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## Latest Developments in the Canadian Economic Accounts

# Revision to quarterly Income and Expenditure Accounts: 1961 to 1980



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# Revision to quarterly Income and Expenditure Accounts: 1961 to 1980

## Background

Users of macroeconomic statistics require long time series in order to understand economic cycles, to forecast and to conduct economic modeling. In general the longer the time series the better users are able to understand the economy. Statistics Canada has been producing macroeconomic account statistics since the 1930s. Over the last 80 plus years these statistics have evolved due to the changing nature of the economy, the development of international macroeconomic accounting standards and the development of new statistical methods and processes.

Throughout this period of change Statistics Canada has attempted to maintain a long and consistent time series of data for users of macroeconomic statistics. Prior to October 2012, Statistics Canada published a consistent set of income and expenditure and income and expenditure accounts, including GDP, for the period 1961 to 2012. In October 2012, Statistics Canada released a comprehensive revision of the Canadian macroeconomic accounts. This comprehensive revision was undertaken to align the Canadian System of Macroeconomic Accounts (CSMA) with the latest international macroeconomic accounting standards (*System of National Accounts 2008 and the sixth edition of the Balance of Payments and International Investment Position Manual*). In 2015, the CSMA were further updated to align government revenues, expenditures and balance sheets with the revised International Monetary Fund's Government Finance Statistics Manual (2014). In addition, estimates from Statistics Canada modernized Capital Stock and Consumption of Fixed Capital program were incorporated in the CSMA.

While these comprehensive revisions increased the overall relevance, quality, scope and coherence of the CSMA, the income and expenditure accounts, including GDP, data set was truncated to start at 1981. Since that time, macroeconomic account users have requested Statistics Canada to backcast the current GDP and the income and expenditure accounts from 1981 to 1961 in order to provide users with an additional 20 years of data that can be used for modeling and forecasting purposes.

Over the last two years Statistics Canada has been working towards this objective and is now able to provide users with a consistent set of income and expenditure accounts, including GDP, for the period 1961 to present. This project entailed re-compiling, mapping and/or linking the 1961 to 1980 time series to the current 1981 to present time series. This paper outlines the revisions that have been made for the 1961 to 1980 period and the data sources and methods that were used to align the 1961 to 1980 accounts with the 1981 to present accounts. The paper concludes with a presentation of the results.

## What was revised and how it was revised

The following is the list of the revisions that have been applied to the estimates of GDP and the income and expenditure accounts for the period 1961 to 1980 in order to align them with the current 1981 to present time series. For each of the revisions, an overview is provided along with the data sources and methods that were used to revise the 1961 to 1980 time period.

### 1. Revision to the presentation of the income and expenditure accounts, including GDP

Beginning in 2012 the presentational structure, terminology and naming conventions of GDP and the income and expenditure accounts were aligned with the international standard *System of National Accounts 2008* (2008 SNA) on which the measurement of GDP and other macroeconomic variables are based. This involved revising the vintage presentation into the new sequence of accounts, which portrays how income arises from productive activity (GDP) and is allocated and used by the institutional sectors of the economy (household and unincorporated businesses, non-profit institutions serving households, corporations, governments and non-residents).

In addition to changes in the way the accounts were presented a number of individual series were renamed, aggregated with other series or split into more detail. Notable changes include:

- Labour income and supplementary labour income were renamed compensation of employees and employer social contributions to align with the international terminology.
- The variables capital cost allowance, inventory valuation adjustment, corporate profits, miscellaneous investment income, accrued net income of farm operators were grouped into gross operating surplus (when the income pertained to corporations) and mixed income (when the income pertained to unincorporated businesses) as per international standards.
- The capital cost allowance associated with government, corporate and unincorporated business institutional units was renamed consumption of fixed capital.
- The previously published sector accounts were renamed current and capital accounts by institutional sector.

## 2. Revisions to the classification systems

In order to align the 1961 to 1980 time series with the 1981 to present time series the household final consumption expenditure, gross fixed capital formation and institutional sector classification systems were revised.

The classification system used to classify household final consumption expenditures was updated to reflect the Classification of Individual Consumption by Purpose (COICOP)-based household final consumption expenditure classification system currently in use (1981 to the present). The COICOP classification system is an international system included in the 2008 SNA as the recommended classification system to use to classify household expenditures. It is a purpose-based classification system such that all expenditures are related to the purpose they serve.

The implementation of the new classification was achieved by using concordance files and conversion ratios at the most detailed level of household expenditure between the old classification system (referred to as the J-series) and the new classification system for the years 1981 to 2002 based on information contained in the 1981 to 2002 Canadian supply and use tables. Extending these concordances back through the 1960s and 1970s was impossible due to the use of out-of-date classifications and a lack of source data. An analysis of the conversion ratios for the period 1981 to 1985 revealed a significant stability through time. It was decided to apply the 1981 conversion ratios through the entire 1961 to 1980 time period. The quarterly series were converted applying the 1981 annual concordance ratios to quarterly data. This approach was used for both the current and constant dollar series, for both raw and seasonally adjusted data. Deflators were then re-calculated to align with the new classification system.

The advantage of this method is that it links the new aggregates up to the 1981 published data and maintains the trends and patterns of the past. There are slight noise-type revisions to the chained Fisher (2007)-based growth rates due to the different aggregation structure.

A classification change is a revision that is essentially a noise-type revision. It re-allocates the old estimates into new breakdowns and may result in small changes to quarterly growth rates but these changes will not alter the trends or patterns of household consumption.

The gross fixed capital formation classification system was converted to align with the suggested 2008 SNA classification of investment. This involved moving investment in mineral and exploration from non-residential investment to a new category called investment in intellectual property products. In addition, the new investment categories—military weapons systems and research and development were also added.

The international trade in goods classification system for the period 1981 to present is based on the North American Product Classification System (NAPCS). It was not possible to backcast this classification for the period 1961 to 1980 due to the fact that the level of detail required to develop an appropriate concordance file and conversion file does not exist. As such, only aggregate values of international trade in goods are presented. Since there were no conceptual or statistical revisions to trade in goods, the old data was maintained as published.

The institutional sector classification system was expanded from three domestic institutional sectors (persons and unincorporated businesses, governments and corporations) to the five domestic institutional sectors recommended by the 2008 SNA (households, non-profit institutions serving households, financial corporations, non-financial corporations and general government).

Previously, for the period 1961 to 1980, non-profit institutions serving households were consolidated within the household sector such that the transactions between households and non-profits were not made explicit and the balance of their activity was recorded in the household sector in both the estimates of GDP and the income and expenditure accounts. In order to align the 1961 to 1980 time series with the 1981 to present time series, the non-profit institutions serving households transactions had to be decoupled from the pure household transactions. In order to undertake this decoupling activity Statistics Canada leveraged work done in the mid-2000s on the development of a non-profit and volunteering satellite account. The satellite account was developed using survey and administrative data on the various charitable and non-profit organizations that serve households. The satellite account work helped to clarify the definition of the sector and to decouple the transactions between households and non-profits. This work was extended backwards using a combination of new data and backcasting techniques.

Estimates of donations from households to non-profit institutions serving households for the period 1961 to 1980 were estimated based on taxation data taken from the Green Book of Taxation Statistics<sup>1</sup> published by the Canadian Revenue Agency. These data were of annual frequency and consistent back to 1961. While they were slightly lower in level than the 1981 to present data (not all donations are included in tax deductions), the trend was consistent and the data were linked to the 1981 levels and converted to a quarterly series using a smooth cubic spline function. Data on international transactions were based on detailed information available from Statistics Canada's Balance of International Payments program. Government transactions with non-profit institutions serving households were derived by taking the current definition and applying it to previously published data. Corporate donations to charitable organizations were available in the 1961 to 1980 data set. These flows were rerouted from transfers to persons and unincorporated businesses to transfers to non-profit institutions serving households.

Final consumption expenditure of non-profit institutions serving households for the period 1961 to 1980 were previously recorded in the persons and unincorporated sector as expenditures on:

- other educational and cultural services;
- welfare and charitable organizations;
- religious organizations;
- political parties;
- other health care;
- other recreational services; and
- trade unions.

These expenditures were rerouted to non-profit institutions serving households. In addition, analysis showed that expenditures by household on the commercial activities of non-profit institutions serving households had been underestimated—mainly an underestimation of fees for services of sports clubs and recreation organizations. These revisions were backcasted using the trend of previously published estimates but based on the new levels.

An Aboriginal general government institutional sector was also added as a new sub-sector under the general government sector. Transactions related to the Aboriginal general government sector were previously included in the persons and unincorporated business sector or embedded in the other levels of the government sector. The backcasting of this sector was, for the most part, accomplished by moving transactions from the government sector and persons and unincorporated business sector for the period 1970 to 1980 to the new aboriginal general government sector for the period 1970 to 1980. The starting date of 1970 refers to when the data transactions of transfers from the Federal government directly to First Nations governments become separable in the accounts due to a change in the way money was transferred to Aboriginal peoples. No data are available for prior periods.

Certain transactions that had to be estimated for the period 1970 to 1980 because they had been netted within either the federal government sector or persons and unincorporated businesses sector. These series were backcasted using the trends of related series in the 1970 to 1980 data set. Aboriginal general government final

1. First published in 1946, this volume is known to generations of tax policy analysts as the "Green Book," although its official title has varied from "Taxation Statistics" to the current "Income Statistics." The data is now only available electronically on the Canada Revenue Agency's website: <http://www.cra-arc.gc.ca/gncy/stts/menu-eng.html>.

consumption expenditure was determined residually. It was assumed that all revenue was spent by Aboriginal general governments (after accounting for known transactions).

### **3. Revisions to the asset boundary and the valuation of consumption of fixed capital**

In order to align the 1961 to 1980 time series with the 1981 to present time series the asset boundary for the period 1961 to 1980 was expanded to include investment (and stocks of) research and development and military weapons systems. The asset boundary was also extended to include investment in software for the period 1976 to 1980. The revisions to the asset boundary, the re-sectoring of capital and the revision of consumption of fixed capital were all aligned with the revised capital stock data published in 2015.

In the case of investment in software, these estimates had previously been included starting in 1981. This resulted in a relatively significant break of \$800 million in the first quarter of 1981 and had an effect of nearly 0.2% on the GDP growth rate. Since the revised capital stock data set included software investment for the years 1976 to 1980, they were also used for the investment flows of the macroeconomic accounts. This pushed the break back to 1976, but it is much less significant having only a negligible effect on GDP growth.

The capitalization of research and development for businesses involved moving expenditures on research and development from intermediate consumption to investment. This resulted in an increase in both business operating surplus and business investment. For governments, this involved moving expenditures on research and development from final consumption expenditure to investment. The reduction in current expenditures was offset by the increase in investment.

For the period 1961 to 1980, the data for research and development capital expenditures and consumption of fixed capital were taken from the annual capital stock program which has estimates of the stock, investment flows, consumption of fixed capital and implicit prices of research and development from 1955 onwards. These data are based on research and development surveys and administrative data programs that were conducted by Statistics Canada in the 1960s and 1970s. The programs were, in general, conducted biennially, as such data for the intervening years were modelled. Annual data were converted to quarterly estimates using a smooth cubic spline function. No seasonal pattern was introduced because no related indicator was available to do so. The deflators were based on those used in the capital stock program, which were in turn based on back casted wage rates for scientists and engineers.

This expansion of the asset boundary resulted in increased levels of consumption of fixed capital for all of the sectors where the research and development assets are held.

Military weapon systems were also capitalized for the period 1961 to 1980. The involved reclassifying the expenditures on military weapon systems from general government final consumption expenditure to general government gross fixed capital formation. In addition, the consumption of fixed capital of military weapon systems was added to general government surplus and general government final consumption expenditure. Data were taken from federal government public account documents.

### **4. Revision of consumption of fixed capital**

The consumption of fixed capital, previously referred to as capital consumption allowance, was converted to a replacement cost valuation for all sectors of the economy for the period 1961 to 1980. This is consistent with the current 1981 to present set of accounts. The revised 1961 to 1980 estimates are based on a geometric method of depreciation and asset service lives consistent with the current period.

### **5. Revisions to operating surplus, mixed income, and property income flows**

In 2012, the CSMA reformatted the presentation of the income-based approach to measuring GDP to align with international standards. This change was also implemented for the period 1961 to 1980. An important part of this reformatting involved mapping the 1961 to 1980 series (interest and miscellaneous investment income, corporation profits, inventory valuation adjustments, accrued income of farm operators, net income of unincorporated businesses, and capital consumption allowance) into the variables: gross operating surplus / net operating surplus and gross mixed income / net mixed income.

The following outlines how the old income variables were mapped to the new income variables:

- Corporate profits were first adjusted to take into consideration the capitalization of research and development (1961 to 1980) and software (1976 to 1980) and the recording of consumption of fixed capital on a replacement cost basis. These adjusted estimates were then mapped in their entirety to net operating surplus.
- Accrued income of farm operators and net income of unincorporated businesses were similarly adjusted for the capitalization of research and development (1961 to 1980) and software (1976 to 1980) and consumption of fixed capital on a replacement cost basis. The adjusted estimates were then mapped in their entirety to net mixed income.
- Interest and miscellaneous investment income (the types of transactions included in this variable were interest paid on bonds and loans and other types of credit used by businesses to borrow money for operating purposes) had to be split by sector since the old estimates reflected interest and miscellaneous investment income for all sectors combined. This was done by allocating the estimate to the institutions that generated the operating income (financial corporations, non-financial corporations, unincorporated businesses—i.e., households). This work was done by estimating interest paid by unincorporated businesses (mortgage interest for rental activity—both owner and tenant occupied), interest paid by unincorporated farms and interest paid by other unincorporated business. Mortgage interest paid had always been estimated in the accounts as part of investment income and for the calculation of net rental income, unincorporated farm interest paid was also available in the farm income data set via farm income surveys. For the remainder of the unincorporated business sector, an interest flow was imputed using market interest rates and a stock of operating debt estimated from the national balance sheet data. This was done using annual data and the pattern of farm interest payments was used to interpolate a quarterly pattern. These interest flows were then rerouted to net mixed income of unincorporated businesses. The remainder of the previously published interest and miscellaneous investment income was re-routed to net operating surplus of corporations.

## 6. Changes to the treatment of pensions and household disposable income

One of the changes implemented in the 2015 comprehensive revision was to change the treatment of defined benefit pensions to an accrual accounting basis, to better reflect the compensation of employees that shows the cost to employers of that form of compensation for each production period. Large accrual adjustments were applied back to 1990 to undo the impact of large retroactive payments or withdrawals to pension plans meant to compensate for actuarial surpluses or shortfalls. The new treatment replaced the pension entitlement accrual in disposable income with the actual benefits paid out of the pension plan. This better reflects the spending potential of each time period since pension entitlements during the working life of an employee are not spendable until a pension benefit is drawn. The pension entitlement is then added back to saving as it reflects the saving of the employees in the pension plan over the working-life period, less the benefits paid out. The entitlement is the difference between the contributions paid by employers and employees to the plan plus the investment income earned by the plan, less the benefits paid out to retirees.

Since the effects of large top-ups or withdrawals from pension funds is not available prior to 1990, the contributions are maintained on an as paid basis for the 1961 to 1980 period (and from 1981 to 1990). Some variables needed to carry this calculation back to 1961 were available in detailed data sets such as investment income of trustee pension plans (that account for a large share of defined benefit plans), employer contributions to all plans and a few intermittent years of employee contributions. Two new sources were used to complete the calculation. In 1988, a study<sup>2</sup> was published breaking down household saving into various components. The breakdown included net saving of trustee pension plans and of other registered retirement savings plans. The sum of these two components are a good estimate of the new series for pension entitlements and was used to backcast this series. The annual data was converted to quarterly using a cubic spline function that assumes smooth quarterly accrual of pension entitlements.

The other piece needed was a time series of pension benefits paid. For this component, the Green Book of Taxation Statistics provided consistent annual data from 1966 (when the Canada pension plan was put in

2. Components of Personal Savings, *Canadian Economic Observer*, November 1988, Catalogue no. 11-010.

place). Data provided in the Green Book for the years 1961 to 1965 were recorded in the occupational group data as “pensioners”. This is a subset of the total (people self-declare as a pensioner or some other occupation) and the overlap with the total published in 1966 forward showed that the subset could be used to project the trend backwards. Again, the annual data was converted to quarterly using the same techniques as mentioned previously, assuming smooth pension benefit payments throughout the year. The total transfer of contributions plus investment income was calculated residually using the entitlements and the benefits, but was consistent with the data available in the accounts.

The result is an estimate of household disposable income consistent with the new definition implemented in 2015.

## 7. The implementation of the Government Financial Statistics data

The adoption of the International Monetary Fund’s Government Finance Statistics Manual (2014) resulted in the reclassification of the following government transactions for the period 1981 to the present. These changes have now been subsequently applied to the 1961 to 1980 estimates:

- Crop insurance provided to farmers was previously classified as a subsidy on products—this was revised and is now classified as a subsidy on production given they influence the production of the crops and are directed at farmers rather than levied on the sales and directed towards consumers.
- Driver’s license fees were previously classified as a tax and are now classified as household final consumption expenditure.
- The training portion of the old unemployment insurance program was reclassified to subsidies on production—since they are related to the flows of labour services in productive activity.
- A new category of excise taxes was added to the current account breakdown.

In addition to the adoption of the GFS classifications, the implementation revealed some data issues that were corrected and backcasted. In particular, the estimates of government final consumption expenditures were revised up to correct under coverage of the old system. The problem had been evident when the expenditures were broken down into the wage and non-wage components. Since the wage variables were estimated from the administrative tax (T4) data, which is a census of wages and salaries paid by governments, the lack of statistical stability in the residual non-wage component (after accounting for sales of goods and services by government) was always problematic. The new GFS data system confirmed the under coverage. The non-wage expenditures were backcasted by level of government to correct the levels. This represents a significant revision to the level of final expenditure by governments for the time period.

## 8. Other consistency issues

In 2003, when the Fisher index method of aggregation was implemented for expenditure-based real GDP, no sub-categories were available for investment in machinery and equipment for either government or business investment, even though there was considerable detail available for investment in structures. This was a major gap in the Fisher aggregation. At the time, it was recognized that there had been considerable relative price shifts and investment shifts by type of investment good, particularly after the oil price shock in 1973. An estimate of weight shifts was calculated and an adjusted price for machinery and equipment was used in the Fisher aggregation to compensate for this deficiency. In the revised capital stock program, the investments have been allocated by industry, by asset and by province. The implicit Fisher price index from the capital stock program for machinery and equipment shows a very similar trend to the imputed one used in the previous 2003 estimates. It was decided to use the Fisher-type price index for the whole 1961 to 1980 period to pick up the major relative price shifts throughout the time series for both business and government investment. Since the capital stock data for the 1961 to 1980 period was only available on an annual frequency it was not possible to estimate quarterly investment by type of machinery. This would require related quarterly interpolators to accurately reflect the cyclical aspect of investment.

Also related to deflation, for investment in inventories, farm and non-farm, previously unpublished detail which had been used in the Fisher index calculation, were re-used for this revision and the detail is now published. This is also true for re-estimated government final consumption expenditure where deflation is calculated for the wage, non-wage and consumption of fixed capital components by level of government. The volume estimates are now published for all of the levels of government.

## 9. Rebalancing the Income and Expenditure Accounts

The conceptual revisions (capitalization of research and development 1961 to 1980 and software 1976 to 1980) are reflected equivalently on both the income and expenditure sides of the accounts. Likewise the valuation of consumption of fixed capital on a replacement cost basis for governments had the same impact on GDP by income and by expenditure.

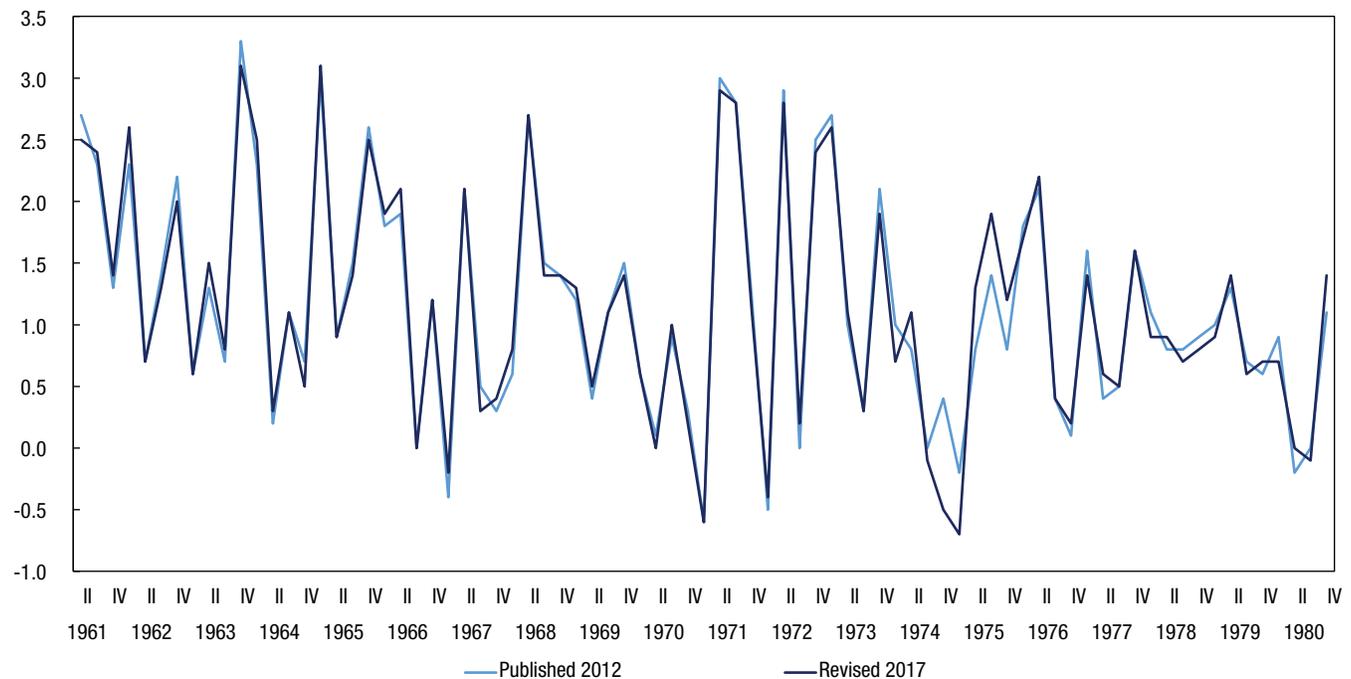
The myriad of statistical revisions to government non-wage expenditures and household final consumption, all had no clear counterpart on the income side. The methodology of linking estimates at 1981 for the statistical revisions, resulted in a basic imbalance between GDP measured from the income side and GDP measured from the expenditure side. If left unadjusted it would have resulted in a statistical discrepancy, which had the same pattern as the previous estimates but with a large positive bias—suggesting missing incomes.<sup>3</sup> The solution to balancing the revised accounts was done by adding an adjustment to net operating surplus including the statistical discrepancy of corporations to account for revenues related to the expenditure side revisions. The result is a pattern of statistical discrepancies very similar to the previously published data for the 1960s and a reduced contribution of the discrepancy in the 1970s.

### Overall results of the revision process

Chart 1 presents the previously-published and revised estimates of the percentage change in real GDP for the period 1961 to 1980. The overall trends and cycles are largely unchanged with the exception of the 1974 and 1975 period. For the most part, the revisions fall within a band of +0.2 to -0.2 percentage points on a quarterly basis. The mean revision to GDP percentage change for the whole time period is -0.01 percentage points. There are important revisions to individual time series that are significant in the sense that they change the trend and cycle of a particular component, but they do not have a significant impact on overall GDP.

**Chart 1**  
**Comparison of GDP growth rates in chained Fisher volume terms**

percent



**Source:** Statistics Canada, revision to quarterly Income and Expenditure Accounts: 1961 to 1980, 2017.

3. The discrepancy had been small and unbiased from 1961 to about 1972 in the previous accounts, then following 1972 some buildup of error, suggesting missing incomes, and a subsequent correction with the recessionary cycles in 1980 and 1981.

In 1974 and 1975 some important revisions were applied. When these data were originally compiled in the 1970s, a downturn in the economy was evident. At the time, the U.S. economy was in recession and Canadian exports weakened, declining for a number of quarters. Initially GDP did not decline and inventories accumulated, but as the manufacturing sector declined, the economy weakened. The most cyclical element, investment in housing, fell rapidly and consumer expenditures, especially on durables, also weakened.

**Table 1**  
**Comparison of gross domestic product growth rates from preliminary estimates to 2017 vintage**

	First quarter 1974	Second quarter 1974	Third quarter 1974	Fourth quarter 1974	First quarter 1975	Second quarter 1975	Third quarter 1975
	percent						
Original growth rates	1.5	-0.1	-0.1	-0.9	-1.8	0.3	1.2
Growth rates as of 1986 revision	1.0	0.6	0.6	0.7	-0.1	0.9	1.5
Published growth rates as of 2017	0.8	0.8	-0.1	-0.5	-0.7	1.3	1.9

Source: Statistics Canada, Revision to quarterly Income and Expenditure Accounts: 1961 to 1980, 2017.

The quarterly growth pattern originally published for the period showed a 0.1% decline in the second quarter of 1974 followed by a 0.1% decline in the third, a 0.9% decline in the fourth and a further 1.8% decline in the first quarter of 1975. Since this initial release, this period has undergone a number of revisions, including comprehensive revisions to the Canadian national accounts in 1986 and 1997. The last vintage of published growth rates show a 0.6% increase in real GDP in the second quarter of 1974, a 0.6% increase in the third, a 0.7% increase in the fourth and a -0.1% decline in the first quarter of 1975.

The comprehensive revisions in 1986 and again in 1997 eliminated the business cycle that appeared very evident during the 1970s. Forecasters, academics and policy makers have questioned the extent of these revisions and requested that Statistics Canada undertake a thorough review for the period 1974 to 1975 taking into account modern statistical methods, such as improved benchmarking, improved models and compilation techniques.

One large revision introduced during the 1986 comprehensive revision was the implementation of a new benchmark level for housing renovation activity. The revision was based on a 1982 survey of household expenditures that had been altered to match the national accounts definition of renovations. This single data point was used to correct the level of renovations historically back to 1947. Given discrepancies between GDP primary incomes and final expenditures in 1974 and 1975, an assumption was made that renovation activity was counter-cyclical (laid off construction workers were doing informal market activity to gain incomes) justifying an upward revision to renovation investment.

In addition to these revisions, new benchmarks levels for new housing construction were incorporated during the 1986 comprehensive revision. These revisions were based on the 1981 Census of Population. The 1981 census data indicated that new construction of housing had been underestimated in the 1970s. During the 1986 comprehensive revision the level of new housing construction was revised upwards for the 1970s—including the period 1974 to 1975.

The original estimates of the decline of renovations and new housing construction when published in 1974 and 1975 was 0.8% and -10.7% respectively. At the time of the 1986 comprehensive revision they were revised upwards to 3.4% and -0.9%.

Hindsight permits us to test the hypothesis of counter-cyclicity in renovations during recessionary periods. Since the 1974 to 1975 period, the Canadian economy has experienced a number of downturns (e.g. 1981 to 1982, 1991 to 1992 and 2008 to 2009). In each case there was no evidence of counter-cyclical behaviour in the housing market. Therefore it has been decided to undo the counter-cyclical assumption for the period 1974 to 1975. With this revision therefore, housing investment for the period 1974 to 1975 has been revised downward from 0.2% to -2.4%.

In the mid to late 1970s Statistics Canada began exploiting administrative tax (T4) data to estimate wages and salaries of employed individuals. Prior to using T4 benchmarks, Statistics Canada relied on wage and salary information and employment reported by businesses on economic surveys. The T4 data represent a census of wage and salary earners and are one of the highest quality data sources currently used in the macroeconomic accounts. The initial incorporation of these new data in the macroeconomic accounts in the 1970s resulted in

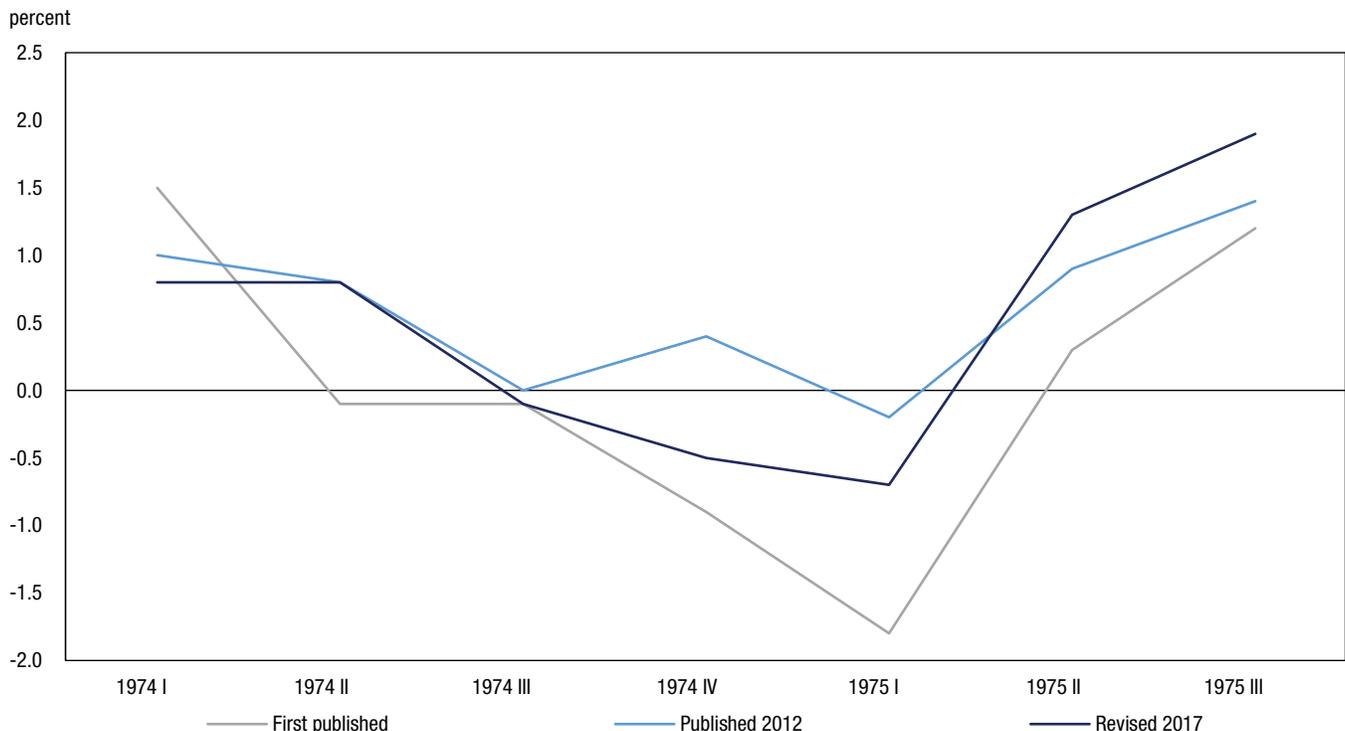
a substantial upward revision to the income-side measure of GDP over the entire decade. Since an equivalent 'expenditure-side' revision was not evident, the ensuing imbalance between GDP incomes and expenditures appeared in the statistical discrepancy. The overall result was a large upward revision to GDP and a dampening of the business cycle.

This recent analysis also revealed that the net operating surplus of corporations had not been adjusted to take into account higher estimates of labour costs for the 1974 to 1975 period. Net operating surplus represents the payment to capital after labour has been fully compensated. Since labour compensation was revised up, the operating surplus measures from the surveys should have been reviewed to correct for the under-estimation of wage payments. While it was not possible to do a full reconciliation, the size and sign of the statistical discrepancy was an indication that capital income measures were too high. With this release, the operating surplus is now published as a variable in the quarterly accounts, income-based GDP is more coherent with the final expenditure side.

Finally, estimates of investment in inventories have also been revised many times over the years to reflect new benchmark data from annual surveys in the 1980s, resulting in higher stock levels. They have also been subject to reconciliations with annual flow estimates from the supply and use tables. While there was no new quarterly information available when the comprehensive revision was undertaken in 1986, it appears that the inventory pattern throughout the 1974 to 1975 period was distorted by the annual benchmarking process. This resulted in a revision to the change real GDP for the fourth quarter of 1974 from a negative to a positive.

Modern benchmarking techniques would not produce similar distortions to quarterly patterns. The inventory change series were reviewed for the 1974 to 1975 time period in the light of the decline in exports and other expenditure items and revised to better reflect the quarterly signals originally published. Results now show that the economy declined slightly in the third quarter of 1974 and dropped  $-0.5\%$  and  $-0.7\%$ , respectively, in the fourth quarter of 1974 and the first quarter of 1975.

**Chart 2**  
**Comparison of real GDP growth rates**



Source: Statistics Canada, revision to quarterly Income and Expenditure Accounts: 1961 to 1980, 2017.

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