; the corresponding PEA series are thus directly available.

Net Income of Non-Farm Unincorporated Business Including Rent

Net income of non-farm unincorporated business consists of the net earnings of proprietors from their own businesses in all industries except agriculture.[28] Also included here is the net income of private consultants, doctors, lawyers, and other independent professionals, as well as the net rental income of persons, both paid and imputed, resulting from ownership of residential and non-residential property. Table 3.5 gives the breakdown by industry of net income of unincorporated business excluding rent while Table 3.6 shows the calculation of net rents, starting from gross space rents.

For unincorporated business income other than rent, the primary source is Revenue Canada's ***Taxation Statistics***.[29] The publication provides information on both gross and net business income. The applicable concept is net income, with expenses subtracted from gross income. In some cases, however, the movement in gross income is applied to the corresponding net income series. The number of working proprietors by industry according to the LFS,[30] the indexes of GDP at factor cost by industry[31] and some other statistics are used to distribute the annual estimates on a quarterly basis, and to project forward in the most recent quarters when the taxation data are not available.[32]

---

[23] For this reason, the "book values" problem encountered in estimating business non-farm inventories does not arise in the case of farm inventories.

[24] The VPC in farm inventories at 1986 prices is calculated simply by applying the average market price in 1986 to the physical inventory change.

[25] The seasonal adjustment of quarterly grain inventories raises particular problems. See the discussion at the end of this chapter.

[26] See *Livestock Report*, Catalogue 23-008, quarterly, *Livestock and Animal Products Statistics*, Catalogue 23-203, annual, and *Production and Disposition of Tobacco Products*, Catalogue 32-022, monthly.

[27] See *Agriculture Economic Statistics*, Catalogue 21-603E, annual. The expense estimates are adjusted to conform with national accounts concepts.

[28] The net income of unincorporated businesses is actually a blend of two types of income, the income of proprietors from their labour and the return on their capital. The two cannot be as easily distinguished for unincorporated businesses as they can for incorporated ones.

[29] The publication contains statistics from a stratified sample of "T1" returns submitted for tax purposes. Additional unpublished tables from Revenue Canada giving a more detailed occupational breakdown are also used in deriving the IEA estimates.

[30] Forestry and transportation are two relevant examples.

[31] For example, the net income of accountants and auditors is projected using the industry output measure for accountants in conjunction with the CPI for "legal, accounting and other services". See *Gross Domestic Product by Industry*, Catalogue 15-001, monthly, and *The Consumer Price Index*, Catalogue 62-001, monthly.

[32] A case in point here is that of physicians, dentists and other health professionals (under "Community services" in Table 3.5). In this case, data on provincial government health expenditures and the number of practitioners are obtained from Health and Welfare Canada.

Table 3.5
Net Income of Non-Farm Unincorporated Business, Excluding Rent

	Millions of dollars in 1985
Net income of non-farm unincorporated business, excluding rent	15,811
Fishing	359
Hunting and trapping	33
Forestry	253
Mining	79
Manufacturing	217
Construction	2,494
Transportation	741
Retail trade	1,668
Wholesale trade	372
Finance, insurance and real estate	55
Community services	4,844
Business services	2,329
Lawyers	1,196
Accountants and auditors	592
Engineers and architects	240
Other business services	301
Personal services	1,484
Restaurants	342
Hairdressing	328
Hotels and motels	125
Laundry and dry cleaning	104
Board and lodging	97
Funeral services	15
Childcare and other personal services	473
Other service industries	883

The estimates of net rents are built up separately for the farm and non-farm sectors, and for residential and non-residential buildings. Residential non-farm rents amounted to $10,126 million in 1985, or about 95% of total net rental income and of this amount about 90% was attributable to imputed rents on owner-occupied dwellings.

The estimation of residential rents begins with the stock of dwellings from the Census, divided into single dwellings, multiple unit dwellings, mobile homes, cottages and farms. Census stock figures are extended forward on the basis of the number of new dwellings completed less the number destroyed. The housing stock is then split into owner-occupied, tenant-occupied and unoccupied portions.[33]

[33] A further split of tenant-occupied dwellings is necessary to eliminate the share owned by corporations and governments. The net rents accruing to those sectors are recorded elsewhere in the accounts, as part of corporation profits before taxes and government investment income.

Table 3.6
Net Rents Paid and Imputed to Unincorporated Landlords

	Millions of dollars in 1985
Net rents paid and imputed to unincorporated landlords	10,636
Residential non-farm rents:	
Gross residential non-farm space rents	40,579
Paid	6,597
Imputed	33,982
Less: Expenses relating to residential non-farm space rents	30,453
Repairs	2,435
Tenant-occupied dwellings	638
Owner-occupied dwellings	1,797
Property taxes	6,354
Tenant-occupied dwellings	1,034
Owner-occupied dwellings	5,320
Insurance	863
Tenant-occupied dwellings	140
Owner-occupied dwellings	723
Mortgage interest	13,837
Tenant-occupied dwellings	2,250
Owner-occupied dwellings	11,587
Depreciation	5,778
Tenant-occupied dwellings	1,036
Owner-occupied dwellings	4,742
Miscellaneous expenses	1,186
Tenant-occupied dwellings	661
Owner-occupied dwellings	525
Sub-total: Expenses on tenant-occupied dwellings	5,759
Sub-total: Expenses on owner-occupied dwellings	24,694
Net residential non-farm space rents	10,126
Paid	838
Imputed	9,288
Residential farm rents:	
Gross farm residential space rents	852
Paid	47
Imputed	805
Less: Expenses relating to farm space rents	711
Tenant-occupied dwellings	38
Owner-occupied dwellings	673
Net residential farm space rents	141
Paid	9
Imputed	132
Non-residential rents:	
Net non-residential rents	369
Non-farm	303
Farm	66

The stock of occupied dwellings is multiplied by the "average contract rent per dwelling", estimated on the basis of information from a sub-sample of respondents in the Labour Force Survey,[34] to obtain gross contract rents at current prices. In the case of owner-occupied dwellings, the average rent is assumed to be equivalent to that on rented housing, adjusted by a coefficient based on the average number of rooms in each type of dwelling according to the Census. The estimated cost of heat, lighting, furniture, appliances and services supplied by the landlord (also based on the LFS sub-sample) and included in the contract rent is deducted from total gross contract rents, yielding gross space rents.[35]

Space expenses, namely repairs, property taxes, insurance, mortgage interest, depreciation and other miscellaneous items, are deducted to arrive at net rents. Mortgage interest is the largest single expense, accounting for about 45% of the total in 1985, followed by property taxes and depreciation, together accounting for a further 40%. Information on expenses comes from several sources[36] and is seldom available separately for owner-occupied and tenant-occupied dwellings. Total expenses must usually be split on the basis of the relative importance of gross paid rents and gross imputed rents in the total.

Farm rent estimates come from the Agriculture Division and are based on information from the Census of Agriculture and other sources. Gross residential farm rents are equal to the stock of farm dwellings multiplied by an estimated average rent per dwelling. Non-residential rents, both farm and non-farm, are calculated on an annual basis in the Input-Output Division and the quarterly estimates are simply an interpolation of the annual figures.

The provincial distribution of net rents is based on a distributor calculated as the product of the housing stock and the average rent in the province.

Inventory Valuation Adjustment

The inventory valuation adjustment (IVA) is a by-product of the calculation of the value of physical change in business non-farm inventories. It is an offset to the net holding gain or loss which businesses realize on their inventories as a result of price changes. Holding gains and losses on inventory are present in corporation profits before taxes and other income aggregates, and must be removed in order to measure the value of current production. Due to ongoing inflation, the IVA is usually negative. Businesses frequently value inventories at original cost rather than at replacement prices; as a result, the change in the book value of inventories tends to be less than the physical change in inventories valued at current prices. Table 3.7 shows an industrial breakdown of the IVA in 1985. The sources and methods for the IVA are explained later, in the section dealing with the value of physical change in business non-farm inventories.

---

[34] This survey provides data used in calculating the CPI for rents as well as the national accounts series referred to here.

[35] Total gross rents enter personal expenditure on consumer goods and services. This contrasts with net income of unincorporated business where only the *non-corporate* share of *net* rents is included.

[36] The housing repair and depreciation estimates are based on the annual Shelter Cost Survey and CMHC data. The insurance and mortgage interest estimates are based on data in ***Financial Institutions, Financial Statistics***, Catalogue 61-006, quarterly, and the ***Bank of Canada Review***, monthly. Data on property taxes come from ***Local Government Finance, Revenue and Expenditure, Assets and Liabilities, Actual***, Catalogue 68-204, annual.

Table 3.7
Inventory Valuation Adjustment

	Millions of dollars in 1985
Total inventory valuation adjustment	-1,760
Manufacturing	-629
Food	-87
Beverages	-43
Tobacco	-19
Rubber	-9
Plastics	-18
Leather	-14
Textiles	-4
Knitting and clothing	8
Paper and allied products	112
Printing and publishing	-24
Refined petroleum products	-53
Chemical products	-49
Wood products	-40
Furniture	-17
Primary metals	41
Metal products	-51
Machinery	-60
Transportation equipment	-220
Motor vehicles	-112
Motor vehicle parts	-34
Other transportation equipment	-74
Electrical products	-3
Non-metallic mineral products	-28
Miscellaneous manufacturing	-51
Trade	-880
Retail trade	-206
Motor vehicles	-141
Other durable goods	-101
Non-durable goods	36
Wholesale trade	-673
Machinery and equipment	-171
Lumber	-154
Motor vehicles	-130
Other durable goods	-82
Non-durable goods	-136
Other industries	-271
Logging	-78
Mining	-5
Finance and services	-26
Utilities	-54
Transportation	-57
Construction	-51
Private grain dealers	20

Indirect Taxes Less Subsidies

All federal and provincial government sector estimates are based on the audited public account statements of the various governments. These accounting statements become available six to twelve months after the end of the fiscal year on March 31. Preliminary estimates rely on budget information and unaudited government financial reports.[37] Data on local governments are taken from surveys conducted by the Public Institutions Division[38] and from reports published by departments responsible for municipal affairs in provincial and territorial governments.

Table 3.8 displays the major indirect taxes and subsidies which were in effect in 1985 by level of government. Those which were important in earlier years and have been abolished do not appear in the table, while others which were important in 1985 and have since been eliminated — notably the oil export charge, the Petroleum Compensation Fund levy and the Canadian ownership charge — do appear in the table.[39]

The provincial distribution of provincial and local government indirect taxes and subsidies poses no problem in the PEA as the national estimates are simply obtained by summation of the provincial data. In the case of the federal government, however, the issue is a more difficult one. The provincial allocation is done separately for each major tax and subsidy. The largest category, the federal sales tax (most of "excise taxes" in Table 3.8), is distributed on the basis of the province or territory where the production takes place. First, a taxable portion of shipments by commodity is calculated by subtracting exports and non-taxable purchases from total shipments in Canada. Shipments by commodity by province[40] are then multiplied by the appropriate tax rate and taxable portion to yield estimated federal sales tax revenue by commodity by province. The results are summed over commodities and used to apportion total federal sales tax revenue by province.[41] Customs import duties are allocated by port of entry, as reported by Revenue Canada — Customs and Excise. Excise duties on alcohol and tobacco also are taken directly as reported by Revenue Canada.

---

[37] The Public Institutions Division compiles government sector statistics according to two distinct conceptual frameworks, that of the national accounts and that of the financial management system. See ***The System of Government Financial Management Statistics***, Catalogue 68-507E, occasional, ***Federal Government Finance, Revenue and Expenditure, Assets and Liabilities***, Catalogue 68-211, annual, ***Provincial Government Finance, Revenue and Expenditure***, Catalogue 68-207, annual, and ***Provincial Government Finance, Assets, Liabilities, Source and Application of Funds***, Catalogue 68-209, annual. See also CANSIM matrices 2711, 2712 and 2713 for some national accounts data on governments not published elsewhere.

[38] See ***Local Government Finance, Revenue and Expenditure, Assets and Liabilities, Actual***, Catalogue 68-204, annual.

[39] See Tables 51 and 56 in the historical annual ***NIEA***, Catalogue 13-531, for a complete record of major indirect taxes and subsidies, beginning in 1926. Similar information by province and territory can be found in ***Provincial Economic Accounts, Annual Estimates, 1984-1988***, Catalogue 13-213, annual.

[40] See ***Manufacturing Industries of Canada, National and Provincial Areas***, Catalogue 31-203, annual, and ***Products Shipped by Canadian Manufacturers***, Catalogue 31-211, annual.

[41] This procedure in the PEA contrasts with that employed in the provincial input-output accounts, where the federal sales tax is distributed on the basis of the location of purchase, rather than production.

Table 3.8
Indirect Taxes Less Subsidies

	Millions of dollars in 1985
Indirect taxes less subsidies	47,212
Indirect taxes	58,789
Federal	18,897
Customs import duties	3,910
Excise duties	1,513
Excise taxes	10,722
Oil export charge	419
Petroleum Compensation Fund levy	1,381
Canadian ownership charge	328
Air transportation tax	252
Miscellaneous taxes	372
Provincial	24,459
Amusement tax	146
Corporation tax (not on profits)	1,172
Gasoline tax	3,241
Motor vehicle licences and permits	481
Other licences, fees and permits	339
Taxes on natural resources	675
Real property tax	1,139
Retail sales tax	13,183
Profits of liquor commissions	2,130
Miscellaneous taxes	1,953
Local	15,433
Amusement tax	27
Licences, fees and permits	195
Real and personal property tax	13,458
Retail sales tax	25
Miscellaneous taxes	1,728
Less: Subsidies	11,577
Federal	6,369
Freight assistance on western feed grains	16
Assistance re storage costs on grain	3
Western Grain Stabilization Plan payments	522
Canadian Dairy Commission payments	538
Agricultural Stabilization Board loss or payments	9
Other agricultural subsidies	73
Atlantic Region Freight Assistance Act	61
Maritime Freight Rates Act	15
Other payments to railroads	555
Grants to the Canadian Broadcasting Corporation	810
Training-on-the-job program	117
Payments to importers of crude oil and petroleum products	455
Petroleum Compensation Fund payments	1,483
Housing assistance	783
Assistance to industry for applied research	76
Grants to the Canada Post Corporation	275
Other federal subsidies	578
Provincial	4,610
Local	598

Capital Consumption Allowances

Table 3.9 shows a breakdown of capital consumption allowances by sector.[42] In 1985, the persons and unincorporated business sector accounted for 27% of depreciation, private corporations, 52%, governments, 13%, and government business enterprises, 8%.

Within the persons and unincorporated business sector, the largest single element is depreciation on the housing stock. This is computed as one half of one per cent per quarter of the opening stock of housing measured at constant prices, reduced by half the full depreciation on buildings destroyed during the period on the assumption that the latter depreciated for only half the period on average.[43] The depreciation at constant prices is revalued at current prices with the implicit price index of investment in residential construction excluding real estate commissions.

Depreciation on non-residential buildings owned and rented by persons, except farms, is based on capital cost allowances claimed against rental income as reported in ***Taxation Statistics***. Projections for the current period follow the trend of depreciation on residential buildings.

Capital consumption allowances in agriculture are also measured on a replacement cost basis and cover buildings, machinery and equipment. The estimates correspond to the depreciation deducted in arriving at the accrued net income of farm operators from farm production plus that on farm housing calculated in conjunction with net rents. The estimated corporate share is deducted to avoid double counting. For non-residential farm buildings, the straight line depreciation assumption is made, with an average life of 28.5 years. For machinery, the annual depreciation rates range from 10% to 12%.[44]

In the case of other unincorporated businesses, depreciation is calculated by major industry group mostly on the assumption of a fixed relationship between CCA and gross business income. Generally, the ratios are based on those observed in the corporate sector, for which more statistics are available. Again, ***Taxation Statistics*** is the primary source. Preliminary estimates rely on trend projections.

The category "amortization of consumer durables" relates to items such as refrigerators, washing machines and furniture supplied to tenants [45]. The estimates are built up as part of the calculation of rents. They are obtained by applying fixed amortization rates to the estimated stock.

Depreciation for universities, churches and similar non-commercial institutions is derived in conjunction with the estimates of the capital stock.[46]

---

[42] The terms "capital consumption allowances", "capital cost allowances" and "depreciation" are used interchangeably in the text which follows.

[43] The calculations are done in the Investment and Capital Stock Division.

[44] The Agriculture Division is responsible for the estimates of depreciation on agriculture assets. See ***Agriculture Economic Statistics***, Catalogue 21-603E, annual.

[45] Durable goods purchased by persons are not treated as capital assets in the IEA.

[46] See ***Fixed Capital Flows and Stocks***, Catalogue 13-211, annual.

Table 3.9
Capital Consumption Allowances

	Millions of dollars in 1985
Capital consumption allowances	55,926
Persons and unincorporated businesses	15,313
Housing, non-farm	5,895
Non-residential buildings, non-farm	365
Agriculture	2,389
Other unincorporated businesses	3,628
Amortization of consumer durables	214
Universities and churches	595
Insurance claims	2,141
Capital items expensed	86
Corporations	29,253
Depreciation	25,732
Marine claims	33
Railway claims	13
Other adjustments	-36
Insurance claims	2,001
Capital items expensed	1,510
Governments	7,092
Federal	1,236
Provincial	2,424
Municipal	1,736
Provincial hospitals	7
Other hospitals	688
Local schools	762
Municipal water systems	239
Government business enterprises	4,268
Federal	1,196
Provincial	2,424
Local	406
Railway claims	19
Other adjustments	154
Capital items expensed	69

The allowance for insurance claims is based on information provided by the OSFI. As explained in Chapter 2, the amounts under this heading represent the claims paid to businesses and landlords to compensate for fire and other types of losses. The estimates are calculated as total claims less adjustment expenses and are divided between business and persons.

"Capital items expensed", as mentioned earlier, represent outlays charged to operating expenses by business but included in gross investment and depreciation in the IEA. The source is ***Private and Public Investment in Canada***.[47]

[47] See ***Private and Public Investment in Canada, Intentions***, Catalogue 61-205, annual, and ***Private and Public Investment in Canada, Revised Intentions***, Catalogue 61-206, annual.

The estimates of depreciation in the corporate sector are established in conjunction with those for corporation profits before taxes. They are calculated for major industrial groups, using data from financial statements attached to company tax returns.

Capital consumption allowances for the government sector are calculated on a replacement cost basis, based on the capital stock estimates.[48] The estimates are split by level of government, and those for local government are subdivided into municipal government proper, schools and water systems.

Estimates of depreciation for government business enterprises rely on financial statements of the enterprises and other government accounting statements.[49]

Personal Expenditure on Consumer Goods and Services

Personal expenditure on consumer goods and services is the largest spending aggregate, accounting for almost 60% of GDP. It is divided into four broad categories, namely durable goods, semi-durable goods, non-durable goods and services,[50] but the estimates are actually compiled for over 130 distinct commodities or commodity groups. The 130 commodity groups are further aggregated for publication by purpose of expenditure. Including the four broad categories, eighteen aggregates and sub-aggregates appear in the quarterly accounts while fifty-three are published in the annual accounts, for which more reliable sources are available.[51] Tables 3.10 to 3.13 provide a detailed breakdown of personal expenditure for the year 1985 and indicate how the commodity groups are aggregated to the published categories on a quarterly basis.

The methods used to prepare the consumer expenditure estimates rely on the Retail Trade Survey (RTS)[52] and a wide variety of other monthly, quarterly and annual sources, as outlined in Appendix I. Many of the inputs are not immediately available and are taken into account only after a lag of one or more quarters. The estimates are reconciled with their counterpart series in the Input-Output Accounts after about three years. This reconciliation is carried out at the level of the forty distinct sub-aggregates shown in Table 60 of the annual *NIEA* publication.

The quarterly estimates for most of consumer spending on goods rely on the monthly Retail Trade Survey. Monthly survey results are brought to the level indicated by the most recent annual Retail Trade Survey, normally available two to three years after the reference period; they are also adjusted for variations in the lag before retail store "births" and "deaths" are reflected in the monthly RTS sample.[53] Estimated retail sales made to business and government are then deducted in order to capture only sales to persons.

---

[48] New capital stock estimates released by Statistics Canada in 1990 imply substantially shorter average lives for capital assets (other than housing) and correspondingly higher annual rates of depreciation. In the IEA, these new estimates for depreciation on government assets and those in agriculture are linked to the 1985 published estimates in order to maintain continuous time series. The higher CCA levels will be incorporated in the IEA estimates at the time of the next historical revision.

[49] The estimates are prepared by the Public Institutions Division.

[50] Each commodity is assigned to a broad category following in general outline the classification of household goods and services recommended by the United Nations. See *A System of National Accounts*, Studies in Methods, Series F, No. 2, Rev. 3, Statistical Office, Department of Economic and Social Affairs, United Nations, New York, 1968, pp. 105-109.

[51] See Tables 7 and 8 in the quarterly *NIEA*, Catalogue 13-001, and Tables 60 and 61 in the annual *NIEA*, Catalogue 13-201.

[52] See *Retail Trade*, Catalogue 63-005, monthly, and *Annual Retail Trade Survey*, Catalogue 63-223, annual.

[53] The sample of the Retail Trade Survey is drawn from Statistics Canada's Central Frame Data Base (CFDB), which in turn is kept up to date using administrative records from Revenue Canada. When businesses apply for a Payroll Deduction Account, Statistics Canada follows up with a profiling questionnaire, updating the CFDB, and consequently the RTS sample frame, with a lag. Adjustments are made to the consumer expenditure estimates to account for variations in the average lag between the time application is made for new payroll deduction accounts and the time the associated CFDB updates are implemented.

Table 3.10
Personal Expenditure on Consumer Goods, Part I

	Millions of dollars in 1985
Personal expenditure on consumer goods	148,384
Durable goods	40,278
Motor vehicles, parts and repairs	20,750
New automobiles	10,239
New trucks and vans	2,453
Used motor vehicles	2,533
Motor vehicle parts and accessories	2,603
Motor vehicle maintenance and repair	2,922
Furniture and household appliances	8,145
Furniture	3,432
Floor coverings	384
Upholstery and furniture repairs	148
Stoves, ranges and microwaves	630
Washers and dryers	618
Refrigerators and freezers	549
Other major appliances	841
Small electrical appliances	846
Garden tools and equipment	496
Household equipment repairs	199
Other durable goods	11,383
Television sets, video equipment and accessories	2,094
Radios, sound systems and accessories	1,102
Sporting and camping equipment	1,358
Musical instruments and supplies	1,122
Bicycles and motorcycles	988
Cameras and accessories	848
Office machines and equipment	453
Boats, motors and accessories	505
Trailers	420
Recreation equipment rentals	416
Recreation equipment repairs	266
Watches and jewellery	1,722
Watch and jewellery repairs	85

Table 3.11
Personal Expenditure on Consumer Goods, Part II

	Millions of dollars in 1985
Personal expenditure on consumer goods	148,384
Semi-durable goods	28,147
Clothing and footwear	16,592
Men's and boys' clothing	5,776
Women's, misses' and children's clothing	8,254
Dressmaking, repairs and alterations	99
Footwear	2,396
Shoe repairs	68
Other semi-durable goods	11,556
Notions and smallware	308
Piece goods	584
Household textiles and furnishings	2,079
Luggage and leather goods	154
China, glassware and crockery	1,304
Lamps, fixtures and accessories	584
Silverware and flatware	148
Hardware	1,834
Toys, games and hobby supplies	1,350
Films and other photographic supplies	260
Stationery, books, newspapers and magazines	2,870
Pets and supplies	81
Non-durable goods	79,959
Food and non-alcoholic beverages	32,806
Food and non-alcoholic beverages	32,166
Imputed food (farm and non-farm)	639
Motor fuels and lubricants	10,413
Electricity, gas and other fuels	10,679
Electricity	5,466
Natural gas	2,474
Other fuels	2,739
Other non-durable goods	26,061
Alcoholic beverages	8,471
Tobacco products	5,922
Pet food	648
Soaps and other cleaning supplies	1,432
Other household supplies	2,604
Flowers and plants	914
Cosmetics and toiletries	2,450
Drugs and pharmaceutical products	3,621

Virtually all data sources entering the estimation of personal expenditure must be adjusted to reflect only sales to persons or households. At retail, sales to persons generally account for well over 90% of the total. Only motor vehicle dealers derive a good portion of their revenue from sales to other sectors. In the case of certain services like child care, nearly all spending is made by individuals, while in others like air transport, spending by business and government represents a substantial part of the total. Estimates of the share of personal spending by expenditure category draw on the annual Retail Trade Survey (containing data on sales by class of customer), the FAMEX survey[54] and on information from manufacturers' and retailers' associations, or else they are calculated residually through the commodity flow balancing approach.

The adjusted monthly retail trade statistics are compiled by "kind of business",[55] not by commodity, but they are needed on the latter basis for purposes of deflation. The transformation is accomplished by applying a matrix of commodity weights to sales by kind-of-business, each weight w_{ij} representing the estimated share of sales within the particular kind of business "i" that is attributable to the particular commodity "j". The weights are based on the results of the 1974 Retail Commodity Survey[56] and have been updated in an *ad hoc* fashion since then using commodity flow data and the quadrennial FAMEX survey on which are based the expenditure weights for the CPI. Other annual surveys are used to calculate purchases of consumer goods not made at retail outlets, directly on manufacturers' premises, by mail order, in vending machines or through any other means, and the results are added to retail purchases by commodity.[57] These transformed retail trade statistics are then used to project consumer expenditure by commodity from the last available benchmark year. Provincial sales taxes are added, finally, in order to measure the value of spending at market prices. Among the series estimated quarterly through this approach are food, clothing, footwear, furniture, appliances, household furnishings and supplies, and recreation equipment.

Where possible, statistics by commodity or other relevant data are employed in the estimation procedure instead of retail sales by kind of business, on account of the uncertainty which besets the transformation of the latter into sales by commodity. This is the case for important spending categories such as motor vehicles, energy products, alcohol and tobacco. For motor vehicles, accounting for 36% of spending on durable goods in 1985, data from the Motor Vehicle Manufacturers' Association and from the Survey of New Motor Vehicle Sales are used.[58] Vehicle parts and maintenance and the markup on used motor vehicle sales are derived residually by subtracting sales of new motor vehicles from the receipts of motor vehicle dealers according to the RTS. In the case of gasoline, electricity, natural gas and other fuels, spending is estimated by multiplying quantities consumed by the average retail price.[59] A similar approach is adopted for tobacco, the domestic supply (production less exports plus imports) being multiplied by an average price.[60] Finally, spending on alcoholic beverages is calculated with data from liquor commissions and from the Brewers Association of Canada.[61]

An even greater variety of sources is employed for services (see Tables 3.12 and 3.13). The object is to measure the value of services rendered directly to individuals, as opposed to those provided to businesses or governments. Three major categories, namely rents, restaurant and accommodation services and net expenditure abroad, account for about half of total service outlays by consumers. Gross paid and imputed rents are calculated along with net rents, as part of net

---

54 See *Family Expenditure Survey*, Catalogue 62-555, irregular.

55 Previously, the Retail Trade Survey provided data for 28 kinds of business. Beginning in January 1990, a new RTS was launched in which only 17 kinds of business are identified.

56 See *Retail Commodity Survey, 1974*, Catalogue 63-526, occasional.

57 See *Direct Selling in Canada*, Catalogue 63-218, annual, and *Vending Machine Operators*, Catalogue 63-213, annual.

58 See *New Motor Vehicle Sales*, Catalogue 63-007, monthly.

59 For quantities, see *Quarterly Report on Energy Supply-Demand in Canada*, Catalogue 57-003, quarterly, *Electric Power Statistics, Volume II, Annual Statistics*, Catalogue 57-202, annual, and *Gas Utilities, Transport and Distribution Systems*, Catalogue 57-205, annual. For prices, see *The Consumer Price Index*, Catalogue 62-001, monthly, and *Industry Price Indexes*, Catalogue 62-011, monthly.

60 Quantities are obtained from *Production and Disposition of Tobacco Products*, Catalogue 32-022, monthly, and prices, from *The Consumer Price Index*, Catalogue 62-001, monthly.

61 See *The Control and Sale of Alcoholic Beverages in Canada*, Catalogue 63-202, annual.

income of non-farm unincorporated business. Spending on restaurants and hotels is based on information from the Restaurant, Caterer and Tavern Survey[62] and the Traveller Accommodation Survey.[63] Net expenditure abroad is equal to the expenditures of Canadian travellers abroad less those of foreign travellers in Canada. Personal expenditure ought to encompass all outlays of Canadian residents and exclude those of non-residents to be consistent with personal income. Spending abroad by Canadians is not captured by any domestic survey and must be estimated separately. On the other hand, the expenditures of foreign visitors to Canada in hotels and restaurants, on travel and on other goods and services are included with the domestic spending of Canadian residents and can only be deducted as a lump sum. The travel expenditure estimates are compiled by the Education, Culture and Travel Division from data on border crossings, combined with survey information about the average amounts spent by travellers. They also appear, with opposite sign, in non-merchandise exports and imports.

The remaining categories of consumer services are many and diverse, as can be seen from Table 3.13. Spending on recreation (cinemas, theatres, spectator sports, etcetera), laundry and dry cleaning, motor vehicle rental and leasing, and household services is estimated with operating revenues of service establishments collected in annual surveys,[64] at times supplemented with information from the Family Expenditure Survey. The estimates for other expenditure, on taxis for instance, relies on taxation statistics, also in conjunction with data from the FAMEX survey. Spending on air, railway and inter-city bus transport as well as urban transit is estimated annually and projected quarterly with the number of passengers and operating revenues.[65] Similarly, operating revenues are employed for postal and telephone services.[66] Spending on lotteries is measured as sales less prizes paid out and is calculated monthly with data received from the lottery corporations. Again, non-personal expenditures are subtracted and retail sales taxes are added where applicable.

Services rendered by universities, treated as "associations of individuals" rather than as part of the government or business sectors in the accounts, are measured by their total operating costs. Personal spending on life, accident, property and automobile insurance is also measured by the operating costs (including profits) of insurance companies, mainly with statistics from the OSFI. Hospital expenses charged directly to patients, such as differential costs for preferred accommodation and expenses of non-profit special care facilities (such as nursing homes) are treated as personal expenditure. Otherwise most hospital expenses are part of government current expenditure on goods and services.

There are conceptual or measurement problems associated with the estimation of several service categories. For instance, some services provided by banks and other financial institutions are not priced explicitly, but rather are covered implicitly through the difference between interest rates paid on deposits and those charged on loans. In this case, an imputation is made in consumer spending on one side and in interest and miscellaneous investment income on the other. For several categories, quarterly data sources are very weak and estimation methods rely on trends in employment, population or wages and salaries, on the consumer price index and on judgement. This is specially the case for spending on education, cultural services, recreation services except lotteries and the operating expenses of non-profit organizations.

The provincial allocation of personal expenditure is carried out at the same level of detail as the national estimates, that is for over 130 categories. Where feasible, the methods employed at the national level are replicated for the provinces and territories.

---

[62] See *Restaurant, Caterer and Tavern Statistics*, Catalogue 63-011, monthly.

[63] See *Traveller Accommodation Statistics*, Catalogue 63-204, annual.

[64] One of these is a census-type survey covering all firms above a given revenue threshold, supplemented by data from tax records on gross business income for firms below the threshold.

[65] See *Air Carrier Operations in Canada*, Catalogue 51-002, quarterly; *Railway Operating Statistics*, Catalogue 52-003, monthly; *Passenger Bus and Urban Transit Statistics*, Catalogue 53-003, monthly.

[66] See *Telephone Statistics*, Catalogue 56-002, monthly. Postal revenue is taken from financial reports of the Canada Post Corporation.

Table 3.12
Personal Expenditure on Consumer Services, Part I

	Millions of dollars in 1985
Personal expenditure on consumer services	126,119
Gross rent (paid and imputed)	48,674
Gross imputed rent	34,787
Water charges relating to imputed rent	608
Gross paid rent	12,215
Water charges relating to paid rent	358
Furniture and appliance rental	214
Janitorial services	492
Restaurants and hotels	17,068
Meals outside the home	12,446
Service portion of alcoholic beverages	2,503
Accommodation	1,902
Board paid	218
Net expenditure abroad	1,119
Travel payments	5,995
Military pay and allowances abroad	130
Less: Travel receipts	5,006

Government Current Expenditure on Goods and Services

As stated earlier, government sector estimates are generally based on the audited public accounts of the various governments.[67] In the case of the federal government, current expenditure on goods and services is calculated residually. Transfer payments, capital spending and interest on the public debt are subtracted from total expenditure. The proceeds from sales of goods and services are also netted out, and the remainder is taken to be current expenditure on goods and services. For provincial, territorial and local governments, the estimates are built up by summing all amounts pertaining to items classified as expenditure on goods and services in the source documents, again netting out the proceeds from sales. Current expenditure of hospitals is obtained by summing the operating expenditure of all hospitals as reported in Health Division surveys and health ministry records and deducting expenditures of private hospitals. Finally, current expenditure of the CPP and QPP are taken from accounting records of the federal and Quebec governments. In many cases, adjustments must also be made to convert the data from a fiscal-year to a calendar-year basis.[68,69]

---

[67] More precisely, this is the case for the federal, provincial/territorial and CPP/QPP subsectors. Estimates for local government and hospitals come from surveys and from the administrative reporting systems set up by the provincial governments.

[68] While the government sector estimates are developed quarterly using sub-annual data, the federal, provincial/territorial and CPP/QPP benchmark public accounts data are all fiscal-year figures. For the local government sub-sector, the source data are on a calendar year basis.

[69] Table 65 in the annual *NIEA*, Catalogue 13-201, provides a statement showing the reconciliation of the federal government total revenue and expenditure according to the IEA with the corresponding series according to the Public Accounts of Canada. The federal budget normally contains a similar reconciliation statement in which the public accounts budget estimates are converted to a national accounts basis. See, for example, ***The Fiscal Plan***, tabled in Parliament by the Honourable Michael H. Wilson, Minister of Finance, April 26, 1989, pp. 65-72.

Table 3.13
Personal Expenditure on Consumer Services, Part II

	Millions of dollars in 1985
Personal expenditure on consumer services	126,119
Other services	59,258
Imputed lodging	368
Lodging paid	433
Lodging in universities	145
Laundry and dry cleaning	792
Domestic services	579
Child care in the home	752
Child care outside the home	1,104
Property insurance, cost of service	245
Pet care	210
Miscellaneous household services	367
Medical care, dental care and the like	1,334
Special care facilities, operating expenses	2,542
Other health care	1,685
Hospital care and the like	1,471
Accident and sickness insurance, cost of service, societies	38
Accident and sickness insurance, cost of service, companies	662
Workers' Compensation Boards and railway payments	-38
Bridge and highway tolls	62
Automobile insurance, cost of service	539
Parking	314
Driving lessons and tests	162
Motor vehicle renting and leasing	713
Commissions of tour operators	282
Urban transit	844
Railway transport	181
Intercity and rural bus transport	477
Air transport	2,980
Water transport	94
Taxis	276
Moving and storage	428
Telecommunications	4,189
Postal service	369
Lotteries	1,294
Pari-mutuel betting	360
Other recreational services	2,991
Cable television and pay television	929
Movie theatres and drive-ins	343
Photography	552
Universities, operating expenses	5,727
Private schools, operating expenses	1,398
Other educational and cultural services	861
Hairstyling for men and women	1,458
Other personal care	434
Funerals and burials	500
Trust companies, imputed interest	478
Stock and bond commissions	840
Interest on consumer debt	2,775
Credit unions, imputed interest	560
Life insurance, cost of service	2,632
Bank service charges paid	1,079
Bank service charges imputed	2,192
Credit unions, cost of service	185
Pension funds, cost of service	179
Mortgage loan companies, imputed interest	174
Mutual funds, cost of service	251
Legal, accounting and other services	1,056
Welfare organizations, operating expenses	2,395
Religious organizations, operating expenses	1,316
Trade unions, operating expenses	1,005
Political parties, operating expenses	97

Table 3.14 provides a disaggregation of government current expenditure on goods and services by level of government. The estimates of wages are developed by the Labour Division as part of the labour income calculation. Capital consumption allowances imputed to the government sector are also included in government current expenditure on goods and services. The other non-wage expenditures are obtained residually by subtracting wages and depreciation. By convention, military equipment is treated as current expenditure although it has some characteristics of capital goods.

Table 3.14
Government Current Expenditure on Goods and Services

	Millions of dollars in 1985
Government current expenditure on goods and services	95,519
Federal	23,398
Civilian wages and salaries, except DND*	9,165
Non-wage expenditure, except DND*	3,565
Capital consumption allowances	1,236
Military pay and allowances	2,742
Civilian wages and salaries, DND*	1,360
Other expenditure, DND*	5,330
Provincial	30,074
Wages and salaries	14,999
Non-wage expenditure	12,644
Capital consumption allowances	2,431
Local	28,224
School board wages and salaries	13,148
Other wages and salaries	9,342
Non-wage expenditure	2,997
Capital consumption allowances	2,737
Hospitals	13,657
Wages and salaries	11,146
Non-wage expenditure	1,823
Capital consumption allowances	688
Canada and Quebec Pension Plans	166

* DND is the Department of National Defence.

Investment in Fixed Capital

Investment in fixed capital comprises three major categories, namely residential construction, non-residential construction and machinery and equipment (see Table 3.15). The estimates for the first part are derived from data on housing starts and completions, building permits and sales of existing houses. Those for the second and third parts come primarily from Statistics Canada's capital expenditure surveys.[70] In each category, separate estimates are calculated for the business sector[71] and for each level of government.

[70] See *Private and Public Investment in Canada, Intentions*, Catalogue 61-205, annual, and *Private and Public Investment in Canada, Revised Intentions*, Catalogue 61-206, annual. See also *Construction in Canada*, Catalogue 64-201, annual.

[71] Business investment in non-residential construction and in machinery and equipment is often referred to as investment in plant and equipment.

Table 3.15
Government and Business Investment in Fixed Capital

	Millions of dollars in 1985
Total investment in fixed capital	94,198
Government investment	12,886
Residential construction	16
Non-residential construction	10,480
Buildings	3,385
Highways, streets and bridges	4,614
Other engineering	2,481
Machinery and equipment	2,390
Furniture	224
Agricultural machinery	26
Industrial machinery	476
Office machines	304
Automobiles	145
Trucks	145
Other transportation equipment	412
Telecommunication equipment	136
Other machinery and equipment	522
Business investment	81,312
Residential construction	25,222
New construction	11,653
Alterations and improvements	9,320
Transfer costs	4,249
Non-residential construction	26,747
Buildings	11,133
Highways, streets and bridges	444
Railways	964
Other engineering	14,206
Machinery and equipment	29,343
Furniture	1,151
Agricultural machinery	1,928
Industrial machinery	9,732
Office machines	3,196
Automobiles	2,855
Trucks	2,171
Other transportation equipment	2,257
Telecommunication equipment	1,957
Other machinery and equipment	4,096

Residential Construction

Residential construction investment is divided into three components. The first is new housing construction, in turn sub-divided into single dwellings, semi-detached dwellings, row housing, apartments, plus cottages, conversions[72] and mobile homes. The value of construction work put in place (WPIP) is calculated in the Investment and Capital Stock Division from housing starts,[73] WPIP technical coefficients and average values of building permits.[74] The WPIP coefficients measure, by quarter of start,[75] by province and by type of dwelling, the volume of work normally executed in each construction period. For single and semi-detached dwellings, about 50% of the construction work is normally done in the first quarter, about 40% in the second quarter and most of the remaining work, in the third quarter after the start. The work patterns are quite different for row housing and apartments and typically longer, with about 30% done in the first quarter, 40% in the second, 20% in the third and the rest in the fourth and fifth quarters following a start. The value of work put in place in a particular period is calculated by multiplying these WPIP technical coefficients by the value of housing starts for that period and previous periods, and summing. Estimates of expenditures on cottages and conversions are based on building permits and those on mobile homes, on manufacturers' shipments. One final adjustment is added to new construction, called supplementary costs. This is an estimate of the architectural, engineering and other costs associated with the final value of a new dwelling which are not captured in the building permit values.

The second component of residential construction is alterations and improvements to existing dwellings. Estimates are benchmarked to the Survey of Family Expenditure in Canada every fourth year[76] and are based on the results of the Shelter Cost Survey in other years.[77] Quarterly estimates of spending on alterations and improvements are projected using related indicators such as building permits and wholesale sales of lumber and building materials.

The third component of residential investment, transfer costs, refers to the value of services relating to the sale of dwellings. In practice, the only such service measured is real estate commissions. Information is severely lacking in this area and currently the estimates are based solely on monthly statistics from the Multiple Listing Service (MLS) database of the Canadian Real Estate Association. The MLS data on unit sales and average selling prices, weighted to reflect the Canada-wide distribution of housing resale activity, are used to project the trend in transfer costs.

Non-Residential Construction

Non-residential construction investment refers to industrial, commercial and institutional buildings and engineering works such as roads, dams, transmission lines, pipelines, oil well drilling and mine development. Spending is defined to include all capitalized costs such as architectural, legal and engineering fees, capitalized interest and "own account" work by firms employing their own labour force.[78] As in the case of residential construction, an estimate of real estate commissions is added to the annual investment benchmarks and quarterly projections. For non-residential construction this portion is small, amounting to about 1% of the total in 1985.

---

[72] Conversions refer to investment outlays for the purpose of transforming one type of dwelling into another, for instance a single house into a multiple unit dwelling.

[73] These are obtained from a Canada Mortgage and Housing Corporation survey, results of which are published by Statistics Canada in ***Housing Starts and Completions***, Catalogue 64-002, monthly.

[74] See ***Building Permits***, Catalogue 64-001, monthly, and ***Building Permits, Annual Summary***, Catalogue 64-203, annual.

[75] The work-put-in-place coefficients are actually available, and are employed, on a monthly basis.

[76] The estimates for alterations and improvements underwent a major revision in 1986. Previous estimates, based on building permits, were found to be much too low, according to the 1982 FAMEX survey.

[77] The Shelter Cost Survey is conducted annually in conjunction with the Labour Force Survey. The questions are similar to those from the FAMEX survey that deal with shelter costs.

[78] However, exploration costs are not all capitalized. Geological and geophysical expenditures are treated as current spending in the IEA even though some companies capitalize them on their books.

There are three surveys on private and public investment. The first is carried out in November and December and yields preliminary estimates of capital spending in the current year and spending intentions for the coming year. These intentions are updated in the second survey conducted the following June. Finally, actual capital expenditures are collected in a survey carried out between March and September of the year following the reference year. These surveys are the basic source of information used in constructing the estimates for government and business investment in non-residential construction.

In the absence of a quarterly survey, the quarterly estimates must rely on related indicators.[79] Since most indicators in this area do not distinguish well between residential and non-residential construction, a two-step method is utilized. First, total construction outlays are projected using information on employment, wages, shipments of construction materials and base profit in the construction industry.[80] The independently derived estimate of residential construction is then subtracted, yielding estimated outlays on non-residential construction. The government/business sector split is calculated using the proportions indicated in the PPI forecast or mid-year intentions. Some government business enterprises, however, are shifted from the government to the business sector, in conformity with their classification in the SNA. The provincial distribution of investment in non-residential construction also comes directly from the capital investment surveys.

Machinery and Equipment

Machinery and equipment investment refers to government and business expenditure on capital goods having a productive life of one year or more. The investment covers installation costs as well as delivery costs. Progress payments on heavy machinery are counted as investment in the period in which they are made. However, machinery and equipment excludes equipment which is an integral part of a building or other structure, such as elevators and furnaces, treated instead as non-residential construction.

As stated, the annual estimates for machinery and equipment investment are taken from the capital expenditure surveys, with adjustments to convert the results to a national accounts basis.[81] As in the case of non-residential construction investment, the quarterly estimates are distributed and projected using related indicators. For each of thirty-three categories or commodity groups, final demand is estimated as total domestic supply (production plus imports minus exports) less intermediate use and inventory change.[82,83]

The first step in the procedure is to project domestic production of each category of machinery and equipment. These estimates are calculated by applying a commodity matrix to manufacturing shipments by industry. The elements in the

---

[79] Since a substantial divergence between intentions and actual investment can be observed historically, the intentions statistics are not tied to the estimation procedure in any formal manner.

[80] Employment is adjusted for time lost in work stoppages; see ***The Labour Force***, Catalogue 71-001, monthly, and Labour Canada, ***Major Work Stoppages***. Average hourly earnings in construction are used as the wage indicator; see ***Employment, Earnings and Hours***, Catalogue 72-002. Shipments and exports of construction materials are taken from ***Monthly Survey of Manufacturing***, Catalogue 31-001, and ***Summary of Canadian International Trade (H.S. Based)***, Catalogue 65-001, monthly. Profits come from ***Industrial Corporations, Financial Statistics***, Catalogue 61-003, quarterly. Value added in contract drilling, computed by the Industry Measures and Analysis Division, is an additional indicator used in the projector; see ***Gross Domestic Product by Industry***, Catalogue 15-001, monthly. The indicators are combined in a linear equation with coefficients calculated by least squares.

[81] Net sales of used assets such as ships, motor vehicles and other types of equipment recorded implicitly or explicitly elsewhere in final expenditure are not part of current production or GDP and must be deducted from business investment in machinery and equipment. This adjustment was introduced at the time of the historical revision of 1972. Defence capital outlays are also subtracted and transfer costs on sales and purchases of existing fixed assets are added. See Table 66 in the annual ***NIEA***, Catalogue 13-201.

[82] The 33 commodity categories originate in the Input-Output Accounts. Until recently, the capital investment surveys did not contain information by commodity, but a breakdown of this type is now available from that source as well, for 30 types of assets in 54 industries. See ***Capital Expenditure on Machinery and Equipment by Type of Asset, 1987***, an uncatalogued publication of the Investment and Capital Stock Division.

[83] See Luc Provençal, "Incorporation in the Income and Expenditure Accounts of a Breakdown of Investment in Machinery and Equipment," ***National Income and Expenditure Accounts***, Catalogue 13-001, third quarter 1989, pp. xxv-xli for a thorough review of estimates in this area.

matrix represent the proportion of production accounted for by each commodity group in each industry and are taken from the "make" matrix of the input-output system. The next step is to add imports and subtract exports of machinery and equipment to these commodity totals in order to obtain total domestic supply. A concordance has been established to this effect between the Harmonized Commodity Description and Coding System used for the international trade statistics and the commodity groups which make up the projectors for machinery and equipment. Taxes along with trade and transportation margins, calculated with input-output ratios, are then added to each total domestic supply series, yielding total domestic supply at market prices by commodity group. Finally, the estimated contribution of inventory change to total domestic supply and intermediate use are then subtracted, to provide the estimated portion of total supply which ends up as machinery and equipment investment.

The procedure just described is, in fact, applied only to 31 of the 33 commodity groups. Final demand for the remaining groups, namely automobiles and trucks, is estimated by a more direct method. Total sales by type of vehicle come from the Survey of New Motor Vehicle Sales.[84] The share of automobile sales attributable to government and business is based on data from the Canadian Motor Vehicle Manufacturers' Association; for trucks, the share is based on buyer profile information. Fleet sales are treated separately in both instances and assumed to be accounted for entirely by the business and government sectors.

As in the case of non-residential construction, the capital expenditure intentions for machinery and equipment are analyzed in conjunction with the current indicators, but are not tied in formally with the quarterly estimation procedure.[85] The investment intentions are, however, used to split the total spending into separate government and business portions.

The provincial allocation of machinery and equipment investment comes directly from the capital investment surveys, with the adjustments made to the national estimates being replicated at the provincial level.

Value of Physical Change in Inventories

Government Inventories

Government inventories represent an insignificant part of total inventory holdings. They include inventories held by government marketing agencies such as the Canadian Dairy Commission. All the inventory change recorded in the accounts relates to the federal government and the estimates are based on the accounting records of the agencies.

Business Non-Farm Inventories

The value of physical change (VPC) in business non-farm inventories is one of the most volatile aggregates of GDP, contributing substantially to cyclical movements in the economy. It is also one of the most difficult to measure accurately in the accounts. This component comprises all net additions to or withdrawals from inventories, except for government inventories as well as farm inventories and grain in commercial channels.[86]

---

[84] See *New Motor Vehicle Sales*, Catalogue 63-007, monthly.

[85] As a predictor of actual investment, the intended capital spending sometimes turns out to be quite wide of the mark. The 1982 recession year provides a striking example in this regard. The initial PPI forecast for the year, from the December 1981 survey, indicated an increase of 10% in machinery and equipment investment. The mid-year survey, carried out in June 1982, revised this estimate to essentially no growth for the year. At the same time, the current indicators, that is imports and domestic shipments, were pointing to a substantial decline. The preliminary actual PPI figures for the year reported in the December 1982 survey indicated a 10% drop and the final actual figures, from the June 1983 survey, showed a 5% decline.

[86] In principle the VPC in business non-farm inventories should be apportioned by sector, but this is not possible with the existing data. For this reason, the VPC is allocated entirely to corporations and government business enterprises in the sector accounts.

The estimation of the VPC in business non-farm inventories begins with statistics on inventory book values by industry, which appear in the annual industry surveys and in a number of other surveys.[87] In the construction industry, inventories of building materials are recorded but dwellings partially completed or completed but still unsold are treated as fixed investment rather than as inventories. The quarterly estimates are projected using the existing sub-annual information and are subsequently revised when annual information becomes available.[88]

The inventory book values obtained from business accounting records are based on methods of inventory valuation which are quite different from those required in the IEA. Changes in company book values reflect prices recorded in firms' financial accounts, which in turn depend on the accounting conventions adopted and the average turnover period of inventories. In the IEA, inventory changes must be measured in terms of the average market price prevailing during the reference period, and recorded book values must be adjusted accordingly.

The steps in the estimation procedure are the following. First, inventory book values are deflated using an appropriate price index, lagged and weighted to reflect the commodity composition of stocks, the average stock turnover period and the typical accounting method in a given industry.[89] This yields new inventory book values measured at the prices of the base period. The change in this new volume series, referred to as the "physical change", is then revalued by the application of a price index reflecting the average market price prevailing for the current period. This revalued inventory change is called the value of physical change at current prices. The physical change valued at prices of the base period enters GDP at 1986 prices, while the physical change revalued at current prices enters GDP at market prices. The difference between the VPC at current market prices and the change in the original unadjusted book values is called the inventory valuation adjustment, and is subtracted from income-based GDP in order to eliminate holding gains or losses present in corporation profits before taxes and net income of unincorporated business. These calculations are carried out at a detailed level for over 200 industries and are illustrated in Table 3.16. Table 3.17 provides a view of the aggregated results, for the year 1985.

In the absence of the required price deflators by province, this method is not employed to derive the provincial estimates of VPC in business non-farm inventories. Instead, the national estimates are distributed simply on the basis of reported book values.

---

87 See in particular ***Pulpwood and Wood Residue Statistics***, Catalogue 25-001, monthly; ***Logging Industry***, Catalogue 25-201, annual; ***Coal Mines***, Catalogue 26-206, annual; ***The Crude Petroleum and Natural Gas Industry***, Catalogue 26-213, annual; ***Monthly Survey of Manufacturing***, Catalogue 31-001, monthly; ***Manufacturing Industries of Canada, National and Provincial Areas***, Catalogue 31-203, annual; ***Oil Pipe Line Transport***, Catalogue 55-201, annual; ***Telecommunications Statistics***, Catalogue 56-201, annual; ***Telephone Statistics***, Catalogue 56-203, annual; ***Radio and Television Broadcasting***, Catalogue 56-204, annual; ***Cable Television***, Catalogue 56-205, annual; ***Electric Power Statistics***, Catalogue 57-202, annual; ***Gas Utilities, Transport and Distribution Systems***, Catalogue 57-205, annual; ***Industrial Corporations, Financial Statistics***, Catalogue 61-003, quarterly; ***Corporation Financial Statistics***, Catalogue 61-207, annual; ***Department Store Sales and Stocks***, Catalogue 63-002, monthly; ***Wholesale Trade***, Catalogue 63-008, monthly; and ***Merchandising Inventories***, Catalogue 63-014, monthly.

88 The survey information on inventories in construction and in finance and services is very weak. In the former case, inventories are projected on Labour Force Survey employment in the construction industry and on construction price indexes. Stocks in finance and services are projected using related consumer expenditure series.

89 The estimation of turnover periods largely relies on a survey of accounting methods in manufacturing industries carried out in 1976 by the Industry Division. Turnover periods have been updated in an *ad hoc* fashion since then on the basis of shipments-to-inventories ratios. The deflators are constructed with CPIs, IPPIs and import and export price indexes. See ***The Consumer Price Index***, Catalogue 62-001, monthly; ***Consumer Prices and Price Indexes***, Catalogue 62-010, quarterly; ***Construction Price Statistics***, Catalogue 62-007, monthly; ***Industry Price Indexes***, Catalogue 62-011, monthly; and ***Summary of Canadian International Trade (H.S. Based)***, Catalogue 65-001, monthly. The estimated commodity composition of stocks for a given industry comes from the input-output accounts.

Table 3.16
Calculation of the IVA and the VPC in Business Non-Farm Inventories

	Opening balance	Closing balance	Period-to-period change
1. Enter reported book values (millions of dollars)	1769	2042	
2. Establish price index for deflating book values*	112	115	
3. Calculate the constant dollar book value (100 x line 1 ÷ line 2)	1579	1776	
4. Calculate the change in constant dollar book value (from line 3)			197
5. Establish a "revaluer" price index based on average prices during the period**	114	114	
6. Revalue the reported book values to replacement cost using the revaluer price index (line 5 x line 3 ÷ 100)	1800	2025	
7. Calculate the value of physical change based on the change in the book values at replacement cost (from line 6)			225
8. Enter the change in reported book values (from line 1)			273
9. Calculate the inventory valuation adjustment (line 7 - line 8)			-48

* The deflators are composite price indexes taking into account the commodity composition of the goods in inventory (raw materials, goods in process and finished products). The indexes are derived using lagged prices or averages of current and lagged prices depending on the accounting conventions and average turnover periods of the goods in stock in a given industry.

** The composite price index used in the revaluation is the same as in the deflation; however, the index reflects the average price of the current period only. The average price is used to revalue both the opening and the closing balance to replacement cost, that is, to current market price.

Table 3.17
Value of Physical Change in Business Non-Farm Inventories

	Millions of dollars in 1985
Total VPC in business non-farm inventories	1,997
Manufacturing	86
Food	-71
Beverages	-79
Tobacco	-142
Rubber	19
Plastics	27
Leather	-12
Textiles	-12
Knitting and clothing	44
Paper and allied products	75
Printing and publishing	-36
Refined petroleum products	-410
Chemical products	230
Wood products	68
Furniture	44
Primary metals	-76
Metal products	82
Machinery	-62
Transportation equipment	315
Motor vehicles	105
Motor vehicle parts	52
Other transportation equipment	158
Electrical products	16
Non-metallic mineral products	13
Miscellaneous manufacturing	53
Trade	1,871
Retail trade	1,986
Motor vehicles	866
Other durable goods	295
Non-durable goods	825
Wholesale trade	-115
Machinery and equipment	-124
Lumber	-44
Motor vehicles	101
Other durable goods	66
Non-durable goods	-114
Other industries	61
Logging	-75
Mining	147
Finance and services	24
Utilities	-144
Transportation	64
Construction	45
Gold	-21

There are serious practical problems in the estimation procedure of the VPC in business non-farm inventories. One basic difficulty is that the accounting practices of firms differ, some using the "first in first out" (FIFO) method, others the "average cost" (AC), others the "last in first out" (LIFO) and others again the "lower of cost or market price" (LCM) method.[90] The valuation methods employed are not always clearly indicated in the statistics. Nor are the turnover period and the commodity content of the stocks well identified. Furthermore, price indexes do not always match the book values they serve to deflate and revalue. For all of these reasons, the value of physical change in business non-farm inventories is less accurate than most of the other GDP aggregates.

Farm Inventories and Grain in Commercial Channels

The value of physical change in farm inventories appears in the income based estimate of GDP as part of accrued net income of farm operators from farm production. It also enters the expenditure based estimate of GDP as a component of business investment in inventories. The sources and methods for the VPC in farm inventories are explained in the earlier section that deals with the accrued net income of farm operators. Grain in commercial channels is valued as the change in the quantity of grain held by the Canadian Wheat Board and held privately by commercial dealers. Information comes from the ***Grain Statistics Weekly***, published by the Canadian Grain Commission.

Merchandise Exports and Imports

Merchandise trade covers transactions involving a sale of movable goods between residents of Canada and non-residents. Estimates are based on data from administrative records of Revenue Canada — Customs and Excise,[91] compiled according to the Harmonized Commodity Description and Coding System.[92] When goods are imported to or exported from Canada, declarations must be filed with Customs giving their description and value, stating their origin or port of clearance and the mode of transport. Most of this information is required for Customs administration. These statistics on a "Customs basis" are adjusted to conform with national accounts concepts and definitions, thereby becoming estimates on a "Balance of Payments basis". The adjustments involve the definition of trade, its valuation and the timing of transactions.[93]

The most significant adjustment on account of definition concerns cross-border flows which do not involve a change in ownership of the goods, as called for in the Balance of Payments. For example, gold shipped to Canada to be refined here is sometimes returned to the country of origin after processing with no change in ownership. According to the BOP, the only trade which occurs in this instance is the export of metal refining services, recorded in the non-merchandise rather than the merchandise account. Other adjustments are made on account of transactions which involve a change of ownership without the goods leaving the country. Valuation adjustments are made in cases where freight and shipping costs have been included in the Customs valuation or where discounts have been applied which were not reflected in the

---

[90] With FIFO, goods are assumed to be charged out from inventory to sales or production in the order they were originally acquired. Average cost valuation allows for the recalculation of inventory book values through time so that the prices of goods charged out to sales or production are more recent (although not necessarily the most recent). With LIFO, which is closer to the replacement cost valuation required in the accounts, it is assumed that the goods charged out first are the ones most recently acquired. Finally, the lower of cost or market value approach may be used with any of the other valuation methods just mentioned, and involves writing down book values immediately if current market prices fall below acquisition prices as previously recorded.

[91] One important exception is data on crude petroleum imports, which are collected through the National Energy Board rather than in Customs documents.

[92] Data on a Customs basis are compiled in the International Trade Division. For a description of the statistical program on merchandise trade see ***Summary of Canadian International Trade (H.S. Based)***, Catalogue 65-001, monthly.

[93] Data on a Balance of Payments basis are the responsibility of the Balance of Payments Division. For a detailed description of the adjustments made, see ***The Canadian Balance of International Payments and International Investment Position***, Catalogue 67-506E, occasional, pp. 49-64. The publication ***Quarterly Estimates of the Canadian Balance of International Payments***, Catalogue 67-001, quarterly, contains a glossary.

Customs valuation.[94] Timing adjustments[95] are also required, largely to account for delays in processing the Customs data. Grain exports are a case in point.

As explained in Chapter 2, it has not yet proved feasible to develop estimates of interprovincial trade or of international trade by province in the Provincial Economic Accounts. Tables 3.18 through 3.21 provide a breakdown of the merchandise trade estimates by commodity grouping for 1985.[96]

Beginning in 1990, the estimates of Canadian merchandise exports to the United States have been derived from U.S. import Customs documents, rather than Canadian export documents. The import documents are generally considered superior. The United States also make use of data from Canadian import documents to measure their exports.

Non-Merchandise Exports and Imports

Non-merchandise trade is more difficult to measure, since it involves a variety of transactions which are not subject to the administrative requirements of Customs. International trade in services has been expanding and changing very rapidly in recent years. The estimates, divided into five categories and several sub-categories, are displayed in Tables 3.22 and 3.23.[97,98]

The travel category refers to the expenditures of foreign travellers in Canada and of Canadian travellers abroad. International passenger fares paid to foreign airlines by residents or to Canadian airlines by non-residents are included here, as well as goods purchased by travellers for personal use, with the exception of goods shipped home by travellers, which are recorded in merchandise trade. The estimates are compiled from data on border crossings, combined with survey information about the average amounts spent by travellers.[99]

Freight and shipping refer to receipts and payments relating to the transportation of merchandise by sea, by air and inland, and to in-transit and port expenditures. These outlays belong to non-merchandise trade since merchandise trade is measured FOB at point of lading. The estimation of freight and shipping charges relies on a number of sources including reports by airline, railway and pipeline companies. As mentioned earlier, efforts are made to ensure that all freight and shipping charges are counted in non-merchandise, rather than merchandise trade.

---

94 In principle, Customs value goods free on board (FOB) at point of lading, excluding freight, landing, insurance or similar charges. In practice, some transportation costs are incorporated in the statistics on a Customs basis. When detected, these are removed from merchandise trade and transferred to freight and shipping in the service account.

95 Timing adjustments refer to date shifts applied when data for a particular period actually relate to activity which took place in an earlier period. For example, Customs records for May might, in fact, apply to goods which crossed the border in the last few days of April as well. A simple timing adjustment in this case would be to calculate a new series containing, say, 90% of the amount reported in May and 10% of the amount reported in June.

96 For more detailed information by commodity and country of origin or destination, see ***Exports by Country***, Catalogue 65-003, quarterly; ***Exports by Commodity***, Catalogue 65-004, monthly; ***Imports by Country***, Catalogue 65-006, quarterly; ***Imports by Commodity***, Catalogue 65-007, monthly; ***Exports, Merchandise Trade***, Catalogue 65-202, annual; and ***Imports, Merchandise Trade***, Catalogue 65-203, annual.

97 This classification has been established by the Balance of Payments Division. See ***Canada's International Transactions in Services***, Catalogue 67-203, annual, and ***Canada's International Trade in Services, 1969 to 1984***, Catalogue 67-510, occasional. The publications also contain a review of sources and methods.

98 Prior to the historical revision in 1986, when the accounts were centred on GNP instead of GDP, investment income received from and paid to non-residents were additional major components of non-merchandise exports and imports.

99 The travel estimates are calculated by the Education, Culture and Tourism Division. See ***International Travel***, Catalogue 66-001, quarterly; and ***International Travel, Travel Between Canada and Other Countries***, Catalogue 66-201, annual.

Table 3.18
Merchandise Exports, Part I

	Millions of dollars in 1985
Total merchandise exports	119,061
Live animals	468
Food, feed, beverages and tobacco	9,265
Fish and fish preparations	1,849
Barley	283
Wheat	3,811
Wheat flour	85
Other cereals, unmilled	114
Other cereal preparations	238
Meat and meat preparations	835
Alcoholic beverages	553
Other food, feed, beverages and tobacco	1,497
Crude materials, inedible	19,227
Rapeseed	531
Other crude vegetable products	475
Iron ores, concentrates and scrap	1,252
Copper ores, concentrates and scrap	552
Nickel ores, concentrates and scrap	580
Zinc ores, concentrates and scrap	222
Other ores, concentrates and scrap	1,567
Crude petroleum	5,972
Natural gas	4,011
Coal and other bituminous substances	1,541
Asbestos, unmanufactured	332
Other crude animal products	326
Other crude wood products	295
Other crude non-metallic minerals	1,352
Other crude materials, inedible	219

Table 3.19
Merchandise Exports, Part II

	Millions of dollars in 1985
Total merchandise exports	119,061
Fabricated materials, inedible	35,364
Lumber	4,630
Other wood fabricated materials	990
Woodpulp and similar pulp	3,301
Newsprint paper	4,820
Other paper and paperboard	1,296
Inorganic chemicals	836
Organic chemicals	1,388
Fertilizers and fertilizer materials	1,131
Synthetic rubber and plastics	1,148
Other chemical products	353
Petroleum and coal products	3,343
Primary iron and steel	196
Steel bars, rods, plates, sheets	1,200
Other iron and steel and alloys	995
Aluminum including alloys	1,913
Copper and alloys	668
Nickel and alloys	595
Precious metals and alloys	1,595
Zinc and alloys	649
Other non-ferrous metals and alloys	178
Metal fabricated basic products	931
Electricity	1,425
Textile fabricated materials	316
Non-metallic mineral basic products	746
Other fabricated materials	721
End products, inedible	52,258
Industrial machinery	3,502
Agricultural machinery including tractors	628
Passenger autos and chassis	15,743
Trucks and other motor vehicles	6,260
Motor vehicle parts including engines and engine parts	11,210
Television, telecommunication equipment	2,872
Aircraft, engines, parts	2,449
Other transportation equipment	1,144
Office machines and equipment	1,882
Other equipment and tools	2,647
Other consumer goods	2,000
Other end products, inedible	1,921
Special transactions, trade	398
Unallocated BOP adjustments	2,081

Table 3.20
Merchandise Imports, Part I

	Millions of dollars in 1985
Total merchandise imports	102,670
Live animals	109
Food, feed, beverages and tobacco	5,800
Meat and meat preparations	427
Fish and marine animals	494
Fresh fruits and berries	852
Dried fruits and fruit preparations	492
Fresh vegetables	549
Other vegetables and vegetable preparations	316
Cocoa, coffee, tea and other food preparations	1,039
Dairy produce, eggs and honey	135
Corn (maize), shelled	94
Other cereals and cereal preparations	256
Sugar and sugar preparations	432
Fodder, feed, excluding unmilled cereal	241
Beverages	441
Tobacco	32
Crude materials, inedible	7,748
Metals in ores, concentrates and scrap	1,501
Coal and other related products	888
Crude petroleum	3,749
Crude animal products	269
Crude vegetable products	452
Crude wood products	183
Cotton	88
Wool and synthetic fibres	163
Crude non-metallic minerals	455

Table 3.21
Merchandise Imports, Part II

	Millions of dollars in 1985
Total merchandise imports	102,670
Fabricated materials, inedible	18,731
Wood fabricated materials	673
Textile fabricated materials	1,886
Organic chemicals	1,509
Plastic materials	1,555
Other chemicals and related products	2,380
Petroleum and coal products	1,710
Steel bars, rods, plates, sheets	1,127
Other iron and steel products	881
Precious metals including alloys	1,432
Other non-ferrous metals and alloys	1,135
Metal fabricated basic products	1,592
Rubber fabricated materials	233
Oils, fats, animal and vegetable	230
Non-metallic minerals	1,036
Other fabricated materials	1,352
End products, inedible	69,593
Engines, turbines and electric motors	790
Drilling mining machinery	791
Excavating machinery	863
Metal working machinery	1,033
Other industrial machinery	4,450
Agricultural machinery including tractors	1,739
Passenger autos and chassis	10,774
Trucks and other motor vehicles	3,109
Motor vehicle parts including engines and engine parts	17,208
Television, radios, phonographs	831
Other commununication and related equipment	3,720
Office machines and equipment	4,194
Other equipment and tools	6,665
Aircraft, engines, parts	2,554
Other transportation equipment and parts	1,294
Apparel and apparel accessories	1,804
Footwaar	499
Printed matter	1,385
Watches, sporting goods and toys	956
House furnishings	1,144
Photographic goods	1,017
Miscellaneous end products	2,773
Special transactions, trade	1,629
Unallocated BOP adjustments	-940

Table 3.22
Non-merchandise Exports

	Millions of dollars in 1985
Total non-merchandise exports	15,858
Expenditure of foreign travellers in Canada	5,006
From United States	3,674
From other countries	1,332
Freight and shipping	4,604
Ocean shipping	986
Inland freight on exports	3,382
In-transit and air freight	236
Business services	5,241
Consulting and other professional services	973
Transport-related services	598
Airline transactions	550
Other transport-related services	48
Management and administrative services	155
Research and development	458
Commissions	648
Broker and agent commissions	522
Other commissions	126
Royalties, patents and trademarks	67
Films and broadcasting	26
Advertising and promotional services	60
Financial services	711
Insurance companies	447
Insurance brokers	264
Computer services	84
Equipment rentals	239
Communications	317
Refining and processing services	65
Tooling and other automotive charges	602
Other services	238
Government transactions	564
Federal government	508
Provincial governments	56
Other services	443
Trade unions	74
Other services	369

Table 3.23
Non-merchandise Imports

	Millions of dollars in 1985
Total non-merchandise imports	20,718
Expenditure of Canadian travellers abroad	7,110
To United States	4,158
To other countries	2,952
Freight and shipping	4,396
Ocean shipping	1,326
Inland freight on imports	2,600
In-transit and air freight	470
Business services	7,680
Consulting and other professional services	271
Transport-related services	768
Airline transactions	736
Other transport-related services	32
Management and administrative services	935
Research and development	754
Commissions	481
Broker and agent commissions	249
Other commissions	232
Royalties, patents and trademarks	1,067
Films and broadcasting	192
Advertising and promotional services	83
Financial services	1,320
Insurance companies	582
Insurance brokers	397
Other financial	341
Computer services	92
Equipment rentals	420
Franchises and similar rights	16
Communications	298
Tooling and other automotive charges	508
Other services	475
Government transactions	1,191
Federal government	974
Provincial governments	217
Other services	341
Trade unions	120
Other services	221

The remaining components of non-merchandise trade cover a variety of business and government transactions. Included in the latter category are federal government outlays for diplomatic representation and military bases abroad and contributions to NATO, the OECD, the UN and other international organizations. These flows are estimated from survey data[100] and from federal and provincial government public accounts. "Other services" refer to expenditures of foreign students, transactions on recreational and cultural services and wage earnings of commuters and migrant workers.[101] Again, no estimates have been compiled for non-merchandise trade by province, either international or interprovincial.

3.2 The Constant Price Estimates

The constant price estimates of GDP are obtained by summation of over 400 deflated expenditure categories.[102] The income aggregates of GDP are not deflated.[103]

The deflation method chosen depends on data availability. Most of the price indexes employed in the procedure are published by Statistics Canada at regular intervals, usually each month. They include the consumer price indexes, the industrial product price indexes, the construction price indexes (such as those for new housing), the farm product price indexes and the merchandise exports and imports price indexes.[104] Indexes of wage rates and average earnings are also employed.[105]

Table 3.24 shows the relative importance of the price indexes entering the deflation procedure. The table gives, for GDP and its aggregates excluding inventories, the percentage of the total value in 1986 which is deflated by a particular type of price index. The CPI, for instance, serves to deflate about 72% of personal expenditure on consumer goods and services, about 9% of government current expenditure on goods and services, 10% of investment in fixed capital, 5% of exports and no part of imports. Summed over all expenditure aggregates, this amounts to 48% of GDP in 1986. Consumer price indexes are clearly the most important source for the deflation of GDP. Earnings and wage rate indexes come in second place, followed by the export and import price indexes. The "other" category refers mainly to series for which there is an independent volume indicator, such as operating expenses of universities where enrollment is used. In these instances, the price index is implicit.

---

100 The Balance of Payments Division is responsible for these surveys.

101 See *The Canadian Balance of International Payments and International Investment Position*, Catalogue 67-506E, occasional, for a thorough explanation of sources and methods in the area of non-merchandise trade.

102 A review of the concepts which underlie the constant price estimates can be found in Chapter 2.

103 The deflation of the income aggregates is not undertaken. No adequate conceptual framework for deflating incomes has ever been defined. This means it is not possible to calculate the statistical discrepancy in constant prices in the same manner as in current prices. There is a statistical discrepancy in constant prices, but it is simply derived by deflating the current price discrepancy by the overall GDP implicit price index excluding this discrepancy.

104 See *The Consumer Price Index*, Catalogue 62-001, monthly; *Consumer Prices and Price Indexes*, Catalogue 62-010, quarterly; *Farm Product Price Index*, Catalogue 62-003, monthly; *Farm Input Price Index*, Catalogue 62-004, quarterly; *Construction Price Statistics*, Catalogue 62-007, quarterly; *Industry Price Indexes*, Catalogue 62-011, monthly; and *Summary of International Trade (H.S. Based)*, Catalogue 65-001, monthly. For information on the definition, scope, concepts and data collection for some of these indexes, see *The Consumer Price Index Reference Paper: Updating Based on 1986 Expenditures*, Catalogue 62-553, occasional, and *Industrial Product Price Indexes, 1981=100: Concepts and Methods*, Catalogue 62-556, occasional.

105 The chief source in this case is the SEPH.

Table 3.24
Relative Importance of Price Indexes in IEA Deflation
(Based on 1986 expenditures)

	Personal Expenditure	Government Current Expenditure	Investment in Fixed Capital	Exports	Imports	GDP
Consumer price indexes	72	9	10	5	-	48
Industrial product price indexes	-	5	15	-	-	4
Construction price indexes	-	3	47	-	-	10
Earnings and wage rate indexes	2	67	-	7	11	14
Export unit values	-	-	-	46	-	13
Export specified price indexes	-	-	-	41	-	11
Import unit values	-	-	-	-	23	-6
Import specified price indexes	-	-	19	-	51	-10
Other indexes	26	16	9	1	15	16
Total	100	100	100	100	100	100

Personal Expenditure on Consumer Goods and Services

The deflation of consumer spending on goods and services is carried out at the same level of detail as the current price estimates, that is for over 130 commodities. Virtually all spending on goods is deflated with CPIs but there are several series in services for which suitable CPIs do not exist. When no single CPI matches a particular category, several CPIs may be aggregated to form the required index.[106]

In a few cases, indexes other than consumer price indexes, such as the IPPIs, are employed.[107] For a small number of commodities, quantity data multiplied by an average price from the base year are used to calculate the constant price estimates.[108]

Several of the services categories rely on sources other than consumer price indexes:

- For a few categories, notably janitorial services, stock and bond commissions, legal, accounting and similar services, funerals and burials, and accident and sickness insurance, the deflation procedure is based on an appropriate average weekly earnings series from the SEPH.
- Medical care spending is deflated with a fee-benefits index of medical care developed by Health and Welfare Canada.
- For lotteries and pari-mutuel betting, deflators are constructed using the "all items" CPI and the average payout proportions involved.

---

106 For example, cameras and accessories are deflated using a weighted index of the CPI for "photographic cameras" and the CPI for "camera parts and accessories, including lenses".

107 A relevant example is sporting and camping equipment, which is deflated with a weighted average of the CPIs for "sporting and athletic equipment", "camping and picnic equipment" and "supplies and parts for recreation equipment", plus the IPPI for "snowmobiles and motorized sleds".

108 Consumption of natural gas is a case in point. See *Gas Utilities*, Catalogue 55-002, monthly; and *Gas Utilities, Transport and Distribution Systems*, Catalogue 57-205, annual. Gross rents are another important example. In this instance the volume series is calculated by multiplying the annual stock of housing by gross average space rent in the base year.

- For universities, the volume series is deemed proportional to enrollment.
- For financial services, the constant price series is deemed proportional to the volume of consumer loans and personal deposits, which in turn is obtained through deflating current dollar values by the "all items" CPI.
- Operating expenses of special care facilities in constant dollars are deemed proportional to employment.
- Travel expenditures outside Canada are deflated with a weighted average of the United States CPIs for food away from home, shelter, apparel and upkeep, private transportation and other goods and services, adjusted for the exchange rate.
- Military pay and allowances abroad[109] are deflated with a weighted average of cost of living indexes from the United Kingdom, the Federal Republic of Germany and the United States, also adjusted for exchange rates.

Generally speaking, the deflation of consumer expenditure is of high quality, usually superior to that of other GDP aggregates, since reliable price indexes are available and many of these match the categories in current prices very closely.

Government Current Expenditure on Goods and Services

The deflation of government current expenditure on goods and services is carried out for three components: wages and salaries, capital consumption allowances and other goods and services. For wages and salaries, the constant price estimate is deemed proportional to total government sector employment. Capital consumption allowances in constant prices are derived from data on capital stock, combined with information about average lives of assets.[110] For other expenditure on goods and services, the current price series is deflated using a weighted average of CPIs, IPPIs and other price indexes for specific commodities with weights taken from the input-output tables. Among the commodities with a relatively large weight are repair work (10.5%), rent (7.5%), business services (7.1%), travel (6.3%), office supplies (6.2%), pharmaceuticals (5.6%), electricity (5.3%), spare parts and maintenance (4.6%), telecommunications (4.4%) and rental of data processing equipment (4.1%).

Medicare, hospital and defence purchases are treated separately. For medicare, deflation relies on the same fee-benefits index employed in personal expenditure. Hospital expenditure on other goods and services is deflated with a weighted index of commodities used in hospitals.[111] Military equipment is deflated with the weighted-average price index used for government spending on other goods and services referred to above, combined with the machinery and equipment investment implicit price index.

---

[109] Military pay and allowances to Canadian forces stationed outside Canada are part of wages, salaries and supplementary labour income on the income side of the accounts. On the expenditure side they enter government current expenditure on goods and services. They are recorded again in consumer expenditure on services, offset by an identical entry in non-merchandise imports.

[110] See ***Fixed Capital Flows and Stocks***, Catalogue 13-211, annual, and the earlier discussion in this chapter.

[111] The index weights come from the input-output tables and the price indexes are mostly CPIs and IPPIs.

Investment in Fixed Capital

Residential Construction

Business and government investment in residential construction is deflated in the usual manner with appropriate price indexes. The new housing price index excluding land (NHPI)[112] is used to deflate new construction work put in place for single dwellings, semi-detached dwellings and row housing. The deflation is carried out by province with 20 city NHPIs aggregated to form provincial indexes. Construction work put in place for apartments is deflated with an apartment price index. Alterations and improvements to existing housing are deflated with a specially constructed labour and materials price index, weighted on the basis of information from the FAMEX survey and employing IPPIs[113] and union wage rate indexes[114] for the construction industry. The constant price estimates for the current quarter are calculated using the CPI for housing maintenance and repairs, pending the detailed weighting information. The constant price estimates for transfer costs are based on unit sales of existing houses by province, from the Multiple Listing Service.

Non-Residential Construction

For the purpose of deflation, non-residential construction investment is subdivided by type of building and engineering structure. The annual estimates are deflated with a detailed method, while the quarterly estimates are projected using a more approximate approach. Deflation of non-residential building construction is carried out annually by province using non-residential building output price indexes and information on the type of structure.[115] Price indexes are available for seven cities (Halifax, Montreal, Ottawa, Toronto, Calgary, Edmonton and Vancouver) and five types of structure (office buildings, warehouses, shopping centres, industrial buildings and institutional buildings). The indexes are weighted using current estimates of investment in non-residential construction by type of structure. The same method is also employed quarterly, but with annual weights. The deflation of engineering construction also relies on structural categories and non-residential construction price indexes. Currently, it is carried out separately for:

- Hydro and thermal generating plants and transmission lines
- Nuclear generating plants
- Oil, gas and water storage tanks
- Sewers and sewage disposal plants
- Oil and natural gas refineries
- Telecommunications installations
- Exploration and development drilling
- Railways
- Highways
- Other engineering structures

Output price indexes are employed annually, except for railways and sewers and sewage disposal plants where an input price approach must be used in the absence of output price indexes. On a quarterly basis, output price estimates are

---

[112] This index measures the contractors' selling prices of new houses, where specifications remain the same for two consecutive periods. House prices reported by builders are adjusted for differences in quality of both the structures and the serviced lots, including intangible factors such as location, to ensure uniform specifications.

[113] See *Industry Price Indexes*, Catalogue 62-011, monthly.

[114] See *Construction Price Statistics*, Catalogue 62-007, quarterly.

[115] For the former, see *Construction Price Statistics*, Catalogue 62-007, quarterly, and for the latter, see *Construction in Canada*, Catalogue 64-201, annual.

available only for highways. The remainder of engineering construction is deflated with the input approach, with SEPH average earnings representing the labour inputs and IPPIs, the material ones.

Machinery and Equipment

The deflation of investment in machinery and equipment is carried out at the same level of detail as the estimates in current prices, that is for 33 commodity groups,[116] with corresponding machinery and equipment price indexes.[117] The computer price index produced by the United States Bureau of Economic Analysis is used for the office machines category.[118,119] This approach is justified because over 90% of computer equipment purchased in Canada is imported from the United States. Separate BEA indexes are available for printers, display devices, processors, disk drives and microcomputers. The U.S. indexes are adjusted for fluctuations in the exchange rate and weighted to reflect the composition of machinery and equipment purchases in Canada.

Value of Physical Change in Inventories

Government Inventories

The only government inventories recorded in the accounts are those held by marketing agencies. Inventories of the Canadian Dairy Commission are deflated using a weighted average of the IPPIs for creamery butter, powdered skim milk and other dairy products.

Business Non-Farm Inventories

The value of physical change in business non-farm inventories at constant prices is obtained from inventory book values, deflated by industry with IPPIs, CPIs and other price indexes. The appropriate deflator here is a weighted average of current and lagged price indexes, with the lag reflecting average turnover periods for each kind of inventory. The relative importance of the various sources, based on the 1986 book values, is as follows: the IPPIs, 55%, the CPIs, 25%, the import price indexes, 7%, the raw material price indexes, 5%, the machinery and equipment price indexes, 3% and other indexes, 5%.

Farm Inventories and Grain in Commercial Channels

Farm inventory changes at constant prices are mostly built up from quantities by commodity (metric tons of wheat, for example), multiplied by the corresponding prices prevailing in the base year. The estimation of farm-held inventories at constant prices is explained in the section on the current dollar estimates. Grain in commercial channels is calculated in the same manner by valuing the physical change in grain holdings of the Canadian Wheat Board and of private dealers at the average prices prevailing in the base year.

---

[116] The procedure is summarized in Luc Provençal, "Incorporation in the Income and Expenditure Accounts of a Breakdown of Investment in Machinery and Equipment," *National Income and Expenditure Accounts*, Catalogue 13-001, third quarter 1989, pp. xxv-xli.

[117] The MEPIs are calculated by industry and by commodity. Domestic prices are manufacturers' selling prices f.o.b. plant, adjusted as necessary for changes in the federal sales tax. Prices for imported equipment are represented by United States Bureau of Labor Statistics producers' selling price indexes, adjusted for changes in exchange rates, Customs tariffs and Canadian federal sales tax.

[118] Currently over 90% of the "office machines and equipment" category is accounted for by computers and related products. The rest consists of accounting machines and other business machines.

[119] The Canadian SNA began to use the U.S. hedonic price index of computers at the time of the historical revision in 1986. See the discussion in Chapter 1 and the references in the *Survey of Current Business* given there.

Merchandise Exports and Imports

The deflation of merchandise trade is carried out for several hundred commodities[120] with a variety of unit-value indexes and specific price indexes. About half of the indexes applied to exports are unit values obtained by dividing the value of commodities exported by the quantity involved. This is the case for live animals, food, feed, beverages, tobacco, and crude and fabricated materials, all relatively homogeneous commodities. For end-products such as industrial machinery, cars and trucks, IPPIs are used as deflators. For imports of merchandise, more specific price indexes and fewer unit value indexes are employed, among which are the United States producer price and consumer price indexes, adjusted for exchange rate fluctuations.

Non-Merchandise Exports and Imports

The deflation of non-merchandise trade is more problematic since there are few appropriate price indexes and average earnings have to be relied upon to a substantial degree. Travel expenditures in Canada and abroad are deflated with consumer price indexes from Canada and the United States. A weighted average of United States hourly earnings in transportation industries (trucking, railways, pipelines), adjusted for the exchange rate, is employed to deflate freight and shipping payments while Canadian average hourly earnings in water, truck, rail and air transport are used for receipts. Average weekly earnings in the finance, insurance and real estate industry in the United States serve to deflate other service payments while average weekly earnings in business services from the SEPH are used to deflate the other receipts.

3.3 Seasonal Adjustment

The quarterly IEA exist in two versions, one unadjusted and the other adjusted for seasonal variations.[121] Quarter-to-quarter movements in the unadjusted estimates are dominated by large seasonal fluctuations exhibiting similar patterns from one year to the next, which are of little interest in themselves and tend to mask underlying non-seasonal trends. For the convenience of users, these seasonal regularities are removed to help isolate underlying trends, through a statistical technique known as seasonal adjustment.

The need for seasonal adjustment is illustrated by Table 3.25 which shows the quarter-to-quarter growth rate of seasonally adjusted versus unadjusted GDP at 1986 prices. The growth rates of the unadjusted estimates vary widely, ranging from -8.4% to 12.5%. The general pattern of growth within a year is quite predictable: the percentage change is always positive in the second and third quarters and negative in the first and fourth quarters.[122] The recession in 1981 and 1982 is only evident with careful scrutiny of the unadjusted data, and its precise beginning and ending points are not obvious. By contrast, the growth rates of the adjusted estimates vary within a much narrower range of -1.2% to 2.3%. There is no predictable intra-year pattern and the recession of the early 1980's is clearly revealed.

---

120 The method used to construct the merchandise trade price and volume indexes is described in a reference paper entitled "The 1971-Based Price and Volume Indexes of Canada's External Trade," in *Summary of Canadian International Trade*, Catalogue 65-001, monthly, December 1976.

121 Only the latter version is published, but the unadjusted estimates are also available on request.

122 This particular seasonal pattern is related to weather in Canada. The warm weather occurs in the second and third quarters and production then reaches its peak. Agriculture and construction are industries where the influence of the seasons is most marked. Consumer spending has its seasonal peak in the fourth quarter because of Christmas. Government outlays are highest in the first quarter, coinciding with the end of the fiscal year. Merchandise exports usually reach their highest point in the second quarter and non-merchandise exports, which include travel expenditures by non-residents in Canada, in the third quarter.

Table 3.25
GDP at 1986 Prices, Unadjusted and Seasonally Adjusted, 1981-1989
(Quarter-to-Quarter Percentage Change)

	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Gross Domestic Product at 1986 Prices, unadjusted				
1981	-4.4	4.3	9.1	-7.7
1982	-5.9	0.9	10.3	-8.4
1983	-3.3	4.8	12.5	-6.4
1984	-3.3	4.8	10.7	-4.7
1985	-3.7	2.5	9.7	-1.5
1986	-5.0	2.3	7.0	-2.8
1987	-3.9	3.3	8.3	-1.3
1988	-4.5	3.7	5.3	-0.7
1989	-4.8	3.0	5.6	-0.3
Gross Domestic Product at 1986 Prices, seasonally adjusted				
1981	2.0	1.3	-0.9	-0.7
1982	-1.2	-1.2	-0.7	-0.8
1983	1.7	2.3	1.6	0.8
1984	1.6	2.3	1.1	1.1
1985	1.3	0.3	1.2	2.3
1986	0.6	0.2	0.5	-0.3
1987	1.8	1.2	1.9	1.3
1988	0.9	0.9	0.8	0.5
1989	1.2	0.3	0.8	0.6

Most seasonal adjustment in Statistics Canada is undertaken using X11ARIMA, a procedure based on the United States Bureau of the Census method II, X11.[123] This method relies on a three-part decomposition of the original unadjusted time series (O) into trend-cycle (C), seasonal (S) and irregular (I) elements.[124] There are two alternative versions of this model, one multiplicative and the other additive:

$$O_t = C_t \cdot S_t \cdot I_t \qquad [1]$$

$$O_t = C_t + S_t + I_t \qquad [2]$$

The X11 method involves the application of moving averages to estimate each of these components, with special treatment for outliers and foreseeable trading-days. The multiplicative model is the more appropriate for most national accounts

[123] See *The X11ARIMA/88 Seasonal Adjustment Method*, by Estela Bee Dagum, Time Series Research and Analysis Division, October 1988. For further information about the original X11 method, see Cleveland and Tiao (1976), Shiskin, Young and Musgrave (1967) and Young (1968).

[124] This three-part decomposition is used to examine the relative variability of the GDP aggregates in Chapter 4.

series although in a few cases such as the value of physical change in inventories, the additive model must be employed.[125]

The Statistics Canada X11ARIMA method fits an autoregressive integrated moving-average (ARIMA) model[126] to the series and uses it to project the series forward and backward prior to the seasonal adjustment itself being carried out. This approach makes it possible to perform seasonal adjustment more consistently at the end points of series, thereby reducing the magnitude of the revisions affecting the implicit seasonal factors through the extension of the series. Many other techniques of seasonal adjustment have also been suggested in the professional literature.[127]

Almost all series of the quarterly IEA are seasonally adjusted using the X11ARIMA method.[128] The adjustment is generally made at the lowest level of aggregation and seasonally adjusted aggregates are obtained by summation. The advantages of this approach are twofold. First, by carrying out the seasonal adjustment at the most detailed level, seasonal shifts in the aggregates are more easily explained. Second, the calculation of seasonally adjusted aggregates by summation preserves the accounting identities in the system and is much more convenient for users.

There are two important exceptions where X11ARIMA is not used in the IEA, namely the value of physical change in inventories of potatoes and farm-held grain. In both cases, the VPC in inventories is determined as the difference between additions to stocks, which occur at the time of the annual harvest, and withdrawals from stocks, which take place as farmers sell their crops throughout the year. While withdrawals are handled in a straightforward manner by the X11ARIMA method, additions to stocks pose a special problem. The harvest is in fact an annual series transformed out of necessity into a quarterly one. Its unadjusted value is always zero in the first and second quarters. The X11ARIMA method is not appropriate for this type of time series, so a different approach is needed.

Until recently the quarterly seasonally adjusted harvest was equal to the annual harvest divided by four. This technique had the advantage of simplicity, but also the effect of concentrating artificially into the first quarter the entire change in the harvest from one year to the next. As a result, seasonally adjusted inventories displayed variations larger than normal in the first quarter and correspondingly less in other quarters. GDP and the other aggregates of which farm inventories are a part were similarly affected.

In 1989 the method for calculating a seasonally adjusted version of the grain harvest was changed to deal with this problem. The variation from one year's harvest to the next is now spread smoothly over several quarters using a quadratic minimization technique, instead of occurring entirely in the first quarter. Bumper crops or droughts are treated specially, with the abnormal element concentrated in the harvest quarters.[129]

---

[125] The multiplicative model is inappropriate for time series which switch sign.

[126] This type of model was developed and popularized by Box and Jenkins (1970).

[127] See for example Bonin (1968), Burman (1965), Eisenpress (1956), Grether and Nerlove (1970), Hannan (1963), Jorgenson (1964), Lovell (1963), Mendershausen (1939) and Nerlove (1964).

[128] The seasonally adjusted quarterly estimates in the IEA are expressed at annual rates (SAAR), which means they are multiplied by four. This is done for the convenience of users more accustomed to the annual accounts.

[129] This innovation was spurred by the severe drought of 1988. With the former seasonal adjustment method, the drought would have had a marked negative effect on GDP in the first quarter of 1988 and a correspondingly sharp positive effect in the first quarter of 1989, when the harvest returned to a more normal level. With the new approach, the drought's effects are concentrated more in the harvest quarters of 1988 and the rebound is spread out over a few quarters. This new method is currently applied to the estimates from 1985 onward. It will be extended back to earlier years at the time of the next historical revision. For more information on this subject, see "Technical Paper on the Treatment of Grain Production in the Quarterly Income and Expenditure Accounts," *National Income and Expenditure Accounts*, Catalogue 13-001, first quarter 1989, pp. xxxi-xl.

4. Quality of the Estimates

This chapter deals with the quality and reliability of the Income and Expenditure Accounts. Quality assessment is a difficult matter in the context of the accounts, given the number and variety of data sources and methods employed in the estimation process. The objective here is to help users better understand the IEA estimates and apply them more effectively, with a fuller awareness of their strengths and weaknesses. Several dimensions of the quality issue will be discussed.[1]

One important aspect of quality is the accuracy of the final estimates, once all data from surveys, administrative records, censuses and other sources are received and incorporated. For which aggregates of the accounts are these final estimates considered to be quite good and for which are they seen to be of lower quality? The chapter provides a subjective quality evaluation of the final estimates for each major aggregate of income and expenditure.

The accuracy of the preliminary estimates vis-à-vis the final ones constitutes a second and related dimension of the issue. What is the validity of these earlier estimates, judged against the final, fully revised ones? Which GDP components typically undergo large revisions and which are well estimated from the outset? To answer these questions, a statistical analysis is carried out of the revisions in the accounts since 1971.

The third issue relating to quality concerns the extent of overall balance within the accounts. Is the statistical discrepancy between the income-based and expenditure-based estimates of GDP an essentially zero-mean time series, or does it indicate a systematic pattern of overestimation or underestimation on one side of the accounts? Is the variance of the discrepancy rising or falling? The historical evolution of the statistical discrepancy is examined in order to answer these questions.

Finally, the "noise-to-signal" ratios of the GDP aggregates are calculated using an X11ARIMA seasonal adjustment model to determine which components in the quarterly accounts are most variable, and therefore most difficult to interpret in a short-term context.

4.1 Sources of Error in the Accounts

To assess the reliability of the IEA estimates, one must begin by considering the many errors to which they are subject. Some errors originate in the input data while others can be traced to estimation methods. Broadly, the sources of error in the accounts are the following:

- Estimates must often be derived before survey or census tabulations are complete, or in some minor instances before any data at all are available. Errors can result from faulty imputations for cases of non-response to surveys, or from inaccurate projections made in the accounts to fill temporary data gaps.

- Survey information can be subject to biases and sampling errors even when tabulations are complete.

- Tabulation, editing, calculation and transcription errors can and do occur when statistical information is being processed.

[1] On the topic of assessing the quality of the national accounts, see Arvay (1974), Kirkham (1976), Langaskens and Rijckeghem (1974), Novak (1975), Ostry (1974), Parker (1982), Pierce (1981) and Slater (1982, 1986).

- Lack of correspondence between national accounting concepts and those which underlie the input data is a ubiquitous problem. Many of the data sources are designed to meet very different requirements from those of the accounts. Moreover, virtually all data sources must accommodate other needs as well. Definition, timing, classification and coverage problems abound. While adjustments are made in an attempt to resolve these difficulties, they are inevitably imperfect.

- The procedure of seasonal adjustment can introduce additional errors into the estimates. Because of the very nature of seasonal adjustment, which involves the application of centred moving averages to time series over a long period, an error in a single observation of an unadjusted series will be carried backward and forward into earlier and subsequent periods in the corresponding adjusted series.[2] Moreover, the adjustment procedure itself must detect outliers and shifting seasonal patterns. No seasonal adjustment method can accomplish this in more than an approximate manner.

- Finally, the accounts can convey erroneous information if their underlying structure, concepts and definitions are inconsistent, become outmoded or are not well suited to the reality they are attempting to depict.[3]

Sorting out the effects on the accounts of all the possible sources of error is a difficult task. The problem has multiple dimensions. To deal with it effectively, a number of distinctions first need to be drawn.

One is that between preliminary and final estimates. The final, revised estimates should be at least as reliable, and usually significantly more so, than the preliminary ones, simply because the latter are based only on a subset of the information used in compiling the former.[4] The final estimates are believed to be better. It is therefore appropriate to assess the quality of the preliminary and intermediate estimates in relation to the final ones.

A second important distinction is that between the quarterly and the annual estimates. Annual estimates can be viewed as a summary version of the corresponding quarterly ones, obtained by aggregation over time. As such, they contain less information than the quarterly estimates. Quarterly data necessarily exist at an annual frequency, either as the sum or average of the four quarters.[5] The reverse is not necessarily true, however, and in fact many sources are available annually but not quarterly. Tax files are a good example. One normally has access to more information to compile the annual IEA estimates. On the other hand, annual data often become available after a long delay, whereas quarterly data are usually compiled within two months of the reference period.

---

[2] Since the procedure involves centred moving averages, the seasonally adjusted value of a series for a particular period cannot be finally established until long after the fact. Preliminary seasonally adjusted values must be based on projections of future (unadjusted) values. While the ARIMA version of the X11 seasonal adjustment procedure has reduced the problems in this area, variations in seasonal factors continue to be an important cause of revision in the IEA. For further discussion of seasonal adjustment procedures, see Chapter 3.

[3] A dilemma arises when one must chose either to maintain consistent time series or to incorporate the best possible estimate of the current level. For example, the adoption of new Census of Agriculture benchmarks might imply a need to revise the accounts in the past for a decade or more. This however conflicts with the SNA policy that revisions should normally be carried back only four years. The introduction of the new census benchmarks into the estimates, but only for the last four years, will give rise to a break in the time series. Waiting for the next historical revision to use the new information, on the other hand, entails maintaining the lesser quality estimates for quite a long time. In other instances, better information may come from new quarterly surveys or improved estimation methods. In such cases the option exists of linking in the new information, that is applying the movement of the new series to the last unrevisable data point. Problems of this kind resolve themselves eventually, when historical revisions are carried out, but they often lead to lower quality estimates in the interim.

[4] This is not to say that every final estimate must be of higher quality than the corresponding preliminary one. The point here is, rather, a probabilistic one. The data inputs and estimation methods used in compiling the final estimates should, on average, lead to results of greater reliability, with less bias and lower error variance (or according to whatever other criterion is taken to be important).

[5] Aggregation over time by summing or averaging applies to flow variables, and most of the IEA series are of this type. For stock variables, the annual level is normally defined as the first, average of second and third, or last quarter value, depending on whether the stock is a beginning-, middle- or end-of-period measure.

As an example, consider wages, salaries and supplementary labour income. The quarterly estimates rely primarily on the Survey of Employment, Payrolls and Hours and the Labour Force Survey, both carried out monthly. The annual estimates, on the other hand, are based on benchmark data from "T4" forms submitted by employers to Revenue Canada for income tax purposes plus various series from other annual surveys such as the Survey of Manufacturing. The quarterly estimates do benefit from the annual tax benchmarks in the sense that they are raised or lowered to correspond to the new annual level. However, the benchmarks provide no information about the quarter-to-quarter distribution within the year, which still depends on monthly survey data.[6]

This case serves to illustrate two techniques frequently used in the accounts: projection and distribution. For the current year (and sometimes for the previous year or years), before annual benchmarks become available, the quarterly estimates must be projected from the estimates for the last benchmark year, with quarterly indicators ("projectors"). Annual benchmarks seldom contain information for the quarters within the year. They must therefore be distributed over the four quarters using quarterly indicators (in this instance, "distributors").

A third important distinction to be drawn before evaluating the reliability of the estimates concerns the national vis-à-vis the provincial accounts. Since the basic estimation procedure in the provincial accounts consists of disaggregating the national totals,[7] the validity of the provincial accounts depends not only on the quality of the statistical information entering the allocation procedure but also on the quality of the national estimates themselves. The validity of the former is conditional on that of the latter. As a result, the provincial accounts are, at best, as reliable as the national accounts.[8]

A final distinction to be considered in this context is that between the level and the rate of change of a time series. The two are closely tied: the level of a series is equal to the cumulative sum of all its period-to-period changes, while the rate of change of a series is simply the relative first difference in its level. If the level of a series is accurate over time, so too must be its rate of change. It is possible, however, to measure the rate of change of a particular series accurately and yet be seriously wide of the mark in establishing its level. This can happen if the initial value of the series is inaccurate. It is also possible to measure the level fairly accurately while making serious errors on the period-to-period rate of change. This can occur, for example, if overestimation and underestimation errors affect the rate of change sequentially, canceling one another over time.

This distinction between levels and rates of change often serves to shed light on the issue of reliability. When studying the shares of factor incomes or of provinces in GDP in a particular year, for instance, it is relative levels that matter and not rates of change. If the object is to analyze overall economic growth, on the other hand, rates of change are more important. Certain series in the accounts are thought be to quite accurate as to the level but not as to the period-to-period changes, while for other series the reverse is the case.[9]

---

[6] The procedure of adjusting a given quarterly (or other sub-annual) series so that its corresponding annual values are made equal to a set of predetermined "benchmark" totals is fundamental in the field of national accounting, and is referred to as "step-adjustment". There are many possible step-adjustment methods using multiple regression techniques, quadratic minimization and other approaches. The general goal is to derive a new sub-annual time series which is as much like the old one as possible, yet sums or averages over time to the annual benchmark figures. See, for example, Chow and Lin (1971) and Denton (1971).

[7] For a few components, such as residential construction and provincial government revenue and expenditure, the national estimates are obtained by summing the corresponding provincial estimates. Instances of this type are exceptional.

[8] See *Provincial Economic Accounts, Annual Estimates, 1984-1988*, Catalogue 13-213, annual, pp. xxv-xxvi, for a quality assessment of provincial GDP aggregates.

[9] An example of a series where the rate of change is probably gauged more precisely than the level is capital consumption allowances, whose quarterly or annual rate of change is relatively simple to measure (CCA tends to grow quite steadily) and whose level, including as it does a number of imputations, is subject to a fairly wide margin of error. The value of physical change in inventories can be considered an example of the other sort, where the level is known to be small in relation to other GDP aggregates but where the rate of change (in this case, the change in the VPC) is quite difficult to estimate.

4.2 Subjective Quality Assessment

In principle, the quality characteristics of national accounts aggregates should be rigorously ascertained from measured sampling biases and variances, and other measurement error properties of the input data. In practice, this is not possible, certainly not in any comprehensive manner, given the complexity of the estimation methods involved, the variety of inputs and the lack of reliable measures of error for many of those. Simon Kuznets, the distinguished American statistician, expounded the argument clearly some fifty years ago:

> "To analyze the reliability of data and procedures used to derive national income totals and their components is essentially an insoluble task... Were our procedures or data of such a controlled character that we could make specific assumptions concerning the distribution of errors, if not concerning each single error, it would be possible to apply to our task the full armory of weapons of statistical analysis of sampling errors and limits of inference. But dealing as we do with data that are partly a by-product of administrative activity, partly a result of direct observation of complex phenomena without controls designed to reduce the variations observed, the best that we can do is to express an opinion in quantitative form."[10]

Kuznets put this principle to work by asking expert data analysts to assign cardinal "margins of maximum relative errors for the various cells in the nationwide totals". In the present case a similar approach is followed, but with ordinal rather than cardinal quality ratings.[11] The scores are assigned by statisticians in the Income and Expenditure Accounts Division.[12,13]

Table 4.1 presents the subjective quality ratings, or reliability scores, for the final estimates of the GDP aggregates. "Final" here refers to the estimates published at the end of the usual four-year revision cycle. At that time, national accounts have had access to virtually all the data sources that will ever be available. These quality ratings thus apply to the estimates derived when all of the expected inputs have been taken into account.[14] The scale allows for three ratings:[15]

1 —— most reliable

2 —— reliable

3 —— acceptable

---

[10] Simon Kuznets, ***National Income and Its Composition, 1919-1938***, volume II, National Bureau of Economic Research, New York, 1941, p. 535.

[11] Kuznets also observed that because his cardinal quality ratings were based on the judgement of the very individuals who calculated the estimates, there might have been a tendency for them to "underestimate the errors attaching to the result of their labors" (*op. cit.*, p. 505). While this may indeed have been a problem in his approach, it is less likely to be the case with the ordinal measures presented here.

[12] The first qualitative assessment of the Canadian IEA was published in ***National Accounts Income and Expenditure, by Quarters, 1947-1957***, Catalogue 13-511, April 1959. The evaluation contained this interesting observation: "Among the qualitatively less reliable series, the following may be noted: the expense component of accrued net farm income; the greater part of net income of unincorporated business; personal expenditure on services; and municipal government expenditure on goods and services."

[13] For comparison, see the evaluation of the United States National Income and Product Accounts in Young (1987).

[14] The subjective ratings could of course be quite different if they applied to the preliminary estimates. Later in this chapter, these are assessed in relation to the final estimates, using statistics on revisions.

[15] The Estimates of Gross Domestic Product by Industry and those of the Input-Output Accounts are evaluated on a similar ordinal scale. See ***Gross Domestic Product by Industry***, Catalogue 15-001, June 1989, Appendix IV, pp. 127-130 and ***The Input-Output Structure of the Canadian Economy, 1981-1984***, Catalogue 15-201, Appendix A, pp. 13-29.

- A rating of 1 is assigned, in the main,[16] when the estimates are based on censuses, administrative records, surveys or other highly reliable sources, and the concepts and definitions underlying the input data closely correspond to those in the IEA, or else adjustments required for coverage, valuation and classification are straightforward.

- A rating of 2 is attributed primarily to estimates based on administrative records or surveys which are not highly reliable, or else require difficult, error-prone adjustments to convert them to a national accounts basis.

- Finally, a rating of 3 denotes estimates for which direct, reliable observation is not possible and which are therefore dependent on judgement to a large degree or are based on related indicators.

The comments above apply to the estimates at current prices. The quality of the estimates at constant prices depends on that of the estimates at current prices, since the former are most often derived through the division of the latter by appropriate price indexes. In such cases, the quality of the constant price estimates is deemed no better than that of the estimates in current prices; the quality reduction, if any, is then attributable to the corresponding price indexes.[17] For some components, however, the estimates at current prices are obtained after the ones in constant prices, through the multiplication of the latter, calculated directly from a volume-type indicator, by an appropriate price or price index.[18] In these cases the quality of the current price estimates is expected to be lower or equal to that of the ones in constant prices. Finally, there is a third category of components for which values and volumes are each estimated directly and the price indexes are implicit.[19] In this instance, the value and volume series can be assessed independently.

The distinctions made in the previous paragraph apply at a very detailed level in the accounts. The components appearing in Table 4.1, however, are aggregates, many of which encompass all three cases discussed. Again, an attempt at generalization has been made in order to establish quality ratings at the level of major aggregates. In this context, price deflators are considered most reliable when based on a price survey (as opposed to a unit value index). Volume indicators are deemed most reliable when they relate to homogeneous commodities and the series measure real purchases quite accurately. Lower quality ratings are given in cases where price or volume indicators are proxies or are built up from partial information, or else when problems of concept or definition remain in the measurement of price or quantity.

Several aggregates at current prices warrant the most reliable rating. In the case of wages, salaries and supplementary labour income, the rating applies because the final estimates rely on comprehensive tax files, requiring minimal adjustments. The accrued net income of farm operators from farm production and the value of physical change in farm inventories and grain in commercial channels are based on census data and good-quality, comprehensive surveys. Indirect taxes less subsidies and government current expenditure on goods and services both merit the "1" rating because the final estimates come almost entirely from audited public accounts statements. Personal expenditure on consumer goods is considered most reliable because it is derived from the Annual Retail Trade Survey and other good quality information, and furthermore is subject to the quality checks inherent in the input-output commodity flow balancing procedure. Business and government non-residential construction and machinery and equipment investment estimates are grounded in the capital expenditure surveys published in ***Public and Private Investment in Canada*** and also benefit from the input-output commodity balancing. The estimates for merchandise exports and imports are given the top rating because they are dependent on comprehensive customs data converted to a national accounts basis with straightforward adjustments.

---

[16] The qualification "in the main" is an important one, since most national accounts estimates are built up at a detailed level using inputs from many sources. The quality evaluation provided here represents an attempt to generalize about these various inputs and methods.

[17] In theory, there could be situations where measurement errors in the price indexes consistently offset errors in the current price estimates, making the constant price estimates of superior quality. Such cases are believed to be rare in the IEA.

[18] The value of physical change in farm inventories is a relevant example.

[19] An example of this kind is government expenditure on wages, salaries and supplementary labour income.

Table 4.1
Subjective Quality Ratings of GDP Aggregates (Final Estimates)

	Rating
At current prices:	
Wages, salaries and supplementary labour income	1
Corporation profits before taxes	2
Interest and miscellaneous investment income	2
Accrued net income of farm operators from farm production	1
Net income of non-farm unincorporated business, including rent	3
Inventory valuation adjustment	3
Indirect taxes less subsidies	1
Capital consumption allowances	2
Personal expenditure on consumer goods and services:	
Durable goods	1
Semi-durable goods	1
Non-durable goods	1
Services	2
Government final expenditure:	
Government current expenditure on goods and services	1
Government investment in fixed capital and inventories	1
Business investment in fixed capital:	
Residential construction	2
Non-residential construction	1
Machinery and equipment	1
VPC in business non-farm inventories	3
VPC in farm inventories and GICC	1
Exports of goods and services:	
Merchandise	1
Non-merchandise	2
Imports of goods and services:	
Merchandise	1
Non-merchandise	2
At constant prices:	
Personal expenditure on consumer goods and services:	
Durable goods	1
Semi-durable goods	1
Non-durable goods	1
Services	3
Government final expenditure:	
Government current expenditure on goods and services	3
Government investment in fixed capital and inventories	2
Business investment in fixed capital:	
Residential construction	2
Non-residential construction	2
Machinery and equipment	2
VPC in business non-farm inventories	3
VPC in farm inventories and GICC	1
Exports of goods and services:	
Merchandise	1
Non-merchandise	3
Imports of goods and services:	
Merchandise	1
Non-merchandise	3

The quality ratings in this table are 1 - most reliable, 2 - reliable and 3 - acceptable. See the text for a more detailed explanation.

Among the aggregates measured at constant prices, only personal expenditure on consumer goods, the value of physical change in farm inventories and grain in commercial channels, and merchandise exports and imports earn the "1" rating. For expenditure on goods, the rating is attributable to the highly reliable price deflators drawn from the consumer price index. In the case of farm inventories, the constant price estimates are based mostly on comprehensive quantity data for homogeneous commodities. Finally, the deflated estimates for merchandise trade are calculated from a very detailed database containing good-quality Canada and United States price and unit value indexes.

A number of aggregates at current prices receive a "2" rating, among which are corporation profits before taxes. While the input data for the profits calculation are taxation statistics, numerous adjustments are required to convert them to a consistent national accounts conceptual basis. Nevertheless, the estimates for profits are considered to be quite good, close to the "1" rating. Interest and miscellaneous investment income also fall into the middle category, but here the rating lies closer to the borderline with the lower "3" rating. In this instance, while the estimates rely on good-quality surveys and administrative records, investment income of persons must be estimated through a residual approach, which justifies the middle rating. Capital consumption allowances are given the "2" rating primarily on account of the imputations made for depreciation on housing and on government fixed assets. Personal expenditure on consumer services is not assigned the highest rating for two reasons: there are gaps in the survey coverage in this area and the estimates for rents, the largest single sub-component, are based on a relatively weak survey of contract rents. Business investment in residential construction warrants the lower rating on account of transfer costs. While estimates for new construction and alterations and improvements are of high quality, those for transfer costs come from the Canadian Real Estate Association MLS survey which only partially covers the Canadian housing resale market. The estimates for non-merchandise exports and imports are based mostly on surveys specially designed for the SNA. However, the many conceptual and practical difficulties involved in measuring trans-border flows of services support a "2" score for these two components.

Current price series which are assessed the minimal "3" rating are the net income of non-farm unincorporated business including rent, the inventory valuation adjustment and the value of physical change in business non-farm inventories. Net income of non-farm unincorporated business is assigned the "3" rating on account of, on the one hand, the many problems inherent in the estimation of net rents and, on the other, the likely underestimation of the other components of net income, possibly due to underreporting in income tax statistics.[20] The inventory valuation adjustment and the value of physical change in business non-farm inventories get the lowest score because their estimation requires information which is not readily accessible on the prevailing accounting methods and the average stock turnover periods in the various industries.

All constant price series involving services receive lower ratings than their current price counterparts because of the difficulties in measuring the output and prices of services. In personal expenditure on services, the problems are particularly severe in areas such as financial services, health and education. In government current expenditure on goods and services the deflation of wages and salaries is problematic, with average earnings per employee being used as a proxy deflator. Since the services provided by government are not generally priced in the market, their valuation is always difficult. Finally, the deflators for non-merchandise exports and imports are mostly proxies rather than specific price indexes.

[20] The weight of the "underground economy" is likely more important in the unincorporated business sector.

4.3 Analysis of Revisions

The analysis of revisions is another dimension of quality assessment, a means of grading the quality of the preliminary estimates in relation to the final estimates.[21] Tables 4.2 and 4.3 record the means and standard deviations of the total revisions[22] to the annual growth rates of GDP and its aggregates at current and constant prices. The tables focus on growth rates rather than dollar levels, both as a partial solution to the trend problem[23] and in recognition of the general interest in growth rates.[24] The statistics are shown separately for the periods 1971-1980, 1981-1986 and 1971-1986. These particular periods were selected for several reasons. Firstly, the pattern of recent revisions is of much greater interest than that of revisions in the distant past because national accounts data sources and methods have changed over the years. The revision patterns of the 1950s and 1960s have little to tell us about the IEA of the 1990s, so they are not examined here. Secondly, the estimates for the years after 1986 are not taken into account in the analysis because they are not yet final. Estimates for the years up to and including 1986, in contrast, are final in the sense that they will not be revised further until the next historical revision. Thirdly, the 1971-1980 period is examined separately because 1971 and 1981 were base years for the constant price estimates. Expressed differently, the constant price estimates for the 1971-1980 period are derived using 1971 weights and are linked to the estimates for 1981.

Historical revisions serve to complicate any statistical analysis of revision patterns and provide another good reason to put the emphasis on the short, rather than the long term. The main complication for the study of revisions that arose from the historical revision carried out in 1986 was the conversion of the accounts from a "national" to a "domestic" basis.[25] As a result, several aggregates were defined differently (corporation profits before taxes, interest and miscellaneous investment income, non-merchandise exports and imports). If revisions to levels instead of growth rates were being analyzed, this complication would have to be carefully dealt with. Revisions due to changes in definition should not be regarded as *revisions* at all, but it is difficult to separate them after the fact from other revisions which occur at the same time. When revisions to growth rates are examined instead, as is the case here, the effects of the definition changes are not likely to be so great. Indeed, if the old and newly-defined components evolve in a similar way, there may be little overall effect on the growth rate revisions. Analysts should nevertheless be aware of the discontinuities in the statistics on revisions. In the present analysis, several return-to-capital components particularly affected by the 1986 historical revision have been aggregated into a single category called "net operating surplus". Net operating surplus is defined as the sum of corporation profits before taxes, interest and miscellaneous investment income, the inventory valuation adjustment and, prior to 1986, dividends paid to non-residents (a deduction).

The periodic rebasing of the estimates at constant prices provides a further source of discontinuity in the statistics on revisions. The base year for the estimates at constant prices was changed at the time of the historical revision, from 1971

---

[21] It must be emphasized that the conclusions yielded by revisions analysis are strictly "in relation to the final estimates". A series subject to very small revisions, or no revisions at all, is not necessarily of high quality. There may simply be very little statistical information available, initially or subsequently. If the preliminary estimates are based on poor input data and no better information is forthcoming, the series will exhibit small revision means and standard deviations, but will still be of low quality.

[22] The term "total revisions" refers to the difference between the final estimates presently published and the preliminary estimates released initially, about 60 days after the reference period. A more thorough analysis of revisions would require that one look at the sequence of intermediate revisions, to determine how quickly and how directly the estimates move from their preliminary to their final state. For other studies of national accounts revisions, see Bjerke (1974), Cole (1969), De Janosi (1961), Denny and Sawyer (1976), Denton and Kuiper (1965), Denton and Oksanen (1972, 1973), Glejser and Schavey (1974), Gruen (1979), Holden (1969), Holden and Peel (1982), Howrey (1984), Kenney (1985), King (1982), Mankiw and Shapiro (1986), McDonald (1975), Mork (1987), Nelson (1984), Rinne (1969), Stekler (1967), Walsh (1985) and Zellner (1958). More detailed studies of Canadian IEA revisions appear in Barbara Clift and Stewart Wells, "The Reliability of the Canadian National Accounts Estimates," *Canadian Economic Observer*, Catalogue 11-010, February 1990, pp. 3.1-3.18 and in the article "Revisions to the Income and Expenditure Accounts," *National Income and Expenditure Accounts*, Catalogue 13-001, first quarter 1977, pp. xxiii-xxxii.

[23] The revisions to the dollar levels of GDP tend to become larger over time just because real economic growth and inflation make the level of GDP itself larger. An examination of trends in revisions expressed in relation to previous levels is more useful, and one way of achieving this is to analyze the growth rate revisions.

[24] For a few series, mentioned in the table footnotes, the results are simple revisions to levels expressed as a proportion of GDP, rather than revisions to growth rates. For series fluctuating around zero, growth rate calculations are not meaningful.

[25] The adoption of GDP as the central aggregate in the accounts is discussed in Chapters 1 and 2.

to 1981, and was updated again to 1986 with the release of the accounts for the first quarter of 1990.[26] By focussing on *growth rates* rather than levels this problem too is circumvented. Given the normal IEA practice of preserving previously published growth rates by chaining the estimates at constant prices, analyses of revisions to growth rates will be unaffected by changes in the base year used for deflation.[27]

The results in Table 4.2 indicate substantially lower average revisions for the most recent period in comparison to the 1971-1980 period. A second conclusion to be drawn from the table is that the national accounts preliminary estimates exhibit a downward bias. In other words, the revisions tend to be upward rather than downward. Thirdly, at current prices, the aggregates subject to the largest revisions are net income of non-farm unincorporated business including rent and the net operating surplus on the income side, and business investment generally on the expenditure side; at constant prices, the largest revisions have affected business investment in machinery and equipment. Net operating surplus and investment are among the most cyclical and volatile aggregates in the national accounts. In the case of net income of non-farm unincorporated business including rent, the large average revision in the 1981-1986 period is the result of methodological changes implemented at the time of the 1986 historical revision;[28] in the case of business investment in machinery and equipment, the revision reflects the adoption, also in 1986, of a new price index for computer equipment which yielded substantially higher real growth rates for this series.[29]

Turning to Table 4.3, another positive finding is that the standard deviations of the growth rate revisions are smaller in the 1981-1986 period than earlier. However, the reduction here is minor: from 0.9% to 0.7% for GDP at current prices and from 0.6% to 0.5% for GDP at constant prices. If normal probability distributions applied, these results would imply that users would be correct 95% of the time to expect revisions to the real GDP annual growth rate of one percentage point or less. Based on the means and standard deviations of the growth rate revisions shown in Tables 4.2 and 4.3, and assuming the normal bell-shaped curve, Figure 4.1 depicts the distribution of growth rate revisions for GDP at current prices and at constant prices.

At current prices, only for net income of non-farm unincorporated business including rent and business investment in residential construction is the standard deviation larger during the 1981-1986 period. Both cases are explained by the revision to housing alterations and improvements alluded to earlier. At constant prices, there are more instances where the standard deviation is larger in the 1980s than in the 1970s, the additional ones being business investment in non-residential construction, VPC in business non-farm inventories, VPC in farm inventories and GICC, and imports of goods and services.

The evolution of revisions can be examined from yet another angle, that of the average absolute value of revisions to annual growth rates, as shown in Table 4.4. The average revision to the GDP growth rate, without regard to sign, dropped from 1.2 percentage point in 1971-80 to 0.6 in 1981-86. In constant prices, the average revision fell from 0.9 percentage points to 0.6.

---

[26] See Chapter 2 for particulars on the rebasing of the accounts.

[27] The year 1986 is one exception to this statement. The preliminary constant dollar estimates for 1986 were expressed at 1981 prices but the final estimates are expressed at 1986 prices. Accordingly, for this particular year the revisions reflect not just changes to data inputs, but also the shift in price weights when the constant dollar estimates were rebased. Similarly, the preliminary estimates for the years 1981-1985 were expressed at 1971 prices and were subsequently, at the time of the historical revision in 1986, recalculated at 1981 prices.

[28] The largest revision here was to net rents, where the method for estimating residential alterations and repairs was improved. Over 40% of the amount formerly treated as a current repair expense was reclassified as capital expenditure. Also, a major upward revision was incorporated in the amounts spent on alterations and improvements.

[29] See Chapter 1 for details on the computer price index.

Table 4.2
Means of Revisions to Annual Growth Rates of GDP Aggregates
(Percentage points)

	1971-80	1981-86	1971-86
At current prices:			
Wages, salaries and supplementery labour income	1.4	0.7	1.2
Net operating surplus	1.3	-1.8	0.1
Accrued net income of farm operators from ferm production	-0.1	-0.3	-0.2
Net income of non-farm unincorporated business, including rent	-0.7	2.7	0.6
Net domestic income at factor cost	1.1	0.1	0.7
Indirect taxes less subsidies	0.6	-0.2	0.3
Cepital consumption allowances	3.3	0.8	2.3
Personal expenditure on consumer goods and services	0.5	0.3	0.4
Government current expenditure on goods and services	1.0	-0.1	0.6
Government investment in fixed capital	-0.9	0.7	-0.3
Business residential construction investment	2.4	0.7	1.7
Business non-residential construction investment	2.7	0.9	2.0
Business machinery and equipment investment	1.9	1.0	1.5
VPC in business non-farm inventories	0.5	0.0	0.3
VPC in farm inventories and GICC	0.1	-0.1	0.0
Exports of goods and services	0.7	-0.1	0.4
Imports of goods and services	0.5	0.2	0.4
Statistical discrepency	-0.2	-0.1	-0.2
Gross Domestic Product at Market Prices	1.2	0.1	0.8
At constant prices:			
Personal expenditure on consumer goods and services	0.4	0.4	0.4
Government current expenditure on goods and services	0.2	0.8	0.4
Government investment in fixed cepital	-2.2	1.8	-0.7
Business residential construction investment	3.2	-0.4	1.9
Business non-residential construction investment	1.6	1.2	1.4
Business machinery and equipment investment	4.7	6.2	5.3
VPC in business non-farm inventories	0.9	-0.2	0.5
VPC in farm inventories and GICC	0.1	-0.0	0.1
Exports of goods and services	1.5	0.2	1.0
Imports of goods and services	2.5	1.5	2.1
Statistical discrepancy	-0.1	-0.1	-0.1
Gross Domestic Product at Market Prices	0.9	0.5	0.8

This table shows the erithmetic average of revisions to the growth rate (expressed in percentage points) of the GDP aggregetes, measured as the difference between the "finel" estimates currently officiel end the initial estimetes. The figures reported for the eccrued net income of farm operetors from farm production, the VPC in inventories and the statistical discrepency are simple revisions expressed as a percentage of GDP, rather than growth rates. Net operating surplus is defined as the sum of corporation profits before taxes, interest and miscellaneous investment income, the inventory valuation edjustment and, prior to 1986, dividends paid to non-residents (a deduction).

Table 4.3
Standard Deviations of Revisions to Annual Growth Rates of GDP Aggregates
(Percentage points)

	1971-80	1981-86	1971-86
At current prices:			
Wages, salaries and supplementary labour income	1.1	0.9	1.1
Net operating surplus	3.9	2.9	3.9
Accrued net income of farm operetors from ferm production	0.2	0.1	0.2
Net income of non-ferm unincorporated business, including rent	2.5	7.3	5.2
Net domestic income at factor cost	1.2	1.1	1.2
Indirect taxes less subsidies	2.0	1.3	1.8
Capital consumption allowances	2.9	2.0	2.8
Personal expenditure on consumer goods and services	0.6	0.6	0.6
Government current expenditure on goods and services	2.1	1.4	2.0
Government investment in fixed capital	2.8	4.4	3.6
Business residential construction investment	2.8	5.8	4.2
Business non-residential construction investment	3.1	2.5	3.0
Business machinery and equipment investment	2.1	2.0	2.1
VPC in business non-farm inventories	0.3	0.3	0.4
VPC in ferm inventories and GICC	0.1	0.1	0.1
Exports of goods and services	1.2	0.5	1.1
Imports of goods and servicas	1.6	0.8	1.3
Statistical discrepancy	0.7	0.4	0.6
Gross Domestic Product et Market Prices	0.9	0.7	1.0
At constant prices:			
Personal expenditure on consumer goods and services	0.8	0.4	0.7
Government current expenditure on goods and services	1.8	1.4	1.7
Government investment in fixed capital	3.0	5.1	4.3
Business residential construction investment	4.1	6.8	5.5
Business non-residential construction investment	2.8	3.1	2.9
Business machinery and equipment investment	4.1	3.6	4.0
VPC in business non-farm inventories	0.5	0.9	0.8
VPC in farm inventories and GICC	0.0	0.1	0.1
Exports of goods and services	1.9	1.7	1.9
Imports of goods and services	3.5	3.6	3.6
Statistical discrepancy	0.4	0.2	0.4
Gross Domestic Product at Market Prices	0.6	0.5	0.6

This table shows the standard deviation of revisions to the growth rate (expressed in percentage points) of the GDP aggregates, measured as the difference between the "final" estimates currently official and the initial estimates. The figures reported for the accrued net income of farm operators from farm production, the VPC in inventories and the statistical discrepancy are simple revisions expressed as a percentage of GDP, rather than growth rates. Net operating surplus is defined as the sum of corporation profits before taxes, interest and miscellaneous investment income, the inventory valuation adjustment and, prior to 1986, dividends paid to non-residents (a deduction).

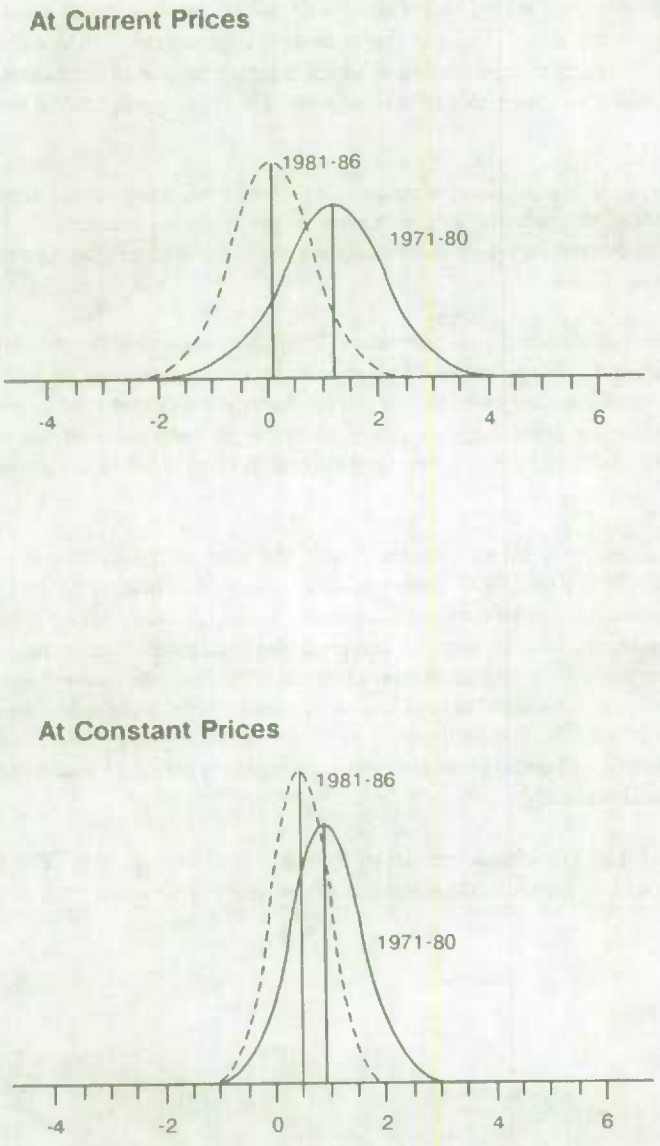
Table 4.4
Average Absolute Value of Revisions to Annual Growth Rates of GDP Aggregates
(Percentage points)

	1971-80	1981-86	1971-86
At current prices:			
Wages, salaries and supplementary labour income	1.5	1.0	1.3
Net operating surplus	3.5	2.8	3.3
Accrued net income of farm operators from farm production	0.2	0.3	0.2
Net income of non-farm unincorporated business, including rent	2.2	6.3	3.7
Net domestic income at factor cost	1.4	0.8	1.2
Indirect taxes less subsidies	1.7	1.1	1.5
Capital consumption allowances	3.6	1.8	2.9
Personal expenditure on consumer goods and services	0.6	0.6	0.6
Government current expenditure on goods and services	2.0	1.1	1.7
Government investment in fixed capital	2.6	2.9	2.7
Business residential construction investment	3.3	5.1	4.0
Business non-residential construction investment	3.0	2.3	2.7
Business machinery and equipment investment	2.4	2.1	2.3
VPC in business non-farm inventories	0.5	0.2	0.4
VPC in farm inventories and GICC	0.1	0.1	0.1
Exports of goods and services	1.1	0.4	0.9
Imports of goods and services	1.1	0.8	1.0
Statistical discrepancy	0.5	0.3	0.4
Gross Domestic Product at Market Prices	1.2	0.6	1.0
At constant prices:			
Personal expenditure on consumer goods and services	0.7	0.5	0.6
Government current expenditure on goods and services	1.6	1.3	1.5
Government investment in fixed capital	3.2	4.1	3.5
Business residential construction investment	4.2	6.0	4.9
Business non-residential construction investment	2.4	2.3	2.3
Business machinery and equipment investment	4.7	6.2	5.3
VPC in business non-farm inventories	0.9	0.6	0.8
VPC in farm inventories and GICC	0.1	0.1	0.1
Exports of goods and services	1.7	1.6	1.7
Imports of goods and services	3.3	3.2	3.3
Statistical discrepancy	0.3	0.2	0.3
Gross Domestic Product at Market Prices	0.9	0.6	0.8

This table shows the average of absolute revisions to the growth rate (expressed in percentage points) of the GDP aggregates, measured as the difference between the "final" estimates currently official and the initial estimates. The figures reported for the accrued net income of farm operators from farm production, the VPC in inventories and the statistical discrepancy are simple revisions expressed as a percentage of GDP, rather than growth rates. Net operating surplus is defined as the sum of corporation profits before taxes, interest and miscellaneous investment income, the inventory valuation adjustment and, prior to 1986, dividends paid to non-residents (a deduction).

Figure 4.1

Distributions of GDP Growth Rate Revisions



4.4 The Statistical Discrepancy

As explained in Chapters 1 and 2, the accounts contain two estimates of GDP, one calculated as the sum of factor incomes and the other, as the sum of final expenditures on goods and services. The difference between the two estimates, known as the statistical discrepancy, offers another perspective on the general reliability of the IEA.

The statistical discrepancy has not evolved in a completely random manner over time. Rather, the expenditure side of the accounts has tended to be somewhat higher than the income side in most years. Since 1926 this proves to be the case in fifty-three of the sixty-four years on record (see Figure 4.2), which implies the existence of systematic biases in the accounts, although their origin is not clear. The fact that measured total expenditure has tended to exceed measured total income suggests that perhaps the latter, a large portion of which is benchmarked to taxation statistics, may have a tendency to be understated. For this reason, the magnitude of the statistical discrepancy might shed some light on the "underground economy".[30]

The statistical discrepancy is, in a limited way, a measure of overall accuracy of the IEA. A large discrepancy does constitute indisputable evidence that something is seriously amiss with the estimates. However, the reverse is not necessarily true. While a large discrepancy does indeed signal serious problems in the accounts, a small discrepancy need not imply the absence of errors.

A small discrepancy may be a misleading indicator since both incomes and expenditures could be overestimated or underestimated by similar amounts. Large errors of comparable size in aggregates on each side of the accounts would lead to almost identical, but equally wrong estimates of GDP. A situation of this kind is perhaps more likely than might at first appear to be the case, since some aggregates are identical on both sides of the accounts.[31] Furthermore, as discussed in Chapter 3, the estimation of different components on the two sides of the accounts often relies on the same surveys or administrative records.

National accounts statisticians are very much concerned with the size of the statistical discrepancy in compiling the estimates. Large discrepancies in the first GDP summations are deemed indicative of problems in the statistical system and/or the national accounts estimation procedure, problems which are rigorously investigated. Substantial effort is made to track down and eliminate errors with a view to reducing the statistical discrepancy. To a lesser degree, large fluctuations in the discrepancy are also a matter of concern even if its absolute size remains within the expected range, since such fluctuations can occasion substantial unexplained increases or reductions in measured economic growth. Again, this prompts an investigation of sources and methods in an effort to identify the underlying causes of such fluctuations and limit them as much as possible. The statistical discrepancy ultimately recorded in the accounts is thus, at best, a quite limited indicator of their overall accuracy.

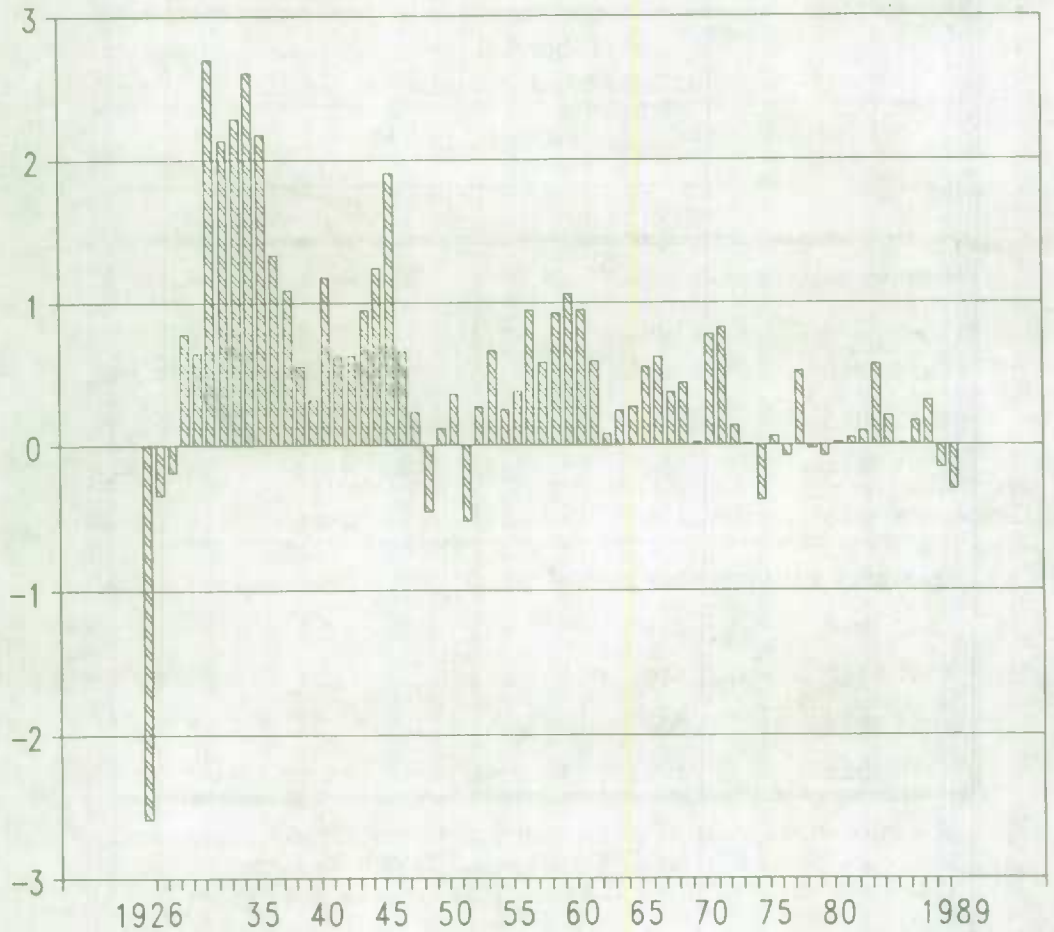
Table 4.5 gives a summary of the main characteristics of the statistical discrepancy. The table provides the arithmetic mean and standard deviation of the income-side statistical discrepancy, expressed both in millions of dollars and as a percentage of GDP.

[30] For more on the measurement of the underground economy, see Berger (1986), Blades (1982), Carson (1984), De Leeuw (1986), Denison (1982), Feige (1979, 1981, 1982, 1983, 1989), Franz (1985), Frey and Pommerehne (1983), Gaertner (1985), Henry (1978), Houston (1987), Mirus and Smith (1981), Tanzi (1982) and Thomas (1986).

[31] Government capital consumption allowances are one example, the value of physical change in farm inventories, another.

Figure 4.2

Statistical Discrepancy as a Percentage of GDP



Interestingly, while the mean of the discrepancy is positive in each period[32] and increases very slightly over time, its rate of increase is much less rapid than that of GDP. Accordingly, the mean ratio of the discrepancy to GDP drops substantially, from about 1.0% in the 1926-1946 period to 0.4% between 1947 and 1960, 0.3% between 1961 and 1974 and just 0.1% between 1975 and 1988. The standard deviation of the statistical discrepancy, measured in millions of dollars, has grown quite rapidly over time. Indeed, it was eleven times larger in the 1975-1988 period than in the years 1926-1946. However, the standard deviation of the *relative* statistical discrepancy (that is, expressed as a percentage of GDP) shows a clear downward trend, dropping from 1.2% in 1926-1946 to 0.5% in 1947-1960, 0.3% in 1961-1974 and 0.2% in 1975-1988. The declining mean and standard deviation of the relative statistical discrepancy are certainly positive observations, which presumably reflect the considerable improvements made to the statistical system and to estimation methods in the postwar period.

Table 4.5
The Statistical Discrepancy

	Mean	Standard Deviation	Mean	Standard Deviation
	(Millions of dollars)		(Percentage of GDP)	
Annual estimates				
1926-1988	193	441	0.5	0.8
1926-1946	66	73	1.0	1.2
1947-1960	139	163	0.4	0.5
1961-1974	204	326	0.3	0.3
1975-1988	429	834	0.1	0.2
Quarterly estimates (at annual rates)				
1947-1988	257	662	0.3	0.6
1947-1960	139	223	0.4	0.8
1961-1974	204	381	0.3	0.4
1975-1988	429	1044	0.1	0.3

This table shows statistics on the statistical discrepancy as it appears in the income-based GDP table. The statistical discrepancy in the expenditure-based GDP table is equal in absolute value, but opposite in sign.

[32] A positive statistical discrepancy as defined here means that measured total expenditure exceeds measured total income.

4.5 Noise-to-Signal Ratios

The previous sections in this chapter have dealt with the issue of the quality and reliability of the estimates from several perspectives. This final part looks at a closely related measure, the "noise-to-signal" ratio. More precisely, the question addressed here is this: to what degree does the underlying trend or cyclical movement (the signal) in the quarterly GDP aggregates tend to be obscured by short-term random fluctuations (the noise)?

Short-term "random movements", "shocks", "irregularities" or "noise" can be caused by many factors. Droughts, for instance, can affect GDP significantly in particular quarters. Strikes and lockouts, political actions, social events, international developments and other similar factors can all contribute to short-term variability in economic time series.

Errors in statistical measurement can also contribute noise to a time series when, for example, survey sampling variances are large. A sizeable "noise-to-signal" ratio may therefore indicate in a series a substantial variance due to measurement error. Alternatively, most of the noise in a series might be due to real effects rather than measurement errors. Nor can a series with a very slight noise-to-signal ratio be assumed to have relatively little measurement error. Indeed, a series might have a quite small noise-to-signal ratio simply because its estimation involves a trend extrapolation from a benchmark. In this case, measurement errors could in fact produce an artificially low noise-to-signal ratio.

Despite these limitations, noise-to-signal ratios can provide an interesting perspective on the quarterly accounts. They reveal which components are most influenced by random effects, for whatever reason, and thereby help the user to interpret short-term fluctuations. If the quarterly growth rate in personal expenditure were to jump from 1% to 2%, for example, should this be regarded as a significant development? Or should the interpretation be more cautious, given the possibility that the increase may be due to temporary phenomena? Would the answer differ if the increase occurred in business investment instead? This is the kind of question that the noise-to-signal ratios help to address.

Table 4.6 shows the noise-to-signal ratios obtained through the seasonal adjustment of the quarterly GDP aggregates.[33] The X11ARIMA method was first used to decompose each of the unadjusted quarterly accounts series into its "irregular" and "trend-cycle" elements. The figures in Table 4.6 were then calculated as the average absolute percentage change (or first difference) in the estimated irregular component, divided by the average absolute percentage change (or first difference) in the estimated trend-cycle component for each time series. Small values indicate low noise-to-signal ratios.[34] The results are based on estimates for three 14-year periods which together span most of the postwar era: 1947-1960, 1961-1974 and 1975-1988.

Noise-to-signal ratios are much higher than average, perhaps not surprisingly, for aggregates relating to the farm sector and the statistical discrepancy. Accrued net income of farm operators from farm production and the VPC in farm inventories and GICC both exhibit ratios in the 4-6 range, and the statistical discrepancy, between 1 and 4. The next largest ratios, ranging from 1 to 3, are those of the VPC in business non-farm inventories.

Among the other income aggregates, those with the largest noise-to-signal ratios over the past 14 years are, in descending order, the inventory valuation adjustment and interest and miscellaneous investment income (with ratios of 1.0 and 0.9 respectively), corporation profits before taxes and indirect taxes less subsidies (both with ratios of 0.6), net income of non-farm unincorporated business including rent (0.4), and wages, salaries and supplementary labour income and capital consumption allowances (both 0.2).

On the expenditure side, at current prices, the noisiest series other than inventory changes and the statistical discrepancy are exports of goods, exports of services and government investment, with ratios of 0.6, 0.7 and 0.7 respectively.

---

[33] See Chapter 3 for a discussion of the X11ARIMA procedure and its underlying decomposition of time series.

[34] A similar way to look at this information is in terms of the "quarter of cyclical dominance" (QCD), which is defined as the number of quarters it takes for the average absolute change in the trend-cycle component to dominate that in the irregular component. The QCD can be approximated by the noise-to-signal ratio rounded up to the nearest integer. If the noise-to-signal ratio is less than one, for example, then the QCD is likely to be one.

Government current expenditure on goods and services, business investment in machinery and equipment, imports of goods and imports of services show ratios of 0.5, business investment in residential and non-residential construction, 0.5 and 0.4 respectively, and personal expenditure on consumer goods and services, 0.2.

At constant prices, the noise-to-signal ratios are usually larger than those in current prices. The noise ratio of GDP at constant prices is about twice as large as the one for GDP at current prices, in all three periods. This pattern reflects the fact that current price series generally have larger growth rates (and therefore larger trend-cycle variances) than corresponding constant price series. To the extent this is true, the noise-to-signal ratios would be higher for the constant price series even if the noise component variances were equal. Furthermore, price and volume trends are often inversely correlated. In the current price series, sharp price increases tend to be offset by volume decreases. Finally, the larger noise ratios in constant prices may also be due to measurement errors in deflation compounding those in the current price aggregates.

Table 4.6
Noise-to-Signal Ratios of GDP Aggregates

	1947-60	1961-74	1975-88
At current prices:			
Wages, salaries and supplementary labour income	0.1	0.1	0.2
Corporation profits before taxes	0.6	0.6	0.6
Interest and miscellaneous investment income	1.9	0.7	0.9
Accrued net income of farm operators from farm production	4.6	4.5	4.6
Net income of non-farm unincorporated business, including rent	0.5	0.5	0.4
Inventory valuation adjustment	0.9	0.9	1.0
Net domestic income at factor cost	0.6	0.3	0.4
Indirect taxes less subsidies	0.8	0.5	0.6
Capital consumption allowances	0.2	0.2	0.2
Personal expenditure on consumer goods and services	0.5	0.3	0.2
Government current expenditure on goods and services	0.8	0.4	0.5
Government investment in fixed capital and inventories	1.0	0.4	0.7
Business residential construction investment	0.5	0.6	0.5
Business non-residential construction investment	0.3	0.3	0.4
Business machinery and equipment investment	0.7	0.5	0.6
VPC in business non-farm inventories	1.4	2.8	1.2
VPC in farm inventories and GICC	5.8	2.2	5.0
Exports of goods	1.4	0.5	0.6
Exports of services	1.0	0.7	0.7
Imports of goods	0.6	0.5	0.5
Imports of services	0.8	0.7	0.5
Statistical discrepancy	3.3	1.3	1.7
Gross Domestic Product at Market Prices	0.6	0.3	0.3
At constant prices:			
Personal expenditure on consumer goods and services	0.7	0.5	0.4
Government current expenditure on goods and services	1.0	0.8	1.3
Government investment in fixed capital and inventories	0.8	0.7	1.0
Business residential construction investment	0.5	0.7	0.5
Business non-residential construction investment	0.4	0.5	0.5
Business machinery and equipment investment	0.9	0.7	0.6
VPC in business non-farm inventories	1.5	3.2	1.1
VPC in farm inventories and GICC	6.4	3.7	4.3
Exports of goods	2.1	0.7	1.0
Exports of services	1.0	1.0	1.0
Imports of goods	0.7	0.7	0.6
Imports of services	0.9	0.8	0.9
Statistical discrepancy	3.2	1.3	1.8
Gross Domestic Product at Market Prices	1.1	0.5	0.6

This table shows the ratio of the average absolute percentage change in the irregular component to that in the trend-cycle component, as estimated by the X11ARIMA seasonal adjustment procedure.

Conclusion

The development and improvement of the Income and Expenditure Accounts will continue in the years ahead. There are many issues to be addressed. As noted earlier, an international working group of national accounts experts, including Canadian representatives, has been meeting periodically to discuss the refinement and the extension of the system. The United Nations are expected to publish, within two to three years, a new SNA manual which will replace the "blue book" of 1968. The implications of the U.N.'s proposals for the Canadian SNA will then have to be considered.

Many areas in the accounts require further development regardless of the forthcoming U.N. recommendations. If the proposed federal Goods and Services Tax comes into effect as scheduled on January 1, 1991, the estimation methods for the aggregates of domestic expenditure and price indexes employed in deflation will need substantial adaptation. New chain volume indexes are also planned, which will complement the present Laspeyres-type estimates of GDP at constant prices. Further work is needed in other areas as well, such as the sectoral structure of the accounts, deflation of government expenditure and of non-merchandise trade, the treatment of leasing and retooling expenditures, and the measurement of corporation profits, dividends, rents, real estate commissions and supplementary labour income.

The Provincial Economic Accounts, much more recent and less developed, are another area requiring further advancement. Interprovincial trade flows of services as well as goods are not presently estimated and this is a priority for future research. Distinct estimates of personal income must be derived according to province of employment and province of residence. The concepts underlying the provincial allocation of the federal government estimates need to be freshly reassessed.

A range of other topics closely related to the accounts need to be examined or reexamined. Environmental accounts, the "underground economy", the value of non-market production and the service flow from the stock of consumer durable goods are relevant examples.

As these brief remarks indicate, the agenda for further research and development work in the accounts is quite challenging. The next historical revision of the SNA will likely occur in the mid-1990s and will reflect the progress of the coming years.

Appendix I. Data Sources

IEA data sources vary over time, both because of extraneous constraints and in response to the changing needs of the accounts themselves. An example of the latter is the adoption, during the historical revision in 1986, of an hedonic price index as a deflator for computer and peripheral equipment. Previously a more conventional price index had been used, which made comparatively little allowance for quality change over time. With the boom of the new microcomputer industry during the 1980s, it became increasingly apparent that a more rigorous treatment of the quality change problem was required. An example of a change in response to extraneous constraints is the adoption of the new industrial product price index in deflation, replacing the wholesale and industry selling price indexes which were discontinued.

This appendix provides a list of data sources currently used in compiling the Income and Expenditure Accounts. The list is not exhaustive. It does not include all sources that were utilized in the past.[1] Another important point is that the list is confined to direct sources, leaving aside derivative sources. The latter are ones which, like the IEA, contain "estimates" which themselves are based on direct information from other sources. The main derivative sources are the Input-Output Accounts (with which the IEA are reconciled after three years), the Balance of International Payments (from which the IEA non-resident sector estimates are taken), and the monthly Estimates of GDP by Industry (from which originate a number of quarterly projectors in the IEA).

The list has been divided into two groups, referred to as primary and secondary sources. The dividing line between the two is arbitrary and the distinction is established simply as an aid to comprehension. It reflects a judgement as to which of the many sources are most important. Except where otherwise stated, references are to Statistics Canada surveys.[2] Statistics Canada publications are referred to by their Catalogue number.[3]

Wages, Salaries and Supplementary Labour Income

Primary sources

- Budgets of the federal and provincial governments, annual.
- ***Collective Bargaining Review***, monthly, Bureau of Labour Information, Labour Canada, Catalogue L160-2668.
- Federal Government Employment, monthly, survey 1713, Catalogue 72-004 and 72-205.
- Labour Force Survey, monthly, survey 3701, Catalogue 71-001P, 71-001 and 71-201.
- Local Government Employment and Payrolls, monthly, survey 1705, Catalogue 72-009.
- ***Major Wage Settlements***, quarterly, Bureau of Labour Information, Labour Canada.
- ***Major Work Stoppages in Effect***, quarterly, Bureau of Labour Information, Labour Canada.
- Personal income tax "T4" tabulations, Revenue Canada — Taxation.
- Provincial and Territorial Government Employment, monthly, survey 1728, Catalogue 72-007.
- Public Accounts of Canada, annual, Supply and Services Canada.
- Statements of Financial Operations, monthly, Supply and Services Canada.
- Survey of Employment, Payrolls and Hours, monthly, survey 2612, Catalogue 72-002.

---

[1] See Appendix IV for a list of Statistics Canada publications, some of which provide documentation on the sources utilized in compiling the IEA in earlier decades.

[2] For a thorough reference on Statistics Canada's many surveys, see ***Index to Statistics Canada Surveys and Questionnaires, 1988***, Catalogue 12-205, annual, and ***Inventory of Statistics Canada Questionnaires on Microfiche***, Catalogue 12-205M, annual. Surveys mentioned in this appendix are indexed in these publications.

[3] See the ***Statistics Canada Catalogue 1990***, Catalogue 11-204E, annual, for a complete list of Statistics Canada publications in print as of March 30, 1990.

Secondary sources

- Air Carrier Operation in Canada, quarterly, survey 2712, Catalogue 51-002 and 51-206.
- Cable Television Survey, annual, survey 2728, Catalogue 56-205.
- Canadian Life and Health Insurance Association, annual reports.
- Canadian Bankers' Association, annual reports.
- Census of Agriculture, quinquennial, tabulations.
- Census of Canada and intercensal studies, Catalogue 91-002 and 91-209E.
- Census of Forestry, annual, survey 2107, Catalogue 25-201 and 25-202.
- Census of Mining, annual, Catalogue 26-201.
- Census of the Construction Industry, annual, survey 2807, Catalogue 64-206, 64-207, 64-208 and 64-209.
- Census of Wildlife Pelt Production, annual, survey 3428, Catalogue 23-207.
- Coastwise Shipping Survey, annual, survey 2751, Catalogue 54-205.
- Consumer Price Index, monthly, survey 2301, Catalogue 62-001 and 62-010.
- Corporation Financial Statistics, Financial Analysis Integrated Data Card, annual, survey 2508, Catalogue 61-207 and 61-208.
- Corporations and Labour Unions Return Act (CALURA), Part 2, Labour Unions, annual, survey 2502, Catalogue 71-202.
- Department of National Defence, monthly, accounting records.
- Electric Utility, Financial Report, annual, survey 2001, Catalogue 57-202.
- Electricity, monthly, survey 2151, Catalogue 57-001.
- Estimates of Trusteed Pension Funds, quarterly, survey 2607, Catalogue 74-001.
- Fisheries and Oceans Canada, tabulations.
- For-Hire Trucking Survey, annual, survey 2741, Catalogue 53-222.
- Gas Utilities, Transportation and Distribution Systems, annual, survey 2180, Catalogue 57-205.
- Hospital Annual Statistical Program, annual, survey 3208, tabulations.
- Office of the Superintendent of Financial Institutions, reports and tabulations on banks, trusts and insurance companies.
- Oil Pipeline Transport, annual, survey 2179, Catalogue 55-201.
- Passenger Bus and Urban Transit Statistics, annual, survey 2743, Catalogue 53-215.
- Provincial government and government business enterprise accounting statements.
- Provincial Workers' Compensation Boards, annual reports.
- Radio and Television Broadcasting Survey, annual, survey 2724, Catalogue 56-001 and 56-204.
- Railway Transport Survey, annual, survey 2734, Catalogue 52-211.
- Retail Trade Survey, annual, survey 2422, Catalogue 63-210 and 63-223.
- Retail Trade Survey, monthly, survey 2406, Catalogue 63-005.
- Survey of Financial Institutions, quarterly, survey 2504, Catalogue 61-006.
- Survey of Financial Statistics of Community Colleges and Vocational Schools, annual, survey 3146, tabulations.
- Survey of Financial Statistics of Universities and Colleges, annual, survey 3121, tabulations.
- Survey of Manufacturing, annual, survey 2103, Catalogue 32-250, 42-250 and 42-251.
- Survey of Uniform Financial System, School Boards, annual, survey 3119, tabulations.
- Telephone Statistics Survey, annual, survey 2722, Catalogue 56-001 and 56-203.
- Truck Use Survey, annual, survey 2793, Catalogue 53-222.
- Trusteed Pension Funds: Financial Statistics, annual, survey 2608, Catalogue 74-201.
- Wholesale Trade Survey, annual, survey 2427, Catalogue 63-226.
- Wholesale Trade Survey, monthly, survey 2401, Catalogue 63-008.

Corporation Profits Before Taxes

Primary sources

- Corporation Financial Statistics, Financial Analysis Integrated Data Card, annual, survey 2508, Catalogue 61-207 and 61-208.
- Industrial Corporations: Financial Statistics, quarterly, survey 2501, Catalogue 61-003.

- Office of the Superintendent of Financial Institutions, reports and tabulations for banks, trusts and insurance companies.
- Survey of Financial Institutions, quarterly, survey 2504, Catalogue 61-006.

Secondary sources
- ***Bank of Canada Review***, monthly, Bank of Canada.
- Canadian chartered banks, annual reports.
- Canadian Petroleum Monitoring Agency surveys, Energy Mines and Resources Canada.
- Capital and Repair Expenditures, Preliminary Estimates and Forecast, annual, survey 2803, Catalogue 61-205, 61-214 and 61-216.
- Census of Mining, annual, Catalogue 26-201.
- Coal Mines, annual, survey 2177, Catalogue 26-206.
- Crude Petroleum and Natural Gas Industry, annual, survey 2178, Catalogue 26-213.
- Labour Force Survey, monthly, survey 3701, Catalogue 71-001P, 71-001 and 71-201.
- Personal income tax "T4" tabulations, Revenue Canada — Taxation.
- Provincial government and government business enterprise accounting statements.
- Survey of Employment, Payrolls and Hours, monthly, survey 2612, Catalogue 72-002.
- Survey of Manufacturing, annual, survey 2103, Catalogue 32-250, 42-250 and 42-251.
- Survey of Manufacturing, monthly, survey 2101, Catalogue 31-001.
- Energy, Mines and Resources Canada, tabulations.
- ***Taxation Statistics***, annual, Revenue Canada — Taxation.
- Transactions Between Canada and Other Countries, annual, survey 1506, Catalogue 67-001, 67-002 and 67-202.

Interest and Miscellaneous Investment Income

Primary sources
- Budgets of the federal and provincial governments, annual.
- Corporation Financial Statistics, Financial Analysis Integrated Data Card, annual, survey 2508, Catalogue 61-207 and 61-208.
- Industrial Corporations: Financial Statistics, quarterly, survey 2501, Catalogue 61-003.
- Office of the Superintendent of Financial Institutions, reports and tabulations for banks, trusts and insurance companies.
- Payment of Dividends, annual, survey 1512, Catalogue 67-001 and 67-202.
- Public Accounts of Canada, annual, Supply and Services Canada.
- Statements of Financial Operations, monthly, Supply and Services Canada.
- Survey of Financial Institutions, quarterly, survey 2504, Catalogue 61-006.
- ***Taxation Statistics***, annual, Revenue Canada — Taxation.
- Trusteed Pension Funds: Financial Statistics, annual, survey 2608, Catalogue 74-201.

Secondary sources
- ***Bank of Canada Review***, monthly, Bank of Canada.
- ***Canada Gazette***, Supplement, Part 1, Chartered banks.
- Canadian chartered banks, annual reports.
- Crude Petroleum and Natural Gas Industry, annual, survey 2178, Catalogue 26-213.
- Debentures and Other Long-term Debt, New Issues, monthly, survey 1701.
- Department Store Sales and Stocks, monthly, survey 2408, Catalogue 63-002.
- Geographical Distribution of Ownership of Debentures Booked in Canada at Canadian Banks and Consolidated Canadian Subsidiaries, annual, survey 1526, Catalogue 67-001, 67-002 and 67-202.
- Interest on marketable bonds, Treasury bills and Canada Saving Bonds, quarterly, Department of Finance tabulations.
- International Transactions in Services, annual, survey 1533, Catalogue 67-203 and 67-510.

- Investment in Canada of Non-Canadian Corporations, annual, survey 1527, Catalogue 67-001, 67-002 and 67-202.
- Local Government Financial Management Program, Current Revenue and Expenditure, annual, survey 1732.
- Movement of Funds Between British and Foreign Insurance Companioes Doing Business in Canada and Head or Other Offices, Companies or Persons Outside Canada, annual, survey 1517, Catalogue 67-001, 67-002, 67-202.
- Movement of Funds Between Canadian Insurance Companies and Their Branches, Agencies, Bank Accounts, and Other Companies or Persons Outside Canada, annual, survey 1516, Catalogue 67-001, 67-002, 67-202.
- National Farm Survey, annual, survey 3439, Catalogue 21-202, 22-002 and 23-008.
- Particulars of Selected Issues of Funded Debt and Foreign Bank Borrowing, annual, survey 1525, Catalogue 67-001, 67-002 and 67-202.
- Provincial government and government business enterprise accounting statements.
- Report by Trust and Mortgage Loan Companies in Canada on Transactions with Non-Residents, annual, survey 1518, Catalogue 67-001 and 67-202.
- Security Transactions with Non-Residents, monthly, survey 1519, Catalogue 67-001, 67-002 and 67-202.
- Toronto Stock Exchange, value of shares traded, average commissions paid, provincial distribution of commissions and types of clients, quarterly tabulations.
- Transactions Between Canada and Other Countries, annual, survey 1506, Catalogue 67-001, 67-002 and 67-202.
- Transactions Between Canada and Other Countries, quarterly, survey 1507, Catalogue 67-001, 67-002 and 67-202.

Accrued Net Income of Farm Operators from Farm Production

Primary sources

- Canadian Wheat Board, annual reports.
- Farm Cash Receipts, monthly, survey 3437, Catalogue 21-001.
- Farm Prices Survey, monthly, survey 3436, Catalogue 62-003.
- Field Crop Reporting Series, annual, survey 3401, Catalogue 22-002.
- ***Grain Statistics Weekly***, Economics and Statistics Division, Canadian Grain Commission.
- National Farm Survey, annual, survey 3439, Catalogue 21-202, 22-002 and 23-008.

Secondary sources

- Census of Agriculture, quinquennial, tabulations.
- Census of Wildlife Pelt Production, annual, survey 3428, Catalogue 23-207.
- Corporation Financial Statistics, Financial Analysis Integrated Data Card, annual, survey 2508, Catalogue 61-207 and 61-208.
- Dairy Factory Production and Stocks, monthly, survey 3430, Catalogue 23-001.
- Egg Producers Report, quarterly, survey 3421, Catalogue 23-003 and 23-202.
- Fall Vegetable Report, annual, survey 3408, Catalogue 22-003.
- Farm Input Price Index, quarterly, survey 2305, Catalogue 62-004.
- Fur Farmers' Report, Foxes, annual, survey 3427, Catalogue 23-208.
- Fur Farmers' Report, Mink, annual, survey 3426, Catalogue 23-208.
- Harvested Area, Production and Value of Processing Vegetables, annual, survey 3406, Catalogue 22-003.
- Honey Production, Value and Colonies, annual, survey 3419, Catalogue 23-211.
- Inventory of Edible Dried Egg Products, monthly, survey 3424, Catalogue 23-003.
- Inventory Statement of Butter and Cheese, monthly, survey 3431, Catalogue 23-001.
- Leaf Tobacco Acreage, Production and Value, annual, survey 3405, Catalogue 22-003.
- Maple Products, annual, survey 3414, Catalogue 23-211.
- ***Market Commentary***, monthly, Agriculture Canada.
- Miller's Report, annual, survey 3443, Catalogue 22-007 and 22-201.
- Miller's Report, monthly, survey 3403, Catalogue 22-007 and 22-201.
- Mushroom Growers' Survey, annual, survey 3411, Catalogue 22-003.
- National Livestock Survey, annual, survey 3433, Catalogue 23-008 and 23-203.
- Potato Objective Yield Survey, annual, survey 3440, Catalogue 22-008.

- Potato Survey, annual, survey 3420, Catalogue 22-008.
- Raspberry Growers' Survey, annual, survey 3412, Catalogue 22-003.
- Seed Usage Survey, annual, survey 3442, tabulations.
- Skim Milk Powder Sales, monthly, survey 3429, Catalogue 23-001.
- Stocks of Frozen Meat Products, monthly, survey 3423, Catalogue 32-012.
- Storable Vegetable Survey, annual, survey 3444, Catalogue 22-003.
- Strawberry Growers' Survey, annual, survey 3413, Catalogue 22-003.
- Survey of Livestock Slaughter, quarterly, survey 3434, Catalogue 23-008.
- Survey of the Greenhouse Industry, annual, survey 3416, Catalogue 22-202.
- Vegetable Area Survey, annual, survey 3407, Catalogue 22-003.

Net Income of Non-Farm Unincorporated Business Including Rent

Primary sources
- Estimates of Canada's housing stock, Investment and Capital Stock Division.
- Labour Force Survey, monthly, survey 3701, Catalogue 71-001P, 71-001 and 71-201.
- Personal income tax T4 tabulations, Revenue Canada — Taxation.
- Survey of Employment, Payrolls and Hours, monthly, survey 2612, Catalogue 72-002.
- ***Taxation Statistics***, annual, Revenue Canada — Taxation.

Secondary sources
- Average rents, monthly, Canada Mortgage and Housing Corporation, tabulations.
- Building Permits Survey, monthly, survey 2802, Catalogue 64-001, 64-003 and 64-203.
- ***Canadian Fisheries — Landings***, monthly, Fisheries and Oceans Canada.
- Census of Canada and intercensal studies, Catalogue 91-002 and 91-209E.
- Consumer Price Index, monthly, survey 2301, Catalogue 62-001 and 62-010.
- Office of the Superintendent of Financial Institutions, reports and tabulations for banks, trusts and insurance companies.
- ***Production of Canada's Leading Minerals***, monthly, Energy, Mines and Resources Canada.
- Public Accounts of Canada, annual, Supply and Services Canada.
- Retail Trade Survey, annual, survey 2422, Catalogue 63-210 and 63-223.
- Retail Trade Survey, monthly, survey 2406, Catalogue 63-005.
- Road Motor Vehicles (Registrations), annual, survey 2747, Catalogue 53-219.
- Survey of Dwellings Started and Completed, monthly, carried out by CMHC and reported in ***Housing Starts and Completions***, Catalogue 64-002.
- Survey of Manufacturing, monthly, survey 2101, Catalogue 31-001.
- Wholesale Trade Survey, annual, survey 2427, Catalogue 63-226.
- Wholesale Trade Survey, monthly, survey 2401, Catalogue 63-008.

Inventory Valuation Adjustment

- See the section which follows on the value of physical change in inventories, business non-farm.

Indirect Taxes Less Subsidies

Primary sources
- Budgets of the federal and provincial governments, annual.
- Farm Cash Receipts, monthly, survey 3437, Catalogue 21-001.
- Local Government Financial Management Program, Current Revenue and Expenditure, annual, survey 1732.

- Provincial government accounting statements.
- Public Accounts of Canada, annual, Supply and Services Canada.
- Statements of Financial Operations, monthly, Supply and Services Canada.

Secondary sources
- Air Carrier Operation in Canada, quarterly, survey 2712, Catalogue 51-002 and 51-206.
- Canadian Dairy Commission, annual report.
- Gas Utilities, Transportation and Distribution Systems, annual, survey 2180, Catalogue 57-205.
- ***Grain Statistics Weekly***, Canadian Grain Commission.
- Livestock Feed Board, annual report.
- Refined Petroleum Products, monthly, survey 2150, Catalogue 45-004
- Survey of Manufacturing, annual, survey 2103, Catalogue 32-250, 42-250 and 42-251.
- Survey of Manufacturing, monthly, survey 2101, Catalogue 31-001.

Capital Consumption Allowances

Primary sources
- Capital Expenditures, Actual, annual, survey 2805, Catalogue 61-205, 61-206, 61-214, 61-215 and 61-216.
- Corporation Financial Statistics, Financial Analysis Integrated Data Card, annual, survey 2508, Catalogue 61-207 and 61-208.
- Industrial Corporations: Financial Statistics, quarterly, survey 2501, Catalogue 61-003.
- Office of the Superintendent of Financial Institutions, reports and tabulations for banks, trusts and insurance companies.
- Survey of Financial Institutions, quarterly, survey 2504, Catalogue 61-006.

Secondary sources
- Capital and Repair Expenditures, Preliminary Estimates and Forecast, annual, survey 2803, Catalogue 61-205, 61-214 and 61-216.
- Capital Expenditures, Revised Forecast, annual, survey 2804, Catalogue 61-206.
- Census of Agriculture, quinquennial, tabulations.
- Local government business enterprise accounting statements.
- Losses and gains associated with repossessed homes, annual, CMHC, tabulations.
- National Farm Survey, annual, survey 3439, Catalogue 21-202, 22-002 and 23-008.
- Passenger Bus and Urban Transit Statistics, annual, survey 2743, Catalogue 53-215.
- Provincial government and government business enterprise accounting statements.
- Public Accounts of Canada, annual, Supply and Services Canada.
- Railway Transport Survey, annual, survey 2734, Catalogue 52-211.
- ***Taxation Statistics***, annual, Revenue Canada — Taxation.
- Telephone Statistics Survey, annual, survey 2722, Catalogue 56-001 and 56-203.
- Toronto Stock Exchange, value of shares traded, average commissions paid, provincial distribution of commissions and types of clients, quarterly tabulations.

Personal Expenditure on Consumer Goods and Services

Primary sources
- Consumer Price Index, monthly, survey 2301, Catalogue 62-001 and 62-010.
- Department Store Sales by Province and Selected Metropolitan Areas, monthly, survey 2407, Catalogue 63-004.
- ***Family Expenditure in Canada***, irregular, Catalogue 62-555.
- Motor Vehicle Dealers Survey, monthly, survey 2428, Catalogue 63-014.
- New Motor Vehicle Sales, monthly, survey 2402, Catalogue 63-007.

- Retail Chains and Department Stores, annual, survey 2409, Catalogue 63-210.
- Retail Trade Survey, annual, survey 2422, Catalogue 63-210 and 63-223.
- Retail Trade Survey, monthly, survey 2406, Catalogue 63-005.

Secondary sources

- Air Carrier Operation in Canada, quarterly, survey 2712, Catalogue 51-002 and 51-206.
- ***Bank of Canada Review***, monthly, Bank of Canada.
- Budgets of the federal and provincial governments, annual.
- Cable Television Survey, annual, survey 2728, Catalogue 56-205.
- Campus Book Stores, annual, survey 2403, Catalogue 63-219.
- Canadian Merchandise Trade, monthly, survey 2201, Catalogue 65-004 and 65-007.
- Motor Vehicle Manufacturers' Association, monthly reports.
- Canadian Tobacco Manufacturers' Council, taxes on Canadian cigarettes by province, irregular reports.
- Census of Canada and intercensal studies, Catalogue 91-002, 91-209E.
- Census of Forestry, annual, survey 2107, Catalogue 25-201 and 25-202.
- Control and Sales of Alcoholic Beverages in Canada, annual, survey 1726, Catalogue 63-202.
- Corporations and Labour Unions Return Act (CALURA), Part 2, Labour Unions, annual, survey 2502, Catalogue 71-202.
- Crude Petroleum and Natural Gas Industry, annual, survey 2178, Catalogue 26-213.
- Department of National Defence, monthly, accounting records.
- Direct Selling in Canada, annual, survey 2405, Catalogue 63-218.
- Electricity, monthly, survey 2151, Catalogue 57-001.
- Electricity Supply/Disposition, quarterly, survey 2194, Catalogue 57-003 and 57-202.
- Fare Basis Report, quarterly, survey 2708, tabulations.
- Financial Survey of Canadian Water Carriers, annual, survey 2753, Catalogue 54-205.
- Foreign Service Allowance Indexes, continuing, survey 2322, Catalogue 62-010.
- Gas Utilities, Transportation and Distribution Systems, annual, survey 2180, Catalogue 57-205.
- Gas Utilities, Transportation and Distribution Systems, monthly, survey 2149, Catalogue 55-002.
- Industrial Corporations: Financial Statistics, quarterly, survey 2501, Catalogue 61-003.
- Industrial Product Price Indexes, monthly, survey 2318, Catalogue 62-011.
- Intercity and Rural Passenger Bus Survey, monthly, survey 2744, Catalogue 53-003.
- International Transactions in Services, annual, survey 1533, Catalogue 67-203 and 67-510.
- Local Government Financial Management Program, Current Revenue and Expenditures, annual, survey 1732.
- ***Monthly Beer Sales Bulletin***, monthly, Brewers Association of Canada.
- Motion Picture Theatres, annual, survey 2416, Catalogue 63-207 and 63-233.
- Motor Carrier, Freight and Household Goods Movers Survey, annual, survey 2742, Catalogue 53-222.
- National Child Care Survey, survey 3848, annual, tabulations.
- Office of the Chief Electoral Officer, irregular, reports.
- Office of the Superintendent of Financial Institutions, reports and tabulations for banks, trusts and insurance companies, quarterly.
- Official Canadian Government Travel Survey, continuing, survey 1803, Catalogue 66-001 and 66-201.
- Passenger Bus and Urban Transit Statistics, annual, survey 2743, Catalogue 53-215.
- Production and Disposition of Tobacco Products, monthly, survey 2142, Catalogue 32-022.
- Provincial lotteries corporations, monthly and annual reports.
- Public Accounts of Canada, annual, Supply and Services Canada.
- Questionnaire for Canadian Residents Leaving and Returning to Canada on the Same Day, continuing, survey 1801, Catalogue 66-001 and 66-201.
- Questionnaire for Canadian Residents Travelling Outside Canada, continuing, survey 1802, Catalogue 66-001 and 66-201.
- ***Race Course Report***, bi-monthly, Race Track Division, Agriculture Canada.
- Railway Transport Survey, annual, survey 2734, Catalogue 52-211.
- ***Report on National Health Expenditures in Canada***, Health and Welfare Canada.
- Restaurant, Caterer and Tavern Statistics, monthly, survey 2419, Catalogue 63-011.

- Road Motor Vehicle Survey (Fuel), monthly, survey 2746, Catalogue 53-218.
- Road Motor Vehicles (Registrations), annual, survey 2747, Catalogue 53-219.
- ***Status of Daycare in Canada***, irregular, Health and Welfare Canada.
- Survey of Amusements and Recreational Services, annual, survey 2425, Catalogue 63-231 and 63-233.
- Survey of Business Services, annual, survey 2426, Catalogue 63-231 and 62-232.
- Survey of Employment, Payrolls and Hours, monthly, survey 2612, Catalogue 72-002.
- Survey of Financial Institutions, quarterly, survey 2504, Catalogue 61-006.
- Survey of Financial Statistics of Community Colleges and Vocational Schools, annual, survey 3146, tabulations.
- Survey of Financial Statistics of Universities and Colleges, annual, survey 3121, tabulations.
- Survey of Manufacturing, annual, survey 2103, Catalogue 32-250, 42-250 and 42-251.
- Survey of Miscellaneous Services, annual, survey 2423, Catalogue 63-231.
- Survey of Personal and Household Services, annual, survey 2424, Catalogue 63-231 and 63-233.
- Survey of Uniform Financial System, School Boards, annual, survey 3119, tabulations.
- Telephone Statistics Survey, annual, survey 2722, Catalogue 56-001, 56-203.
- Telephone Statistics Survey, monthly, survey 2721, Catalogue 56-002.
- Toronto Stock Exchange, value of shares traded, average commissions paid, provincial distribution of commissions and types of clients, quarterly tabulations.
- Traveller Accommodation Statistics, annual, survey 2418, Catalogue 63-204.
- Uniform Crime Reporting Survey, monthly, survey 3302, Catalogue 85-205.
- United States Consumer Price Index for all Urban Consumers, Bureau of Labor Statistics, United States Department of Labor.
- Urban Transit Survey, monthly, survey 2745, Catalogue 53-003.
- Vending Machine Operators, annual, survey 2404, Catalogue 63-213.
- Wholesale Trade Survey, annual, survey 2427, Catalogue 63-226.
- Wholesale Trade Survey, monthly, survey 2401, Catalogue 63-008.

Government Current Expenditure on Goods and Services

Primary sources

- Budgets of the federal and provincial governments, annual.
- Local Government Financial Management Program, Current Revenue and Expenditure, annual, survey 1732.
- Provincial government accounting statements.
- Public Accounts of Canada, annual, Supply and Services Canada.
- Statements of Financial Operations, monthly, Supply and Services Canada.

Secondary sources

- Consumer Price Index, monthly, survey 2301, Catalogue 62-001 and 62-010.
- Estimates of government capital depreciation, Investment and Capital Stock Division, semi-annual tabulations.
- Hospital Annual Statistical Program, annual, survey 3208, tabulations.
- Industrial Product Price Indexes, monthly, survey 2318, Catalogue 62-011.
- Provincial health care payment and physicians' service schedules, Health and Welfare Canada.
- Survey of Uniform Financial System, School Boards, annual, survey 3119, tabulations.

Residential Construction

Primary sources

- Building Permits Survey, monthly, survey 2802, Catalogue 64-001, 64-003 and 64-203.
- ***Monthly MLS Statistical Survey***, monthly, Communications Department, Canadian Real Estate Association.
- New Housing Price Indexes, monthly, survey 2310, Catalogue 62-007.
- Shelter Cost Survey, annual, survey 3507, Catalogue 62-201.

- Survey of Dwellings Started and Completed, monthly, carried out by CMHC and reported on in CMHC, ***Monthly Housing Statistics***, Statistical Services Division and Statistics Canada, ***Housing Starts and Completions***, Catalogue 64-002.

Secondary sources
- Consumer Price Index, monthly, survey 2301, Catalogue 62-001 and 62-010.
- Industrial Corporations: Financial Statistics, quarterly, survey 2501, Catalogue 61-003.
- Industrial Product Price Indexes, monthly, survey 2318, Catalogue 62-011.
- Public Accounts of Canada, annual, Supply and Services Canada.
- Retail Trade Survey, monthly, survey 2406, Catalogue 63-005.
- Statements of Financial Operations, monthly, Supply and Services Canada.
- Wholesale Trade Survey, monthly, survey 2401, Catalogue 63-008.

Non-Residential Construction

Primary sources
- Capital and Repair Expenditures, Preliminary Estimates and Forecast, annual, survey 2803, Catalogue 61-205, 61-214 and 61-216.
- Capital Expenditures, Actual, annual, survey 2805, Catalogue 61-205, 61-206, 61-214, 61-215 and 61-216.
- Capital Expenditures, Revised Forecast, annual, survey 2804, Catalogue 61-206.
- ***Construction in Canada***, annual, Catalogue 64-201.
- Output Price Indexes of Non-Residential Construction, quarterly, survey 2317, Catalogue 62-007.

Secondary sources
- Canadian Merchandise Trade, monthly, survey 2201, Catalogue 65-004, 65-007, 65-202 and 65-203.
- Census of the Construction Industry, annual, survey 2807, Catalogue 64-206, 64-207, 64-208 and 64-209.
- Electric Utility Construction Price Indexes, monthly, survey 2316, Catalogue 62-007.
- Industrial Corporations: Financial Statistics, quarterly, survey 2501, Catalogue 61-003.
- Labour Force Survey, monthly, survey 3701, Catalogue 71-001P, 71-001 and 71-201.
- ***Major Work Stoppages in Effect***, quarterly, Bureau of Labour Information, Labour Canada.
- Public Accounts of Canada, annual, Supply and Services Canada.
- Statements of Financial Operations, monthly, Supply and Services Canada.
- Survey of Employment, Payrolls and Hours, monthly, survey 2612, Catalogue 72-002.
- Survey of Manufacturing, monthly, survey 2101, Catalogue 31-001.
- ***Taxation Statistics***, annual, Revenue Canada — Taxation.

Machinery and Equipment

Primary sources
- Canadian Merchandise Trade, monthly, survey 2201, Catalogue 65-004, 65-007, 65-202 and 65-203.
- Capital and Repair Expenditures, Preliminary Estimates and Forecast, annual, survey 2803, Catalogue 61-205, 61-214 and 61-216.
- Capital Expenditures, Actual, annual, survey 2805, Catalogue 61-205, 61-206, 61-214, 61-215 and 61-216.
- Capital Expenditures, Revised Forecast, annual, survey 2804, Catalogue 61-206.
- Hedonic Price Indexes for Computers and Peripheral Equipment, annual, Bureau of Economic Analysis, United States Department of Commerce.
- Machinery and Equipment Price Indexes, monthly, survey 2312, Catalogue 62-007.
- New Motor Vehicle Sales, monthly, survey 2402, Catalogue 63-007.
- Survey of Manufacturing, monthly, survey 2101, Catalogue 31-001.

Secondary sources
- Motor Vehicle Manufacturers' Association, monthly reports.
- Public Accounts of Canada, annual, Supply and Services Canada.
- Statements of Financial Operations, monthly, Supply and Services Canada.
- Survey of Manufacturing, annual, survey 2103, Catalogue 32-250, 42-250 and 42-251.
- ***Taxation Statistics***, annual, Revenue Canada — Taxation.

VPC in Inventories, Government

Primary and secondary sources
- Canadian Dairy Commission, annual reports.
- Industrial Product Price Indexes, monthly, survey 2318, Catalogue 62-011.
- Public Accounts of Canada, annual, Supply and Services Canada.
- Statements of Financial Operations, monthly, Supply and Services Canada.

VPC in Inventories, Business, Non-Farm

Primary sources
- Canadian Merchandise Trade, monthly, survey 2201, Catalogue 65-004, 65-007, 65-202 and 65-203.
- Consumer Price Index, monthly, survey 2301, Catalogue 62-001 and 62-010.
- Industrial Product Price Indexes, monthly, survey 2318, Catalogue 62-011.
- Raw Materials Price Indexes, monthly, survey 2306, Catalogue 62-011.
- Retail Trade Survey, monthly, survey 2406, Catalogue 63-005.
- Survey of Manufacturing, monthly, survey 2101, Catalogue 31-001.
- Wholesale Trade Survey, monthly, survey 2401, Catalogue 63-008.

Secondary sources
- Corporation Financial Statistics, Financial Analysis Integrated Data Card, annual, survey 2508, Catalogue 61-207 and 61-208.
- Industrial Corporations: Financial Statistics, quarterly, survey 2501, Catalogue 61-003.
- ***Production of Canada's Leading Minerals***, monthly, Energy, Mines and Resources Canada.
- Refined Petroleum Products, monthly, survey 2150, Catalogue 45-004
- Retail Trade Survey, annual, survey 2422.
- Survey of Employment, Payrolls and Hours, monthly, survey 2612, Catalogue 72-002.
- Survey of Manufacturing, annual, survey 2103, Catalogue 32-250, 42-250 and 42-251.
- ***Taxation Statistics***, annual, Revenue Canada — Taxation.

VPC in Inventories, Farm and Grain in Commercial Channels

- See the section above on the accrued net income of farm operators from farm production.

Exports and Imports of Goods and Services

Primary and secondary sources
- Canadian Merchandise Trade, monthly, survey 2201, Catalogue 65-004, 65-007, 65-202 and 65-203.
- International Transactions in Services, annual, survey 1533, Catalogue 67-001 and 67-510.
- ***Monthly Labor Review***, Bureau of Labour Statistics, United States Department of Labor.
- Survey of Employment, Payrolls and Hours, monthly, survey 2612, Catalogue 72-002.

Appendix II. Glossary

This appendix contains definitions of terms used in the Income and Expenditure Accounts. Additional explanations for many of these terms can be found in the text by referring to the index at the end of the book.[1] The terms are printed in alphabetical order and in bold, italicized type, with the definitions following.

Accrued net income of farm operators from farm production
Gross proceeds from the sale of farm products, plus the imputed value of farm output consumed by farmers and their families, plus the value of the physical change in farm inventories, less farm operating expenses and capital consumption allowances on farm buildings and equipment. Includes accrued earnings (both distributed and undistributed) of farm operators arising out of the operations of the Canadian Wheat Board. Other forms of income of farmers, such as net rent or interest receipts, are excluded. Includes only income from unincorporated farming.

Adjustment on grain transactions
The undistributed portion of earnings arising out of the operations of the Canadian Wheat Board. This portion of the accrued net income of farm operators from farm production is excluded from personal income.

Bad debts plus charitable and other contributions
Current transfers from corporations to persons in the form of bad debt write-offs, charitable donations and other contributions.

Balance of trade in goods and services
Exports of goods and services less imports of goods and services.

Business investment in fixed capital
Expenditures by the business sector on durable tangible goods with an expected service life of one year or more, and on building and engineering construction of all types. It also includes residential construction by individuals, alterations and improvements made to the stock of buildings and transfer costs paid on the sale of existing fixed assets.

Business investment in inventories
Change in the physical volume of stocks valued at the average market prices of the period. The reported book value of business inventories is deflated to remove the effect of price changes and the derived "physical" change is then revalued at average prices of the current period to obtain the value of physical change.

Business non-farm inventories
Inventories of raw materials, goods-in-process and finished products held by corporations, non-farm unincorporated businesses and government business enterprises.

Business sector
All transactors who produce goods and services for sale at a price which is intended to cover the cost of production. These include corporations, unincorporated business enterprises, independent professional practitioners and government business enterprises. Persons who own dwellings are treated as if operating business enterprises (as landlords) with respect to their housing activity whether or not they occupy their own premises. Similarly, private

---

[1] Canadian SNA terminology is generally consistent with internationally agreed definitions. See the *Glossary of Main Terms* in *A System of National Accounts*, Studies in Methods, Series F, No. 2, Rev. 3, Statistical Office, Department of Economic and Social Affairs, United Nations, New York, 1968, pp. 230-237.

non-commercial institutions are treated as if operating business enterprises when they undertake capital outlays, although their current transactions are included in the personal sector.

Canada and Quebec Pension Plans
The part of the government sector which consists of the operations of the Canada and Quebec Pension Plans, established in 1966.

Canadian residents
Individuals and institutions, such as corporations, non-profit institutions and government agencies, which normally reside in Canada.

Capital assistance
Transfers from government to business, whether incorporated or unincorporated, to encourage investment in fixed capital and the improvement of existing assets. Includes a variety of incentive programs such as the Canadian Home Insulation Program, the Petroleum Incentives Program and grants for the construction of commercial and fishing vessels.

Capital consumption allowances
The allowance for the using up of capital in the productive process. Also included here are miscellaneous valuation adjustments to bring business accounting records into conformity with national accounting definitions. Among these valuation adjustments are a deduction for non-capital outlays charged to capital account by business, such as brokerage fees on the purchase and sale of stocks and bonds, and an addition for the amounts paid by insurance companies to compensate for fire and other types of losses.

Capital Finance Accounts
The saving, investment and lending transactions of each of the four sectors of the Income and Expenditure Accounts: persons and unincorporated business, government, corporate and government business enterprises and non-residents.

Capital transfers
Transfers which are designed to finance investment, other forms of accumulation or long-term expenditure of the recipient or which are made out of wealth or saving of the donor.

Chain price indexes
Price indexes where the values of the aggregate index for two adjacent periods, calculated from the detailed price indexes, are based on the expenditure pattern from the first of the two periods, and where these index values are linked together in a chain to form the index.

Consumer services
Spending by persons on services such as gross rents (including the rental value of owner-occupied housing), recreation, transportation, medical care, child care, hotels and restaurants.

Corporate and government business enterprise sector
All business transactors whose legal form of organization is the corporation, plus government business enterprises.

Corporate direct taxes
The part of direct taxes representing income tax liabilities of corporations, which are divided into collections proper and the excess of liabilities over collections.

Corporation profits before taxes
The net earnings from economic activity of privately-held corporations. Profits are measured after deducting an allowance for the consumption of fixed capital in the current period.

Current transfers
Transfers of income between transactors, reducing the current income of the payer and adding to the current income of the recipient.

Current transfers from corporations and government business enterprises to government
Direct taxes paid by corporations and government business enterprises.

Current transfers from corporations and government business enterprises to non-residents
Withholding taxes paid by corporations and government business enterprises to foreign governments.

Current transfers from corporations and government business enterprises to persons
Bad debts plus charitable and other contributions.

Current transfers from government to business
Subsidies and capital assistance to incorporated and unincorporated businesses and to government business enterprises.

Current transfers from government to corporations and government business enterprises
Capital assistance to corporations and government business enterprises.

Current transfers from government to non-residents
Official contributions and pensions paid to non-residents.

Current transfers from government to persons
Payments such as family allowances, unemployment benefits, old age security benefits, scholarships and research grants, social welfare payments, grants to private non-commercial institutions, grants to post-secondary educational institutions, public service pensions and pensions paid under the Canada and Quebec Pension Plans.

Current transfers from government to unincorporated business
Capital assistance to unincorporated business.

Current transfers from non-residents to government
Withholding taxes paid by non-residents to the Government of Canada.

Current transfers from non-residents to persons
Personal and other remittances from abroad.

Current transfers from persons and unincorporated business to government
Direct taxes from persons and unincorporated businesses and other current transfers from persons to government.

Current transfers from persons to corporations
The transfer portion of interest on the consumer debt. (See ***interest on the consumer debt.***)

Current transfers from persons to non-residents
Personal remittances and withholding taxes paid abroad.

Direct taxes
Current transfers to government from persons, unincorporated businesses, corporations and government business enterprises in the form of taxes levied on income from employment, property, holding gains or any other source. Also includes employer and employee contributions to social insurance, contributions to government pension funds and contributions to the Canada and Quebec Pension Plans.

Dividends
Income payable and receivable in respect of corporate equity securities and other forms of equity participation in corporate enterprises.

Durable consumer goods
Goods acquired by persons which can be used on multiple occasions and which have an expected lifetime of considerably more than one year, such as motor vehicles and major appliances.

Exports of goods and services
Current receipts from exports of merchandise, travel expenditures of non-residents in Canada, freight and shipping charges earned on Canadian account and other receipts from services rendered to non-residents.

Factor cost
Valuation at factor cost represents the costs of the factors of production. The valuation is expressed in terms of the expense of the producer, rather than of the purchaser. It excludes all indirect taxes, such as sales and excise taxes, customs duties and property taxes. Compare with valuation at ***market prices***.

Factors of production
Productive agents which, when combined, create economic output. In broad terms there are two factors of production, labour and capital.

Farm inventories
Farm output stored on farms; includes grains, tobacco, potatoes and livestock.

Final domestic demand
The sum of personal expenditure on consumer goods and services, government current expenditure on goods and services, and government and business investment in fixed capital.

Fixed-weighted price indexes
Also known as "Laspeyres" indexes, these are price indexes where a fixed pattern of expenditure from some base period is used to aggregate the detailed price indexes in each period.

Government business enterprises
Government enterprises and agencies which operate on a profit or cost recovery basis and are similar in motivation to private business enterprises.

Government current expenditure on goods and services
All current outlays for goods and services by the government sector, covering wages and salaries of government employees and purchases of other non-capital goods and services. This component includes defence expenditures and an imputation for the capital consumption of government fixed assets. The expenditures are measured net of receipts from sales to other sectors.

Government investment in fixed capital
Expenditures by the government sector on new durable assets such as buildings, waterworks, sewage systems, roads, harbours, airports as well as machinery and equipment. Excludes defence construction and equipment, which are defined as current expenditure.

Government investment in inventories
Change in the physical volume of stocks held by government, valued at the average market price of the period. Includes only those inventories held by federal government marketing agencies, such as the Canadian Dairy Commission, and uranium stocks.

Government receipts from sales to business
Revenues received by government from fees charged for certain goods and services purchased voluntarily by other sectors. Includes a range of cost recovery charges such as water charges, landing fees and prices charged for government documents. In the Income and Expenditure Accounts, sales by government to persons and unincorporated businesses and to non-residents are included with sales to corporations and government business enterprises, since separate statistics are not presently available for the individual sectors.

Government sector
All general government departments, agencies and funds (budgetary and non-budgetary) of the federal, provincial and local governments, including locally administered elementary and secondary school systems, plus non-profit hospitals and the Canada and Quebec Pension Plans.

Grain in commercial channels
Grain in the hands of the Canadian Wheat Board or private grain dealers.

Gross Domestic Product
The unduplicated value of production originating within the boundaries of Canada, regardless of the ownership of the factors of production. Gross Domestic Product can be valued either at factor cost or at market prices.

Gross National Product
The unduplicated value of production by Canadian-owned factors of production, regardless of where it takes place. Gross National Product can be valued either at factor cost or at market prices.

Holding gains and losses
Additions to or subtractions from income which result from selling an asset at a price either higher or lower than its purchase price. Holding gains and losses are excluded from the Income and Expenditure Accounts because they are not related to current production.

Hospitals
Hospitals are allocated to three different sectors in the Income and Expenditure Accounts, depending on how they are controlled. Hospitals owned and operated directly by the federal and provincial governments are classified to the federal and provincial government sub-sectors. Public lay and religious hospitals, defined as independent institutions not operating for profit and accepting patients regardless of ability to pay, are allocated to a separate hospitals sub-sector within the government sector. Finally, privately owned profit-oriented hospitals are included in the business sector.

Implicit price indexes
Also known as variable-weighted or "Paasche" indexes (although not strictly of the Paasche type), these price indexes are a by-product of the deflation procedure and are obtained by dividing the value series (measured at current prices) by the volume series (measured at constant prices).

Imports of goods and services
Current payments for imports of merchandise, travel expenditures of Canadians abroad, freight and shipping charges incurred by Canada on foreign account and other payments for services rendered by non-residents.

Income and Expenditure (Outlay) Accounts
Accounts which record, on the income side, incomes earned on the production account and all other classes of income received by each sector from various sources, except income attributable to holding gains (which is not part of current production); and, on the expenditure side, outlays in the form of current expenditures on goods and services, transfer payments and distribution of earnings.

Indirect taxes
Taxes which represent a business cost and are likely to be reflected in market prices paid by the purchaser, such as sales and excise taxes, import duties and property taxes. Property taxes fall under this heading because they represent a business cost to landlords (including residents of their own dwellings who, in the accounts, are considered to be "renting to themselves").

Inheritances and migrants' funds
The net worth of immigrants or emigrants, representing capital amounts transferred to or from Canada at the time of arrival or departure, or intended to be transferred at a later date, plus bequests to Canadian residents from non-residents or to non-residents from Canadian residents.

Interest
Income payable or receivable on bank and other deposits, bills, bonds and other loans, and on pension funds and life insurance actuarial reserves.

Interest and miscellaneous investment income
Earnings in the form of interest and other investment income of persons (except dividends), plus government investment income (including profits net of losses of government business enterprises), less net investment income received by persons and governments from non-residents, less all interest on the public debt and the transfer portion of interest on the consumer debt. Due to lack of information, the last deduction is made here in its entirety although in principle it should be apportioned among three income aggregates, namely this one, corporation profits before taxes and net income of unincorporated business.

Interest, dividends and miscellaneous investment income of persons
Earnings in the form of interest and dividends accruing to persons from corporations, governments and non-residents. Also includes the interest accruing on private pension funds, life insurance funds and funds invested by other "associations of individuals".

Interest on the consumer debt
Interest payments on liabilities of the personal sector to the corporate and government business enterprise sector which are incurred to finance personal expenditure on consumer goods and services. Comprised of two parts: the administrative cost, representing the expense of rendering services to borrowers, and the remaining "transfer portion".

Interest on the public debt
Interest payments on liabilities of the government sector.

Inventory valuation adjustment
The difference between the change in inventory book values and the value of physical change in inventories, which is a measure of the net holding gain or loss realized by business as a result of price changes. Holding gains and losses on inventories are present in corporation profits before taxes and other income aggregates, and must be removed in order to measure current production.

Investment income paid to non-residents
Investment income payments on Canadian liabilities to non-residents, inclusive of any applicable withholding taxes. Includes a variety of interest, dividend and other types of payments such as net expenses of Canadian banks from foreign currency transactions and net revenues of foreign insurance companies from insurance operations in Canada.

Investment income received from non-residents
Investment income earned by Canadian residents on their assets abroad, inclusive of any applicable withholding taxes. Includes a variety of interest, dividend and other types of receipts such as net earnings of Canadian banks from foreign currency transactions and net revenues of Canadian insurance companies from insurance operations abroad.

Machinery and equipment
Expenditures of a capital nature on durable, tangible goods with an expected service life of one year or more. The equipment must be of a type that can be removed without materially altering the structure within which it is housed. The estimates cover the installed cost, not simply the delivered cost. Progress payments on heavy machinery, such as aircraft or ships, are included as capital outlays in the year in which they are made regardless of the date of delivery of the equipment.

Market prices
Valuation at market prices is expressed in terms of the prices actually paid by the purchaser. It includes all indirect taxes, such as sales and excise taxes, customs duties and property taxes and also reflects the impact of subsidy payments. Compare with valuation at ***factor cost***.

Merchandise exports and imports
Receipts and payments arising out of transactions involving the sale of movable goods between residents and non-residents.

Military pay and allowances
The part of wages, salaries and supplementary labour income consisting of payments to members of the Armed Forces serving in Canada or abroad. Included are military pay, various allowances and employer contributions to pension funds and other benefits. Veterans' allowances are excluded and treated instead as transfer payments.

Net current transfers from non-residents
All current transfers from non-residents less all current transfers to non-residents.

Net Domestic Income at Factor Cost
The sum of all incomes arising in productive activity within the boundaries of Canada, representing the earnings of factors of production, whether owned by Canadians or non-residents. Includes wages, salaries and supplementary labour income, corporation profits before taxes, interest and miscellaneous investment income, accrued net income of farm operators from farm production, net income of non-farm unincorporated business, including rent, and the inventory valuation adjustment. Differs from GDP at factor cost in that it excludes capital consumption allowances.

Net income of non-farm unincorporated business, including rent
Earnings of unincorporated proprietors from their own businesses, except farm operators. The net income of businesses such as unincorporated retailers and consultants, and of independent professional practitioners such as doctors, dentists, lawyers and engineers is included, as is the net rental income of persons (but not corporations). Net rental income covers paid and imputed rents, after expenses, from the ownership of residential property and net paid rents from the ownership of non-residential property.

Net income received by farm operators from farm production
Accrued net income of farm operators from farm production less the adjustment on grain transactions.

Net inheritances and migrants' funds
Inheritances and immigrants' funds received in Canada from abroad, less inheritances and emigrants' funds transferred from Canada to other countries.

Net investment income received from non-residents
Investment income received from non-residents less investment income paid to non-residents.

Net lending
A balancing item in the Capital Finance Accounts equal to the saving of a sector, plus its capital consumption allowances and net capital transfers receipts, less its investment in fixed capital and in inventories.

Net National Income at Factor Cost
The sum of all incomes arising in productive activity by Canadian factors of production, regardless of where the production takes place. Includes wages, salaries and supplementary labour income, corporation profits before taxes, interest and miscellaneous investment income, accrued net income of farm operators from farm production, net income of non-farm unincorporated business, including rent, the inventory valuation adjustment and net investment income received from non-residents.

Non-durable consumer goods
Goods acquired by persons which can be used only once, such as food, gasoline, alcoholic beverages and tobacco.

Non-merchandise exports and imports
Receipts and payments arising out of transactions in services between residents and non-residents. Included are travel expenditures, freight and shipping charges and business, government and other services. In the Balance of International Payments, the non-merchandise component also includes investment income and transfers (both payments and receipts).

Non-resident sector
All transactors who normally reside abroad.

Non-residential construction
Industrial, commercial and institutional building construction and construction of highways, bridges and streets, railway tracks and roadbeds, docks and canals, waterworks and sewage systems, dams and irrigation systems, electric power construction projects, telephone and telegraph lines and marine cables, gas and oil facilities and similar items. Included here is the value of all new non-residential construction put in place, all additions and major renovations and all conversions and alterations where structural changes have taken place or the life of an existing asset is extended beyond its normal life expectancy. The estimates include both contract work and work done by a firm's own labour force. Expenditure on permanently built-in equipment is included as well as costs of site preparation and land improvement.

Official contributions
Technical and economic assistance and food aid to developing countries provided by the Canadian International Development Assistance Agency, plus assistance by other Canadian governmental agencies and non-governmental organizations.

Other current transfers from persons to government
Includes the personal share of motor vehicle licences and permits, hospital and medical care premiums, various miscellaneous licences and permits, such as hunting and fishing permits and marriage licences, fines and penalties, and donations to hospitals.

Outside Canada
The territory of Canada encompasses not only the provinces and territories but also Canadian embassies and military bases abroad. Income and expenditure pertaining to the latter, such as the salaries of Canadian diplomats stationed abroad, as well as current transfers from government to non-residents and those from non-residents to government, are shown under the heading "Outside Canada" in the government supplementary tables of the Provincial Economic Accounts.

Personal direct taxes
The part of direct taxes representing the sum of personal income taxes, succession duties and estate taxes and such current transfers as employer and employee contributions to social insurance, public service pensions and the Canada and Quebec Pension Plans. Includes taxes paid by unincorporated businesses as well as those paid by persons.

Personal disposable income
Personal income less personal direct taxes and other current transfers from persons to government.

Personal expenditure on consumer goods and services
The sum of expenditures on consumer durable, semi-durable and non-durable goods and consumer services. Travel expenditures of Canadians abroad are included and travel expenditures of foreigners in Canada are subtracted. The category also includes the operating expenses of universities, churches, labour unions, charitable institutions and other private non-commercial organizations, which are treated as "associations of individuals" in the accounts. Purchases of used goods are excluded although services to facilitate transactions in used goods are included.

Personal income
The sum of all incomes received by persons resident in Canada, whether these incomes represent factor earnings from current production or are received as current transfers of income from the government and other sectors. Also includes investment income accumulated on behalf of persons by life insurance companies, private pension plans and similar institutions as well as the investment income of private non-commercial institutions such as universities, labour unions and political and charitable organizations.

Personal remittances
Pensions paid by foreign governments to Canadian residents plus other transfers by non-residents to Canadian residents or by Canadian residents (particularly religious, charitable and academic institutions) to non-residents.

Personal saving
Personal disposable income less personal expenditure on consumer goods and services, less current transfers from persons to corporations and to non-residents.

Personal sector
All persons, households and non-profit organizations such as charitable institutions, labour unions, professional organizations, fraternal societies and universities. Also included are private pension funds and the investment income of life insurance companies.

Persons and unincorporated business sector
All personal sector transactors plus all transactors of the unincorporated business sector. The transactions of the unincorporated business sector are consolidated with those of the personal sector in the Income and Expenditure Accounts because it is difficult in the case of unincorporated businesses to distinguish between withdrawals of net income for personal consumption and those for capital purposes.

Plant and equipment
The sum of business investment in non-residential construction and in machinery and equipment.

Remitted profits of government business enterprises
Current earnings of government business enterprises which are remitted or deemed to be remitted to the government sector.

Residential construction
All expenditures for new housing including single dwellings, multiple dwellings and garages, major improvements and alterations and transfer costs, such as legal fees and real estate commissions.

Saving
A balancing item in the Income and Expenditure Accounts, equal to the current income of a sector, less its current expenditure. Current income and expenditure include current transfers but exclude capital consumption allowances and capital transfers.

Semi-durable consumer goods
Goods acquired by persons which can be used on multiple occasions and which have an expected lifetime of one year or somewhat more, such as clothing, footwear and linens.

Statistical discrepancy
The conceptually equal income and expenditure based estimates of Gross Domestic Product at Market Prices produce independently calculated totals. The difference between these two totals — called the statistical discrepancy — is halved, with one half being subtracted from the higher estimate and the other being added to the lower estimate.

Subsidies
Transfers from government to business, whether incorporated or unincorporated, toward current costs of production. These transfers, because they are related to the quantity or value of output produced, exported or consumed, represent additions to the income of producers from current production.

Supplementary labour income
Mandatory employer contributions to workers' compensation and social insurance (such as unemployment insurance, the Canada and Quebec Pension Plans and the Quebec and Ontario payroll taxes which help to finance provincial health insurance plans) and non-mandatory employer contributions on behalf of employees to pension funds and private and public insurance plans (such as life, health and dental care, and short- and long-term disability).

Surplus or deficit of Canada on current transactions with non-residents
The balance of trade in goods and services plus net investment income received from non-residents plus net current transfers from non-residents.

Surplus or deficit on current account as per the "Canadian Balance of International Payments"
The surplus or deficit of Canada on current transactions with non-residents plus net inheritances and migrants' funds.

Transactors
The economic agents of the system who engage in transactions involving the purchase and sale of goods and services and the payment and receipt of factor incomes and transfers.

Transfer payments
Unrequited payments involving a unilateral transfer in which there is no *quid pro quo*. See ***current transfers*** and ***capital transfers***.

Unincorporated business sector
All business transactors whose legal form of organization is not the corporation.

Unremitted profits of government business enterprises
Current earnings of government business enterprises which are retained rather than being remitted to the government sector.

Wages and salaries
All earnings from employment of Canadian residents paid for work performed, whether in cash or in kind, and before deduction of income taxes and contributions to pension funds, unemployment insurance and other social insurance schemes. Also includes military pay and allowances, commissions, tips and bonuses, directors' fees and taxable allowances, such as cost-of-living allowances and allowances in respect of holidays and sick leave. Excludes mandatory and non-mandatory employer contributions on behalf of employees to social insurance plans, which are treated as supplementary labour income.

Withholding taxes
Taxes withheld by the Government of Canada on selected income and service payments to non-residents, or withheld by foreign governments on selected income and service payments to Canadian residents.

Appendix III. List of Abbreviations

This appendix contains a list of abbreviations used in this book and elsewhere in the Income and Expenditure Accounts. Readers can find additional explanations for many of these terms in the glossary (Appendix II), or in the text by referring to the index at the end of this book.

AC	average cost (method of inventory valuation)
AGT	adjustment on grain transactions
BOP	Balance of (International) Payments
CCA	capital consumption allowances
CFDB	Central Frame Data Base
CHI	chain price index
CMHC	Canada Mortgage and Housing Corporation
CPI	consumer price index
CPP	Canada Pension Plan
CSNA	Canadian System of National Accounts
CWB	Canadian Wheat Board
FAMEX	Family Expenditure (Survey)
FARM	accrued net income of farm operators from farm production
FFA	Financial Flow Accounts
FIFO	first in first out (method of inventory valuation)
FMS	Financial Management System (of government accounting)
FOB	free on board (point of lading)
FWI	fixed-weighted price index
GBE	government business enterprise
GDP	Gross Domestic Product at Market Prices
GDPFC	Gross Domestic Product at Factor Cost
GICC	grain in commercial channels
GNP	Gross National Product at Market Prices
GNPFC	Gross National Product at Factor Cost
HS	Harmonized System (of classification for international trade)
IEA	Income and Expenditure Accounts
IEAD	Income and Expenditure Accounts Division (of Statistics Canada)
IMAD	Industry Measures and Analysis Division (of Statistics Canada)
IMF	International Monetary Fund
INSEE	Institut National de la Statistique et des Études Économiques (of France)
INT	interest and miscellaneous investment income
IOA	Input-Output Accounts
IOD	Input-Output Division (of Statistics Canada)
IOFD	Industrial Organization and Finance Division (of Statistics Canada)
IPI	implicit price index
IPPI	industrial product price index
ITD	International Trade Division (of Statistics Canada)
ITLS	indirect taxes less subsidies
IVA	inventory valuation adjustment
LFS	Labour Force Survey
LCM	lower of cost or market (method of inventory valuation)
LIFO	last in first out (method of inventory valuation)
M&E	machinery and equipment (investment)
MEPI	machinery and equipment price index
MLS	Multiple Listing Service (of the Canadian Real Estate Association)

MPA	military pay and allowances
MVA	miscellaneous valuation adjustments
NATO	North Atlantic Treaty Organization
NBSA	National Balance Sheet Accounts
NDP	Net Domestic Product at Market Prices
NDPFC	Net Domestic Product at Factor Cost
NHPI	new housing price index
NIEA	National Income and Expenditure Accounts
NNP	Net National Product at Market Prices
NNPFC	Net National Product at Factor Cost
OECD	Organization for Economic Cooperation and Development
OSFI	Office of the Superintendent of Financial Institutions
PEA	Provincial Economic Accounts
PID	Public Institutions Division (of Statistics Canada)
PIOA	Provincial Input-Output Accounts
PPI	Private and Public Investment (Survey)
PROF	corporation profits before taxes
QCD	quarter of cyclical dominance
QPP	Quebec Pension Plan
RTS	Retail Trade Survey
SAAR	seasonally adjusted at annual rates
SAQR	seasonally adjusted at quarterly rates
SEPH	Survey of Employment, Payrolls and Hours
SCC	Standard Commodity Classification
SIC	Standard Industrial Classification
SIO	(Manufacturing) Shipments, Inventories and Orders (Survey)
SLI	supplementary labour income
SNA	System of National Accounts
STC	Statistics Canada
UN	United Nations
UNINC	net income of unincorporated business, including rent
VPC	value of physical change (in inventories)
WPIP	work put in place (applies to construction activity)
WSSLI	wages, salaries and supplementary labour income
WTS	Wholesale Trade Survey
YNR	net investment income from non-residents

Appendix IV. Bibliography

This bibliography covers the theory, history and current practice of national and regional accounting, both in Canada and abroad. It is divided into three sections, as follows:

- IEA publications
- Other references on the Canadian SNA
- General references on national accounting

The last section, by far the longest of the three, contains references on topics such as price index theory, the underground economy, the extension of national accounts and the revisions of national accounts estimates in other countries.

Current and Historical IEA Publications

Dominion Bureau of Statistics, ***National Income of Canada, 1919-1938, Part 1***, Catalogue 13-502B, 1941, occasional.

———, ***National Accounts Income and Expenditure, 1938-1945***, Catalogue 13-201, April 1946, occasional.

———, ***National Accounts Income and Expenditure, 1926-1950***, Catalogue 13-502A, 1952, occasional.

———, ***Government Transactions Related to the National Accounts, 1926-1951***, D.B.S. Reference Paper number 39, Catalogue 13-D-20, December 1952, occasional.

———, ***National Accounts Income and Expenditure, by Quarters, 1947-1952***, Catalogue 13-501, 1953, occasional.

———, ***National Accounts Income and Expenditure, by Quarters, 1947-1957***, Catalogue 13-511, April 1959, occasional.

———, ***National Accounts Income and Expenditure, 1926-1956***, Catalogue 13-502, February 1962, occasional.

———, ***National Accounts Income and Expenditure, by Quarters, 1947-1961***, Catalogue 13-519, August 1962, occasional.

———, ***National Income and Expenditure Accounts, 1926-1968***, August 1969, occasional.

Statistics Canada, ***National Income and Expenditure Accounts, Volume 1, The Annual Estimates, 1926-1974***, Catalogue 13-531, March 1976, occasional.

———, ***National Income and Expenditure Accounts, Volume 2, The Quarterly Estimates, 1947-1974***, Catalogue 13-533, February 1976, occasional.

———, ***National Income and Expenditure Accounts, Volume 3, A Guide to the National Income and Expenditure Accounts (Definitions-Concepts-Sources-Methods)***, Catalogue 13-549E, September 1975, occasional.

———, ***Provincial Economic Accounts, Historical Issue, 1961-1986***, Catalogue 13-213S, June 1988, occasional.

———, ***National Income and Expenditure Accounts, Annual Estimates, 1926-1986***, Catalogue 13-531, June 1988, occasional.

———, ***National Income and Expenditure Accounts, Quarterly Estimates, 1947-1986***, Catalogue 13-533, February 1989, occasional.

———, ***National Income and Expenditure Accounts***, Catalogue 13-001, quarterly.

———, ***National Income and Expenditure Accounts, Annual Estimates***, Catalogue 13-201, annual.

———, ***Provincial Economic Accounts, Annual Estimates***, Catalogue 13-213, annual.

———, ***Provincial Economic Accounts, Preliminary Estimates***, Catalogue 13-213P, annual.

Other References on the Canadian SNA

Statistics Canada, ***Financial Flow Accounts***, Catalogue 13-002, quarterly.
————, ***Financial Flow Accounts: Preliminary Data***, Catalogue 13-002P, quarterly.
————, ***Financial Flow and National Balance Sheet Accounts***, Catalogue 13-214, annual.
————, ***A Guide to the Financial Flow Accounts and National Balance Sheet Accounts (Definitions, Concepts, Sources, Methods)***, Catalogue 13-585E, February 1989, occasional.
————, ***A User Guide to the Canadian System of National Accounts***, Catalogue 13-589E, November 1989, occasional.
————, ***Gross Domestic Product by Industry***, Catalogue 15-001, monthly. (The June issue contains appendices outlining sources and methods and providing a quality assessment for the monthly Estimates of Gross Domestic Product by Industry.)
————, ***The Input-Output Structure of the Canadian Economy***, Catalogue 15-201, annual.
————, ***The Input-Output Structure of the Canadian Economy in Constant Prices***, Catalogue 15-202, annual.
————, ***Provincial Gross Domestic Product by Industry***, Catalogue 15-203, annual.
————, ***Aggregate Productivity Measures***, Catalogue 15-204, annual.
————, ***The Input-Output Structure of the Canadian Economy, 1961-1981***, Catalogue 15-510, occasional.
————, ***The Input-Output Structure of the Canadian Economy in Constant Prices, 1961-1981***, Catalogue 15-511, occasional.
————, ***Gross Domestic Product by Industry (1981=100), 1961-1980***, Catalogue 15-512, occasional.
————, ***Quarterly Estimates of the Canadian Balance of International Payments***, Catalogue 67-001, quarterly.
————, ***Quarterly Estimates of the Canadian Balance of International Payments, Preliminary Data***, Catalogue 67-001P, quarterly.
————, ***Canada's International Investment Position***, Catalogue 67-202, annual.
————, ***Canada's International Investment Position, Preliminary Data***, Catalogue 67-202P, annual.
————, ***Canada's International Trade in Services***, Catalogue 67-203, annual.
————, ***The Canadian Balance of International Payments and International Investment Position: A Description of Sources and Methods***, Catalogue 67-506E, occasional.

General References on National Accounting

Adams, F.G., and P.E. De Janosi, "On the Statistical Discrepancy in the Revised U.S. National Accounts," ***Journal of the American Statistical Association***, volume 61, 1966, pp. 1219-1229.
Adler, Hans J., "Approaches to Regional Economic Accounting in Canada," ***Review of Income and Wealth***, volume 16, June 1970, pp. 185-208.
————, "Selected Problems of Welfare and Production in the National Accounts," ***Review of Income and Wealth***, volume 28, June 1982, pp. 121-132.
Al, P.G., G.P. Den Bakker, B.M. Balk and S. De Boer, "The Use of Chain Indices for Deflating the National Accounts," ***Statistical Journal of the United Nations***, ECE 4, 1986, pp. 347-368.
Alberta Bureau of Statistics, ***Alberta Economic Accounts***, Edmonton, annual.
Allen, R.G.D., ***Index Numbers in Theory and Practice***, London: MacMillan Press, 1975.
Arangio-Ruiz, Grazia Giacopini, ***Mesure du volume de l'emploi non déclaré***, doc. MAS/WP 7 (80) 3, Paris: OECD, March 1980.
Archambault, Edith, and Oleg Arkhipoff, (eds.), ***Études de comptabilité nationale***, Paris: Economica, 1986.
Archambault, Edith, and Xavier Greffe, "Les Économies non officielles," ***La Découverte***, Paris, 1984.
Arkhipoff, Oleg, "Le paradigme de la mesure et la fiabilité de la comptabilité nationale," ***Journal de la Société de Statistique de Paris***, volume 125, 1984, pp. 25-41.
————, "Formalisme comptable: de la comptabilité d'entreprise à la comptabilité nationale," ***Journal de la Société de Statistique de Paris***, volume 125, 1984, pp. 164-185.
————, ***Peut-on mesurer le bien-être national?*** Collections de l'INSEE, series C, number 41, Paris: INSEE, 1976.

Arvay, J., "Problems of Determining and Measuring the Reliability of the National Accounts: Hungary's Experiences," ***Review of Income and Wealth***, volume 20, March 1974, pp. 55-69.

Australian Bureau of Statistics, ***Australian National Accounts, Concepts, Sources and Methods***, Catalogue 5216.0, Canberra: Commonwealth Government Printer, May 1990.

Bailey, Martin J., ***National Income and the Price Level***, New York: McGraw-Hill, 1962.

Baily, Martin N., and Robert J. Gordon, "The Productivity Slowdown, Measurement Issues and the Explosion of Computer Power," ***Brookings Papers on Economic Activity***, volume 2, 1988, pp. 347-420.

Barthelemy, Philippe, "Travail au noir et économie souterraine: un état de la recherche," ***Travail and Emploi***, number 12, 1982.

————, "The Macroeconomic Estimates of the Hidden Economy," ***Review of Income and Wealth***, volume 34, June 1988, pp. 183-208.

Benard, J., ***Comptabilité nationale et modèles de politique économique***, Paris: Presses Universitaires de France, 1972.

Berger, Seymour, "The Unrecorded Economy: Concepts, Approach and Preliminary Estimates for Canada, 1981," ***Canadian Statistical Review***, Statistics Canada, Catalogue 11-003E, April 1986, pp. vi-xxvi.

Bertram, G.W., "Economic Growth in Canadian Industry, 1870-1915: The Staple Model and the Take-off Hypothesis," ***Canadian Journal of Economics and Political Science***, volume 29, 1963, pp. 159-184.

————, "Historical Statistics on Growth and Structure of Manufacturing in Canada, 1870-1957," ***Conference on Statistics***, Canadian Political Science Association, 1962.

————, "The Relevance of the Wheat Boom in Canadian Economic Growth," ***Canadian Journal of Economics***, volume 6, November 1973, pp. 545-566.

Bhatia, Kul B., "Accrued Capital Gains, Personal Income and Saving in the United States, 1948-1964," ***Review of Income and Wealth***, volume 16, December 1970, pp. 363-378.

Bjerke, K., "The Preliminary and Final Figures of the Danish National Accounts," ***Review of Income and Wealth***, volume 20, September 1974, p. 333-347.

Blades, Derek, "The Hidden Economy and the National Accounts," ***OECD Economic Outlook***, Occasional Studies, June 1982, pp. 28-45.

Bonin, J.M., "Seasonality and Economic Analysis," ***Southern Economic Journal***, volume 34, January 1968, pp. 383-391.

Boskin, M.J., M.S. Robinson and Alan Huber, "Government Saving, Capital Formation and Wealth in the United States, 1947-85," in Lipsey, Robert E., and Helen Tice, (eds.), ***The Measurement of Saving, Investment and Wealth***, Chicago: University of Chicago Press and National Bureau of Economic Research, 1989, pp. 287-353.

Box, G.E.P., and G.M. Jenkins, ***Time Series Analysis Forecasting and Control***, San Francisco: Holden Day, 1970.

Britton, A., and D. Savage, "The Three Measures of GDP," ***National Institute Economic Review***, volume 107, February 1984, pp. 54-59.

Bryant, C.G.E., and D.L. Daniel, "The Effects of Rebasing on the Estimates of Gross Domestic Product," ***Economic Trends***, January 1989, pp. 118-127.

Buckley, Kenneth A.H., "The Role of Staple Industries in Canada's Economic Development," ***Journal of Economic History***, volume 18, December 1958, pp. 439-450.

————, ***Capital Formation in Canada, 1886-1930***, Toronto: University of Toronto Press, 1951.

Bureau de la statistique du Québec, ***Comptes économiques des revenues et des dépenses du Québec, Estimations trimestrielles, sources et méthodes: exposé sommaire***, Quebec: Government of Quebec, 1984.

————, ***Comptes économiques des revenues et des dépenses, Estimations annuelles***, Quebec: Government of Quebec, annual.

————, ***Comptes économiques du Québec, Estimations trimestrielles***, Quebec: Government of Quebec, quarterly.

Bureau of Statistics, ***Income and Expenditure Accounts, Northwest Territories, 1977-1986***, Yellowknife, August 1988.

Bureau of Statistics, ***Yukon Economic Accounts, 1977-1987***, Whitehorse, July 1989.

Burman, J.P., "Moving Seasonal Adjustment of Economic Time Series," ***Journal of the Royal Statistical Society***, series A, volume 128, 1965, pp. 534-558.

Carson, Carol, "GNP: An Overview of Source Data and Estimating Methods," ***Survey of Current Business***, volume 67, July 1987, pp. 103-126.

————, "The History of the United States National Income and Product Accounts: the Development of an Analytical Tool," ***Review of Income and Wealth***, volume 21, June 1975, pp. 153-182.

————, "The Underground Economy: An Introduction," ***Survey of Current Business***, volume 64, May 1984, pp. 21-37 and July 1984 pp. 106-117.

Cartwright, David W., "Improved Deflation of Purchases of Computers," ***Survey of Current Business***, volume 66, March 1986, pp. 7-9.

————, and Scott D. Smith, "Deflators for Purchases of Computers in GNP: Revised and Extended Estimates, 1983-1988," ***Survey of Current Business***, volume 68, November 1988, pp. 22-23.

Caves, D.W., L.R. Christensen and W.E. Diewert, "The Economic Theory of Index Numbers and the Measurement of Input, Output and Productivity," ***Econometrica***, volume 50, 1982, pp. 1393-1414.

C.D. Howe Research Institute, ***Why do the Balances Differ on Federal Receipts and Expenditures in Quebec?***, Montreal, 1977.

Central Statistical Office of the United Kingdom, ***Regional Accounts***, Studies in Official Statistics, number 31, London: HMSO, 1978.

————, ***National Accounts Sources and Methods***, third edition, Studies in Official Statistics, number 37, London: HMSO, 1985.

Central Statistics Bureau, ***British Columbia Economic Accounts, 1961-1989***, Victoria, 1990.

Chadeau, Ann, "Measuring Household Activities: Some International Comparisons," ***Review of Income and Wealth***, volume 31, September 1985, pp. 237-253.

————, and Annie Fouquet, "Le travail domestique, essai de quantification," ***Archives and documents***, number 32, Paris: INSEE, August 1981.

Chari, M.V., and R.H. Frank, "The Development of Ontario Economic Accounts," ***Ontario Economic Review***, volume 8, November-December 1970, pp. 5-17.

Chow, G.C., and A. Lin, "Best Linear Unbiased Interpolation, Distribution and Extrapolation of Time Series by Related Series," ***Review of Economics and Statistics***, volume 53, 1971, pp. 372-375.

Cleveland, W.P., and G.C. Tiao, "Decomposition of Seasonal Time Series: A Model for the Census X11 Program," ***Journal of the American Statistical Association***, volume 71, 1976, pp. 581-587.

Clift, Barbara, "The Components of Personal Saving," ***Canadian Economic Observer***, Statistics Canada, Catalogue 11-010, November 1988, pp. 3.1-3.16.

————, and Stewart Wells, "The Reliability of the Canadian National Accounts Estimates," ***Canadian Economic Observer***, Statistics Canada, Catalogue 11-010, February 1990, pp. 3.1-3.18.

Coats, R.H., "Beginnings in Canadian Statistics," ***Canadian Historical Review***, volume 27, June 1946, pp. 109-130.

————, "Canadian Trade Statistics; Imports and Exports: What They Are; How to Use Them," ***Journal of the Canadian Bankers Association***, volume 33, April 1926, pp. 308-317 and July 1926, pp. 431-448.

————, "Fifty Years of Statistical Progress," in ***Fifty Years Retrospect: Anniversary Volume, 1882-1932***, Royal Society of Canada, Toronto: University of Toronto Press, 1932, pp. 77-83.

————, "Statistics Come of Age," ***Canadian Journal of Economics and Political Science***, volume 2, August 1936, pp. 269-287.

————, ***Wholesale Prices in Canada, 1890-1909***, Ottawa: King's Printer, 1910.

Cole, Rosanne, ***Errors in the Provisional Estimates of Gross National Product***, National Bureau of Economic Research, 1969.

————, Y.C. Chen, J.A. Barquin-Stolleman, E. Dulberger, N. Helvacian and J.H. Hodge, "Quality-Adjusted Price Indexes for Computer Processors and Selected Peripheral Equipment," ***Survey of Current Business***, volume 66, January 1986, pp. 41-50.

Collet, J.Y., H. Delestre, and P. Teillet, "Travail et capital dans les comptes nationaux," ***Économie et Statistique***, number 127, November 1980, pp. 7-19.

Conference Board of Canada, ***The Provincial Economies, 1961-1978 Data***, supplement to the Quarterly Provincial Forecast, 1979.

Courbis, R., and P. Temple, ***La Méthode des "comptes de surplus" et ses applications macro-économiques***, Collections de l'INSEE, series C, number 35, Paris: INSEE, July 1975.

Creamer, Daniel, Rosanne E. Cole, Edward F. Denison, Raymond W. Goldsmith, Alan Greenspan and John W. Kendrick, ***Gross National Product Data Improvement Project Report***, Report of the Advisory Committee on Gross National Product Data Improvement, United States Department of Commerce, Washington, DC: U.S. Government Printing Office, October 1977.

Cremeans, John E., "Conceptual and Statistical Issues in Developing Environmental Measures — Recent U.S. Experience," ***Review of Income and Wealth***, volume 23, June 1977, pp. 97-115.

Crozier, Robert B., "The Treatment of Interest on the Public Debt in the National Accounts," ***Canadian Journal of Economics and Political Science***, volume 25, November 1959, pp. 501-503.

Curtis, C.A., K.W. Taylor and H. Michell, ***Statistical Contributions to Canadian Economic History***, volumes 1 and 2, Toronto: Hunter-Rose Publishers, 1931.

De Janosi, P.E., "A Note on Provisional Estimates of the Gross National Product and its Major Components," ***Journal of Business***, volume 34, 1961, pp. 495-499.

De Leeuw, Frank, "An Indirect Technique for Measuring the Underground Economy: A Note on Revised Data," ***Survey of Current Business***, volume 24, September 1986, pp. 21-26.

————, "Conflicting Measures of Private Savings," ***Survey of Current Business***, volume 22, November 1984, pp. 17-23.

Denison, Edward F., "Is U.S. Growth Understated Because of the Underground Economy? Employment Ratios Suggest Not," ***Review of Income and Wealth***, series 28, March 1982, pp. 1-16.

————, "Welfare Measures and the GNP," ***Survey of Current Business***, volume 51, January 1971, pp. 13-16, 39.

Denizot, F.-B., and V. Levy-Garboua, "Le Problème de l'agrégation; un essai de synthèse," ***Revue Economique***, volume 27, January 1972, pp. 20-53.

Denny, M.G.S., and J.A. Sawyer, "Revising the National Accounts," ***Canadian Journal of Economics***, volume 9, November 1976, pp. 720-732.

Denton, Frank T., "Adjustment of Monthly or Quarterly Series to Annual Totals: An Approach Based on Quadratic Minimization," ***Journal of the American Statistical Association***, volume 66, 1971, pp. 99-102.

————, and E.H. Oksanen, "A Multi-Country Analysis of the Effects of Data Revisions on an Econometric Model," ***Journal of the American Statistical Association***, volume 67, June 1972, pp. 286-291.

————, and E.H. Oksanen, "Data Revisions and Forecasting Accuracy: An Econometric Analysis Based on Preliminary and Revised National Accounting Estimates," ***Review of Income and Wealth***, volume 19, December 1973, pp. 437-452.

————, and J. Kuiper, "The Effect of Measurement Errors on Parameter Estimates and Forecasts: A Case Study Based on the Canadian Preliminary National Accounts," ***Review of Economics and Statistics***, volume 47, May 1965, pp. 198-206.

Deutsch, John J., "War Finance and the Canadian Economy, 1914-1920," ***Canadian Journal of Economics and Political Science***, volume 6, November 1940, pp. 525-542.

Diewert, W.E., "Exact and Superlative Index Numbers," ***Journal of Econometrics***, volume 4, 1976, pp. 115-145.

————, "The Economic Theory of Index Numbers: A Survey," in ***Essays in the Theory and Measurement of Consumer Behaviour in Honour of Sir Richard Stone***, ed. A. Deaton, Cambridge: Cambridge University Press, 1981.

————, "The Theory of the Cost-of-Living Index and the Measurement of Welfare Change," in Diewert, W.E., and C. Montmarquette, (eds.), ***Price Level Measurement, Proceedings from a Conference Sponsored by Statistics Canada***, Statistics Canada, Catalogue 62-602, 1983, pp. 163-233.

————, and C. Montmarquette, (eds.), ***Price Level Measurement, Proceedings from a Conference Sponsored by Statistics Canada***, Statistics Canada, Catalogue 62-602, 1983.

Divisia, F., "L'indice monétaire et la théorie de la monnaie," ***Revue d'économie politique***, volume 39, 1925, pp. 980-1008.

Drechsler, László, "Problems of Recording Environmental Phenomena in National Accounting Aggregates," ***Review of Income and Wealth***, volume 22, September 1976, pp. 239-252.

Duprat, Henri, "Problèmes posés par les nomenclatures and l'agrégation," ***Économie industrielle, problématique et méthodologie***, Paris: Economica, 1982, pp. 75-81.

Eichhorn, W., and J. Voeller, "Axiomatic Foundations of Price Indexes and Purchasing Power Parities," in Diewert, W.E., and C. Montmarquette, (eds.), ***Price Level Measurement, Proceedings from a Conference Sponsored by Statistics Canada***, Statistics Canada, Catalogue 62-602, 1983, pp. 411-450.

Eisenpress, H., "Regression Techniques Applied to Seasonal Corrections and Adjustments for Calendar Shifts," ***Journal of the American Statistical Association***, volume 51, 1956, pp. 615-621.

Eisner, Robert, "Divergences of Measurement and Theory and Some Implications for Economic Policy," ***American Economic Review***, volume 79, March 1989, pp. 1-13.

———, "Extended Accounts for National Income and Product," ***Journal of Economic Literature***, volume 26, December 1988, pp. 1611-1684.

———, "The Total Incomes System of Accounts," ***Survey of Current Business***, volume 23, January 1985, pp. 24-35.

———, "Total Incomes in the United States, 1959 and 1969," ***Review of Income and Wealth***, volume 24, March 1978, pp. 41-70.

———, ***How Real is the Federal Deficit?*** New York: The Free Press, 1986.

———, ***The Total Incomes System of Accounts***, Chicago: University of Chicago Press, 1989.

Emery, B.J., and G.J. Garston, "The Measurement of Constant Price Aggregates in Canada," ***Review of Income and Wealth***, volume 15, March 1969, pp. 1-32.

Eslami-Dizdjeh, M., "Applications régionales de la comptabilité économique," ***Cahiers de l'ISEA***, series L, February 1966.

Feige, Edgar, "How Big is the Irregular Economy?" ***Challenge***, volume 22, November-December 1979, pp. 5-13.

———, "Sweden's Laffer Curve: Taxation and the Unobserved Economy," ***Scandinavian Journal of Economics***, volume 85, 1983, pp. 499-519.

———, "The Theory and Measurement of the Unobserved Economy: Causes, Consequences and Implications," in H. Walker (ed.), ***Taxation: An International Perspective***, Vancouver: the Fraser Institute, 1982.

———, "The U.K.'s Unobserved Economy: A Preliminary Assessment," ***Journal of Economic Affairs***, volume 1, 1981, pp. 205-212.

———, (ed.), ***The Underground Economies***, New York: Cambridge University Press, 1989.

———, "Le Malaise de la macro-économie et l'économie invisible," ***Consommation***, October-December 1982.

Ferber, M.A., and B.G. Birnbaum, "Housework: Priceless or Valueless?" ***Review of Income and Wealth***, volume 26, December 1980, pp. 387-400.

Fergie, R.W., "Statistical Units, Standards and Central Register Systems: Keys to the Development of Economic Accounting," ***Review of Income and Wealth***, volume 32, March 1986, pp. 46-68.

Firestone, O.J., ***Residential Real Estate in Canada***, Toronto: University of Toronto Press, 1951.

———, ***Canada's Economic Development, 1867-1953***, London: Bowes and Bowes, 1958.

———, "Development of Canada's Economy, 1850-1900," in ***Trends in the American Economy in the Nineteenth Century***, Princeton: National Bureau of Economic Research, 1960, pp. 217-252.

———, (ed.), ***Regional Economic Development***, Ottawa: University of Ottawa Press, 1974.

Fisher, F.M., and K. Shell, ***The Economic Theory of Price Indexes***, New York and London: Academic Press, 1972.

Fisher, Irving, ***The Making of Index Numbers***, third edition, New York: Houghton Mifflin Company, 1927.

Flottum, E.R., ***National Accounts of Norway, System and Methods of Estimation***, Oslo: Norway Central Bureau of Statistics, 1981.

Forsyth, F.G., and R.F. Fowler, "The Theory and Practice of Chain Price Index Numbers," ***Journal of the Royal Statistical Society***, part 2, volume 144, 1981, pp. 224-246.

Foss, Murray F., ***The U.S. National Income and Product Accounts: Selected Topics***, Chicago: University of Chicago Press and National Bureau of Economic Research, volume 47, 1983.

Fourastié, Jacqueline, ***Essai sur la mesure des quantités économiques***, Paris: Mouton, 1972.

———, and Bernard Grais, ***Les Indices statistiques***, Paris: Masson, 1984.

Franz, Alfred, "Estimates of the Hidden Economy in Austria on the Basis of Official Statistics," ***Review of Income and Wealth***, volume 31, December 1985, pp. 325-336.

Fréchette, Pierre, ***L'économie souterraine; examen de la littérature récente et premières estimations pour le Québec***, Programme interdisciplinaire d'études supérieures en aménagement du territoire and développement régional, Québec: Laval University, 1985.

Frey, Bruno S., and Werner W. Pommerehne, "The Hidden Economy: State and Prospects for Measurement," ***Review of Income and Wealth***, series 30, March 1983, pp. 23-44.

Gaertner, W., and A. Wenig (eds.), ***The Economics of the Shadow Economy***, Berlin: Springer-Verlag, 1985.

Gargantis, A.J., and A.S. Goldberger, "A Note on the Statistical Discrepancy in the National Accounts," ***Econometrica***, volume 23, 1955, p. 166-173.

Gaudemet, J.P., and B. Walliser, "Méthodologie de l'évaluation des effets macroéconomiques de projets microéconomiques ou d'intervention publiques spécifiques," ***Économie et Prévision***, number 60, 1983, pp. 3-31.

Geehan, Randall and Len Allen, "Measuring the Real Output and Productivity of Savings and Credit Institutions," ***Canadian Journal of Economics***, volume 11, November 1978, pp. 669-679.

Gershuny, Jay, "L'Économie informelle," ***Futuribles***, June 1979, pp. 37-49.

Glejser, H., and P. Schavey, "An Analysis of Revisions of National Accounts Data for 40 Countries," ***Review of Income and Wealth***, volume 20, September 1974, p. 317-332.

Goldberg, K., "The Measurement and Allocation of Corporate Profits in Regional Sector Accounts," ***Journal of Regional Science***, volume 8, Winter 1968, pp. 159-163.

Goldberg, Simon A., "Long-Run Changes in the Distribution of Income by Factor Shares in Canada," in ***The Behaviour of Income Shares***, Princeton: National Bureau of Economic Research, 1964.

———, "The Development of National Accounts in Canada," ***Canadian Journal of Economics and Political Science***, volume 15, February 1949, pp. 34-52.

———, Hans J. Adler, J.D. Randall and P.S. Sunga, "The Canadian Quarterly National Accounts — A Critical Appraisal," in ***Studies in Short-term National Accounts and Long-term Economic Growth***, Princeton: National Bureau of Economic Research, 1965, pp. 2-99.

———, and Frank H. Leacy, "The National Accounts: Whither Now?" ***Canadian Journal of Economics and Political Science***, volume 22, February 1956, pp. 73-91.

Green, A.G., "Regional Aspects of Canada's Economic Growth, 1890-1929," ***Canadian Journal of Economics and Political Science***, volume 33, May 1967, pp. 232-245.

———, ***Regional Aspects of Canada's Economic Growth***, Toronto: University of Toronto Press, 1971.

Grether D.M., and M. Nerlove, "Some Properties of 'Optimal' Seasonal Adjustment," ***Econometrica***, volume 38, September 1970, pp. 682-703.

Griliches, Z., and D.W. Jorgenson, "The Explanation of Productivity Change," ***Review of Economic Studies***, volume 34, July 1967, pp. 249-285.

Gruen, F.H., "The Statistician's Revisions of Gross Non-Farm Product Estimates," ***Australian Economic Papers***, volume 18, December 1979, pp. 397-400.

Handfield-Jones, Steven J., "The National Transactions Accounts," American Statistical Association, ***Proceedings of the Business and Economic Statistics Section***, Papers Presented at the 115th Annual Meeting, New York, 1955 and the 116th Annual Meeting, Detroit, 1956.

Hannan, E.J., "The Estimation of Seasonal Variation in Economic Time Series," ***Journal of the American Statistical Association***, volume 58, 1963, pp. 31-44.

Hansen, B., and E.F. Lucas, "On the Accuracy of Index Numbers," ***Review of Income and Wealth***, volume 30, March 1984, pp. 25-38.

Harrison, Anne, "Environmental Issues and the SNA," ***Review of Income and Wealth***, volume 35, December 1989, pp. 377-388.

Hartland, P., "Canadian Balance of Payments Since 1868," in ***Trends in the American Economy in the Nineteenth Century***, Princeton: National Bureau of Economic Research, 1960, pp. 717-755.

Hawrylyshyn, Oli, ***A Review of Recent Proposals for Modifying and Extending the Measurement of GNP***, Statistics Canada, Catalogue 13-558, December 1974.

———, "The Value of Household Services: A Survey of Empirical Estimates," ***Review of Income and Wealth***, volume 22, June 1976, pp. 101-131.

———, "Towards a Definition of of Non-Market Activities," ***Review of Income and Wealth***, volume 23, March 1977, pp. 79-96.

———, ***Estimating the Value of Household Work in Canada: 1971***, Statistics Canada, Catalogue 13-566, June 1978.

Hay, K.A.J., "Money and Cycles in Post-Confederation Canada," ***Journal of Political Economy***, June 1967, pp. 263-273.

Heertje, Arnold, and Philippe Barthelemy, ***L'Économie souterraine***, Paris: Economica, 1984.

Henry, S., ***The Hidden Economy***, Oxford: Martin Robinson, 1978.

Hibbert, J., ***La mesure des effets de l'inflation sur le revenu, l'épargne et le patrimoine***, Paris: OECD, June 1983.

Hicks, J.R., ***The Social Framework***, fourth edition, London: Oxford University Press, 1971.

Hill, T.P., ***The Measurement of Real Product***, OECD Economic Studies, February 1971.

————, "Recent Developments in Index Number Theory and Practice," ***OECD Economic Studies***, volume 10, Spring 1988, pp. 123-148.

Hirsch, Weiner Z., "Design and Use of Regional Accounts," ***American Economic Review***, volume 50, May 1962, pp. 365-373.

————, (ed.), ***Elements of Regional Accounts***, Baltimore: Johns Hopkins Press, 1966.

————, (ed.), ***Regional Accounts for Policy Decisions***, Baltimore: Johns Hopkins Press, 1966.

Hirshhorn, R., and Randall Geehan, "Measuring the Real Output of the Life Insurance Industry," ***Review of Economics and Statistics***, volume 59, May 1977, pp. 211-219.

Hochwald, W., (ed.), ***Design of Regional Accounts***, Baltimore: Johns Hopkins Press, 1961.

Holden, K., "An Examination of Revisions to Selected Components of National Income, ***Bulletin of the Oxford Institute of Economics and Statistics***, volume 21, 1969, pp. 133-138.

————, and D.A. Peel, "Data Revisions and Time Series Models of GDP an Its Components," ***Applied Economics***, volume 14, February 1982, pp. 101-110.

Holub, H.W., "Some Reflections on a Universal System of National Accounting," ***Review of Income and Wealth***, volume 27, September 1981, pp. 333-338.

Hood, William C., and Anthony Scott, ***Output, Labour and Capital in the Canadian Economy***, Royal Commission on Canada's Economic Prospects, Hull: Queen's Printer, 1957.

Houston, Joel F., "The Underground Economy: A Troubling Issue for Policymakers," ***Business Review***, September-October 1987, pp. 3-12.

Howrey, E.P., "Data Revision, Reconstruction and Prediction: An Application to Inventory Investment," ***Review of Economics and Statistics***, volume 66, August 1984, pp. 386-393.

————, "The Use of Preliminary Data in Econometric Forecasting," ***Review of Economics and Statistics***, volume 60, 1978, pp. 193-200.

Hulten, Charles R., "Divisia Index Numbers," ***Econometrica***, volume 41, November 1973, p. 1017-1025.

Humphreys, D.J.R., "Personal Savings in Canada: Direct Estimates 1939-1953," American Statistical Association, ***Proceedings of the Business and Economic Statistics Section***, Papers Presented at the 114th Annual Meeting, Montreal, September 10-13, 1954.

Institut National de la Statistique et des Études Économiques, ***Comptes Économiques Régionaux, Essai de Régionalisation des Comptes de la Nation 1962***, Études et Conjoncture, numéro spécial, Études de Comptabilité Nationale, number 9, Paris: Presses Universitaires de France, 1966.

————, ***Sources et méthodes d'élaboration des comptes nationaux: les administrations publiques***, Collections de l'INSEE, series C, number 111-112, Paris: INSEE, October 1983.

————, ***Sources et méthodes d'élaboration des comptes nationaux, Comptes des entreprises par secteur d'activité***, Collections de l'INSEE, series C, number 78, Paris: INSEE, August 1979.

————, ***Système élargi de la comptabilité nationale, méthodes***, Collections de l'INSEE, series C, number 44-45, Paris: INSEE, 1976 and 1979.

————, ***Système élargi de comptabilité nationale***, Collections de l'INSEE, series C, number 140-141, Paris: INSEE, June 1987.

International Association for Research in Income and Wealth, "Special Issue on the Review of the United Nations System of National Accounts," ***Review of Income and Wealth***, volume 32, June 1986.

Jaszi, George, "The Statistical Foundations of the Gross National product," ***Review of Economics and Statistics***, volume 38, May 1956, pp. 205-214.

Johnson, A.G., "The Accuracy and Reliability of the Quarterly Australian National Accounts," ***Australian Bureau of Statistics Occasional Paper***, number 1982/2, August 1982.

Jones, C.M., G.J. Garston and A.E. Ansmits, "Quantity and Price Indexes for Construction," ***Review of Income and Wealth***, volume 24, September 1978, pp. 257-281.

Jorgenson, D.W., "Minimum Variance, Linear, Unbiased Seasonal Adjustment of Economic Time Series," ***Journal of the American Statistical Association***, volume 59, 1964, pp. 681-724.

Jouandet-Bernadat, R., ***Comptes régionaux québecois produit et revenu, 1951-1966***, Office de planification du Québec, Quebec, 1969.

Juster, Thomas, ***Social Accounting Systems***, New York: Academic Press, 1981.

Katz, Arnold J., "Valuing the Services of Consumer Durables," ***Review of Income and Wealth***, volume 29, 1983, pp. 405-427.

———, and Janice Peskin, "The Value of Services Provided by the Stock of Consumer Durables, 1947-77: An Opportunity Cost Measure," ***Survey of Current Business***, volume 60, 1980, pp. 22-31.

Kemp, Katharine, "Developments in Price Statistics for New Residential Building Construction," ***Canadian Statistical Review***, Statistics Canada, Catalogue 11-003E, July 1970, pp. 5, 112-120.

———, "Chain Price Indexes," ***Canadian Economic Observer***, Statistics Canada, Catalogue 11-010, September 1988, pp. 4.1-4.12.

———, and Philip Smith, "A Technical Note on Laspeyres, Paasche and Chain Price Indexes in the Income and Expenditure Accounts," ***National Income and Expenditure Accounts***, Statistics Canada, Catalogue 13-001, fourth quarter 1988, pp. xxi-xxxii.

Kendrick, John W., "Measurement of Real Product," in ***A Critique of the United States Income and Product Accounts***, Princeton: Princeton University Press and National Bureau of Economic Research, 1958, pp. 405-428.

———, "Studies in the National Income Accounts," ***47th Annual Report of the National Bureau of Economic Research***, June 1967, pp. 9-15.

———, ***Economic Accounts and Their Uses***, New York: McGraw-Hill, 1972.

———, ***The Formation and Stocks of Total Capital***, New York: Columbia University Press and National Bureau of Economic Research, 1976.

———, and C. Milton Jaycox, "The Concept and Estimation of Gross State Product," ***Southern Economic Journal***, October 1966, pp. 153-168.

Kenney, P.B., "Revisions to Quarterly Estimates of Gross Domestic Product," ***Economic Trends***, number 381, July 1985, pp. 97-112.

Keyfitz, N., and H.F. Greenway, "Robert Coats and the Organization of Statistics," ***Canadian Journal of Economics and Political Science***, volume 27, August 1961, pp. 313-322.

Keynes, John Maynard, ***The General Theory of Employment, Interest and Money***, Toronto: Macmillan, 1967.

King, Donald A., "Accuracy of the Quarterly GNP Estimates," ***Business Economics***, volume 17, May 1982, pp. 10-16.

King, W.I., ***The National Income and its Purchasing Power***, New York: National Bureau of Economic Research, 1930.

Kirkham, Peter, "Some Problems in Devising Measures of Error for the National Accounts," ***National Income and Expenditure Accounts***, Statistics Canada, Catalogue 13-001, first quarter 1976, pp. xvii-xxix.

Knox, Frank A., "Canadian Capital Movements and the Canadian International Balance of Payments, 1900-1934," in Herbert Marshall, Frank A. Southard and Kenneth W. Taylor, ***Canadian American Industry***, New Haven: Yale University Press and Toronto: Ryerson Press, 1936, pp. 296-324.

Krantz, O., "Historical National Accounts — Some Methodological Notes," ***Scandinavian Economic History Review***, volume 31, 1983, pp. 109-131.

Kravis, Irving B., Alan W. Heston and Robert Summers, ***A System of International Comparisons of Gross Product and Purchasing Power***, United Nations Statistical Office, the World Bank and the University of Pennsylvania, Baltimore: Johns Hopkins University Press, 1975.

———, ***International Comparisons of Real Product and Purchasing Power***, Baltimore: Johns Hopkins University Press, 1978.

Kuznets, Simon, ***National Income and Capital Formation, 1919-1935***, New York: National Bureau of Economic Research, 1937.

———, ***National Income and its Composition, 1919-1938***, two volumes, New York: National Bureau of Economic Research, 1941.

———, ***National Income: A Summary of Findings***, New York: National Bureau of Economic Research, 1946.

Lal, Kishori, "Size and Structure of the Public Sector Market, 1979," ***Canadian Statistical Review***, Statistics Canada, Catalogue 11-003E, December 1983.

————, "Services Industries in the Business Sector of the Canadian Economy," ***Review of Income and Wealth***, series 36, March 1990, pp. 83-94.

————, "Canadian System of National Accounts — An Integrated Framework," in ***Compilation of Input-Output Data***, Proceedings of the Second International Meeting, Baden, Austria, March 13-19, 1988.

————, "Gross Domestic Product," ***Canadian Statistical Review***, Statistics Canada, Catalogue 11-003E, April 1982.

Langaskens, Y., and W.V. Rijckeghem, "A New Method to Estimate Measurement Errors in National Account Statistics: The Belgian Case,"***International Statistical Review***, volume 42, 1974, p. 283-290.

Leacy, Frank H. (ed.), ***Historical Statistics of Canada***, second edition, Statistics Canada, Catalogue 11-516E, 1983, occasional.

Lithwick, N.H., ***Economic Growth in Canada, A Quantitative Analysis***, Toronto: University of Toronto Press, 1967.

Lloyd, P.J., "Substitution Effects and Biases in Nontrue Indices," ***American Economic Review***, volume 65, 1975, pp. 301-313.

Lomas, Eric, "Rebasing the National Accounts: The Reasons and the Likely Effects," ***Economic Trends***, March 1988, pp. 101-104.

Lovell, M.C., "Seasonal Adjustment of Economic Time Series and Multiple Regression Analysis," ***Journal of the American Statistical Association***, volume 58, 1963, pp. 993-1010.

Malinvaud, Edmond, ***Initiation à la comptabilité nationale***, Paris: Imprimerie Nationale, 1960.

Manitoba Bureau of Statistics, ***MBS Quarterly Economic Accounts: Background Notes***, Winnipeg, 1988.

————, ***MBS Annual Economic Accounts: Background Notes***, Winnipeg, 1988.

Mankiw, Gregory N., and Matthew D. Shapiro, "News or Noise: An Analysis of GNP Revisions," ***Survey of Current Business***, volume 66, May 1986, pp. 20-25.

Manser, Marilyn and Richard McDonald, "An Analysis of Substitution Bias in Inflation Measurement, 1959-82," ***Econometrica***, volume 56, 1988, pp. 909-930.

Marchal, J., ***Nouveaux éléments de comptabilité nationale française***, Paris: Éditions Cujas, Paris, 1966.

Marin, A., "National Income, Welfare and the Environment," ***Review of Income and Wealth***, volume 24, 1978, pp. 415-428.

McDonald, J., "An Analysis of the Significance of Revisions to Some Quarterly U.K. National Income Time Series," ***Journal of the Royal Statistical Society***, part 2, volume 138, 1975, pp. 242-256.

————, "An Examination of the Residual Error in the U.K. National Accounts," ***Manchester School Economic and Social Studies***, volume 40, June 1972, pp. 193-207.

McDougall, D.M., "Immigration into Canada, 1851-1920," ***Canadian Journal of Economics and Political Science***, volume 27, May 1961, pp. 162-175.

McNees, Stephen K., "Estimating GNP: The Trade-off Between Timeliness and Accuracy," ***New England Economic Review***, January/February 1986, pp. 3-10.

Meguerditchian, Albert, "Canada's International Investment Position, 1970-88," ***Canadian Economic Observer***, Statistics Canada, Catalogue 11-010, October 1989, pp. 4.1-4.12.

Mendershausen, H., "Eliminating Changing Seasonals by Multiple Regression Analysis," ***Review of Economic Studies***, volume 21, 1939, pp. 171-177.

Merilees, W.J., "The Case Against Divisia Index Numbers as a Basis in a Social Accounting System," ***Review of Income and Wealth***, volume 17, 1971, pp. 81-85.

Meyer, J.R., "Regional Economics: a Survey," ***Surveys of Economic Theory***, volume 2, Toronto: MacMillan, 1965, pp. 240-271.

Mirus, R., and R.S. Smith, "Canada's Irregular Economy," ***Canadian Public Policy***, volume 7, 1981, pp. 444-453.

Mishan, E.J., "GNP — Measurement or Mirage?" ***National Westminster Bank Quarterly Review***, November 1984, pp. 2-13.

Morgenstern, O., ***On the Accuracy of Economic Observations***, second edition, Princeton: Princeton University Press, 1963.

Mork, Knut Anto, "Ain't Behavin': Forecast Errors and Measurement Errors in Early GNP Estimates," ***Journal of Business and Economic Statistics***, volume 5, April 1987, pp. 165-175.

Moss, Milton, (ed.), ***The Measurement of Economic and Social Performance***, New York: Columbia University Press and National Bureau of Economic Research, 1973.

Mouchez, Philippe, ***Les indices de prix, Étude méthodologique***, Paris: Éditions Cujas, 1961.

Mulder, N.G., and R.L. Simpson, "Gross Provincial Product: Methods and Estimates, New Brunswick, 1956-1964," in ***New Brunswick Economic Statistics***, Fredericton: Office of the Economic Adviser, Government of New Brunswick, 1966.

Murphy, M., "Comparative Estimates of the Value of Household Work in the United States for 1976," ***Review of Income and Wealth***, volume 28, March 1982, pp. 29-43.

————, "The Value of Non-Market Household Production: Opportunity Cost Versus Market Cost Estimates," ***Review of Income and Wealth***, volume 24, September 1978, pp. 243-255.

National Bureau of Economic Research, ***A Critique of the United States Income and Product Accounts***, Princeton: Princeton University Press and National Bureau of Economic Research, 1958.

————, ***Problems in the International Comparison of Economic Accounts***, Princeton: Princeton University Press and National Bureau of Economic Research, 1957.

————, ***Regional Income***, Princeton: Princeton University Press and National Bureau of Economic Research, 1957.

Nelson, C.R., "A Benchmark for the Accuracy of Econometric Forecasts of GNP," ***Business Economics***, volume 19, April 1984, pp. 52-58.

Nerlove, M., "Spectral Analysis of Seasonal Adjustment Procedures," ***Econometrica***, volume 32, July 1964, pp. 241-286.

Nordhaus, William D., and James Tobin, "Is Growth Obsolete?" in Moss, Milton, (ed.), ***The Measurement of Economic and Social Performance***, New York: Columbia University Press and National Bureau of Economic Research, 1973, pp. 509-532.

Novak, G.J., "Reliability Criteria for National Accounts," ***Review of Income and Wealth***, volume 21, September 1975, pp. 323-344.

Organization for European Economic Co-operation, ***A Standardized System of National Accounts***, Paris, 1952.

Organization for Economic Co-operation and Development, ***The Measurement of Scientific and Technical Activities***, (the "Frascati Manual"), Paris, 1981.

Ostry, Sylvia, "The Limits of Measurability," ***Common Sense Economics***, volume 2, 1974, pp. 2-11.

Owen, A.D., "International Comparison of GDP and Data Revisions," ***Economic Letters***, volume 2, 1979, pp. 165-167.

Parain-Vial, (ed.), ***Les difficultés de la quantification et de la mesure***, Paris: Maloine, 1981.

Parker, Robert P., "Improved Adjustments for Misreporting of Tax Return Information Used to Estimate the National Income and Product Accounts, 1977," ***Survey of Current Business***, volume 64, 1984, pp. 17-25.

————, "The Quality of the U.S. National Income and Product Accounts," ***Review of Public Data Use***, May 1982, pp. 1-8.

Personnaz, Micheline, "Les comptes nationaux: qui fait quoi?" ***Courrier des Statistiques***, no. 9, January 1979.

Peskin, Henry M., "A National Accounting Framework for Environmental Assets," ***Journal of Environmental and Economic Management***, volume 2, 1976, pp. 255-262.

————, "National Income Accounts and the Environment," ***Natural Resources Journal***, volume 2, 1981, pp. 511-537.

————, and Janice Peskin, "The Valuation of Nonmarket Activities in Income Accounting," ***Review of Income and Wealth***, volume 24, 1978, pp. 71-92.

Petre, J., "Expériences pratiques dans l'utilisation du SCN pour la coopération économique internationale," ***Review of Income and Wealth***, volume 12, 1966, pp. 159-177.

Pickett, J., "Residential Capital Formation in Canada, 1871-1921," ***Canadian Journal of Economics and Political Science***, volume 29, February 1963, pp. 40-58.

Pierce, D.A., "Data Revisions with Moving Average Seasonal Adjustment Procedures," ***Journal of Econometrics***, volume 14, 1980, pp. 95-114.

————, "Sources of Error in Economic Time Series," ***Journal of Econometrics***, volume 17, 1981, pp. 305-321.

Pommerehne, W.W., and Bruno S. Frey, "L'Économie souterraine: problème de mesure and résultats quantitatifs," ***Revue d'économie politique***, May-June 1984, pp. 3-32.

————, "Les Modes d'évaluation de l'économie occulte," ***Futuribles***, December 1981.

Powelson, John P., ***National Income and Flow-of-Funds Analysis***, New York: McGraw-Hill, 1960.

Provençal, Luc, "Incorporation in the Income and Expenditure Accounts of a Breakdown of Investment in Machinery and Equipment," ***National Income and Expenditure Accounts***, Statistics Canada, Catalogue 13-001, third quarter 1989, pp. xxv-xli.

Read, L.M., "Development of National Transactions Accounts," ***Canadian Journal of Economics and Political Science***, volume 22, February 1957, pp. 42-56.

————, Steven J. Handfield-Jones and F.W. Emmerson, "The National Transactions Accounts for Canada, 1946-1954," in W.C. Hood, ***Financing of Economic Activity in Canada***, Royal Commission on Canada's Economic Prospects, Hull: Queen's Printer, 1959, pp. 461-698.

Reich, Utz Peter, "Treatment of Government Activity on the Production Account," ***Review of Income and Wealth***, volume 32, 1986, pp. 69-85.

————, "Does Consumption Entail Income? Implications of the Dual Classification of Consumption Expenditure for the income Side of the Household Sector in the National Accounts," ***Review of Income and Wealth***, volume 33, June 1987, pp. 157-168.

Richardson, H.W., "The State of Regional Economics: a Survey Article," ***International Regional Science Review***, volume 3, Fall 1978, pp. 1-48.

Rinne, H., "On Revisions in National Accounts Estimates," ***Review of Income and Wealth***, volume 15, 1969, pp. 229-245.

Rolph, Earl R., "The Concept of Transfers in National Income Estimates," ***Quarterly Journal of Economics***, May 1948, pp. 327-361.

Romans, J.T., and R.E. Graham Jr., "Interregional Transfer Payments and the Measurement of Regional Income," ***Review of Economics and Statistics***, volume 58, 1976, pp. 251-255.

Rosen, H.S.,"The Monetary Value of a Housewife: A Replacement Cost Approach," ***American Journal of Economics and Sociology***, volume 33, 1974, pp. 65-73.

Royal Commission on the Economic Union and Development Prospects for Canada, ***Report***, volumes 1, 2 and 3, Ottawa: Ministry of Supply and Services, Government of Canada, 1985.

Ruggles, Nancy and Richard Ruggles, "Integrated Economic Accounts for the United States, 1947-1980," ***Survey of Current Business***, volume 62, May 1982, pp. 1-25.

————, "The Treatment of Pensions and Insurance in National Accounts," ***Review of Income and Wealth***, volume 31, March 1985, pp. 85-96.

————, ***The Design of Economic Accounts***, New York: Columbia University Press and National Bureau of Economic Research, 1970.

————, ***National Income Accounts and Income Analysis***, New York: McGraw-Hill, 1956.

Rushbrook, J.A., "Rebasing the National Accounts — Why and How and the Effects," ***Economic Trends***, London: Central Statistical Office of the United Kingdom, March 1978, pp. 105-110.

Rymes, Thomas K., ***Fixed Capital Flows and Stocks, Manufacturing, Canada, 1926-1960 - Statistical Supplement***, Statistics Canada, Catalogue 13-522, 1966.

————, ***On Concepts of Capital and Technical Change***, Cambridge: Cambridge University Press, 1971.

————, "Inflation, Nonoptimal Monetary Arrangements and the Banking Imputation in the National Accounts," ***Review of Income and Wealth***, volume 31, March 1985, pp. 85-96.

————, "Further Through on the Banking Imputation," ***Review of Income and Wealth***, volume 32, December 1986, pp. 425-441.

Samuelson, Paul, "The Evaluation of Real National Income," ***Oxford Economic Papers***, volume 2, 1950, pp. 1-29.

Saulnier, Marie, "Real Gross Domestic Product: Sensitivity to the Choice of Base Year," ***Canadian Economic Observer***, Statistics Canada, Catalogue 11-010, May 1990, pp. 3.1-3.19.

————, "Volume Indexes in the Income and Expenditure Accounts," ***National Income and Expenditure Accounts***, Statistics Canada, Catalogue 13-001, first quarter 1990, pp. xxxviv-lxiv.

Schimmler, Harry, "Some Conceptual Dilemmas in the Use of Present National Accounts," ***Review of Income and Wealth***, volume 29, September 1983, pp. 323-332.

————, "On National Accounts at Constant Prices," ***Review of Income and Wealth***, volume 19, December 1973, pp. 457-461.

Schultz, Bohdan, "Linking Price Index Numbers," in Diewert, W.E., and C. Montmarquette, (eds.), ***Price Level Measurement, Proceedings from a Conference Sponsored by Statistics Canada***, Statistics Canada, Catalogue 62-602, 1983, pp. 537-566.

Schultz, Theodore W., "Investment in Human Capital," ***American Economic Review***, volume 51, 1961, pp. 1-17.

Schultze, Charles L., ***National Income Analysis***, second edition, Englewood Cliffs: Prentice-Hall, 1967.

Shiskin, J., A.H. Young and J.C. Musgrave, "The X11 Variant of Census Method II Seasonal Adjustment," Technical Paper, number 15, Bureau of the Census, United States Department of Commerce, 1967.

Siddiqi, Yusuf and P.S. Krishna Murty, "Commodity Indirect Taxes — An Inventory Before the GST," ***Canadian Economic Observer***, Statistics Canada, Catalogue 11-010, October 1989, pp. 3.1-3.10.

Slater, Courtenay, "The National Income and Product Accounts: Quality Maintenance in the 1980s," ***Business Economics***, volume 17, January 1982, pp. 59-62.

————, "The Quality of the Nation's Economic Statistics," Hearings before the Joint Economic Committee of Congress, Washington, DC: U.S. Government Printing Office, March 17 and April 17, 1986.

Smith, A., "The Informal Economy," ***Lloyds Bank Review***, volume 141, 1981, pp. 45-61.

Smith, James D., "Measuring the Informal Economy," ***The Annals of the American Academy***, volume 493, September 1987, pp. 83-99.

Smith, Philip, "A New Indicator of Trends in Wage Inflation," ***Canadian Economic Observer***, Statistics Canada, Catalogue 11-010, September 1989, pp. 5.1-5.20.

Smyth, D.J., "The Statistical Discrepancy in the Australian National Accounts," ***Australian Economic Papers***, volume 2, 1963, pp. 222-227.

————, and P.C. McMahon, "The Statistical Discrepancy in the Australian National Accounts: A Re-examination," ***Australian Economic Papers***, volume 10, 1971, pp. 86-88.

Sourrouille, J.V., "Regional Accounts: Theoretical and Practical Problems Encountered in the Recent Experience of Argentina," ***Review of Income and Wealth***, volume 22, March 1976, pp. 13-36.

Sraffa, P., ***Production of Commodities by Means of Commodities***, Cambridge: Cambridge University Press, 1960.

Statistics Canada, "Cyclical Movements in National Income and Expenditure Aggregates," ***National Income and Expenditure Accounts***, Catalogue 13-001, third quarter 1975, pp. xiii-xxi.

————, "Fixed Weighted GNE Price Indexes," ***National Income and Expenditure Accounts***, Catalogue 13-001, fourth quarter 1976, pp. xvi-xxix.

————, "Inflation in Canada: The Impact of Export and Import Prices," ***National Income and Expenditure Accounts***, Catalogue 13-001, fourth quarter 1975, pp. xvii-xxv.

————, "Movements in Factor Income Shares," ***National Income and Expenditure Accounts***, Catalogue 13-001, third quarter 1976, pp. xii-xix.

————, "Revisions to the Income and Expenditure Accounts," ***National Income and Expenditure Accounts***, Catalogue 13-001, first quarter 1977, pp. xxiii-xxxii.

————, "Technical Paper on the Treatment of Grain Production in the Quarterly Income and Expenditure Accounts," ***National Income and Expenditure Accounts***, Catalogue 13-001, first quarter 1989, pp. xxxi-xl.

————, "The Terms of Trade, Net Exports and the Real Growth Rate," ***National Income and Expenditure Accounts***, Catalogue 13-001, second quarter 1977, pp. xvi-xxii.

Stekler, H.O., "Data Revisions and Economic Forecasting," ***Journal of the American Statistical Association***, volume 62, 1967, pp. 470-483.

Stone, Richard, "Input-Output and National Accounts," Paris: OECD, 1961.

————, "The International Harmonization of National Income Accounts," ***Accounting and Business Research***, volume 45, Winter 1981, pp. 67-79.

————, ***Measurement of National Income and the Construction of Social Accounts***, League of Nations Studies and Reports on Statistical Methods, number 7, 1947.

————, ***Quantity and Price Indexes in National Accounts***, Paris: Organization for European Economic Co-operation, 1956.

————, and S.J. Prais, "Systems of Aggregative Index Numbers and Their Comparability," ***Economic Journal***, volume 62, September 1952, pp. 565-583.

Studenski, Paul, ***The Income of Nations: Theory, Measurement and Analysis***, New York: New York University Press, 1961.

Stuvel, G., "A New Index Number Formula," ***Econometrica***, volume 25, 1957, pp. 123-131.

Sunga, P., "An Alternative to the Current Treatment of Interest as a Transfer in the United Nations and Canadian System of National Accounts," ***Review of Income and Wealth***, volume 30, December 1984, pp. 385-402.

————, "The Treatment of Interest and Net Rents in the National Accounts Framework," ***Review of Income and Wealth***, volume 13, March 1967, pp. 26-35.

Swinamer, Janet L., "The Value of Household Work in Canada, 1981", ***Canadian Statistical Review***, Statistics Canada, Catalogue 11-003E, March 1985, pp. vi-xv.

Tanzi, V., "The Underground Economy in the United States: Annual Estimates, 1930-80," ***International Monetary Fund Staff Papers***, 1983, pp. 283-305.

————, (ed.), ***The Underground Economy in the United States and Abroad***, Lexington: D.C. Heath, 1982.

Temam, Daniel, ***Sources and méthodes d'élaboration des comptes nationaux — Les biens et services***, Collections de l'INSEE, series C, number 99, Paris: INSEE, November 1981.

Theil, H., "A New Index Formula," ***Review of Economics and Statistics***, volume 55, 1973, pp. 498-502.

————, "More on Log-Change Index Numbers," ***Review of Economics and Statistics***, volume 56, 1974, pp. 552-554.

Thomas, J.J., "The Underground Economy in the United States: A Comment on Tanzi," ***International Monetary Fund Staff Papers***, volume 33, December 1986, pp. 782-788.

Tollison, R.D., "Government Output and National Income Estimates: A Comment," ***Journal of Monetary Economics***, volume 9, 1978, pp. 267-273.

Törnqvist, L., "The Bank of Finland Consumption Price Index," ***Bank of Finland Monthly Bulletin***, volume 10, 1936, pp. 1-8.

Triplett, Jack E., "The Economic Interpretation of Hedonic Methods," ***Survey of Current Business***, volume 66, January 1986, pp. 36-40.

United Nations, ***A System of National Accounts***, Studies in Methods, series F, number 2, rev. 3, Statistical Office, Department of Economic and Social Affairs, New York, 1968.

————, ***Basic Principles of the System of Balances of the National Economy***, Studies in Methods, series F, number 17, Statistical Office, Department of Economic and Social Affairs, New York, 1971.

————, ***Comparisons of the System of National Accounts and the System of Balances of the National Economy, Part 1, Conceptual Relationships***, Studies in Methods, series F, number 20, Statistical Office, Department of Economic and Social Affairs, New York, 1977.

————, ***Guidelines on Principles of a System of Price and Quantity Statistics***, Statistical Studies, series M, number 59, Statistical Office, Department of Economic and Social Affairs, New York, 1977.

————, ***Comptes satellites à ajouter aux comptes et bilans nationaux pour mesurer le bien-être: rapport technique***, Statistical Studies, series F, number 22, Statistical Office, Department of Economic and Social Affairs, New York, 1977.

————, ***Classification des fonctions des administrations publiques***, Statistical Studies, series M, number 70, Statistical Office, Department of Economic and Social Affairs, New York, 1981.

United States Congress, General Accounting Office, ***A Primer on Gross National Product Concepts and Issues***, GAO/GGD-81-47, Washington, DC: U.S. Government Printing Office, April 8, 1981.

————, ***The Bureau of Economic Analysis Should Lead Efforts to Improve GNP Estimate***, GAO/GGD-83-1, Washington, DC: U.S. Government Printing Office, December 27, 1982.

United States Congress, Joint Economic Committee, "National Economic Accounts of the United States: Review, Appraisal and Recommendations," in ***The National Economic Accounts of the United States***, Hearings, 85th Congress, 1st Session, Washington, DC: U.S. Government Printing Office, 1957.

United States Congress, Office of Technology Assessment, ***Statistical Needs for a Changing U.S. Economy — Background Paper***, OTA-BP-E-58, Washington, DC: U.S. Government Printing Office, September 1989.

United States Department of Commerce, Bureau of Economic Analysis, "The Economic Accounts of the United States: Retrospect and Prospect," 50th anniversary issue of the ***Survey of Current Business***, part 2, volume 51, July 1971.

————, ***U.S. Income and Output***, a supplement to the ***Survey of Current Business***, November 1958.

———, ***Introduction to National Economic Accounting***, Methodology Paper Series MP-1, Washington, DC: U.S. Government Printing Office, March 1985.

———, ***Corporate Profits: Profits Before Tax, Profits Tax Liability, and Dividends***, Methodology Paper Series MP-2, Washington, DC: U.S. Government Printing Office, May 1985.

———, ***Foreign Transactions***, Methodology Paper Series MP-3, Washington, DC: U.S. Government Printing Office, May 1987.

———, ***GNP: An Overview of Source Data and Estimating Methods***, Methodology Paper Series MP-4, Washington, DC: U.S. Government Printing Office, September 1987.

———, ***Fixed Reproducible Tangible Wealth in the United States, 1925-85***, Washington, DC: U.S. Government Printing Office, 1987.

———, ***Government Transactions***, Methodology Paper Series MP-5, Washington, DC: U.S. Government Printing Office, November 1988.

Urquhart, M.C., "Public Investment in Canada," ***Canadian Journal of Economics and Political Science***, volume 11, November 1945, pp. 535-553.

———, "New Estimates of Gross National Product, Canada, 1870-1926: Some Implications for Canadian Development," in Stanley L. Engerman and Robert E. Gallman, (eds.), ***Long-Term Factors in American Economic Growth***, Chicago: University of Chicago Press and National Bureau of Economic Research, 1986, pp. 9-94.

Usher, Dan, ***The Measurement of Economic Growth***, New York: Columbia University Press, 1980.

———, ***The Price Mechanism and the Meaning of National Income Statistics***, London: Oxford University Press, 1968.

Van Bochove, C.A., and A.M. Bloem, "The Structure of the Next SNA: Review of the Basic Options," ***Statistical Journal***, volume 4, July 1987, pp. 369-390.

Van der Ploeg, F., "Econometrics and Inconsistencies in the National Accounts," ***Economic Modelling***, volume 2, January 1985, pp. 8-16.

———, "Reliability and the Adjustment of Sequences in Large Economic Accounting Matrices," ***Journal of the Royal Statistical Society***, part 2, volume 145, 1982, pp. 169-186.

Vanoli A., "Le système actuel de comptabilité nationale," ***Review of Income and Wealth***, June 1969, pp. 171-184.

Vartia, Vrjö O., "Ideal Log-Change Index Numbers," ***Scandinavian Journal of Statistics***, volume 3, 1976, pp. 121-126.

Viner, Jacob, ***Canada's Balance of International Indebtedness, 1900-1913***, Cambridge: Harvard University Press, 1924.

Wallis, J.J., and D.C. North, "Should Transactions Costs be Subtracted from Gross National Product?" ***Journal of Economic History***, volume 48, September 1988, pp. 651-654.

Walsh, Carl E., "Revisions in the 'Flash' Estimates of GNP Growth: Measurement Error or Forecast Error?" ***Economic Review***, San Francisco: Federal Reserve Bank of San Francisco, Fall 1985, pp. 5-13.

Walters, R.J., "A Framework for Regional Accounts: an Australian Perspective," ***Review of Income and Wealth***, volume 33, December 1987, pp. 401-416.

Wasserman, G., "The French Regional Accounting Framework: an Alternative to the Keynesian Approach," ***Bulletin of the Oxford University Institute of Economics and Statistics***, volume 29, November 1967, pp. 311-351.

Watkins, M.H., "A Staple Theory of Economic Growth," ***Canadian Journal of Economics and Political Science***, volume 29, May 1963, pp. 141-158.

Weber, Richard E., "A Synthesis of Methods Proposed for Estimating Gross State Product," ***Journal of Regional Science***, 1979, pp. 217-230.

Weinrobe, Maurice, "Household Production and National Production: An Improvement of the Record," ***Review of Income and Wealth***, volume 20, 1974, pp. 89-102.

Young, Allan H., "Alternative Measures of Real GNP," ***Survey of Current Business***, volume 69, April 1989, pp. 27-34.

———, "BEA's Measurement of Computer Output," ***Survey of Current Business***, volume 69, July 1989, pp. 108-115.

———, "Evaluation of the GNP Estimates," ***Survey of Current Business***, volume 67, August 1987, pp. 18-42.

———, "Linear Approximations to the Census and BLS Seasonal Adjustment Methods," ***Journal of the American Statistical Association***, volume 63, 1968, pp. 445-471.

———, "Reliability of the Quarterly National Income and Product Accounts of the United States, 1947-1971," ***Review of Income and Wealth***, volume 20, March 1974, pp. 1-39.

———, and C. Harkins, "Alternative Measures of Price Change for GNP," ***Survey of Current Business***, volume 49, March 1969, pp. 47-52.

———, and Helen S. Tice, "An Introduction to National Economic Accounting," ***Survey of Current Business***, volume 65, March 1985, pp. 59-76.

Zarnowitz, V., "On Functions, Quality and Timeliness of Economic Information," ***Journal of Business***, volume 55, January 1982, pp. 87-119.

Zellner, Arnold, "A Statistical Analysis of the Provisional Estimates of Gross National Product and Its Components, of Selected National Income Components, and of Personal Saving," ***Journal of the American Statistical Association***, volume 53, 1958, pp. 54-65.

Index

L

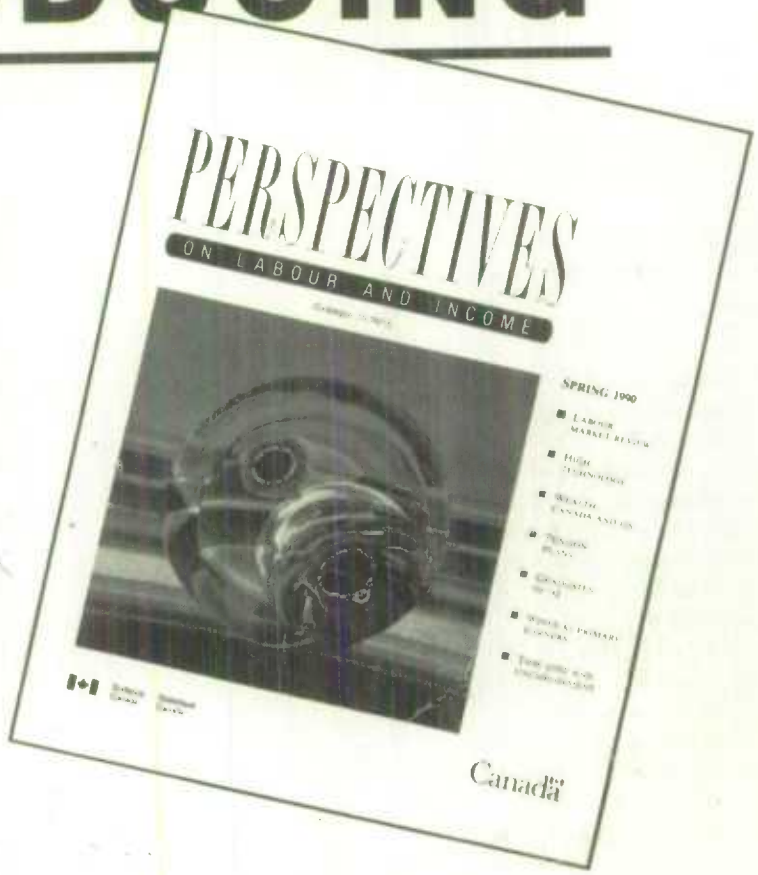
M

N

O

P

INTRODUCING



Canada's essential employment and income information - now in one quarterly journal

If you're responsible for developing employment strategies, negotiating labour contracts, forecasting economic trends, or administering social programs, you'll find ***Perspectives on Labour and Income*** indispensable.

It will keep you up-to-date on the latest Canadian trends in employment... *unemployment insurance, pensions, and industry changes...* and income... *earning gaps between men and women, family income and spending habits,* and more. Every issue of this quarterly journal contains:

- ***Feature Articles***... in-depth information on vital topics: the expansion of service industries; work absences; youth employment; low income families; regional wage disparities and other current issues.
- ***Forum***... an arena for discussion among researchers and readers
- ***Sources***... a compendium of new information sources, news and updates on current research
- ***Key Labour and Income Facts***... lets you monitor the trends with over 60 indicators on a national and provincial level, including employment and unemployment figures; information on earnings and hours of work; labour and family income.

Don't miss a single issue. Order your subscription today!

Perspectives on Labour and Income (Catalogue No. 75-001E) is $53 annually (4 issues) in Canada, US$64 in the United States and US$74 in other countries.

To order, write: Publication Sales, Statistics Canada, Ottawa, Ontario, K1A 0T6, or contact your nearest Statistics Canada Regional Reference Centre, listed in this publication.

For faster service, using VISA or MasterCard, call toll-free,

1-800-267-6677

No other monthly report on the Canadian Economy has this much to offer

Canadian Economic Observer
The most extensive and timely information source for people who want objective facts and analysis on the Canadian Economy... every month.

Current economic conditions
Brief, "to the point" a current update summary of the economy's performance including trend analyses on employment, output, demand and the leading indicator.

Feature articles
In-depth research on current business and economic issues: business cycles, employment trends, personal savings, business investment plans and corporate concentration.

Statistical summary
Statistical tables, charts and graphs cover national accounts, output, demand, trade, labour and financial markets.

Regional analysis
Provincial breakdowns of key economic indicators.

International overview
Digest of economic performance of Canada's most important trading partners — Europe, Japan and the U.S.

Economic and statistical events
Each month, CEO also publishes a chronology of current events that will affect the economy, and information notes about new products from Statistics Canada.

Consult with an expert
The names and phone numbers of the most appropriate Statistics Canada contacts are provided with each data table in the statistical summary; not only can you read the data and the analysis, you can talk to the experts about it.

The Canadian Economic Observer

(Catalogue no. 11-010) is $220 annually in Canada, US$260 in the United States and US$310 in other countries.

To order, write Publication Sales, Statistics Canada, Ottawa, Ontario, K1A 0T6 or contact the nearest Statistics Canada Regional Reference Centre listed in this publication.

For faster service, fax your order to 1-613-951-1584. Or call toll free at 1-800-267-6677 and use your VISA or MasterCard.