STAFF STUDY No. 28

Canadian Growth Revisited, 1950-1967

by

Dorothy Walters

prepared for the

Economic Council of Canada

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PREFACE

The recently published revisions to the national income and expenditure accounts indicated higher historical output growth rates in Canada. Although this result was not unexpected, it did raise the question of the relevance of the analysis and conclusions of my earlier study, *Canadian Income Levels and Growth: An International Perspective*. The research underlying the present volume was undertaken to satisfy a curiosity about the conclusions of that study and to extend its time perspective.

A continuing interest in the sources of economic growth reflects a concern for the current disaffection with growth, and a conviction that our most imaginative human goals can be achieved more easily and more quickly with growth than without it.

I should like to thank Drs. E. F. Denison and D. J. Daly, as well as Council staff members R. Agarwala and T. T. Schweitzer, who commented so helpfully on an early draft of the study. I should also like to express my gratitude to those staff members who provide the services that make our research activities possible -- the clerks, stenographers, administrative and library workers. In particular, I must thank Mrs. A. Oades who, as general factotum, has assisted me over the past $6\frac{1}{2}$ years.

Dorothy Walters

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INTRODUCTION

Early in 1969 the Economic Council published the results of a research project on growth and productivity.[1] This study attempted to fit the Canadian economic experience of the 1950's and early 1960's into an analytical framework of growth developed by Dr. E. F. Denison. The Denison approach was to measure the contribution of factor inputs to growth, and to attribute a number of the major sources of change in factor productivity.[2] In the second of two studies -- *Why Growth Rates Differ* -- Denison compared the growth experience of the United States with eight Western European countries.[3] The Council study set Canadian growth patterns in the context of the experience of these nine countries.

The recently published revisions to the national income and expenditure accounts suggested that postwar economic growth in Canada was in fact significantly larger than the earlier estimates had indicated. For example, the growth rate of real GNE between 1950 and 1968 was raised from 4.6 per cent to 5.1 per cent per annum. Revisions of this order of magnitude in the real output series suggested the need for a reassessment

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1/ Dorothy Walters, *Canadian Income Levels and Growth: An International Perspective*, Staff Study No. 23, Economic Council of Canada, Ottawa, Queen's Printer, 1968.

2/ Edward F. Denison, *The Sources of Economic Growth in the United States and the Alternatives Before Us*, New York, Committee for Economic Development (Supplementary Paper No. 13), 1962; and Edward F. Denison, assisted by Jean-Pierre Poullier, *Why Growth Rates Differ: Postwar Experience in Nine Western Countries*, Washington, The Brookings Institution, 1967. References to "Denison, *op. cit.*" in subsequent footnotes and table source notes refer to *Why Growth Rates Differ*; other Denison publications are specified.

3/ Belgium, Denmark, France, Germany, the Netherlands, Norway and the United Kingdom, comprising Northwest Europe, and Italy.

of Canada's postwar productivity performance. In order to identify any material changes in the analytical conclusions of Staff Study No. 23, the estimates in that study were fully revised using the new output data.[1]

This new version of the Canadian study follows the original so closely that it was not thought necessary to describe again the conceptual framework or the methodology. The text summarizes the contribution of factor inputs and factor productivity to growth for the "Denison" time periods 1950-55 and 1955-62. In addition, the estimates have been updated a further five years for 1962-67. The appended notes discuss the revisions to the national accounts;[2] their effect on the growth analysis, including a comparison of the estimates in Staff Study No. 23 and the revised estimates;[3] and a methodological change.[4]

GROWTH, 1950-67

The rate of growth in output has been relatively high and surprisingly stable in Canada over the postwar period. Using the revised data, real national income[5] grew at 5.2, 4.5 and 6.0 per cent per annum in the three time periods 1950-55, 1955-62, 1962-67.

1/ Staff Study No. 23, *op. cit.*, pp. 190-191, anticipated that the output revisions would not materially affect the contribution of factor inputs to growth, but that the major impact would be reflected in the estimates of total factor and residual productivity growth.

2/ Appendix I, "The Revised National Accounts".

3/ Appendix II, "Revised Factor Shares and Contributions to Growth".

4/ Appendix III, "Re-estimation of the Effect of Variation in the Level of Demand".

5/ At constant factor cost.

In an international context,[1] the Canadian rates of growth were well above those in the slow-growth countries, but below those of the growth leaders. The rate of growth achieved by Japan was incomparably and consistently better than that of any other industrial country.[2] There was considerable variation in the growth performance of the other industrial countries. In the early 1950's, Germany grew almost twice as fast as the other "western" countries; Canada, the Netherlands and Italy were next in line, but with much lower growth rates. In the late 1950's, Canada and the United States both experienced a significant downturn in the level of economic activity, while Germany and Italy continued to grow at almost 6 per cent a year. As the slack of the early 1960's was reabsorbed,[3] Canada and the United States experienced relatively high growth rates through the mid-1960's.

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[1] Data on net national income in constant prices are not available for these countries and time periods; gross national product in constant market prices is the most commonly used output measure. The Canadian growth rates of real gross national product at market prices and net national income at factor cost are compared below:

	1950-55	1955-62	1962-67
	(Annual average rates)		
Gross national product	5.5	4.3	5.8
Net national income	5.2	4.5	6.0

[2] Growth rates for Japan are included as a matter of interest, although it was not one of the "Denison" countries.

[3] The 1962 unemployment rate was over 5½ per cent in Canada and the United States; it averaged 1.2 per cent in the Northwest European countries.

Table 1

GROWTH OF REAL GROSS NATIONAL PRODUCT,[1] 1950-67

(Annual average rates)

	1950-55	1955-62	1962-67	1950-67
Canada	5.5	4.3	5.8	5.1
United States	4.3	2.8	5.0	3.8
Belgium	4.3[2]	3.2	4.3	3.8[2]
Denmark	2.0	5.1	4.1	3.9
France[3]	4.3	5.0	4.9	4.8
Germany	9.4	5.9	3.6	6.6
Netherlands	5.5	3.8	5.0	4.7
Norway	4.0	3.7	5.0	4.2
United Kingdom	2.7	2.7	3.3	2.9
Italy	5.2[2]	5.9	4.7	5.4[2]
Japan	7.9[2]	10.2	10.0	9.8[2]

(1) At constant market prices.

(2) From 1953.

(3) Data for 1958 to 1968, based on the *new* series of French national accounts converted to the SNA system, would give higher growth rates than these earlier estimates, for example, 5.5 per cent per annum compared with 4.9 for the period 1962-67.

Source: Canada -- Dominion Bureau of Statistics (DBS), *National Income and Expenditure Accounts, 1926-1968*, Ottawa, DBS, 1969.
United States -- U.S. Department of Commerce, *The National Income and Product Accounts of the United States, 1929-1965*, and *Survey of Current Business*, Washington, U.S. GPO, 1966, and various issues, respectively.
Europe and Japan -- United Nations (UN), *Yearbook of National Accounts Statistics*, New York, UN, various issues; and Organisation for Economic Co-operation and Development (OECD), *National Accounts*, Paris, OECD, various issues.

Sources of Growth

In each time span and over the 17-year period as a whole, the growth of factor inputs -- both labour and capital -- accounted for some 60 per cent of total Canadian growth. This was roughly the same share as in the United States from 1950 to 1962. In Northwest Europe, on the other hand, only 36 per cent of total growth over the 12-year period was generated by factor inputs. Conversely, some 40 per cent of Canadian growth was generated by higher factor efficiency, while in Europe factor efficiency provided more than 60 per cent of growth.

This difference in the relative contribution of factor inputs and factor efficiency to growth in Canada and Europe was one of the significant features of the growth analysis in the earlier study.[1/] Neither the revision in the accounts data nor the updating to 1967 alters that finding. In spite of rates of growth of 5 to 6 per cent per annum, Canada did not achieve as high a level of growth in factor use and efficiency as did many European countries.

Factor Inputs: Labour

The most important single factor contributing to the potential rate of growth of an economy is growth in the labour force. Changes in the size of the labour force reflect shifts in the share of adults of working age in the population, in international migration, and in labour participation rates.

1/ The earlier study also made a cross-sectional comparison of factors contributing to difference in the level of income per person employed in 1960. This analysis is under way for a more recent year, and may provide the basis for a future study. An international comparison of levels of gross national product per person employed is given in Table 21, p. 46.

Table 2

CONTRIBUTION OF FACTOR INPUTS AND OUTPUT PER UNIT OF INPUT TO GROWTH OF NET NATIONAL INCOME, CANADA, 1950-67

(Contribution to growth rates in percentage points)

	1950-55	1955-62	1962-67
Net National Income	5.2	4.5	6.0
Factor Inputs	3.1	2.4	3.8
Labour	1.3	1.6	2.7
Employment	1.3	1.7	2.6
Hours worked	-.3	- .1	- .2
Age-sex composition	--	- .2	- .2
Education	.3	.2	.5
Capital	1.8	.8	1.0
Housing	.5	.1	.3
Foreign investments	.1	- .2	- .2
Non-residential structures and equipment	1.0	.8	.8
Inventories	.2	.1	.1
Land	--	--	--
Output per Unit of Input	2.1	2.1	2.3
Improved allocation of resources			
Decline in agricultural inputs	.8	.4	.4
Decline in nonagricultural self-employment	.3	--	.1
Economies of scale			
Growth in national market	.5	.5	.6
Growth in local markets	.1	.1	.1
Income elasticities in consumption	--	--	.1
Statistical adjustments*	.2	.3	.2
Variations in pressure of demand*	--	- .1	- .1
Variations in agricultural output*	.1	--	- .1
Residual sources of growth	.5	.9	1.0
	Adjusted Growth Rates (1)		
Net National Income	5.3	4.4	6.0
Factor inputs	3.1	2.4	3.8
Output per unit of input	2.2	1.9	2.3

(1) Adjusted to exclude the effect of starred (*) items -- statistical adjustments, variations in pressure of demand, and variations in agricultural output.

Note: Detail has been rounded to tenths of a percentage point and may not add.

Source: DBS, *National Income and Expenditure Accounts, 1926-1968, op. cit.*, and data as yet unpublished.

Table 3

DISTRIBUTION OF THE CONTRIBUTION OF FACTOR INPUTS AND OUTPUT PER UNIT OF INPUT TO GROWTH OF ADJUSTED[1] NET NATIONAL INCOME, CANADA, 1950-67

(Percentage shares)

	1950-55	1955-62	1962-67
Net National Income	100	100	100
Factor Inputs	59	56	62
Labour	25	37	45
Employment	25	38	44
Hours worked	- 5	- 3	- 4
Age-sex composition	--	- 4	- 3
Education	6	6	8
Capital	33	19	17
Housing	10	3	5
Foreign investments	2	- 5	- 3
Non-residential structures and equipment	18	19	13
Inventories	3	2	2
Land	--	--	--
Output per Unit of Input	41	44	38
Improved allocation of resources			
Decline in agricultural inputs	16	9	6
Decline in nonagricultural self-employment	5	1	2
Economies of scale			
Growth in national market	10	11	10
Growth in local markets	1	2	1
Income elasticities in consumption	1	--	1
Residual sources of growth	9	21	17

(1) Adjusted to exclude statistical adjustments, variations in pressure of demand, and variations in agricultural output.

Note: Detail may not add due to rounding.

Source: Calculated from unrounded data for Table 2.

Since the war, Canada has experienced a very high rate of population growth. From 1950 to 1967, the Canadian population grew by almost 50 per cent, compared with 30 per cent in the United States and 9 per cent in the United Kingdom.[1/] The exceptional level of population growth in Canada arose primarily from the large postwar baby boom, and from a very high level of immigration. By 1967, the Canadian population included over a million and a half postwar migrants; and a million of these were in the labour force. Increased participation, particularly of women, also contributed in a major way to labour force growth in Canada.

Table 4 shows significant differences in the growth of the "adult" source population aged 15 to 64, and in the labour force in a number of countries.

As Tables 2 and 3 indicate, employment was the largest factor contributing to the growth in Canadian output. From the point of view of population and labour force, Canada and the United States were uniquely situated to generate a high level of output growth. The contribution of employment to the Canadian growth rate moved from 1.3 percentage points in the early 1950's to 1.7 between 1955 and 1962 and to 2.6 in the period 1962 to 1967. The share contributions were 25, 38 and 44 per cent respectively. Employment growth contributed to almost 45 per cent of output growth in the more recent period; this was partly the result of the high level of unemployment[2/] in the early 1960's. Total growth also received an additional fillip as the economy moved out of a period of underutilization.

[1/] See Table 22, p. 49.

[2/] Unemployment, which was 7 per cent in 1960, had fallen to 5.9 per cent in 1962, but this was well above the level in 1955 (4.4) and in 1967 (4.1).

Table 4

GROWTH OF SOURCE POPULATION AND LABOUR FORCE, 1950-67

(Annual average rates)

	1950-55	1955-62	1962-67
Source Population[1]			
Canada	1.9	2.0	2.5
United States	.7[2]	1.2	1.6
Belgium	.1	.1	.5
Denmark	.5	.9	.7
France	.2	.7	1.4
Germany	n.a.	n.a.	.3
Netherlands	.8	1.3	1.6
Norway	.5	.6	.7
United Kingdom	--	.5	.3
Italy	.9	.6	.9
Labour Force[3]			
Canada	1.9	2.4	3.0
United States	1.3[2]	1.1	1.9
Belgium	.5	.2	.7
Denmark	n.a.	.9	.6[4]
France	.1	.1	.8
Germany	1.9	1.0	- .1
Netherlands	1.3	1.0[5]	1.2
Norway	.4	.2	.7
United Kingdom	.9	.6	.2
Italy	.7	- .3	- .8

(1) Population aged 15 to 64.

(2) United States excludes Alaska and Hawaii in the 1950-55 period.

(3) Labour force includes the armed forces.

(4) 1962-66.

(5) 1956-62.

Source: DBS, *The Labour Force*, Ottawa, Queen's Printer, various issues; U.S. Department of Labor, *Manpower Report of the President*, Washington, U.S. GPO, 1968; and OECD, *Manpower Statistics* and *Labour Force Statistics*, Paris, OECD, various issues. Also Denison, *op. cit.*, Tables 5-1A and 5-1B, pp. 46-47.

Output per Worker

This framework of analysis takes account of three qualitative factors affecting the level of output per worker -- hours worked, age and sex characteristics, and education. Throughout the 17-year period, average hours worked per person employed declined in Canada. The major part of the contraction in the work week was in the first half of the 1950's. In manufacturing, for example, average hours worked declined from 42.3 hours per week in 1950 to 41.0 in 1955, 40.7 in 1962, and 40.3 by 1967.[1/] The decline in total hours worked reflected the continued implementation of a shorter work week and the very large growth in part-time employment associated with the growth of the service sector of the economy. In general, the decline in hours worked tended to reduce output per man per year.[2/]

A second set of labour characteristics that affects the level of, and growth in, output is age and sex. Young persons, older workers, and women traditionally earn less than adult males. In this way, changes in the age distribution and in the sex make-up of the labour force affect the growth of income and output.

Between 1950 and 1967, the number of young people aged 15 to 19 years increased by 75 per cent in Canada; in the United Kingdom the increase was only one-third as large. The age group 20-24 years increased by 40 per cent in Canada and by 15 per cent in the United Kingdom. This dramatic growth in the number of young people provided a basic element of the large increase in the labour force in Canada.

The share of young people in the labour force is not solely determined by the age distribution of the population; the school-leaving age, drop-out rates, and

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1/ See DBS, *Canadian Statistical Review*, Ottawa, Queen's Printer, various issues.

2/ Days not worked -- vacations, sick leave, etc. -- which affect the volume of output per worker were taken into account. In addition, an allowance was made for the increase in productivity or efficiency per man which may arise when the work week is reduced.

access to postsecondary education also affect the entry of young people into the labour force. The participation rates of young people have shown significant changes over the 17-year period. In 1950, about 45 per cent of the population in the age group 14 to 19 years, inclusive, was in the labour force; by 1967 the share had fallen to 35 per cent. For young males, the participation rate declined even more dramatically -- from 56 to under 40 per cent -- mainly reflecting increased opportunities and encouragement for young people to stay longer in the educational system before entering the labour market.

Table 5

DISTRIBUTION OF THE LABOUR FORCE[1] BY AGE AND SEX, CANADA, 1950-67

(Percentage shares)

	1950	1955	1962	1967
Males				
Under 20	6.8	5.8	5.5	6.0
20 - 64	67.6	68.2	64.5	61.1
65 and over	4.0	3.4	2.8	2.2
Total	78.4	77.4	72.8	69.3
Females				
Under 20	4.0	4.0	4.2	4.6
20 - 64	17.1	18.3	22.3	25.5
65 and over	.4	.4	.6	.6
Total	21.5	22.6	27.2	30.7
Total labour force	100.0	100.0	100.0	100.0

(1) Civilian.

Source: DBS, *The Labour Force*, *op. cit.*, Special Table 1, unpublished.

On the other hand, fewer older workers stay on after they reach 65. In 1950, some 40 per cent of the male population aged 65 and over was in the labour force. By the late 1960's the share had fallen to 25 per cent. While the availability of younger and more highly educated workers has encouraged earlier retirement of older workers, it is much more probable that increased private and public social security measures and a rising standard of wealth and income have been the most important factors contributing to earlier retirement. In accordance with the general trend of increased female participation in the labour force, the rate for older women *rose* from 4 per cent in 1950 to 6 per cent in 1967.

Participation rates[1/] for older males in the United States declined, as in Canada; the U.S. rate for older females has stayed relatively constant in recent years. It is of interest to note that the level of participation for people over 64 is higher in the United States than in Canada -- for males, 27 compared with 25 per cent; for females, 10 compared with 6 per cent. This comparison suggests that average levels of income and wealth are not the only factors affecting retirement. Increased longevity, better overall health, and improved education and work facilities tend to extend the working lives of the population.[2/]

As the share of lower-income groups -- the younger and older workers -- declines, the "quality" of the average unit of labour input rises. The particular age characteristics of the Canadian labour force contributed to growth in the early 1950's, but since that time, there has been little change in the overall age distribution or quality (see Table 5).

1/ For U.S. participation rates by age and sex, see U.S. Department of Labor, *Manpower Report of the President*, *op. cit.*

2/ Dr. T. T. Schweitzer of the Economic Council's staff has suggested the possibility that larger income inequality among the aged in the United States compared with Canada may also be a factor giving rise to higher participation rates in older age groups in the United States.

The second, and perhaps the most dynamic, feature of labour force change in Canada has been in female participation. In 1950, about one-quarter of the female source population was employed; the share is now over one-third (35 per cent). In spite of this increase, the Canadian female participation rate is still well below that in most industrial countries.

Table 6

FEMALE PARTICIPATION RATES,[1] 1967

(Per cent)

Canada	39
United States	47
Belgium	39[2]
Denmark	52[2]
Germany	47
Norway	40
United Kingdom	51
Italy	29

(1) Ratio of the female labour force to the female population aged 15 to 64.

(2) 1966.

Source: OECD, *Labour Force Statistics*, 1956-67, *op. cit.*

Table 7

FEMALE PARTICIPATION RATES,[1] 1950-67

(Per cent)

	1950	1955	1962	1967
Canada	23	24	29	34
United States	33	35	37	40

(1) Women in the labour force, aged 14 years and over, as a percentage of the female population 14 years of age and over. This definition is more precise than that used in the international comparison in Table 6.

Note: The OECD *Labour Force Statistics* stopped publishing participation data on the basis used in Staff Study No. 23, *op. cit.*, Table 26, p. 46. In 1967 the U.S. labour force starting age was revised from 14 to 16 years. The U.S. figure for 1967, above, has been calculated.

Source: Canada -- DBS, *The Labour Force*, Special Table 1, *loc. cit.*
United States -- U.S. Department of Labor, *Manpower Report of the President*, *op. cit.*; U.S. Department of Commerce, Bureau of the Census, *Statistical Abstract of the United States*, and *Current Population Reports, Population Estimates*, Series P-25, No. 385, Washington, U.S. GPO, various issues and 1968, respectively.

As a result of wider participation, the proportion of women in the Canadian labour force rose from about 20 per cent in 1950 to 30 per cent by 1967. This changing labour force pattern is dramatically illustrated by the absolute increase in the number of male and female

workers. Half the increase in the labour force between 1950 and 1967 was accounted for by women. Projections of the labour force suggest that increased female participation, particularly of married women, will continue to be an important factor in labour force growth in Canada for some years to come.1/

Table 8

LABOUR FORCE(1) BY SEX, CANADA, 1950 AND 1967

(Thousands)

	1950	1967	Increase
Labour force	5,163	7,694	2,531
Male	4,050	5,329	1,279
Female	1,112	2,365	1,253

(1) Civilian.

Source: DBS, *The Labour Force*, Special Table No. 1, *loc. cit.*

Changes in the share of the young and the elderly in the labour force were not particularly significant during the 17-year period. In 1950, some 15 per cent of the labour force was under the age of 20 or over 64; in 1967, the ratio had fallen to 13 per cent. The major factor affecting the age-sex element of labour quality was the increase in female participation. As the changes illustrated in Tables 5 and 7 suggest, the decline in labour quality was relatively small from 1950 to 1955, but was significantly larger between 1955 and 1962 and, again, between 1962 and 1967.

1/ Over the decade 1970-80, the growth rate of males in the labour force was estimated at 2.2 per cent per annum; for females the rate was 3.2 per cent. Economic Council of Canada, *Fourth Annual Review*, Ottawa, Queen's Printer, 1967, Table 3-12, p. 72.

The fourth qualitative factor effecting changes in the level of output per worker is education. The larger number of new entrants into the labour force raised its average education content. The median[1] level of education for males in the labour force rose by six-tenths of a year in the ten years from 1951 to 1961,[2] and another six-tenths of a year in the five-year period from 1960 to 1965.[3] New entrants of young people from school had achieved higher levels of education than their predecessors; in 1965 the median level of education in the 20-24 age group of the labour force was 11.0 years; in the 45-64 age group, 7.9 years.[4] In addition, the large inflow of immigrants to Canada during this period raised the average level of education. In 1967, some 40 per cent of the post-war immigrant labour force had completed high school, compared with 32 per cent of the native-born labour force; 9.0 per cent of the former had attended university compared with 5.6 per cent of native-born workers.[5]

A second aspect of the changing educational scene has affected the educational content of the labour force -- the growth in the number of young people with university education. A recent study on the educational

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[1] Dr. Denison has indicated serious reservations concerning the meaningfulness of median levels (rather than means). Unfortunately, these are the only data available for Canada.

[2] Gordon W. Bertram, *The Contribution of Education to Economic Growth*, Staff Study No. 12, Economic Council of Canada, Ottawa, Queen's Printer, 1966, Table 4, p. 13. Please note a misprint in that table: the figure for 1951 should be 8.74, not 9.74.

[3] Estimated, using labour force weights from Michel D. Lagacé, *Educational Attainment in Canada: Some Regional and Social Aspects*, DBS, Special Labour Force Studies, No. 7, Ottawa, Queen's Printer, 1968, Table 21, p. 37.

[4] *Ibid.*, Table 20, p. 37.

[5] H. W. Davis and M. L. Gupta, *Labour Force Characteristics of Post-War Immigrants and Native-Born Canadians, 1956-67*, DBS, Special Labour Force Studies, No. 6, Ottawa, Queen's Printer, 1968, Table 14, p. 23.

characteristics of the labour force[1] indicates that the proportion of the labour force with some university education had increased from 8.5 to over 11 per cent in the six years from 1960 to 1966. In the early 1950's, ten years earlier, the share may have been about 7 per cent, some two percentage points lower.[2]

As a result of these increased levels of education, there has been a significant rise in the education content of the work force, particularly during the 1960's when the growth of the labour force was twice as rapid as in the early 1950's. It is estimated that the contribution of education to growth was about ¼ of 1 per cent during the 1950's, but in the 1960's the contribution rose to ½ of 1 per cent.[3]

The growth in employment, the decline in hours worked, the increase in female participation, the changing age-structure, and the larger education content of the labour force contributed 1.3, 1.6 and 2.7 percentage points to the annual average growth rates in 1950-55, 1955-62 and 1962-67. These contributions indicate that about 25, 35 and 45 per cent of our total growth over the respective periods arose from increases in the quantity and quality of the labour force.

1/ Frank J. Whittingham, *Educational Attainment of the Canadian Population and Labour Force: 1960-1965*, DBS, Special Labour Force Studies, No. 1, Ottawa, Queen's Printer, 1966, Table C26, p. 37; and Lagacé, *op. cit.*, Table F3, p. 48.

2/ These shares do not necessarily correspond with other estimates of the extent of postsecondary education. Problems of defining Grades 12 and 13, and postsecondary levels, on a comparable basis in 10 provinces and various types of institutions are formidable.

3/ As noted in Denison, *op. cit.* and Staff Study No. 23, *op. cit.*, the education contribution does not take account of nonformal education such as on-the-job training, adult education, etc. The increasing importance of these types of education suggests that the measured contributions understate the actual.

Factor Inputs: Capital

The contribution of larger labour inputs to growth increased significantly from the early 1950's to the mid-1960's; the contribution of capital, on the other hand, declined. As Tables 2 and 3 indicated, the percentage point contributions to growth of all categories of capital were 1.8, 0.8 and 1.0 respectively, and the shares were 33, 19 and 17 per cent.

Table 9 compares the shares of investment in total output for the three time periods. The investment ratios do not necessarily reflect the growth of the fixed capital stock. A substantial part of each increment of new investment replaces capital that is ready to be discarded and does not add to the stock.

Table 9

GROSS INVESTMENT(1) AS A SHARE OF GROSS NATIONAL PRODUCT(2)
BY TYPE OF INVESTMENT, CANADA, 1950-67

(Per cent)

	1950-55	1955-62	1962-67
Total gross national investment	22.5	21.3	22.8
Non-residential fixed	17.1	18.2	18.4
Structures	9.4	11.1	10.5
Equipment	7.6	7.2	7.8
Residential construction	5.0	5.4	4.5
Inventories	1.9	1.0	1.4
Net foreign lending	- 1.6	- 3.3	- 1.5

(1) Business and government investment.

(2) Averages of percentages for individual years, in current market prices.

Source: DBS, *National Income and Expenditure Accounts, 1926-1968, op. cit.*

In the 1950's, Canada invested a significantly larger share of output in fixed (non-residential) construction and equipment than most western countries. However, Norway invested relatively more, and in Germany and the Netherlands the ratio was close to the Canadian one.[1/]

The Canadian growth rates of fixed "business" capital, both (non-residential) construction and equipment, were 6.4, 5.6 and 5.3 per cent[2/] respectively over the three time periods from 1950. The factor share for business capital was about 15 per cent.[3/] From these two elements it was estimated that the contribution of non-residential fixed capital to growth was 1.0, 0.8 and 0.8 percentage points per annum. The shares of growth were 18, 19 and 13 per cent respectively.

1/ See Staff Study No. 23, *op. cit.*, Tables 46 and 47, pp. 71-72. It is not clear how the ratios of investment to GNP would look if all countries revised their price deflators to take account of productivity gains in construction. Other refinements of investment data, both statistical and conceptual, could alter these international relatives substantially. See discussion of some of the limitations of the investment data in Robert J. Gordon, "$45 Billion of U.S. Private Investment Has Been Mislaid", *The American Economic Review*, Vol. LIX, No. 3, June 1969; T. P. Hill, "Growth and Investment According to International Comparisons", *The Economic Journal*, Vol. LXXIV, No. 294, June 1964; and Geoffrey Dean, "Fixed Investment in Britain and Norway, An Experiment in International Comparison", *The Journal of the Royal Statistical Society*, Series A (General), Vol. 127, Part I, 1964.

2/ In Staff Study No. 23, *op. cit.*, the fixed capital input was assumed to grow at the average of the growth rates for gross and net fixed capital stock; the same assumption was used in this study. It should be noted that the Dominion Bureau of Statistics has revised the estimates of fixed capital stocks to incorporate the new construction deflators.

3/ The revised distribution of output by factor shares is set out in Appendix II, Table A-4, p. 59.

Housing construction represented about 5 per cent of total output over the 1950's and 1960's. The pace of housing construction was substantially faster in the early 1950's. In 1955, real investment in housing was more than 50 per cent above the level of 1950. The slowdown in economic activity reversed this expansion; by 1962, the volume of house-building was less than it had been in 1955. From 1962, residential construction picked up again, but the increase over the next five years was less in absolute and percentage terms than in the early 1950's.

Table 10

INVESTMENT IN HOUSING, CANADA, 1950-67

	1950	1955	1962	1967
$ Constant 1961 (millions)	1,221	1,910	1,863	2,276
Housing starts (thousands)	92.5	138.3	130.1	164.1

Source: DBS, *National Income and Expenditure Accounts, 1926-1968, op. cit.*; and Central Mortgage and Housing Corporation, *Canadian Housing Statistics*, 1969, Ottawa, 1970, Table 1, p. 1.

The contribution of housing to growth was measured, as in Staff Study No. 23, using the net rental income including house-mortgage income generated by the housing stock.[1/] The contributions of investment in housing to growth were estimated at 0.5, 0.1 and 0.3 percentage points and the shares were 10, 3 and 5 per cent respectively. Over the period, the contribution of housing investment has declined in absolute and in percentage terms.

1/ An imputation of income on owner-occupied housing is included.

Payments of investment income to non-residents enter the macro-accounting system as the difference between the *domestic* and *national* output aggregates. *Domestic* product or income measures output in Canada by the factors of production, i.e., labour and capital, residing here. Some of the capital stock is foreign-owned, and its owners receive a share of the Canadian domestic product as investment income. Domestic product, net of these payments, is the *national* income or product. As a net capital-borrowing country, Canada makes investment income payments to non-residents and thereby reduces national income. Over time and in the "normal" situation of rising payments to non-residents, income on foreign capital makes a negative contribution to growth.[1/]

Payments (net) of investment income to non-residents[2/] were particularly large in 1950, and declined between 1950 and 1955. Since the early 1950's, the net outflow of interest, dividends, and profits has grown, but at a slower rate than net output. The contribution of these flows to the growth of national income was, as noted above, an exceptional +0.1 percentage points in 1950-55 and -0.2 in each of the subsequent time periods. These percentage-point distributions to growth accounted for +2, -5 and -3 per cent of total growth in the periods 1950-55, 1955-62 and 1962-67.

1/ It is important to note that this is not at all a measure of the economic contribution of foreign capital to growth. It merely reflects the fact that interest payments on borrowed money reduce current income. *Gains* from borrowing, higher levels of income, etc., are not picked up by this measure. The contribution of foreign-owned assets to economic growth is, in this framework, included with the contribution of domestic-owned assets, in the input of capital. At this stage of statistical development it is not feasible to make a clear distinction between domestic and foreign-owned fixed capital stocks.

2/ Excluding retained earnings. See discussion of this point, Staff Study No. 23, *op. cit.*, pp. 234-235.

Inventory changes, which are closely related to cyclical fluctuations in the economy, tend to make a variable contribution to growth. The response of inventories to the cyclical downturn at the end of the 1950's created a wide variation in their growth rates during the three periods, i.e., 3.8, 2.3 and 5.0 per cent per annum. The factor share of inventories is small, and the contribution to growth similarly so.

The contribution of all forms of capital to growth was significantly smaller in the 1960's than in the early half of the 1950's. As Table 3 indicates, the relative importance of the capital items was almost twice as large in the earlier period than in the more recent.[1/] Labour and capital together constituted some 60 per cent of the sources of growth; factor productivity, the remaining 40 per cent. The following section discusses some of the elements in factor productivity growth.

Factor Productivity[2/] or Output per Unit of Input

The process of growth involves the reallocation of resources from low-productivity to high-productivity use. One of the most important elements of resource shift in the postwar years has been the movement of labour from self-employed activities to paid employment. In quantitative terms, the shift of workers from farm to nonfarm activities has been the most pronounced. In 1950, agricultural employment represented 20 per cent of total employment; by 1967, this had fallen to only 8 per cent.

1/ It is assumed that the volume of available land remained relatively unchanged and that this factor of production made no (measurable) contribution to total growth.

2/ The discussion of factor productivity, technical change, and capital input measures referred to in Staff Study No. 23, *op. cit.*, continues. Two recent articles that have furthered the discussion are: Edward F. Denison, "Some Major Issues in Productivity Analysis: An Examination of Estimates by Jorgenson and Griliches" in U.S. Department of Commerce, *Survey of Current Business*, *op. cit.*, Vol. 49, No. 5, Part II, May 1969; and Dan Usher, "The Meaning and Measurement of Aggregate Technical Change", Discussion Paper No.12, Institute for Economic Research, Queen's University, Kingston, Ontario, mimeo.

Table 11

AGRICULTURAL EMPLOYMENT
AS A SHARE OF TOTAL EMPLOYMENT,[1] 1950-67

(Per cent)

	1950	1962	1967
Canada	20	11	8
United States	12	8	6[2]
Belgium	11	7	6
Denmark	28	19	17[3]
France	29	20	16
Germany	25	13	10
Netherlands	14	9	8
Norway	24	17	14
United Kingdom	5	4	3
Italy	43	29	24

(1) Includes military.

(2) Adjusted to include 14- and 15-year-old workers for comparability with earlier years. See note to Table 7.

(3) 1966.

Note: Agriculture for the European countries includes forestry, hunting and fishing except for Norway, which is agriculture only.

Source: Canada -- DBS, *The Labour Force*, *op. cit.*, and OECD, *Manpower Statistics* and *Labour Force Statistics*, *op. cit.*
United States and Europe 1950 and 1962 -- Denison, *op. cit.*, Table 16-4, p. 206. United States 1967 -- calculated from U.S. Department of Labor, *Manpower Report of the President*, *op. cit.* Europe (except Norway) 1967 -- OECD, *Labour Force Statistics*, *op. cit.*
Norway 1967 -- estimated from Statistisk Sentralbyrå, *Statistisk Årbok, 1969 (Statistical Yearbook of Norway)*, Norges Offisielle Statistikk XII 252, Oslo, 1969.

The contribution of this reallocation of workers to growth has been measured as the increase in nonfarm income resulting from the declining share of farm employment, less the offsetting loss of farm income.[1/] The rate of decline in farm employment was largest in the early 1950's and has slowed substantially in recent years. This shift added 0.8 percentage points to the growth rate in the first time period, 1950-55, and 0.4 in the periods 1955-62 and 1962-67. The share contributions to growth were 16, 9 and 6 per cent respectively.

Another element of resource shift arises in connection with the nonfarm owner-operated small business and the family workers associated with it. To a significant degree, the corner grocery store, shoe repair shop, and variety store have been replaced by multiples or chain stores. By far the largest decline in the category of small family-sized operations took place in the early 1950's. This shift of workers from low-income activities to paid employment contributed 0.3 percentage points to the growth rate in 1950-55, less than 0.05 from 1955 to 1962, and 0.1 from 1962 to 1967. The comparable share contributions to growth were 5, 1 and 2 per cent.

These two aspects of resource reallocation -- that is, the movement of labour from low income-productivity work to higher income-productivity employment -- added over one full percentage point to the annual growth rate (20 per cent of national income growth) in 1950-55. In the following 12 years, the continuing shift of workers contributed about ½ of 1 per cent of the annual growth rate -- or about 10 per cent. As self-employment as a way of livelihood continues to decline (less than 10 per cent of nonfarm employment is now in this category), the scope for further economic gain from such resource reallocation falls.

A second group of factors contributing to growth through increased factor productivity is economies of

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[1/] Statistical revisions to farm income reduced the level of farm relative to nonfarm income, and raised the measured gain from this shift.

scale. The analysis deals with three varieties of scale factors: increases in the national and international market, in the local distributive market, and in the production of consumer durables. Knowledge about the effect of market size on efficiency is limited. A number of studies[1/] have suggested that size of establishment is not the crucial factor, but that product specialization and length of run are significant. However, the basis for quantifying the effect of changes in the overall size of the Canadian domestic and export market is slight. The scale factor that was assumed to be relevant to Canada in the previous study was applied to the new income growth rates. On this basis, the estimated contribution of wider national and export market size was 0.5 percentage points in the 1950's and 0.6 from 1962 to 1967.

The economies of distribution associated with urban- and suburbanization, supermarket and shopping centre growth, increased car ownership, etc., were estimated to have grown at about the same pace in the 1962-67 period as in the earlier periods. The contribution of the distribution economies to output growth was of the order of 0.1 percentage points per annum.

The third area in which economies of scale have been achieved is in the production of many consumer goods, particularly durables. Rising standards of living and larger discretionary incomes provided the basis for some dramatic increases in consumption. The increase in the volume of consumer expenditure in Canada was larger in the 1962-67 period than in either of the earlier periods. The effect of rising incomes and high income elasticities was estimated to have contributed 0.1 percentage points to the annual rate of growth in the period of the 1960's.

These three elements, which contributed to growth through economies of scale, accounted for 0.6 percentage points of the growth rate from 1950 to 1962, and 0.8 per cent from 1962 to 1967. As a share of national income growth, however, the contributions were a relatively stable 12 to 13 per cent in each time period.

1/ See discussion in Staff Study No. 23, *op. cit.*, pp. 123-126.

Special Adjustments

The following two adjustments take account of the cyclical fluctuations in factor productivity; that is, they standardize the growth rates for short-term fluctuations in output per unit of input. The degree of utilization of the economy has an impact on the efficiency of resource use. In general, a substantial amount of slack in the economy is associated with lower levels of productivity. Earlier work on this question[1/] suggested a close relationship between the unemployment rate and output per man-hour. On the other hand, since each phase of the business cycle has different productivity implications, the degree of unemployment may be seriously incomplete as a measure of productivity variability.[2/]

The estimates used in this study move away from unemployment rates as an indicator of factor productivity variability. Unfortunately, possible insights into the relationships were not accompanied by insights into measurements. For each time period, variations from the medium-term trend of output per man-hour in the commercial nonfarm sector have been used. This method reduced the effect of cyclical variability on productivity from that given in the earlier study. From 1955 to 1962 and 1967, actual productivity growth was almost 0.2 percentage points lower than the smoothed trends suggest. The contributions to factor productivity growth were estimated at -0.1 percentage points in each period. In the 1950-55 comparison, the measured adjustment was insignificant.

The effect of weather on farm output was the second "fluctuation" element. Using a time-trend adjustment, it was estimated that fluctuations in farm output that could be attributed to weather accounted for 0.1 percentage points of the growth rate between 1950 and 1955 and -0.1 between 1962 and 1967.

The revision of the national accounts gave rise to somewhat larger problems of comparability with the alternative real output series than before. Table A-2

1/ See discussion in Staff Study No. 23, *op. cit.*, pp. 144-147.

2/ See Appendix III for further discussion.

in the Appendix compares the growth rates of the two series. A statistical adjustment was incorporated into this analysis that halved the differences between the two series.

The three adjustment factors -- demand fluctuations, farm-output fluctuations, and statistical adjustments -- accounted for -.1 and +.2 percentage points of growth in 1950-55 and 1955-62. They cancelled out in 1962-67.[1/]

Residual Productivity

In this analysis the category "residual sources of growth" includes Denison's "advances in knowledge" and those other factors which contribute to growth but have not been separately identified or quantified.[2/] The absolute contribution of these residual sources to the annual growth rate varied from half a percentage point in the early 1950's to a full percentage point in the more recent years.

The earlier analysis suggested, as this one does, that residual productivity performance, or the "unknowns", has contributed more to the growth rate since 1955 than in the five years before. From 1950 to 1955 the residual sources accounted for 9 per cent of the total growth; from 1955 to 1962 and 1962 to 1967, the residual contribution was about twice as large, 21 and 17 per cent.

At this stage in our knowledge of the growth process, it is not possible to explain why residual productivity grew more slowly in the early 1950's than

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[1/] It should be noted that Table 2 also gives, in summary form, the growth of income and productivity after adjustment for the standardization. The percentages in Table 3 are based on adjusted growth rates. Comparisons of shares between periods are more meaningful on this basis.

[2/] Errors in measuring both factor inputs and the specified elements of output per unit of input are implicitly included in the net residual, as well as omissions.

after 1955.[1] It is, by definition, an unknown residual, and there is little to do but speculate about the factors that may have affected its size and growth. An examination of Tables 2 and 3 suggests no obvious relationship between changes in the contribution of residual productivity and changes in the contribution of the various factor inputs and factor productivity elements. The list of other possible factors that add to, or detract from, growth would be infinitely long and, because of the interrelationships and externalities, extremely involved. Sources of productivity growth that have been suggested include the effect of advances in knowledge on the economic system -- the contribution of managerial education and skill to efficiency and to innovation, changes in the productivity of capital, and the adoption of best-practice techniques in capital goods and production methods.

It is of interest to note that the relative importance of these residual sources in growth was certainly no larger in the mid-1960 period than in the late 1950's.[2] It has been suggested that the factors contributing to growth in the residual may be responsive to differences in the period level of utilization in the economy. Periods of slack, as reflected in high levels of unemployment, do not seem to provide the same opportunity or environment for productivity-generating innovation as periods of fuller utilization. The *average* level of Canadian unemployment over the 1950-55 period was 3½ per cent, over 5½ per cent between 1955 and 1962, and 4½ per cent from 1962 to 1967. If one expected the residual sources of growth for each time period to correspond with the inverse unemployment rates, the

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[1] It is possible that statistical problems associated with differences in the growth rates of the two real output series may account for some of this variation in residual productivity. The "turnaround" in the statistical adjustment between the first and second time periods was 0.5 percentage points.

[2] See Table 2, p. 6. The residual source of growth was 0.9 in 1955-62 and 1.0 percentage points in 1962-67.

growth rate of the residual sources in Canada and the United States would be higher in the mid-1960's than in the 1955-62 period. The Canadian estimates derived for this study do not provide any evidence to support that point of view.[1/]

GROWTH PER PERSON EMPLOYED

For many analytical purposes, interest focuses on the aggregates of total growth; for others, on the sources of growth per person employed. To a large degree, gains in real income arise from increased output per worker. The following section deals with changes in net income per person employed and the factors that contributed to them during the three time periods. Since the largest single component of total growth in the postwar Canadian economy was employment, the elements contributing to income gains per worker have significantly different relationships than those for total growth. But it is these "per person employed" elements which account for changes in the level of labour productivity on which rising standards of living depend.

The earlier study had found that the growth rate of net income per person employed from 1950 to 1962 had been relatively low in Canada. Of the 10 countries studied, only the United Kingdom experienced a lower rate of growth. The revision to the Canadian accounts improved the relative Canadian performance, but not dramatically, in spite of an increase in the rate of growth of one full percentage point a year.[2/] Instead of being second last in the 10-country ranking according to the growth rate of net income per person employed, Canada is now sixth (see Table 12).

[1/] Dr. Denison is continuing his work on sources of economic growth in the United States by developing an historical and updated series. The U.S. experience in the 1960's will provide an interesting comparison with these estimates for Canada.

[2/] The accounts revision raised the 1950-62 growth rate from 1.8 to 2.8 per cent per annum.

Table 12

GROWTH OF NET NATIONAL INCOME
PER PERSON EMPLOYED, 1950-62

(Annual average rates)

Canada	2.8
United States	2.1
Belgium	2.6
Denmark	2.6
France	4.8
Germany	5.2
Netherlands	3.6
Norway	3.3
United Kingdom	1.6
Italy	5.4

Source: Canada -- revised estimates.
United States and Europe -- Denison, *op. cit.*, Table 2-2, p. 18.

On the basis of the revised data, net output or income per worker increased at a rate of 3.4 per cent per annum in the first half of the 1950's. The sharp decline in economic activity towards the end of the decade was reflected in an annual growth rate of only 2.3 per cent from 1955 to 1962. In the five years that followed, the rate of increase in net national income per worker rose slightly to 2.6 per cent a year. This relatively slow growth in labour productivity in the 1960's indicates a far less satisfactory growth performance than one might conclude from the high rate of total growth in the economy.

The contributions of factor inputs per worker and output per unit of input are shown in percentage-point terms in Table 13 and as shares in Table 14.

Table 13

CONTRIBUTION OF FACTOR INPUTS AND OUTPUT PER UNIT OF INPUT TO GROWTH OF NET NATIONAL INCOME PER PERSON EMPLOYED, CANADA, 1950-67

(Contribution to growth rates in percentage points)

	1950-55	1955-62	1962-67
Net National Income	3.4	2.3	2.6
Factor Inputs	1.2	.3	.4
Labour	--	- .1	.1
Hours worked	- .3	- .1	- .2
Age-sex composition	--	- .2	- .2
Education	.3	.2	.5
Capital	1.3	.5	.4
Housing	.4	.1	.1
Foreign investments	.1	- .1	- .1
Non-residential structures and equipment	.7	.5	.3
Inventories	.1	--	--
Land	- .1	- .1	- .1
Output per Unit of Input	2.2	2.0	2.0
Improved allocation of resources			
Decline in agricultural inputs	.9	.4	.4
Decline in nonagricultural self-employment	.3	--	.1
Economies of scale			
Growth in national market	.5	.5	.6
Growth in local markets	.1	.1	.1
Income elasticities in consumption	--	--	.1
Statistical adjustments*	- .2	.3	.2
Variations in pressure of demand*	--	- .1	- .1
Variations in agricultural output*	.1	--	- .1
Residual sources of growth	.5	.9	1.0
	Adjusted Growth Rates(1)		
Net National Income	3.5	2.2	2.6
Factor inputs	1.2	.3	.4
Output per unit of input	2.3	1.9	2.2

(1) Excludes the effect of starred (*) items -- statistical adjustments, variations in pressure of demand, and variations in agricultural output.

Note: Detail has been rounded to tenths of a percentage point and may not add.

Source: Based on Table 2.

Table 14

DISTRIBUTION OF THE CONTRIBUTION OF FACTOR INPUTS AND OUTPUT PER UNIT OF INPUT TO GROWTH OF ADJUSTED[1] NET NATIONAL INCOME PER PERSON EMPLOYED, CANADA, 1950-67

(Percentage shares)

	1950-55	1955-62	1962-67
Net National Income	100	100	100
Factor Inputs	35	14	15
Labour	--	- 3	4
Hours worked	- 8	- 6	- 8
Age-sex composition	- 1	- 8	- 7
Education	9	11	19
Capital	36	21	14
Housing	10	3	5
Foreign investments	2	- 5	- 3
Non-residential structures and equipment	21	22	10
Inventories	3	--	2
Land	- 2	- 5	- 3
Output per Unit of Input	65	86	85
Improved allocation of resources			
Decline in agricultural inputs	25	18	15
Decline in nonagricultural self-employment	8	1	4
Economies of scale			
Growth in national market	16	22	24
Growth in local markets	2	3	2
Income elasticities in consumption	1	--	3
Residual sources of growth	15	42	38

(1) Adjusted to exclude statistical adjustments, variations in pressure of demand, and variations in agricultural output.

Note: Detail may not add due to rounding.

Source: Calculated from unrounded data for Table 13.

The contributions of labour-input characteristics to the growth rate of output per person employed are identical to those in the aggregate or total growth analysis (the contributions are on a "per worker" basis in both calculations -- see Tables 2 and 13). By and large, the contribution of change in these characteristics was not large. The one particularly noteworthy change was in education. By the mid-1960's, improvements in the educational attainment of the labour force, which resulted especially from the influx of young people with higher levels of education, had added half a percentage point to a growth rate of 2½ per cent per annum. This raised the contribution of education to growth in Canada to approximately the level that has obtained in the United States for several decades.

The major element of difference in performance on a per-person-employed basis in the three time periods arose from a substantially larger contribution of capital per worker in the early 1950's. Investment in housing and in fixed and inventory capital per person employed increased at rates that have not been equaled since.1/

The contributions of output per unit of factor input are also identical in the aggregate and per-worker analysis (Tables 2 and 13).2/ Total factor productivity contributed over two percentage points to the growth rate in all three periods.

As the share data in Table 14 suggest, the major source of growth in output per worker after 1955 was factor productivity or the growth of output per unit of input. In the early 1950's, about 65 per cent of the

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1/ It should be noted that, following the earlier study, the national inventory of land and mineral resources was assumed not to have changed significantly over the period. This point is developed more fully in Staff Study No. 23, *op. cit.*, Chapter IX, pp. 94-98. Since the stock of land and resources *per employed person* declines as employment rises, it contributes negatively to the growth of output *per employed person*.

2/ Slight differences in the numbers in Tables 2 and 13 are due to estimating and rounding procedures.

gain in output per person employed arose from this source. In the two subsequent periods to 1967, a significantly larger share -- about 85 per cent of growth -- arose from increased factor productivity.

As the earlier discussion indicated, the shift of resources from self-employed, low-income occupations (including agriculture) to higher-income employment, which had contributed almost one-third of the growth of output per worker in the early 1950's, slowed during the 1950's and has continued to decline. By now, the impetus to growth from this source is almost spent. On the other hand, economies of scale contributed significantly more to growth as total output and incomes rose in recent years.

Residual sources of growth accounted for some 15 per cent of growth in output per person employed in the early 1950's but significantly more after that. The crucial nature of the origin of these residual sources of growth becomes apparent as they account for some 40 per cent of growth in output per employed person.1/

RECENT GROWTH PERFORMANCE

From 1962 to 1967, the economy was moving out of a period of substantial underutilization towards a high level of actual output in relation to potential output. Real national income rose by 6 per cent per annum.2/

1/ In this connection it is of interest to note that there is no obvious correlation between the measured contribution of capital inputs and the residual sources of growth in the three time periods. One might expect some conspicuous similarity if, as has been suggested, the residual sources largely reflect deficiencies in the capital-input measures. Nevertheless, some part of the contribution of technology via capital is hidden in the residual.

2/ The productivity effect of cyclical fluctuations in farm and nonfarm output and the purely "statistical" adjustments were offsetting during this period so that the actual and adjusted rates of growth were both 6.0 per cent.

As in the earlier periods the larger part of this growth was attributed to factor inputs -- over 60 per cent. Of this, almost 45 percentage points arose from increased employment growth. Output per worker increased at a rate of $2\frac{1}{2}$ per cent per annum, well below the rate of growth in the first half of the 1950's.

The record growth of the Canadian labour force in the 1960's brought into the work force young people with a substantially higher level of education. This increase in the education content of the labour force was estimated to contribute over 8 per cent of total growth. To some extent, the effect of higher levels of education on output was offset by a younger, less experienced work force and a continued decline in the number of hours worked.

Total capital inputs were estimated to account for some 17 per cent of total growth, of which increases in fixed capital contributed about 13 per cent - a smaller share than in earlier periods. The contribution of fixed capital may be said to be somewhat understated since the growth rate measures capacity "in place", not "in use", and the degree of underutilization was still large in 1962.

During this period an increased share of growth -- over 60 per cent -- was attributed to increased factor inputs. Conversely, factor productivity declined in relative importance as a source of growth -- from 43 per cent in the 1950-62 period to 38 per cent from 1962 to 1967.

There were minor shifts in the contributions to growth of the factor productivity items. Output per unit of input made a larger absolute contribution to the growth of output in the mid-1960's than earlier, but as a share of the higher growth rate, its importance declined. Self-employment as a share in the total labour force continued to decline, and productivity rose as these workers turned to paid employment. Farm employment also continued to decline -- not at the rate of the early 1950's, but in line with outmigration later in the decade. The faster growth rate of output and income also gave rise to somewhat larger gains from scale between 1962 and 1967 compared with the earlier periods. Residual productivity contributed one percentage point to the growth rate between 1955-62 and 1962-67. No real improvement

in residual productivity as a source of growth became evident during the 1960's.

GROWTH IN CANADA, THE UNITED STATES AND NORTHWEST EUROPE, 1950-62

The revisions of the Canadian national accounts estimates included new price deflators for construction activity.[1] These more comprehensive indexes took account of productivity and profit changes that had not been previously included and that, for the most part, are not included in the deflators of other countries.[2] Comparisons between Canada, the United States and Northwest Europe should take account of this methodological incomparability.

It is estimated that the new construction deflators added about 0.2 percentage points to the annual growth rate of Canadian output. Tables 15 and 16 compare the Canadian growth experience and the factors contributing to growth with Denison's estimates for the United States and Northwest Europe for the period 1950-62.[3]

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[1] See Appendix I.

[2] Denison, *op. cit.*, p. 27.

[3] Table 15 includes the income effect of the profit-productivity adjustment to the construction deflator with statistical adjustments; it is therefore not included in the residual sources of growth. Table 16 was adjusted to *exclude* the cyclical demand factors and the statistical adjustments in Table 15, as well as the effect of the special deflation method on Canadian output growth and factor productivity.

Table 15

INTERNATIONAL COMPARISON[1] OF THE CONTRIBUTION OF FACTOR INPUTS AND OUTPUT PER UNIT OF INPUT TO GROWTH OF NET NATIONAL INCOME

(Contribution to growth rates in percentage points)

	United States 1950-62	Northwest Europe 1950-62	Canada 1950-62	Canada 1962-67
Net National Income	3.3	4.8	4.8	6.0
Factor Inputs	2.0	1.7	2.7	3.8
Labour	1.1	.8	1.5	2.7
Employment	.9	.7	1.5	2.6
Hours worked	- .2	- .1	- .2	- .2
Age-sex composition	- .1	--	- .1	- .2
Education	.5	.2	.3	.5
Capital	.8	.9	1.2	1.0
Housing	.3	.1	.3	.3
Foreign investments	.1	--	- .1	- .2
Non-residential structures and equipment	.4	.6	.9	.8
Inventories	.1	.2	.1	.1
Land				
Output per Unit of Input	1.4	3.1	2.1	2.3
Improved allocation of resources				
Decline in agricultural inputs	.3	.5	.6	.4
Decline in nonagricultural self-employment	--	.1	.1	.1
Reduction in international trade barriers	--	.1	--	--
Economies of scale				
Growth in national market	.3	.4	.5	.6
Growth in local markets	.1	.1	.1	.1
Income elasticities in consumption	--	.5	--	.1
Capital adjustments[2]	--	.1	--	--
Statistical adjustments*	--	.1	.3[1]	.4[1]
Variations in pressure of demand*	--	--	- .1	- .1
Variations in agricultural output*	--	--	--	- .1
Residual sources of growth	.8	1.3	.6[1]	.8[1]
		Adjusted Growth Rates[3]		
Net National Income[3]	3.4	4.7	4.6	5.9
Factor inputs	2.0	1.7	2.7	3.8
Output per unit of input	1.4	3.0	1.9	2.1

(1) The statistical adjustment total has been adjusted to include the amount by which the Canadian growth rate was increased by the use of productivity- and profit-adjusted construction deflators. See text and footnote 3/, p. 36.

(2) Includes the effect of "Reduction in the age of capital" and "Balancing of the capital stock" for some countries in Northwest Europe.

(3) Adjusted to exclude the effect of starred (*) items -- statistical adjustments, variations in pressure of demand, and variations in agricultural output. See also (2).

Note: Detail has been rounded to tenths of a percentage point and may not add.

Source: Canada -- Table 2, p. 6.
United States and Europe -- Denison, *op. cit.*, Tables 21-1 and 21-3, pp. 298 and 300.

Table 16

INTERNATIONAL COMPARISON OF THE SHARE CONTRIBUTION OF FACTOR INPUTS AND OUTPUT PER UNIT OF INPUT TO GROWTH OF ADJUSTED[1] NET NATIONAL INCOME

(Percentage shares)

	United States	Northwest Europe	Canada	
	1950-62	1950-62	1950-62	1962-67
Net National Income	100	100	100	100
Factor Inputs	58	36	59	64
Labour	33	18	32	46
Employment	27	15	33	45
Hours worked	- 5	- 3	- 4	- 4
Age-sex composition	- 3	1	- 2	- 3
Education	15	5	6	9
Capital	25	18	27	18
Housing	7	1	7	5
Foreign investments	1	- 1	- 2	- 3
Non-residential structures and equipment	13	14	19	13
Inventories	3	4	2	2
Land	--	--	--	--
Output per Unit of Input	42	64	41	36
Improved allocation of resources				
Decline in agricultural inputs	7	10	12	7
Decline in nonagricultural self-employment	1	3	3	2
Reduction in international trade barriers	--	2	--	--
Economies of scale				
Growth in national market	9	9	11	11
Growth in local markets	2	1	2	1
Income elasticities in consumption	--	10	--	1
Capital adjustments[2]	--	2	--	--
Residual sources of growth	23	27	13[1]	14[1]

(1) Adjusted to exclude statistical adjustments, variations in pressure of demand, and variations in agricultural output, and also the effect of the use of productivity- and profit-adjusted deflators for construction in Canada. See Table 15, footnote (1).

(2) Includes the effect of "Reduction in the age of capital" and "Balancing of the capital stock" for some countries in Northwest Europe.

Note: Detail may not add due to rounding.

Source: Canada -- calculated from unrounded data for Table 15.
United States and Northwest Europe -- Denison, *op. cit.*, Tables 21-2 and 21-4, pp. 299 and 301.

The Canadian GNP revision raised the Canadian 1950-62 growth rate to the level of the Northwest European growth rate. The major difference in the growth profiles of Canada and Northwest Europe is reflected in the contrast of contributions of factor inputs and factor productivity to growth. In Europe, 3.1 percentage points of the total growth rate arose from gains in the efficiency of resource use; in Canada, only 2.1 percentage points arose from this source. Conversely, 2.7 percentage points of the Canadian growth rate arose from increased inputs of labour and capital; in Northwest Europe the contribution was 1.7 percentage points. These differences in factor-input contributions are dominated by differences in the rate of growth of employment and labour force. In the 1950-55 period, the Canadian labour force grew at about 2 per cent a year; so did the German. The rates in the United States and the Netherlands were just over 1 per cent, and the other countries less than 1 (see Table 4). In the second period, the Canadian labour force growth rate was $2\frac{1}{2}$ per cent a year; the next highest rate in other industrial countries was 1.1 per cent. These growth rates were the major factor that gave rise to a larger contribution of factor inputs to growth in Canada (and in the United States).

The share contributions to growth, as shown in Table 16, suggest that in Canada and the United States about 60 per cent of growth arose from more inputs and 40 per cent from more efficiency. In Europe, on the other hand, the relative importance of the quantity and efficiency of inputs was reversed. Only 40 per cent arose from more inputs of labour and capital; 60 per cent from a more efficient use of resources.

Table 17

INTERNATIONAL COMPARISON[1] OF THE CONTRIBUTION OF FACTOR INPUTS AND OUTPUT PER UNIT OF INPUT TO GROWTH OF NET NATIONAL INCOME PER PERSON EMPLOYED

(Contribution to growth rates in percentage points)

	United States 1950-62	Northwest Europe 1950-62	Canada 1950-62	Canada 1962-67
Net National Income	2.2	3.8	2.8	2.6
Factor Inputs	.8	.7	.7	.4
Labour	.2	.1	--	.1
Hours worked	- .2	- .1	- .2	- .2
Age-sex composition	- .1	--	- .1	- .2
Education	.5	.2	.3	.5
Capital	.6	.7	.8	.4
Housing	.2	--	.2	.1
Foreign investments	--	--	--	- .1
Non-residential structures and equipment	.3	.5	.6	.3
Inventories	.1	.1	--	--
Land	--	--	- .1	- .1
Output per Unit of Input	1.4	3.1	2.1	2.2
Improved allocation of resources				
Decline in agricultural inputs	.3	.5	.6	.4
Decline in nonagricultural self-employment	--	.1	.1	.1
Reduction in international trade barriers	--	.1	--	--
Economies of scale				
Growth in national market	.3	.4	.5	.6
Growth in local markets	.1	.1	.1	.1
Income elasticities in consumption	--	.5	--	.1
Capital adjustments[2]	--	.1	--	--
Statistical adjustments*	--	.1	.2[1]	.4[1]
Variations in pressure of demand*	--	--	- .1	- .1
Variations in agricultural output*	--	--	--	- .1
Residual sources of growth	.8	1.3	.6[1]	.8[1]
		Adjusted Growth Rates[3]		
Net National Income	2.2	3.7	2.6	2.4
Factor inputs	.8	.7	.7	.4
Output per unit of input	1.4	3.0	1.9	2.1

(1) The statistical adjustment total has been adjusted to include the amount by which the Canadian growth rate was increased by the use of productivity- and profit-adjusted construction deflators. See text and footnote 3/, p. 36.

(2) Includes the effect of "Reduction in the age of capital" and "Balancing of the capital stock" for some countries in Northwest Europe.

(3) Adjusted to exclude the effect of starred (*) items -- statistical adjustments, variations in pressure of demand, and variations in agricultural output.

Note: Detail has been rounded to tenths of a percentage point and may not add.

Source: Canada -- Based on data for Table 2.
United States -- Denison, *op. cit.*, Tables 21-1 and 21-3, pp. 298 and 300.

Table 18

INTERNATIONAL COMPARISON OF THE SHARE CONTRIBUTION OF FACTOR INPUTS AND OUTPUT PER UNIT OF INPUT TO GROWTH OF ADJUSTED[1] NET NATIONAL INCOME PER PERSON EMPLOYED

(Percentage shares)

	United States	Northwest Europe	Canada	
	1950-62	1950-62	1950-62	1962-67
Net National Income	100	100	100	100
Factor Inputs	36	20	26	16
Labour	10	3	- 1	4
Hours worked	- 8	- 4	- 7	- 9
Age-sex composition	- 5	1	- 4	- 7
Education	22	6	10	20
Capital	27	17	31	15
Housing	10	1	8	5
Foreign investments	2	- 1	- 1	- 3
Non-residential structures and equipment	13	14	23	11
Inventories	3	4	2	2
Land	- 1	- 1	- 3	- 3
Output per Unit of Input	64	80	73	84
Improved allocation of resources				
Decline in agricultural inputs	11	12	23	16
Decline in nonagricultural self-employment	2	4	5	5
Reduction in international trade barriers	--	2	--	--
Economies of scale				
Growth in national market	14	11	20	25
Growth in local markets	3	2	3	2
Income elasticities in consumption	--	12	--	3
Capital adjustments[2]	--	3	--	--
Residual sources of growth	34	34	22[1]	34[1]

(1) Adjusted to exclude statistical adjustments, variations in pressure of demand, and variations in agricultural output, also the effect of the use of productivity- and profit-adjusted deflators for construction in Canada.

(2) Includes the effect of "Reduction in the age of capital" and "Balancing of the capital stock" for some countries in Northwest Europe.

Note: Detail may not add due to rounding.

Source: Canada -- calculated from unrounded data for Table 17.
United States and Northwest Europe -- Denison, *op. cit.*, Tables 21-2 and 21-4, pp. 299 and 301.

These total growth comparisons are dominated by the effect of increased employment on output growth, but rising efficiency and higher standards of living are more closely related to output per person employed. Tables 17 and 18 compare output per worker in Canada, United States and the eight Northwest European countries. Over the period 1950-62, the growth of net national income per person employed was 3.8 per cent in Northwest Europe, 2.8 per cent in Canada, and 2.2 per cent in the United States. In all three areas, factor inputs (other than employment) accounted for about three-quarters of one percentage point of growth. This represented about one-fifth of the growth rates of output per worker in Northwest Europe, one-quarter in Canada, and over one-third in the United States. Gains in output per unit of input accounted for all the rest.

The factors that contributed significantly to differences in the growth in output per unit of input are those which were emphasized earlier in looking at factors contributing to Canadian growth. In 1950-62, about 28 per cent of the increase in factor efficiency in Canada came from a reallocation of factors from low-income, low-productivity employment to more efficient use. In the United States, the contribution to growth was very much smaller; the share of the labour force in agriculture was already low -- 12 per cent (see Table 11) -- and most of the impetus to growth from shifts of manpower out of agriculture had been experienced in earlier years. Except for the United Kingdom, which in 1950 had already reduced the farm labour force to 5 per cent of total employment, the transfer of self-employed persons to higher-productivity use was at an early stage in the Northwest European countries during the 1950's. The rate of decline in the importance of farm workers has not been as large in Europe as it has in Canada, and its contribution to growth in Northwest Europe was only about half as large as in Canada.

The second important factor accounting for a faster rate of increase in factor productivity in many European countries was economies of scale. Of the various types of scale economies, the most important to the European economy seems to have arisen from the expansion of output of consumer goods, particularly durables, associated with a large rise in the real income of the average Western European. By now, many of the changes that accompanied the rising standard of living in the 1950's are taken for

granted in Europe, as they have been for even longer in North America. The consumption gap between the two continents has narrowed. This is illustrated by the comparison in Table 19 of the number of cars per 1,000 persons in the population in 1950 and 1967. In North America the ratio of cars per person almost doubled, in the United Kingdom the increase was 300 per cent, and in Northwest Europe the increase was over 500 per cent. In 1950 the United States had about 8½ times as many cars per person as Northwest Europe; by 1967 it had only twice as many.

Table 19

PASSENGER CARS PER CAPUT, 1950 AND 1967

(Number per 1,000 population)

	1950	1967
Canada	139	288
United States	266	402
United Kingdom	47	193
Northwest Europe	31	192

Source: United Nations, *Statistical Yearbook*, 1968, New York, 1969, and earlier issues.

Another factor that contributed to a better allocation of resources in Europe during this period was the reduction in tariff barriers associated with the formation of the European Economic Community and EFTA. The widening of markets provided opportunities for rationalization and specialization which contributed to growth. Denison's estimate of the effect of these tariff reductions on growth in Northwest Europe was not large -- one-tenth of a percentage point a year, or 2 per cent of total growth.

It may be that these estimates understate the long-term impact of tariff reductions on growth.[1/]

The residual sources of growth in the United States which the Denison analysis attributed to advances in knowledge accounted for some 0.8 percentage points of U.S. growth in output between 1950 and 1962 (see Tables 15 and 17). In Northwest Europe, advances in knowledge, and all other, i.e., residual sources of growth, accounted for 1.3 percentage points in the same time period. The average Canadian experience between 1950 and 1962 (estimated at 0.6 percentage points for international comparison) appears to have been somewhat below the U.S. level, and significantly below the level in Northwest Europe. Since 1955, however, these residual sources of growth contributed about 0.8 percentage points to the Canadian rate; this contribution is similar to that in the United States but well below that in Europe in the 1950's.

In the absence of data for the 1962-67 period on the sources of growth in the United States and Europe, it is not possible to draw conclusions about Canadian performance vis-à-vis more recent experience elsewhere.

CONCLUSIONS

During the 1950's and 1960's, Canada had the highest rate of labour force growth of any industrial country. It was, for example, almost twice as high as in the United States. This gain provided the basis for an exceptionally high rate of growth of potential output. It is not, therefore, surprising that the growth rate of the Canadian economy was relatively high, although comparatively speaking it was lower than in countries such as Germany and Japan.

Since the rates of growth of the Canadian population and employment were about the same, the rates of

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[1/] See D. J. Daly, "Why Growth Rates Differ - A Summary and Appraisal", *The Review of Income and Wealth*, New Haven, International Association for Research in Income and Wealth, Series 14, Number 1, March 1968, p. 92.

increase in output per employed person, per caput income, and average standard of living were very similar.

Table 20

GROWTH OF OUTPUT PER CAPUT AND PER PERSON EMPLOYED, 1950-67

(Annual average rates)

	Canada	United States
Gross National Product[(1)]	5.1	3.8
Gross National Product per person employed	2.7	2.3
Gross National Product per caput	2.8	2.2

(1) At constant market prices.

Source: Estimated from DBS, *National Income and Expenditure Accounts, 1926-1968*, *op. cit.*, *National Accounts, Income and Expenditure*, Ottawa, Queen's Printer, various issues; U.S. Department of Commerce, *National Income and Product Accounts of the United States, 1929-1965, op. cit.*, and *Business Statistics 1967*, Washington, U.S. GPO. For source of employment data, see Table 11, p. 23.

The earlier study indicated that in 1960 the level of net national income per employed person in Canada was about 18 per cent below the level in the United States. The gap on a per caput basis was substantially wider -- 27 per cent.[1/] The new Canadian output data suggest that these gaps were somewhat smaller. In terms of net

1/ Staff Study No. 23., *op. cit.*, Table 10, p. 20.

income per worker in 1960, the difference is now put at 15 per cent, and in per caput terms about 24 per cent.[1/]

Table 21

INTERNATIONAL COMPARISON OF
REAL GROSS NATIONAL PRODUCT[(1)]
PER PERSON EMPLOYED

(Relatives, U.S. = 100)

	1950	1955	1960	1964	1968
Canada	82	85	89	89	90
United States	100	100	100	100	100
Northwest Europe	51	52	57	59	
Norway	55	56	61	65	
United Kingdom	56	54	56	56	

(1) At factor cost in 1955 U.S. price weights.

Source: Canada and United States -- DBS, *National Income and Expenditure Accounts, 1926-1968, op. cit.*; U.S. Department of Commerce, *National Income and Product Accounts of the United States, 1929-1965, op. cit.*, and *Survey of Current Business, op. cit.*; price relatives developed for Staff Study No. 23, *op. cit.*, for 1950 to 1966 and estimates for 1968.
Northwest Europe -- Denison, *op. cit.*, Table 2-5, p. 23.

The level and growth output comparisons are combined in Table 21, showing gross output per person employed in a number of years between 1950 and 1968. The

1/ It should perhaps be noted here that the Denison study and Staff Study No. 23, *op. cit.*, used U.S. national accounts data which had just been revised. It should also be noted that this *level* comparison in current prices is *not* complicated by the construction deflator incomparabilities in growth comparisons.

Canada/U.S. ratio of *gross* output per worker in 1960 was 89 per cent, some four percentage points higher than the *net* ratio. This primarily reflects the higher capital intensity in Canada. During the 1950's, Canadian real output per worker rose relative to that in the United States, but since 1960 there has been no appreciable narrowing of the gap. Factors such as the lower average level of education, a smaller proportion of university graduates, a lower average level of management education and training, an older and less efficient stock of equipment, a lower level of utilization, and less specialization may be among some of the significant factors contributing to the lower level of output per person employed in Canada.

Future Growth

The data on labour force growth in Canada suggest that employment will continue to be a major contributing factor to the growth of total output over the medium-term future. Between 1970 and 1980, growth in the Canadian labour force is projected at $2\frac{1}{2}$ per cent a year. This rate is well above that projected for most industrial countries. The U.S. forecast suggests a rate of about $1\frac{3}{4}$ per cent a year, and those European countries for which rates are specified in Table 22 show less than 1 per cent a year.

The potential rate of growth of total output in Canada has been estimated at about $5\frac{1}{2}$ per cent a year both between 1967 and 1975,[1/] and 1970 and 1980.[2/] This rate is somewhat larger than the actual rate for the

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1/ Economic Council of Canada, *Sixth Annual Review*, Ottawa, Queen's Printer, 1969, Table 2-3, p. 15.

2/ OECD, *The Outlook for Economic Growth*, Paris, 1970.

period 1950 to 1967. 1/ The potential for a high and growing level of output based on the labour force is not an unmitigated blessing. It adds an additional cost to the failure of economic policy to maintain a high or near-potential level of output in the economy. In the event that a significant amount of slack develops in the economy, the rise in unemployment could be fast and dramatic.

In the period 1950-67 both the labour force and the population in Canada increased by almost 2½ per cent a year. During the next decade, the demographic projections suggest that the labour force will continue to grow at about 2½ per cent a year but the population increase will drop to about 1¾ per cent a year. This differential between the labour force and population growth over the next decade provides increased scope for advances in per caput personal income and consumption or in the standard of living in Canada. It has been estimated that the volume of consumer expenditure may rise by 5.3 per cent a year from 1967 to 1975. This implies an increase in the volume of expenditure per caput of more than 3½ per cent a year 2/ compared with a rate of 2 to 2½ per cent in the postwar period to date.

The Canadian economy will enjoy the fortuitous circumstances of a favourable ratio of population to labour force. However, a high rate of output growth, based largely on labour force and employment growth, does not in itself provide for higher levels of efficiency. A longer-term view would also emphasize the need for a good productivity performance as a basis for growth. For guidance on this point, one turns to the analysis which shows the sources of growth of output per worker.

1/ The projected rate of growth of output in the United States from 1969 to 1975 is 4.3 per cent per annum. This rate is also about half a percentage point above the experience from 1950 to date. See *Economic Report of the President*, Washington, U.S. GPO, 1970; and U.S. Department of Labor, "The United States Economy in 1980", *Monthly Labor Review*, Vol. 93, No. 4, April 1970, pp. 3-34.

2/ Economic Council of Canada, *Sixth Annual Review*, *op. cit.*, Table 4-1, pp. 54 and 55, and Chart 4-2, p. 57.

Table 22

GROWTH OF ACTUAL AND PROJECTED POPULATION, LABOUR FORCE AND GROSS DOMESTIC PRODUCT, 1950-80

(Annual average rates)

	Population		Labour Force[1]		Gross Domestic Product	
	1950-67	1970-80	1950-67	1970-80	1960-70	1970-80
Canada	2.4	1.7	2.4	2.5	4.9	5.4
United States	1.6[2]	1.6	1.4[2]	1.7	4.2	4.7[3]
Belgium	.6	n.a.	.4	n.a.	4.7	4.7
Denmark	.7	.8[4]	.7[5]	n.a.	4.7	3.8
France	1.0	.8[4]	.3	.9	5.6	6.0
Germany	1.3[6]	.4	1.2[6]	.4	4.7	4.6
Netherlands	1.3	1.6[4]	1.1	.9[4]	5.1	4.6
Norway	.9	1.0	.3	.5	4.7	4.4
United Kingdom	.5	.7	.6	.3	2.7	3.2
Italy	.8	.7	-.1	.4	5.7	5.6

(1) Including military.

(2) Excluding Alaska and Hawaii in 1950. Labour force adjusted in 1967 to include 14- and 15-year-old workers for comparability with earlier years.

(3) Including the probable effect of eliminating the present gap between actual and potential output.

(4) Without migration.

(5) 1950-66.

(6) Excludes West Berlin in 1950.

Note: Including migration, except where specified.

Source: Population and labour force estimated from: Actual -- DBS, *National Accounts, Income and Expenditure, op. cit.*, U.S. Department of Labor, *Manpower Report of the President*, 1968, *op. cit.*, OECD, *Manpower Statistics* and *Labour Force Statistics, op. cit.*, and Denison, *op. cit.*, and Projections -- Wolfgang M. Illing, *Population, Family, Household and Labour Force Growth to 1980*, Staff Study No. 19, Economic Council of Canada, Ottawa, Queen's Printer, 1967; and OECD, *Demographic Trends 1965-1980 in Western Europe and North America*, Paris, 1966. Gross Domestic Product from: *The Outlook for Economic Growth, op. cit.*, Table 3, p. 16.

Certain elements of labour quality such as education and labour force experience will, over the next decade, tend to raise the average level of output per worker. At the same time, there will be some offsetting tendency in a slower but continued reduction in hours worked, as well as increases in the number of part-time female workers.

The growth projections also suggest the need for increased levels of investment, not only in total but also per employed person, if a growth momentum and high rates of technological innovation are to be achieved. The backlog of adequate accommodation and the increase in family formation which accompany labour force growth will require a significantly large allocation of resources to housing including urban and suburban infrastructure.

The major factor contributing to higher growth rates in many European countries, compared with Canada or the United States, has been their much larger gains in factor productivity or output per unit of input. As Table 17 indicated, from 1950 to 1962 the rate of increase in output per worker in Northwest Europe was one percentage point higher than in Canada. The increase in factor productivity accounted for all of this difference.

It was noted earlier that Canada and the United States had already derived substantial growth gains from resource reallocations and from the scale-production impact of a high level of consumption and a high standard of living. Europe, on the other hand, has derived more recently, and will continue to derive, stimulus from this source of growth. It would seem that these "identified" sources of productivity growth are not likely to make any significant contribution to the growth of output per worker in Canada.

A large part of the difference in the efficiency of resource use, as indicated by the experience of the 1950's, was in the residual sources of growth -- those unknowns about which one merely speculates.

An improved productivity performance in Canada would require some combination of growth-oriented stimuli which would raise the residual sources of growth. These could include increased efficiency in the organization of factors of production; other gains from higher levels of management skill and efficiency; larger economies of scale and specialization, promoted perhaps by commercial policy; gains in efficiency via a reduction in factors constraining competition; and all those factors which create a mobile, flexible, responsive and efficient economy.

APPENDIX I

THE REVISED NATIONAL ACCOUNTS

The Dominion Bureau of Statistics has recently completed an historical revision of the Canadian national income and expenditure accounts.[1] The revised estimates incorporate changes in concept, format and detail, as well as statistical revisions. The new presentational and conceptual framework brings the Canadian system closer to the recently revised international system established by the United Nations, while maintaining and extending that part of the framework which reflects the particular structural and institutional features of the Canadian economy.

For analytical purposes, and for this study in particular, the statistical revisions are of major significance. The new accounts incorporate data from the 1961 Census, the Department of National Revenue, and the Corporations and Labour Unions Returns Act, as well as other new data sources. Some of the component series have been substantially changed.

Overall, the revisions resulted in an increase in the growth rate of total output in current dollars, a decline in the implicit price deflator and, as a result, a larger increase in the volume growth rates. For the period 1950 to 1962, the growth of real GNP changed from 4.1 per cent per annum in the "old" series to 4.8 per cent in the "new".[2] For the more recent period,

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[1] A summary report, *National Income and Expenditure Accounts, 1926-1968*, *op. cit.*, was published by DBS in August 1969. The fully articulated system of accounts is forthcoming.

[2] The Notes to Chapter II of Staff Study No. 23, *op. cit.*, indicated that the then forthcoming revision of the accounts would alter the calculations. The text of the study, written in 1968, suggested that the growth rates of national income would rise by as much as 0.5 per cent per annum in the Denison time period.

1962-67, the GNP annual growth rate was raised by 0.3 percentage points. The table below compares rates of growth in the value, volume, and price of output in the new and old accounts.

Table A-1

COMPARISON OF GROWTH RATES OF THE "NEW" AND "OLD" GROSS NATIONAL PRODUCT: (1) OUTPUT AND PRICE, CANADA, 1926-67

(Annual average rates)

	"New" Accounts			"Old" Accounts		
	1926-67	1950-62	1962-67	1926-67	1950-62	1962-67
Gross National Product in current dollars	6.4	7.4	9.1	6.3	7.0	8.9
Gross National Product price index	2.1	2.5	3.1	2.2	2.8	3.2
Gross National Product in constant dollars	4.2	4.8	5.8	4.0	4.1	5.5

(1) At market prices.

Source: DBS, *National Accounts, Income and Expenditure, op. cit.*, 1926-56, and various annual issues; also *National Income and Expenditure Accounts, 1926-1968, op. cit.*

There are two points in connection with the accounts revision that merit particular comment in relation to this study. One relates to the revised construction deflator, and the other to the comparison of the two output measures -- Gross Domestic Product and Real Domestic Product.

A statistical revision that is of major importance for this study arises from a change in the method of deflating construction expenditures.

"The most important change in the area of constant dollar estimation was the introduction of productivity and profit margin adjustments in the deflators for residential and non-residential construction. The unavailability of market prices (because of the heterogeneity and discontinuity of the final products) makes it necessary to construct the deflators for this component with cost-of-production price indexes. These are composite indexes of labour and material inputs price indexes, employing the implicit assumptions that the productivity of labour and the ratio of profit to total output remain constant. Another assumption is that there is a proportionality between inputs and outputs and that therefore variations in the price index of the final products will correspond to changes in the composite price index of labour and material inputs. The deflator was obviously deficient in that it removed from the resultant constant dollar estimate not only the pure price change, but also changes in productivity and profit margins. Thus, it had the effect of overestimating the price index used to deflate construction outlays, thereby resulting in an underestimation of the constant dollar figures.

These defects have been corrected in the revision. Deflators were adjusted for productivity changes for the period since 1950.... A profit margin adjustment was applied from 1957 onwards only as data for prior years were not available."1/

The price indexes for construction activity pose difficult methodological problems. These become particularly important in periods when the methods and materials of building undergo dramatic technological change. The revised methodology raised the 1950-67 growth rate of construction activity by one full percentage point per annum.

1/ DBS, *National Income and Expenditure Accounts, 1926-1968*, *op. cit.*, p. 13.

This had the effect of raising total output growth by some 0.2 percentage points over the same period.[1]

The second point relates to a major element of statistical confusion, particularly in productivity measurement -- the difference between the growth rate of real output as measured by the industrial output series (RDP) and the national accounts equivalent (GDP). Table A-2 below compares these two output growth rates. The "new" comparison is based on the revised national accounts and RDP; the "old" comparison uses the earlier accounts and RDP.

In the earlier, i.e. "old", comparison the discrepancies related in large part to the years before 1955; in recent years the series matched quite well. The differences between the growth rates of the two "new" output series are disconcertingly large, even in recent years. In Staff Study No. 23, half of the growth rate difference was included as a statistical adjustment item in factor productivity.[2] This method of accommodating the two output measures was followed in this study.

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[1] The comparison of growth in Canada, the United States, and in Europe took account of the fact that, by and large, other countries do not as yet follow this practice, although there is wide recognition of, and a certain consensus about, the problem.

[2] See the discussion in Staff Study No. 23, *op. cit.*, pp. 147-149.

Table A-2

COMPARISON OF GROWTH RATES OF THE "NEW" AND "OLD" REAL DOMESTIC PRODUCT AND DEFLATED GROSS DOMESTIC EXPENDITURE, CANADA, 1948-68

(Percentage increase per annum)

	National Accounts Expenditure Series	Real Product Series	Difference in Growth Rates
		"New"	
1948-50	5.7	4.9	+ .8
1950-55	5.2	5.6	- .4
1955-62	4.5	3.8	+ .7
1962-66	6.5	6.1	+ .4
1962-68	5.7	5.3	+ .4
		"Old"	
1948-50	4.2	4.3	- .1
1950-55	4.5	5.3	- .8
1955-62	3.8	3.7	+ .1
1962-66	6.5	6.4	+ .1
1962-68	n.a.	n.a.	n.a.

Note: At constant price factor cost.

Source: Staff Study No. 23, *op. cit.*, Table 99, p. 148; DBS, *Indexes of Real Domestic Product by Industry*, Ottawa, Queen's Printer, 1968, Table 1, p. 19; and estimates by Economic Council of Canada.

APPENDIX II

REVISED FACTOR SHARES AND CONTRIBUTIONS TO GROWTH

The revisions to the income and expenditure accounts affected the estimates of factor contributions to growth in two major ways -- by altering the distribution of output among the factors, and by changing components that contribute to factor-input or factor-productivity measures.

The new accounts gave rise to a number of small shifts in the factor-share distribution. A major element in the revisions to the income side of the current dollar accounts was a higher level of salary and wage disbursements. As a result, the share of total output going to labour was higher, and the capital share lower, in the 1950-55 and 1955-62 time periods. This new distribution between labour and capital brought the Canadian estimates closer to those which obtained in the United States.

Table A-3

COMPARISON OF THE DISTRIBUTION OF FACTOR SHARES OF NET NATIONAL INCOME, CANADA ("NEW" AND "OLD") AND UNITED STATES, 1950-62

(Average of annual shares)

	Canada 1950-62		United States
	New	Old	1950-62
Labour	77.3	75.3	78.6
Capital	22.7	24.7	21.4

Source: See Staff Study No. 23, *op. cit.*, Table 13, p. 29, and related text; and Denison, *op. cit.*, Table 4-1, p. 38.

The decline in the share of income going to various forms of investment was reflected in lower shares for housing, inventories, and non-residential land (Table A-4). The Canadian capital shares were noticeably higher than the U.S. shares originally, but this revision brought them closer to those in the United States. The share of fixed non-residential capital, which was already well above the shares in most other industrial countries, was further increased. The inclusion in the revised accounts of withholding tax on income payments to non-residents as part of the factor-income payment raised the measured effect of these income transfers on the growth of net *national* income.

Table A-4

COMPARISON OF THE "NEW" AND "OLD" DISTRIBUTIONS OF NET NATIONAL INCOME, CANADA, 1950-67

(Average of annual shares)

	1950-54		1955-62		1963-67	1950-62	
	New	Old	New	Old	New	New	Old
Net National Income	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Labour income	76.2	72.5	78.0	77.0	78.4	77.3	75.3
Income from housing	2.8	3.0	4.0	4.4	3.8	3.5	3.9
Income on foreign investments	-2.2	-1.8	-2.2	-1.9	-2.6	-2.2	-1.8
Other property income	23.1	26.3	20.3	20.5	20.3	21.4	22.7
Non-residential land	3.4	4.7	2.6	3.2	2.8	2.9	3.7
Non-residential structures and equipment	15.1	15.6	14.8	13.4	15.0	14.9	14.3
Inventories	4.6	6.0	2.9	3.9	2.5	3.6	4.7

Note: Detail may not add due to rounding.

Source: Estimates based on DBS, *National Income and Expenditure Accounts, 1926-1968*, *op. cit.*, and other source material. See also Staff Study No. 23, *op. cit.*, Table 12, p. 28, Text and Notes to Chapter III.

Tables A-5 and A-6 compare the factors contributing to growth which appeared in Staff Study No. 23, *op. cit.*, for 1950-62 and the revised estimates that form the basis of this study. The revised national accounts data gave rise to higher levels of output growth. The increase in

the annual growth rates was about one percentage point. Although, as noted above, the new data also gave rise to changes in the factor shares, there was no substantive revision to the factor input contributions to growth. The major impact of the revisions occurred in the measures of factor productivity.

Table A-5

COMPARISON OF THE "NEW" AND "OLD" CONTRIBUTIONS OF FACTOR INPUTS AND OUTPUT PER UNIT OF INPUT TO GROWTH OF NET NATIONAL INCOME, CANADA, 1950-67

(Contribution to growth rates in percentage points)

	1950-55		1955-62		1962-67
	New	Old	New	Old	
Net National Income	5.2	4.2	4.5	3.6	6.0
Factor inputs	3.1	3.1	2.4	2.5	3.8
Labour	1.3	1.3	1.6	1.5	2.7
Capital and land	1.8	1.8	.8	1.0	1.0
Output per unit of input	2.1	1.1	2.1	1.1	2.3
Productivity elements specified	1.6	.9	1.1	.4	1.3
Residual sources of growth	.5	.1	.9	.7	1.0
	Adjusted Growth Rates*				
Net National Income	5.3	4.7	4.4	4.1	6.0
Factor inputs	3.1	3.1	2.4	2.5	3.8
Output per unit of input	2.2	1.6	1.9	1.6	2.3
Specified	1.7	1.5	1.0	.8	1.3
Residual sources of growth	.5	.1	.9	.7	1.0

* See footnote 1, p. 6.

Note: Detail may not add due to rounding.

Source: Table 2, p. 6; and Staff Study No. 23, *op. cit.*, Table 100.

Since the new output growth rates were significantly higher, and the contribution of factor inputs to growth of net national income changed little in absolute terms, the new adjusted[1/] shares allocated a smaller *share* of growth to factor inputs and a larger portion to productivity (see Table A-6). Nevertheless, the new share estimates continue to indicate that factor inputs were a larger source of growth in Canada than factor productivity.

Table A-6

COMPARISON OF THE "NEW" AND "OLD" DISTRIBUTIONS OF THE CONTRIBUTION OF FACTOR INPUTS AND OUTPUT PER UNIT OF INPUT TO GROWTH RATES OF ADJUSTED* NET NATIONAL INCOME, CANADA, 1950-67

(Percentage shares)

	1950-55		1955-62		1962-67
	New	Old	New	Old	
Net National Income	100	100	100	100	100
Factor inputs	59	66	56	61	62
Labour	25	28	37	38	45
Capital	33	38	19	24	17
Output per unit of input	41	34	44	39	38
Productivity elements specified	32	32	23	21	21
Residual sources of growth	9	2	21	18	17

* See footnote 1, p. 6.

Note: Detail may not add due to rounding.

Source: Table 3, p.7; and Staff Study No. 23, *op. cit.*, Table 101.

1/ As noted in Table 2, the percentage shares are calculated excluding statistical adjustments, variations in the pressure of demand, and variations in agricultural output. See also Staff Study No. 23, *op. cit.*, Chapter XIV.

APPENDIX III

RE-ESTIMATION OF THE EFFECT OF VARIATION IN THE LEVEL OF DEMAND

The only significant methodological change in the updated and revised estimates was in measuring the effect of short-cycle fluctuations in demand on factor productivity. The estimates previously used were based on unemployment as a measure of underutilization; the Okun formulation of the effect of underutilization was based on output per man-hour. In a discussion with Dr. Denison, he expressed concern about these measurements, and an intention to review his earlier estimates. This provided additional incentive to review, and if necessary revise, the estimates for Canada.

Empirical investigation of this area has not been large, but an examination of quarterly productivity performance indicated that differences in productivity levels reflect the *stage* of the cycle as well as the degree of underutilization.[1/] In fact the evidence suggests that output per man-hour may be more sensitive to changes in output than to level of output.

1/ This point is indicated in the research on the U.S. business cycle (see Thor Hultgren, *Cost, Prices and Profits: Their Cyclical Relations*, Studies in Business Cycles, No. 14, and *Changes in Labor Cost During Cycles in Production and Business*, Occasional Paper 74, New York, National Bureau of Economic Research, 1965 and 1960 respectively). The Hultgren analysis (*Cost, Prices and Profits, op. cit.*, Table 21, p. 38) suggests that the largest decline in man-hours per unit of output (increase in output per man-hour) occurs during the period of expansion from the trough to the first one-third of the upturn. In 15 U.S. manufacturing industries over the period 1947-61, about half of total gain in output per man-hour over the whole cycle occurred in the first stage of the upturn.

Three of the benchmark years -- 1950, 1955, and 1962 -- follow within a few months the trough of a business-cycle turning point; in 1967 there was a leveling-off in the upswing from mid-1961. The 1962-67 period provides the best example of the limitations of the earlier approach and the rationale of the new. In 1962 the Canadian economy was in the early stage of a business-cycle recovery from the 1961 trough. By 1967 the recovery period was already the longest in Canadian postwar experience. Unemployment, which was 6 per cent early in 1962, had fallen to about 4.1 per cent by 1967.

Using unemployment as a guide to the relative *level* of factor productivity, 1962 would be substantially lower than 1967, and the growth rate would be enhanced by the cycle. But this position does not take account of the very different stage-of-cycle in these two years. The rate of growth of productivity as the economy moves out of a trough is high and the level may even be above trend. 1/ As the recovery cycle ages, the rate of increase in productivity declines. By 1967, productivity had fallen below its medium-term trend. On this basis, the demand cycle would give rise to a lower rate of growth between 1962 and 1967 than would otherwise obtain. While the general relationships seem clear, much more empirical work needs to be done before one can trace and quantify with certainty the response of productivity to the business cycle.

For purposes of this study, actual and trend levels of output per man-hour in the commercial and in the total nonagricultural sectors were compared. The actual level of output per man-hour was higher in 1950 and 1955 than the trend level; in 1962, actual and trend levels almost coincided, and in 1967 actual was below trend. From these data the actual and trend growth rates were calculated for each period. The actual rate was above trend between 1950 and 1955 and below the trend rates from 1955 to 1962 and 1962 to 1967. This comparison

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1/ Evidence suggests that the upturn in productivity in 1962 was not as large as in earlier recoveries, but it was still likely to be above trend.

suggests that cyclical fluctuations added to the actual growth of productivity in the first five years but reduced it in the two subsequent periods.

The demand-cycle adjustment was estimated as the difference between the actual and trend growth rates for each period, weighted by the share of commercial nonagricultural output in total output.[1/] This method gave rise to a smaller adjustment factor than used in the earlier study.[2/]

1/ A three-year moving average was used. A five-year moving average was also tried, as well as a trend line for the period as a whole, but while these gave adjustments of slightly different sizes, the directions of change were identical in each case.

2/ In his review of this study, Dr. Denison expressed an opposite view of this adjustment:

> "The demand adjustment is very difficult. A satisfactory solution - if there is one at all - is going to require more work than either of us has been able to devote to it as yet. I am hopeful that the development of a full set of estimates annually will enable me to do better for the U.S. in my present study than previously, though I may be disappointed. In the meantime, I can only give an impressionistic reaction to your estimates. I think you were right to reduce the size of your estimates for 1950-55 and 1955-62 considerably, though possibly you have reduced them too much. In 1962-67 I can't help questioning whether you have the sign right. Your observation about the phase of the cycle is doubtless right, but it means only that as between two years with the same unemployment rate, one of which is the early stages of an expansion and the other at the end of an expansion or in a contraction, the former will tend to have higher productivity. I gather the unemployment rate was about 5.9 in 1962 and 3.5 in 1967. I question whether the cycle phase difference is powerful enough to overcome so big a difference in unemployment level. I would have a fairly strong feeling that the movement of productivity from 1962 to 1967 was raised rather than lowered by the cyclical movement between those two years...."

LIST OF TABLES

APPENDIX TABLES

PUBLICATIONS OF ECONOMIC COUNCIL OF CANADA

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PUBLICATIONS DU CONSEIL ÉCONOMIQUE DU CANADA

Annual Reviews	Author—Auteur	Exposés annuels
First Annual Review: Economic Goals for Canada to 1970 (EC21-1/1964, $3.50)	Council – Conseil	Premier exposé annuel: Objectifs économiques du Canada pour 1970 (EC21-1/1964F, $3.50)
Second Annual Review: Towards Sustained and Balanced Economic Growth (EC21-1/1965, $2.75)	Council – Conseil	Deuxième exposé annuel: Vers une croissance économique équilibrée et soutenue (EC21-1/1965F, $2.75)
Third Annual Review: Prices, Productivity and Employment (EC21-1/1966, $2.75)	Council – Conseil	Troisième exposé annuel: Les prix, la productivité et l'emploi (EC21-1/1966F, $2.75)
Fourth Annual Review: The Canadian Economy from the 1960's to the 1970's (EC21-1/1967, $2.75)	Council – Conseil	Quatrième exposé annuel: L'économie canadienne des années 1960 aux années 1970 (EC21-1/1967F, $2.75)
Fifth Annual Review: The Challenge of Growth and Change (EC21-1/1968, $2.75)	Council – Conseil	Cinquième exposé annuel: Défi posé par la croissance et le changement (EC21-1/1968F, $2.75)
Sixth Annual Review: Perspective 1975 (EC21-1/1969, $2.75)	Council – Conseil	Sixième exposé annuel: Perspectives 1975 (EC21-1/1969F, $2.75)

Staff Studies	Author—Auteur	Études préparées par le personnel
1. Population and Labour Force Projections to 1970 (EC22-1/1, $.75)	Frank T. Denton Yoshiko Kasahara Sylvia Ostry	1. Projections de la population et de la main-d'œuvre jusqu'à 1970 (EC22-1/1F, $.75)
2. Potential Output, 1946 to 1970 (EC22-1/2, $1.00)	B. J. Drabble	2. Potentiel de production, 1946 à 1970 (EC22-1/2F, $1.00)
3. An Analysis of Post-War Unemployment (EC22-1/3, $.75)	Frank T. Denton Sylvia Ostry	3. Une analyse du chômage depuis la fin de la guerre (EC22-1/3F, $.75)
4. Housing Demand to 1970 (EC22-1/4, $.75)	Wolfgang M. Illing	4. Demande d'habitations pour 1970 (EC22-1/4F, $.75)
5. Business Investment to 1970 (EC22-1/5, $1.00)	Derek A. White	5. Investissements privés pour 1970 (EC22-1/5F, $1.00)
6. Special Survey of Longer Range Investment Outlook and Planning in Business (EC22-1/6, $.25)	B. A. Keys	6. Enquête spéciale sur les intentions et la programmation à moyen terme des entreprises privées (EC22-1/6F, $.25)
7. Canada and World Trade (EC22-1/7, $.50)	M. G. Clark	7. Le Canada et le commerce mondial (EC22-1/7F, $.50)
8. Export Projections to 1970 (EC22-1/8, $.75)	J. R. Downs	8. Projections des exportations jusqu'à 1970 (EC22-1/8F, $.75)
9. Federal Tax Revenues at Potential Output, 1960 and 1970 (EC22-1/9, $.50)	D. J. Daly	9. Rendement des impôts fédéraux dans l'hypothèse de la réalisation du potentiel de production, 1960 et 1970 (EC22-1/9F, $.50)
10. National Saving at Potential Output to 1970 (EC22-1/10, $.50)	Frank W. Wildgen	10. L'épargne nationale dans l'hypothèse de la réalisation du potentiel de production pour 1970 (EC22-1/10F, $.50)
11. Changes in Agriculture to 1970 (EC22-1/11, $.50)	John Dawson	11. Changements dans le secteur agricole jusqu'à 1970 (EC22-1/11F, $.50)
12. The Contribution of Education to Economic Growth (EC22-1/12, $1.50)	Gordon W. Bertram	12. Apport de l'éducation à la croissance économique (EC22-1/12F, $1.50)
13. Internal Migration in Canada, 1921-1961 (EC22-1/13, $1.60)	Isabel B. Anderson	13. Migration à l'intérieur du Canada, 1921-1961 (EC22-1/13F, $1.60)
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15. An Analysis of Interregional Differences in Manpower Utilization and Earnings (EC22-1/15, $1.00)	Frank T. Denton	15. Analyse des différences interrégionales dans l'utilisation de la main-d'œuvre et le revenu gagné (EC22-1/15F, $1.00)

Staff Studies (*continued*)	Author—Auteur	Études préparées par le personnel (*suite*)
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18. Manpower Planning in Industry: A Case Study (EC22-1/18, $1.00)	B. A. Keys H. H. Wright	18. La planification de la main-d'œuvre dans l'industrie (Étude de cas) (EC22-1/18F, $1.00)
19. Population, Family, Household and Labour Force Growth to 1980 (EC22-1/19, $1.00)	Wolfgang M. Illing Yoshiko Kasahara Frank T. Denton M. V. George	19. La croissance de la population, du nombre de familles et de la main-d'œuvre, jusqu'en 1980 (EC22-1/19F, $1.00)
20. Enrolment in Schools and Universities, 1951-52 to 1975-76 (EC22-1/20, $1.25)	Wolfgang M. Illing Zoltan E. Zsigmond	20. Inscriptions aux écoles et aux universités, 1951-1952 à 1975-1976 (EC22-1/20F, $1.25)
21. Scale and Specialization in Canadian Manufacturing (EC22-1/21, $1.75)	D. J. Daly B. A. Keys E. J. Spence	21. Échelle et spécialisation dans l'industrie manufacturière canadienne (EC22-1/21F, $1.75)
22. Medium-Term Business Investment Outlook: 1967 Survey (EC22-1/22, $.35)	B. A. Keys	22. Perspectives à moyen terme des investissements des entreprises: Relevé de 1967 (EC22-1/22F, $.35)
23. Canadian Income Levels and Growth: An International Perspective (EC22-1/23, $2.25)	Dorothy Walters	
24. Canadian Agricultural Productivity (EC22-1/24, $1.50)	L. Auer	
25. Enrolment in Educational Institutions, by Province, 1951-52 to 1980-81 (EC22-1/25, $3.00)	Z. E. Zsigmond C. J. Wenaas	25. Inscriptions dans les institutions d'enseignement, par province, de 1951-1952 à 1980-1981 (EC-22-1/25F, $3.00)
26. Personal Consumer Expenditures in Canada, 1926-75: Part 1 (EC22-1/26-1, $1.50)	Thomas T. Schweitzer	26. Dépenses personnelles de consommation au Canada, 1926-1975: Partie 1 (EC22-1/26-1F, $1.50)
*27. Some Economic Aspects of Provincial Educational Systems (EC22-1/27, $0.00)	J. Cousin J.-P. Fortin C. J. Wenaas	†27. Certains aspects économiques des systèmes provinciaux d'enseignement (EC22-1/27F, $0.00)
28. Canadian Growth Revisited, 1950-1967 (EC22-1/28, $1.50)	Dorothy Walters	
*29. Sources of Growth in Canadian Industries, 1946-68 (EC22-1/29, $0.00)	Wolfgang M. Illing	†29. Sources de croissance dans les industries canadiennes, 1946-1968 (EC22-1/29F, $0.00)
*30. Productivity Change in Canadian Mining Industries (EC22-1/30, $0.00)	John Dawson	†30. L'évolution de la productivité dans les industries extractives canadiennes (EC22-1/30F, $0.00)

Staff Studies (*concluded*)	Author—Auteur	Études préparées par le personnel (*fin*)
*31. An Analysis of Canadian Manufacturing Productivity: Some Preliminary Results (EC22-1/31, $0.00)	Harry H. Postner	†31. Analyse de la productivité dans les industries manufacturières canadiennes—Premiers résultats (EC22-1/31F, $0.00)
*32. Canada-United States Price and Productivity Differences in Manufacturing Industries, 1963 (EC22-1/32, $0.00)	E. C. West	†32. Différences de prix et de productivité dans les industries manufacturières, Canada et États-Unis, 1963 (EC22-1/32F, $0.00)
*33. Expenditures, Output and Productivity in Canadian University Education (EC22-1/33, $0.00)	Walter Hettich	†33. Coût, production et productivité des universités canadiennes (EC22-1/33F, $0.00)
*34. Development of Community Colleges in Canada (EC22-1/34, $0.00)	Max von Zur-Muehlen	†34. Développement des collèges communautaires au Canada (EC22-1/34F, $0.00)

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Conference on Government Information Systems, Ottawa, October 5 and 6, 1967
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(EC22-4/6F, $.75)

Nouvelle technologie visant les matières premières et les procédés
(EC22-4/7F, $.70)

Other Studies and Reports	Author—Auteur	Autres études et rapports
Annual Report (1964) (EC1-1964, $.50)	John J. Deutsch	Rapport annuel (1964) (EC1-1964F, $.50)
Annual Report (1965) (Fo 1/1965, $.50)	John J. Deutsch	Rapport annuel (1965) (Fo 1/1965F, $.50)
Annual Report (1966) (EC1-1966, $.50)	John J. Deutsch	Rapport annuel (1966) (EC1-1966F, $.50)
Annual Report (1967) (EC1-1967)	John J. Deutsch	Rapport annuel (1967) (EC1-1967F)
Annual Report (1968) (EC1-1968)	Arthur J. R. Smith	Rapport annuel (1968) (EC1-1968F)
Annual Report (1969) (EC1-1969)	Arthur J. R. Smith	Rapport annuel (1969) (EC1-1969F)
Annual Report (1970) (EC1-1970)	Arthur J. R. Smith	Rapport annuel (1970) (EC1-1970F)
A General Incentive Programme to Encourage Research and Development in Canadian Industry, A Report to the Economic Council of Canada (EC22-565, $.60)	Advisory Committee on Industrial Research and Technology—Comité consultatif sur la recherche industrielle et la technologie	Programme général de stimulation des travaux de recherche et de développement dans l'industrie canadienne, Rapport présenté au Conseil économique du Canada (EC22-565F, $.60)
A Declaration on Manpower Adjustments to Technological and Other Change (EC22-866, $.75)	Council—Conseil	Une déclaration au sujet de l'adaptation de la main-d'œuvre aux changements technologiques et autres (EC22-866F, $.75)
Towards Better Communications Between Labour and Management (EC22-967, $.25)	Council—Conseil	Vers une amélioration de la communication entre patrons et travailleurs (EC22-967F, $.25)

Other Studies and Reports (*concluded*)	**Author—Auteur**	**Autres études et rapports** (*fin*)
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Canadian Growth Revisited, 1950-1967

by Dorothy Walters

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