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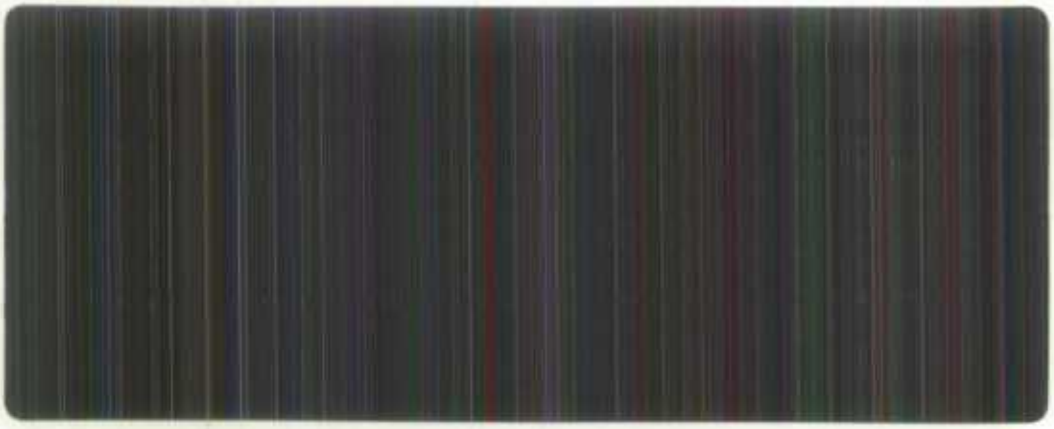

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April 15, 2003

LONG –TERM TRENDS OF GOVERNMENT OUTPUT IN CANADA: 1961 to 2000

 # 103-E

By

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Executive Summary

This study explores empirically the long-term trends of ***government output*** and its ***input structure*** in the Canadian economy for the past four decades, i.e., 1961 to 2000. Since the government production activities, which generate the output, are treated as industries in the Canadian input–output tables, the industry ***input*** matrices show outlays on the utilization of human and material resource inputs for the ***government output***. The data of these ***input*** matrices have been used for empirical analysis. In other words, the analysis is based on the industry input data of the government sector, as defined and measured in the Canadian input–output tables.

As is generally well understood, in the input-output tables, ***total inputs*** (i.e., both human and material resource inputs) used up in the production activities represent the ***total output*** generated by any industry. This principle is valid for all industries – whether they belong to business sector or government sector. Hence, the focus of attention in this study is the input matrices of the government sector industries to identify long-term trends of the government output.

For the purpose of this study, the total government sector industries and their output have been organized under ***four*** categories, namely, ***health services***, ***education services***, ***defence services***, and ***public administration services***. These categories are mutually exclusive in the sense that each category's government outlay excludes the other. For example, the output category called ***health services*** includes total inputs of '***Hospitals***' and ***'Residential Care Facilities'*** industries along with input commodities of ***'health professional services'*** and ***'pharmaceuticals'*** purchased by the other three categories. Similarly, the output category called ***education services*** includes total inputs of 'University education' and 'Other education services' industries along with input commodity 'education services' purchased by the other three categories.

By using a number of steps in the research strategy and methodology, ***input-shares*** of the total government sector's outlay on production inputs have been developed and cross-classified by each of the aforesaid four categories for the four decades. Thus, a three-dimensional paradigm showing not only the share for each input of the total government sector, but also its distribution by each category has been developed for the four decades. In other words, the research strategy and methodology applied in this study condensed the massive detailed information of the past forty years into a few manageable and operationally meaningful '***output shares'*** as well as ***' input shares***' of a ***three-dimensional paradigm***. It is the data of this three-dimensional paradigm that have been subjected to empirical analysis to explore the long-term trends of government output in the Canadian economy.

The analysis has revealed notable features as depicted by Table1.

Table 1: Long-term trends of government output by decade
(Shares of government sector's total outlay on production activities)

	1960s	1970s	1980s	1990s
Output Shares:	%			
Defence services	*13.9*	*6.9*	*6.9*	*5.4*
Health services	*17.1*	*20.4*	*23.3*	*25.6*
Education services	26.7	28.9	25.6	25.6
Public Administration	42.3	43.8	44.2	43.4
Total Output	100.0	100.0	100.0	100.0
Input Shares of all Four Output Categories:				
Wages and Salaries	*54.6*	*52.8*	*48.8*	*45.3*
Supplementary Labour Income contributions	*4.3*	*6.0*	*6.6*	*8.2*
Contracting-out of professional and other services (health services and computer services excluded)	*1.3*	*2.1*	*2.7*	*3.5*
Health professional services	*2.0*	*5.1*	*6.6*	*8.2*
Other services	13.0	12.3	12.9	12.9
Energy-related inputs (Table 10)	*2.2*	*2.4*	*2.5*	*2.0*
Information technology applications (includes services, parts and capital consumption (Table 9)	*0.6*	*0.8*	*1.2*	*1.6*
Raw materials	0.4	0.6	0.8	0.6
Manufactured goods(excluding pharmaceuticals and energy related inputs)	10.9	7.6	7.3	6.5
Pharmaceuticals	*0.7*	*0.8*	*1.5*	*2.2*
Indirect taxes on production	0.4	0.8	1.1	1.4
Capital consumption: construction	7.8	7.2	6.6	6.2
Capital consumption: Machinery & Equipment (excluding information technology assets)	1.8	1.5	1.4	1.4
Sub-total: Capital consumption	9.6	8.7	8.0	7.6
Total Inputs	100.0	100.0	100.0	100.0
Of which: Health professional services & pharmaceuticals	*2.7*	*5.9*	*8.1*	*10.4*

Source: Statistics Canada, Input–Output Division

The following are the highlights:

Output Shares:

- *decline in defence services*
- *growth in health care services*

Input shares:

- ***increases in supplementary labour income contributions***
- ***reduction of own-account employment***
- ***increases in contracting-out for professional and other business services***
- ***decreases in energy-related inputs***
- ***increases in information technology applications***

These features indicate that the government sector tended toward reduced defence spending; tried to promote good quality of life for Canadians through increased health care services; and strengthened contributions to supplementary labour income for programs such as the Canada and Quebec pension plans.

The government sector also reduced the share of wages and salaries for 'own-account' employment and increased acquisition of professional and other business services from other producers in the economy. The energy-related input trend changed: the input shares stopped rising and dropped. Finally, the government reinforced applications for information technology in the form of automated machinery and equipment such as computers, high-speed printers and fax machines to better serve the public.

Furthermore, as summarized in Table 2, these features reveal that during the 1960s, for every dollar's worth of resource inputs used in the production activities, 42 cents went for public administration, 27 cents for education, 17 cents for health, and 14 cents for defence. In contrast, during the 1990s, 43 cents went for public administration, 26 cents for education, 26 cents for health and 5 cents for defence. In the 1960s, a total of 44 cents was spent on education and health, compared with 52 cents in the 1990s.

Table 2: Government output shares by category, 1960s and 1990s

	1960s	1990s
	%	
Public administration	42	43
Education	27	26
Health	17	26
Subtotal of education and health functions	44	52
Defence	14	5
Total	100	100

Source: Statistics Canada, Input-Output Division

It is evident from these data that the combined total shares of the education and health functions were larger than those used for public administration by 2 percentage points in the 1960s and by 9 percentage points in the 1990s. The share of public administration stayed in the same range (42% to 43%) for the entire period of 40 years, showing no significant growth. More resources were, therefore, needed for both health and education

A detailed analysis of the inputs used in the government output reveals the following highlights (Table 1):

- Contributions to social insurance programs for the employees, which are reflected in the employees' supplementary labour income component, accounted for about 4.3% of the total inputs during the 1960s and doubled to 8.2% in the 1990s.

- The health professional services, such as physicians' services, laboratory fees and pharmaceuticals, accounted for about 2.7% in the 1960s and rose to 10.4% in the 1990s.

- Other professional and business services, which accounted for 1.3% during the 1960s grew to about 3.5% by the 1990s.

- The share of wages and salaries to own-account employees, which was 54.6% during the 1960s declined to 45.3% by the 1990s.

- Energy-related inputs increased from 2.2% in the 1960s to 2.5% in the 1980s. However, they dropped to 2.0% in the 1990s.

- Information technology applications, which were approximately 0.6% during the 1960s, rose to 1.6% by the 1990s.

- Capital consumption, which was 9.6% in the 1960s declined to 7.6% by the 1990s.

- Manufactured goods excluding pharmaceuticals, which had a share of 10.9% during the 1960s, declined to 6.5% by the 1990s.

- Indirect taxes on production were 0.4% in the 1960s; they grew to 1.4% by the 1990s.

The government sector is a labour-intensive industry. In the past four decades, over 50% of its resource inputs have gone to employee compensation.

Furthermore, the outlay of the total government sector shows some interesting general patterns besides other outstanding features. Employee compensation and capital consumption, which are own-account resources, steadily declined over the period of this study: their combined share was 69% in the 1960s, 68% in the 1970s, 64% in the 1980s, and 62% in the 1990s (Table 11). On the contrary, however, purchased services and other inputs, which are resources acquired from outside sources, gradually rose: their combined share was 31% in the 1960s, and it rose to 32% in the 1970s, 36% in the 1980s, and 38% in the 1990s. Therefore, during the past four decades, the dependency rate on outside producers has had a steady growth in the performance of government production activities.

Background

It is well known to economists that the input–output tables, which are an integral part of the System of National Accounts, offer extensive information on the production and disposition of goods and services for each industry. This information is useful for a variety of analytical studies. Moreover, the Canadian input–output tables have a new dimension relating to two institutional categories, namely, ***government sector institutions; and non-profit institutions serving households.***

These two institutional categories have been brought into the new industry structure of the Canadian System of National Accounts (CSNA) for the first time in the recent modernization project involving a major historical revision.[1] The special characteristic of these institutions is that they are essentially non-commercial in nature since they do not operate for profit. In view of this, they were ***formerly*** treated as ***final consumers*** and shown only in the ***final demand*** matrix.[2] Since these institutions are now part of the modernized industry structure[3] of the CSNA, the shift in their treatment from ***final consumers*** to ***producers of goods and services*** gave rise to the new dimension mentioned earlier. This shift in their treatment implicitly recognizes the modern thinking that these institutions also have a production role in the economy, because they too produce goods and services. The end result of the change in the treatment of government sector institutions and non-profit institutions serving households is the inclusion of all producers of goods and services in the new industry structure of the input–output tables. These producers of goods and services include ***corporations, unincorporated businesses, governments, and non-profit institutions serving households.*** Among other things, the new dimension mentioned earlier has provided a new insight into government sector production activities while significantly enhancing the usefulness of the data in the input–output tables. Furthermore, the Canadian input–output tables have been published annually since 1961 and are fully integrated into other parts of the CSNA, National Economic and Financial Accounts, and Balance of International Payments.

This study on government output has been facilitated by the availability of industry ***input*** matrices and the integrated time-series for the total government sector covering the past four decades.

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[1] This modernization project was completed during 1998. For more details on the historical revision, see Murty, P.S.K., "Input–Output Accounts of the Canadian Economy: Concepts, Definitions and National Economic Accounting Structure, Volume 3, Historical Revision, 1961–92," Technical Paper No. 95, Input–Output Division, Statistics Canada, Ottawa, August 2001.

[2] In the ***final demand*** matrix of the Canadian input–output tables, government institutions were included in the data of the government sector while non-profit institutions serving households were included in the personal sector.

[3] Murty, P.S.K., "Input-Output Accounts of the Canadian Economy: Concepts, Definitions and National Economic Accounting Structure", Volume 1, Background and Uses, Technical Paper No. 93, Input-Output Division, Statistics Canada, Ottawa, August 2001, pp 49-50

Goal of this Research Study

The goal of this study is to identify long-term trends of government output in Canada over the past four decades (i.e., 1961 to 2000) by analyzing the data from the ***input*** matrices of the Canadian input-output tables. The study also explores the underlying factors that might have contributed to the observed trends.

This is a fact-finding and exploratory study aimed at identifying long-term trends by using the data of ***input*** matrices relating to government production activities. In this context, the information used represents purchasers' prices, which are the market costs of inputs into production activities. In other words, the data reflect the purchasers' actual transaction payments (i.e., cost plus margins such as wholesale margin, retail margin, transportation margin and commodity tax margin), that were incurred to acquire the resource inputs needed for the production activities.

Since the inclusion of the government sector in the industry framework of the Canadian input–output tables occurred recently, it appears that there is a basic need to fill in the emerging literature gap. This study attempts to satisfy this information need.

Furthermore, since topics such as government production activities and their special characteristics are currently receiving much attention, this paper will attempt to shed light on the subject and set the stage for future research involving comparative studies of government production activities with other producers such as goods-producing industries and other service-producing industries. Such extended future studies on the subject could be followed up by a series of research papers highlighting the conclusions in those studies.

Concepts and Definitions

Government Sector

The government sector is made up of ***three*** levels, namely federal, provincial and municipal. It includes all government departments, health service institutions (such as hospitals and residential care facilities) and educational institutions (universities, colleges and schools). These institutions are mostly government-funded.

Also included in the government sector are funds such as the Canada and Quebec Pension Plans and other non-profit housing corporations classified as government sector institutions in the Public Sector Universe Project [4] of the Canadian System of National Accounts.

The activities of the government sector are essentially non-commercial in nature and are mostly financed by taxation and borrowing. A small proportion of government production, approximately 10% to 15%, is sold in the market place, either at nominal prices or at cost. In general, the government does not make a profit from the sales of goods and services and hence its activities are considered essentially non-commercial in nature.[5] By definition, the government sector does not include government business enterprises as they are classified to the business sector.

Government Output

In general, the government sector produces goods and services to meet the needs of the public. It uses several resource ***inputs*** to generate the necessary ***outputs***.

For this study, the ***input data*** of goods and services have been classified under ***four output categories***:

- ***health services*** (including industries such as hospitals and residential care facilities)
- ***education services*** (including industries such as universities, and other educational institutions i.e., colleges and schools)
- ***defence services*** (including the federal Department of National Defence)
- ***public administration*** (including industries for 'other federal', 'other provincial and territorial', and 'other municipal' governments. The term 'other' used here represents 'other than those separated for health, education, and defence industries'. This category includes areas such as internal security, economy, environment, natural resources, tax collection, labour and immigration, agriculture, consumer and corporate affairs, industrial development, and sports and recreation.)

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[4] The Public Sector Universe includes all institutions that are conceptually classified as part of the government sector. It is maintained in Statistics Canada by the Public Institutions Division and utilized by all divisions of the Agency in the production and analysis of statistics relating to the government sector. It facilitates uniformity and consistency in the government-sector database across all divisions of Statistics Canada.

[5] Government business enterprises are not included in the government sector because their motivations and methods of operation are profit-oriented, similar to those of private business enterprises. They are, therefore, included in the relevant business-sector industries.

As part of the production activities, the government sector uses a number of inputs, both ***intermediate*** inputs and ***primary*** inputs. The intermediate inputs include raw materials, manufactured goods and a variety of services from other producers. The ***primary*** inputs include services of its own employees, consumption of its own capital assets such as machinery and equipment, and indirect taxes on production paid to itself. These inputs are shown as the following four different items:

- ***wages and salaries*** (W&S)
- ***supplementary labour income*** (SLI), which mostly contains fringe benefits to its own employees
- ***capital consumption allowances*** (CCA), representing the portion of its own capital assets consumed in the production activities. This item is also called 'depreciation of capital assets'. In line with the normal practice, it is generally combined with 'operating profits' and shown under the category called 'operating surplus' for all industries in the input-output tables. However, since there are no 'operating profits' for the government sector industries, the term 'operating surplus' used in the present input-output tables for the government sector industries represents only 'capital consumption allowances').
- ***Indirect taxes on production***, which are mostly property-related.

The ***'total inputs'*** (i.e., both ***intermediate*** and ***primary*** inputs) that the government-sector industries use for production activities represent the ***'total outputs'***. The spending on total inputs is also called ***'total gross outlays on production activities*** or '***total gross current expenditures on goods and services'***. Therefore, the term '***total inputs'***, which is normally used in connection with the government sector input-output tables, is equivalent to the term '***total gross current expenditures on goods and services'*** used in the Sector Accounts of Government (see Income and Expenditure Accounts of the CSNA). It represents the same total resource-using expenditures on current goods and services for the government production activities. The term ***gross*** implies that the data are gross of 'sales of goods and services' that other sectors of the economy have purchased from the government sector. In other words, these sales are ***not*** netted out of the gross expenditures on production inputs.

As the total inputs include only spending on ***current*** goods and services, outlays on ***capital*** goods such as those relating to 'machinery and equipment' (M&E) and 'construction put-in-place' are not included in them. This is because the capital consumption allowances, which are included in the total inputs, represent the portion of capital assets employed and consumed in the production process.

Supplementary Labour Income (SLI)

Supplementary labour income (SLI) represents a wide variety of fringe benefits payable to employees. In the case of the government sector, these are the contributions to specific accounts of employee benefits under the various social insurance programs such as superannuation, unemployment insurance, Canada and Quebec pension plans, workers' compensation and other welfare plans (hospital and other insurance such as dental and travel insurance). It also includes severance pay employees receive at the time of their retirement from active service. In addition to the normal contributions at the rates determined by the various plans, the government also periodically pays any actuarial deficits into the funds, which are included in the SLI measured in the CSNA.

Research Strategy and Methodology

Database

This study focuses on the input data of the government output for the past 40 years, i.e., from 1961 to 2000. In other words, the focus of attention is the resource inputs that the government utilized to generate its output during the past four decades. At present, published annual data of input-output tables are available only from 1961 to 1999. The data for 2000 are taken from the synthetic unpublished projected series.

The data used in this study represent purchasers' prices, namely, the market cost in current dollars, from the ***input*** matrices. They reflect the purchasers' actual transaction payments (cost plus margins, such as wholesale margin, retail margin, transportation margin and commodity-tax margin) to acquire the resource inputs needed for government output.

Methodology

As mentioned earlier, in the new dimension of the Canadian input-output tables, government-sector institutions are classified into industries. For the purpose of this research, the government sector industries are re-grouped into the following ***four*** categories based on the type of ***output***:

- ***health services*** (including Hospitals; and Residential Care Facilities industries)
- ***education services*** (including University education industry; and Other education services industry, which covers colleges and schools)
- ***defence services*** (covering National Defence)

- ***Public Administration services*** (including Other federal government; Other provincial and territorial governments; and Other municipal (local) governments industries).

The inputs used by these regrouped industries are the focal point of this study. The methodology explained in this section deals with the detailed steps used in the worksheets.

The following are the details:

1. The required consistent basic input data of these government sector industries contain 476 commodities at the Link (L) level of aggregation. They have been extracted from the ***input*** matrices of the existing government sector industries and re-grouped into the ***four*** categories mentioned earlier.

2. For easy exposition, these data are converted into a more manageable level of detail at the Small (S) level of aggregation, which contains 57 commodities. This conversion is necessary because the 40-year historical annual data at the L level are voluminous and rather unwieldy.

3. The 57 S-level commodities are reorganized into two categories, namely ***goods***[6]; and ***services*** to facilitate analysis. If a particular S-level commodity comprises of both goods and services (e.g., other utilities) or cannot be meaningfully analysed, the relevant details are extracted from the L level or in some cases, from the Worksheet (W) level. This enables such S-level commodities to be split into the required inputs. The S-level commodities that have been subjected to this exercise are listed in the appendix.

4 The input data thus classified for the ***four*** categories covering the 40-year period have been expressed as decade annual averages in current dollars for each of the ***four*** decades, namely, the ***1960s*** (1961 to 1970), the ***1970s*** (1971 to 1980), the ***1980s*** (1981 to 1990) and the ***1990s*** (1991 to 2000).

5. The dollar values of the inputs covering the total government sector's industries are converted into percentages of 'total inputs', which are referred to as ***input shares***. By using the dollar values of the four output categories, their proportions to the total government sector have been developed for each input and they are called ***'Output shares..***

6. The input shares of the total government sector representing the four output categories i.e., ***health***, ***education***, ***defence*** and ***public administration,*** have been cross-classified by those categories and transformed them into a three-dimensional paradigm showing not

[6] 'Goods' are products that can be stored while 'services' are not storable.

only the share of each input for the total government sector, but also its distribution by category for each decade.

7.It should be noted that the following adjustments have been made to transform the output categories into mutually exclusive groups:

- The data of health inputs such as 'health services' (I-O commodity S41), and 'pharmaceuticals' (I-O commodity L315) have been deducted from the inputs of education, defence, and public administration groups and added to the health services category to derive the total inputs on health services. The commodities involved in this adjustment represent mostly 'private hospital services' and 'pharmaceuticals', which are the products of the business sector.
- Similarly, the data of 'education services' input (I-O commodity S40) relating to health, defence and public administration groups have been deducted and added to the education services category to derive the total inputs on education services. The commodity involved in this adjustment represents mostly 'private education services', which is the product of the business sector.

8. The data of this three-dimensional paradigm are regrouped further into ***four*** segments to facilitate the analysis:

- ***employee compensation*** (includes wages and salaries and supplementary labour income)
- ***capital consumption*** (represents capital consumption allowances of machinery & equipment and construction)
- ***purchased service*** (covers professional and other business services, computer services, and health services, etc.)
- ***all other inputs*** (includes three categories: raw materials, manufactured goods and indirect taxes).

It is the data of the aforesaid three-dimensional paradigm of the four segments that have been subjected to empirical analysis in the next section.

Empirical Analysis of Government Output Categories

Output shares

Of the four output categories of the government sector, public administration had the largest share of resource inputs: about 42% in the 1960s, 44% in both the 1970s and 1980s, and 43% in the 1990s (see Table 3 following the text). The fluctuations from decade to decade are negligible.

The education services category had the second largest share: about 27% in the 1960s, 29% in the 1970s, and 26% in both the 1980s and 1990s. In this case also, the

fluctuations from decade to decade are rather insignificant.

Health services category had the third largest share of about 17% in the 1960s; it grew rapidly thereafter to 20% in the 1970s, 23% in the 1980s, and 26% in the 1990s—a steady increase of 3 percentage points from decade to decade. The resulting growth from the level of 17% in the 1960s to the level of 23% in the 1990s was 9 percentage points, or about 53%. This growth was due to the following factors:

- The number of patient-days in health care institutions has been significantly increasing since 1961: hospitals across the country recorded about 40.0 million patient-days in 1961, about 50.0 million in 1971, 54.0 million in 1981 and 54.2 million in 1991. Also, full-time hospital staff rose from about 209,000 in 1961 to 306,000 in 1971, further increasing to 321,000 in 1981 and 343,000 in 1991. These data indicate a rise in morbidity among the population over the decades, resulting in increases in patient-days and full-time hospital staff.[7]
- Universal health care was introduced through the national medicare plan across Canada in 1968; since then, the provincial and territorial governments have been bearing the cost under that plan. The share of this component grew rapidly from 2% in the 1960s to 8% in the 1990s (Table 4 following the text).

- During the 1970s and 1980s, all provinces introduced 'pharmacare' plans for their senior populations (aged 65+) and have been bearing the cost of prescription drugs under those plans (Table 4).

- There has been a steady increase in the population of seniors over the past few decades[8]. In 1961, seniors made up about 8% of the total population; their share had risen to about 13% by 2000. This group normally requires more health care, a demographic factor that might also have contributed to the increases in the shares of all the components in the health function (Table 4).

The defence services category had the smallest share of resource inputs: about 14% in the 1960s, its share declined significantly to 7% in the 1970s, stayed at the same level in the 1980s, and declined further to 5% in the 1990s. The steep drop of 50% in the 1970s and the further decline of about 29% in the 1990s resulted in a reduction of the regular forces from about 123,000 in 1963 to 94,000 in 1970, with further reductions to 80,000 in 1980 and 79,000 in 1992. Similarly, the civilian staff, which numbered 52,000 in 1963, declined to 40,000 in 1970, with further reductions to 37,000 in 1980 and 35,500 in 1992.[9]

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[7] The data were taken from ***Annual Return of Hospitals—Hospital Indicators*** and ***Hospital Indicators***, Health Statistics Division, Statistics Canada.

[8] The data were taken from CANSIM II, *Table 051-0026* (1960 to 1970) and *Table 051-0001* (1971 to 2000).

[9] Julien, J.R.P., ***The Influence of the Defence Budget on the Canadian Economy,*** Concordia University, Montréal, 1994, p.23 and p 38.

Furthermore, the output shares show that the public administration and education have had no appreciable changes over the past four decades. The health and defence services, however, have shown significant trends. While the share of the health services had an upward trend, with an increase of 9 percentage points from 17% in the 1960s to 26% in the 1990s or a growth of about 53%, the share of the defence services had a downward trend, losing 9 percentage points from 14% in the 1960s to 5% in the 1990s or a decline of about 64% during the past four decades.

Taken together, the combined share of health and education services was 44% in the 1960s, 49% in both the 1970s and 1980s, and 52% in the 1990s. These shares exceeded the shares of public administration in all four decades.

In summary, during the 1990s, of every dollar's worth of human and material resources used as inputs in the government output, 43 cents were spent on public administration, 26 cents on health, 26 cents on education (a total of 52 cents for health and education combined), and 5 cents on national defence. In contrast, the shares in the 1960s were as follows: 42 cents for public administration, 27 cents for education, 17 cents for health (44 cents for health and education together), and 14 cents for defence.

Input Shares

This section consists of two parts, namely, input shares of the total government sector; and the significant underlying factors that might have contributed to the observed trends.

Input shares of the total government sector:

During the 1960s, the outlay of the total government sector accounted for approximately 59% employee compensation (55% wages and salaries and 4% SLI), 10% capital consumption, 16% purchased services and 15% other inputs consisting of raw materials, manufactured goods and indirect taxes on production (Table 5).

In the 1970s, this pattern changed to approximately 59% employee compensation (53% wages and salaries and 6% SLI), 9% capital consumption, 20% purchased services and 12% other inputs. In other words, during the 1960s and the 1970s, purchased services and SLI had increasing trends while wages and salaries, capital consumption and other inputs had declining trends.

In the 1980s, there were more changes. The outlay had a mix of 55% employee compensation (49% wages and salaries and 6% SLI), 9% capital consumption, 23% purchased services and 13% other inputs. The purchased services component grew in that decade also. Capital consumption stayed stable at the same level as in the 1970s. Employee compensation had a declining trend while other inputs remained almost the same as in the 1970s.

During the 1990s, the declining trend of employee compensation continued. The total

government outlay consisted of 53% employee compensation (45% wages and salaries and 8% SLI), 9% capital consumption, 25% purchased services and 13% other inputs. Here again, as in the 1970s and the1980s, the increasing trend of the purchased services and the declining trend of wages and salaries continued. Capital consumption and other inputs remained at the same levels as in the 1980s.

The foregoing discussion also indicates that the government sector is a labour-intensive industry since over 50% of its resource inputs on production functions have gone to employee compensation during the past four decades.

Furthermore, a closer look at the trends of the total government outlay reveals some interesting general patterns besides other outstanding features highlighted already. Employee compensation and capital consumption, which are own-account resources, steadily declined over the period of this study: their combined share was 69% in the 1960s, 68% in the 1970s, 64% in the 1980s, and 62% in the 1990s (Table 11). On the contrary, however, purchased services and other inputs, which are resources acquired from outside sources, gradually rose. Their combined share was 31% in the 1960s. It rose to 32% in the 1970s, 36% in the 1980s, and 38% in the 1990s. The implication is that the government has been increasing its dependency on purchasing from outside rather than using its own resources to generate its output during the past four decades. Therefore, while the use of own-account resources steadily declined, the dependent resources from outside producers had a steady growth in the performance of government production functions.

Significant Underlying Reasons:

Increasing share of health services

- Important legislative measures were introduced in the 1960s, 1970s and 1980s.
- ***The Hospital Insurance and Diagnostic Act*** came into effect in 1961. As a result, the hospitals that came under the financial and operational control of the provinces and territories began to provide services to the public free of charge.
- In 1962, Saskatchewan introduced its own ***medicare*** plan and started to bear the cost of health services to the public from that year.
- In 1968, the national ***medicare*** plan came into effect in all the other provinces and territories and the concerned governments started to bear the cost of health services covered under that plan since then.

- During the 1970s and 1980s, provincial and territorial governments introduced ***pharmacare*** drug plans for seniors (aged 65+) and started to bear the cost of prescribed drugs.[10]

Health services thus came under the financial responsibility of the government sector, beginning in the 1960s and have been growing rapidly in the subsequent decades.

Decreasing input share of wages and salaries

Although the share of total employee compensation did not change between the 1960s and the 1970s, its composition did. In particular, the 55% share of wages and salaries in the 1960s declined to 53% in the 1970s while the 4% share of supplementary labour income (SLI) rose to 6% in the same period. The decline of 2 percentage points in the share of wages and salaries was offset by a corresponding gain in the SLI. As a result, the overall share of total employee compensation remained at 59% in the 1960s and 1970s. The decline in the share of wages and salaries was mostly in the defence services category, which underwent severe cutbacks in the 1970s. (Tables 6, 6A, and 6B).

The education and public administration services categories also showed declining trends in their shares of wages and salaries during the 1980s and 1990s. A number of factors contributed to these trends:

- The school-age group (4 to 24 years) was about 39% of the population in the 1970s. It declined to 33% in the 1980s and 29% in the 1990s.[11]

- Between 1974 and 1978, the federal government imposed price and wage controls under the '***Anti-Inflation Act***' to restrain increases in wages and salaries of both business and government sectors.

- In June 1982, the Parliament passed the '***Public Sector Compensation Restraint Act***' to control inflation in the economy and encouraged the private sector and provinces to fight inflation. Under this Act, collective bargaining in the public sector was suspended for a period of two years. The ceilings imposed by the Act limited increases in wages and salaries.

- Following the federal government's '***Public Sector Compensation Restraint Act***', provincial governments also passed similar legislation between 1982 and 1984. All these Acts temporarily (i.e., for periods not exceeding three years) led to a freeze in wages and salaries and reduced government spending on that budget

[10] Anderson, Lori J., ***Provincial and Territorial Drug Reimbursement Programs—Descriptive Summary***, Drugs Directorate, Health Protection Branch, Health and Welfare Canada, Ottawa, October 1990

[11] The data were from CANSIM II, *Table 051-0001*.

component, which is usually the largest.

- In 1984, the federal government appointed the ***'Ministerial Task Force on Program Review'*** under the chairmanship of the former deputy Prime Minister, the Hon.Erik Nielson "in response to the government's concern about waste, duplication, and red tape in federal departments and agencies".[12] The Task Force, through its various study teams, reviewed 989 federal programs and services covering annual federal expenditures of more than $92 billion and submitted several recommendations[13]. The federal government implemented some of the measures (see ***Budgets*** of May, 1985 and February 26, 1986; ***Securing Economic Renewal, A Progress Report***, issued by the Honourable Michael Wilson, Minister of Finance, November 1985).

- In order to reduce the size of the public sector, the federal Budget of May 23, 1985 announced that 15,000 person-years would be cut from the federal government departments over a period five years. It also announced that the government would consider privatizing some of its activities while contracting out others "to achieve a leaner, more efficient public service, as well as to reduce government expenditures on salary budgets."[14]

- The government budget deficits grew rapidly during the 1980s compared to the 1970s.[15] Consequently, all levels of government were concerned with the amount of expenditures, particularly on wages and salaries, which is generally the largest component in the government outlays. They introduced measures to reduce spending for their production activities. These measures included privatizing certain activities and contracting out others, thus reducing the need for own-account employees in the payrolls. Some cases of privatization in point are the Post Office, which became the Canada Post Corporation, a Crown corporation, in 1981, and the Queen's Printer, which became St-Joseph Corporation when it was privatized in 1996.

- In 1993, the government of Ontario[16] passed the ***'Social Contract Act'*** "…..in order to achieve significant savings in public sector expenditures"[17] through adjustments in employee compensation arrangements. One of the measures in the Act to meet the expenditure reduction targets required employees to take unpaid leave of absence up to a maximum of 12 days or the equivalent in each of the

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[12] Canada Task force on Program review, ***Introduction to the Process of Program Review***, Ottawa, March 1986, p.1

[13] Ibid., p.2

[14] Budget Papers, ***Securing Economic Renewal***, Department of Finance, Canada, May 23, 1985, p. 31.

[15] The data were taken from CANSIM II, *Table 380-0022.*

[16] Ontario has the greatest government employee complement (about 31% of total complement) of all provincial and federal governments. See Carter, D.D. and Pradeep Kumar, ***Recent Public Sector Restraint Programs: Two Views***, Industrial Relations Centre, Reprint Series No. 53, Queen's University, Kingston, Ontario, 1984.

[17] ***Social Contract Act,*** S.O. 1993, c.5, Preamble.

following periods:

June 14, 1993 to March 31, 1994
April 1, 1994 to March 31, 1995
April 1, 1995 to March 31, 1996

These factors collectively contributed to the downward trend in the share of wages and salaries for education and public administration during the 1980s and 1990s.

Increasing input share of supplementary labour income (SLI)

Several factors contributed to the increased share of SLI:

- In 1966, the Canada and Quebec Pension Plans came into effect. While these plans covered only 5 years in the 1960s (1966 to 1970), they covered all 10 years of the following decade (1970s). This contributed partly to the significant increase in the share of SLI during the 1970s.

- On April 1, 1970, under the authority of the '***Supplementary Retirement Benefit Act***', the federal government introduced the indexation program for pensions of federal civil servants. Consequently, from that time, there have been additional contributions to the pension funds.

- The new '***Unemployment Insurance Act***' of 1971 raised the level of employer contributions to 1.4 times the employee contributions. In addition, there were increases in the contribution rates in 1983 and 1991.

- Because of staff reductions and early retirements associated with budget cuts during the 1990s, large allowances consisting of severance pay and bonuses were paid to retiring public servants. These allowances are considered in the Canadian System of National Accounts as part of SLI.

- The governments also contributed periodically actuarial deficits into the pension funds in addition to their normal contributions, which are treated as SLI.

- The federal government introduced an employee dental care plan on March 1, 1987 and since then, paid the related contributions to the plan.

Relatively stable capital consumption (i.e., depreciation) input share

The share of capital consumption, which was about 10% in the 1960s, declined to 9% in the 1970s and remained stable at the same level in the 1980s and 1990s as well (Table 5 following the text). A further look into the details of this category has revealed that the

share of machinery and equipment (M&E) including information technology assets, which was about 2% in the 1960s, has remained the same in the 1970s and 1980s but rose to 3% in the 1990s (see Table 9 also for information technology assets).

Further analysis of machinery and equipment reveals that about one-third of its share (about 1%) was for information technology assets in the 1990s, with smaller shares in the 1960s, 1970s and 1980s.

In contrast to the increasing trend of machinery and equipment from the 1960s to the 1990s, the share of construction declined from 8% in the 1960s to 7% in the 1970s and 1980s, with a further decline to 6% in the 1990s. This marginal reduction is evident in all output categories, particularly in public administration where the lower capital consumption was associated with lower net new investment levels in both federal and provincial government construction projects.[18]

Increasing input share of purchased services

The increase in the share of purchased services was due to the health services and professional and other business services including information technology services (Table 7).

The share of health services grew from about 2% in the 1960s to 5% in the 1970s due to the introduction of the national medicare in 1968. Coupled with increased morbidity among the population, medicare gave rise to further increases to 7% in the 1980s and 8% in the 1990s.

Professional and other business services including information technology services accounted for a share of about 2% in the 1960s, 3% in both the 1970s and 1980s and 4% in the 1990s. These services include engineering, scientific, accounting and legal services, as well as other business services, such as courier services, and software and information technology services. Most of these services were used in the public administration services category. All other services remained stable at about 13% during the four decades (Table 7).

Declining share of other inputs

Other inputs in this analysis consist of raw materials such as mineral fuels and non-metallic minerals, manufactured goods such as pharmaceuticals, energy-related inputs, spare parts for transport and other equipment, and operating supplies, and indirect taxes on production. The share of this category, which was approximately 15% in the 1960s dropped to 13% in the 1990s (Table 5). This decline is mostly caused by the defence services' share of manufactured goods, which represent parts for motor vehicles and

[18] The net new investment levels were calculated by using the following equation: investment in assets minus capital consumption equals net new investment.

other transport equipment, and electrical and communication products (Table 8). In other words, large cuts in defence personnel and the related infrastructure are associated with the decline in other inputs category.

Increasing share of information technology inputs

In order to assess the total magnitude of the resources used in the automation of government production activities, namely, 'information technology', the related inputs from three different categories of the basic data have been grouped together and analyzed (Table 9). These resources include: 'parts for computer equipment' from the manufactured goods category; 'software and other related services' from the purchased services; and estimated depreciation of information technology equipment from the 'capital consumption' category. The combined share of these inputs revealed a steady growth, from 0.6% in the 1960s to 0.8% in the 1970s, 1.2% in the 1980s, and 1.6% in the 1990s. This growth is attributable to the capital consumption of information technology equipment, and not due to the purchased services and the manufactured goods. The share of capital consumption of information technology equipment rose from a modest 0.2% in the 1960s and 1970s to 0.5% in the 1980s and to 0.9% in the 1990s, a substantial increase of almost five times the share of the 1960s. This indicates that the government sector's investment in information technology increased significantly and rapidly, particularly in the 1980s and 1990s. This rapid increase occurred in all the four output categories, (namely, health services, education services, defence, and public administration), although a large part of it is noticed in the public administration services.

Decreasing share of energy-related inputs

Here again, in order to assess the total magnitude of energy-related inputs in the government production functions, three items have been pulled together from the basic data. They are: 'mineral fuels' from the raw materials; and 'electricity and petroleum products' from the manufactured goods. Their combined share was 2.16% in the 1960s, 2.35% in the 1970s, 2.49% in the 1980s and 1.96% in the 1990s (Table 10). The public administration services consumed the most of the energy inputs while defence had the lowest share (Table 10A). The increasing trend in energy inputs seemed to have reversed in the 1990s.

Conclusions

By examining the government output under the four categories, namely, health, education, defence, and public administration services, this study explored the long-term trends for the past four decades. It also identified the significant underlying factors that might have contributed to the observed trends.

The government sector is a labour-intensive industry. In the past four decades, over 50%

of its resource inputs have gone to employee compensation.

Furthermore, a closer look at the trends of the total government outlay reveals some interesting general patterns besides other outstanding features. Employee compensation and capital consumption, which are own-account resources, steadily declined over the period of this study: their combined share was 69% in the 1960s, 68% in the 1970s, 64% in the 1980s, and 62% in the 1990s. On the contrary, however, purchased services and other inputs, which are resources acquired from outside sources, gradually rose. Their combined share was 31% in the 1960s and it rose to 32% in the 1970s, 36% in the 1980s, and 38% in the 1990s. Therefore, during the past four decades, the dependency rate on outside producers has had a steady growth in the performance of government production activities.

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Appendix – Split of Selected S-Level Commodities

S34 – other utilities

This S-level commodity contains four L- and W-level commodities. They have been separated through the use of details in the concerned L- and W-level aggregations, and allocated to two categories:

Goods

- L409 – electric power
- W5491 – water

Services

- L410 – gas distribution (the gas margin normally added to the gas price by the gas distribution industry)
- W5491 – other utilities (containing waste removal services)

S27 – chemicals, pharmaceuticals and chemical products

This S-level commodity contains L315 – pharmaceuticals, as well as other chemicals (with several L codes). It has been split into two categories (pharmaceuticals and other chemicals) using the relevant details of L-level aggregation.

S45 – operating, office, cafeteria and laboratory supplies

This contains four L-level commodities. They have been separated using details of the L-level aggregation:

- L441 – spare parts and maintenance supplies
- L442 – office supplies
- L443 – cafeteria supplies
- L445 – laboratory equipment and supplies

S39 – business and computer services

This has four service commodities that have been separated using the L-level aggregation:

- L428 – engineering, scientific, accounting and legal services
- L429 – advertising services
- L436 – software development, computer services and rentals
- L437 – other services to business and persons

S22 – machinery and equipment

This commodity has been split into ***computers and similar office equipment*** (W3290: 1961 to1985 and W3291: 1986 to 2000), and ***other M&E*** (total S22 minus computers). This was achieved through the use of W-level aggregation details.

S57 – capital consumption allowances

In the CSNA, capital consumption allowances (CCA) of the government sector are measured in terms of replacement cost, which reflects the cost of replacing the portion of capital assets used up in production. The Income and Expenditure Division makes the necessary adjustments to the basic data supplied by the Capital Stock and Investment Division, taking into consideration replacement cost valuation and historical consistency of the time-series. These adjusted data are then used in the ***Income and Expenditure Accounts*** as well as in the ***Input–Output*** tables.

Although the basic data supplied by the Capital Stock and Investment Division contain details of CCA by type of asset, such as M&E and construction, only the total CCA data for the industries are used in the CSNA. In other words, the final totals of CCA used in the Income and Expenditure Accounts and the input–output tables are not broken down into M&E and construction. Since this split is required for this study, the detailed data of the Investment and Capital Stock Division have been used as proxies to split the total CCA into M&E and construction. Furthermore, for the purpose of analysis, the data for CCA of M&E have been broken down into two groups: 'computers and similar office equipment' and 'other M&E' by using the details of the same source as proxies. For example, if the data of the Investment and Capital Stock Division showed that 5% of the total M&E was used for computers in a given year, that ratio has been applied to the total CCA data of M&E to derive the required estimate for computers. The balance, i.e., after deducting the estimated portion of CCA for 'computers' from the 'total M&E', has been taken for the 'other M&E'.

Tables

Table 3: Government resource inputs, by output category and decade				
	1960s	1970s	1980s	1990s
	%			
Public administration				
Federal	14	14	13	12
Provincial	14	16	18	17
Municipal	14	14	13	14
Total of public administration	42	44	44	43
Education	27	29	26	26
Health	17	20	23	26
Subtotal of education and health services	44	49	49	52
Defence	14	7	7	5
Total government sector	**100**	**100**	**100**	**100**

Source: Statistics Canada, Input–Output Division

Table 4: Inputs of health services, by decade				
	1960s	1970s	1980s	1990s
	% of total shares			
Hospitals and residential care facilities	14	14	15	16
Health professional services covering mostly physicians and laboratory services under the national medicare plan	2	5	7	8
Cost of pharmaceuticals under provincial drug plans (Pharmacare)	1	1	1	2
Subtotal of health services and pharmaceuticals	3	6	8	10
Total health services inputs	**17**	**20**	**23**	**26**

Source: Statistics Canada, Input–Output Division

Table 5: Total government sector – structure of inputs, by decade				
	1960s	1970s	1980s	1990s
	%			
Employee compensation				
Wages and salaries	55	53	49	45
Supplementary labour income	4	6	6	8
Total employee compensation	59	59	55	53
Capital consumption				
Machinery and equipment	2	2	2	3
Construction	8	7	7	6
Total capital consumption	10	9	9	9
Purchased services				
Health services	2	5	7	8
Professional and other business	1	3	3	4
Other	13	12	13	13
Total purchase services	16	20	23	25
Other inputs				
Pharmaceuticals	1	1	1	2
Other	14	11	12	11
Total other inputs	15	12	13	13
Total inputs	**100**	**100**	**100**	**100**

Source: Statistics Canada, Input–Output Division

Table 6: Total government sector – employee compensation, by category and decade				
	1960s	1970s	1980s	1990s
	% of total shares			
Health	10	11	11	11
Education	20	21	19	18
Public administration				
Federal	8	8	8	7
Provincial	7	8	8	8
Municipal	6	7	6	6
Total public administration	21	23	22	21
Defence	8	4	3	3
Total employee compensation	**59**	**59**	**55**	**53**

Source: Statistics Canada, Input–Output Division

Table 6A: Total government sector – wages and salaries, by category and decade				
	1960s	1970s	1980s	1990s
	% of total shares			
Health	10	10	10	10
Education	18	19	16	16
Public administration				
Federal	8	7	7	5
Provincial	6	8	7	6
Municipal	6	6	6	6
Total public administration	20	21	20	17
Defence	7	3	3	2
Total wages and salaries	**55**	**53**	**49**	**45**

Source: Statistics Canada, Input–Output Division
Note: Figures in this table are rounded.

Table 6B: Supplementary labour income, by category and decade				
	1960s	1970s	1980s	1990s
	% of total shares			
Health	0.5	1.0	1.2	1.6
Education	1.1	2.0	2.2	2.6
Public administration				
Federal	0.8	0.9	0.9	1.3
Provincial	0.3	0.6	0.9	1.2
Municipal	0.5	0.8	0.9	1.0
Total public administration	1.6	2.3	2.7	3.5
Defence	1.1	0.7	0.5	0.5
Total supplementary labour income	**4.3**	**6.0**	**6.6**	**8.2**

Source: Statistics Canada, Input–Output Division
Note: Figures in this table are rounded.

Table 7: Total government sector – purchased services, by decade

	1960s	1970s	1980s	1990s
	% of total shares			
Health professional services	2.0	5.1	6.6	8.2
Other professional and business services (excluding information technology services)	1.3	2.1	2.7	3.5
Information technology services	0.3	0.6	0.6	0.6
All other services	13.0	12.3	12.9	12.9
Total services	**16.6**	**20.1**	**22.8**	**25.2**

Source: Statistics Canada, Input-Output Division

Table 8: Total government sector – manufactured goods, by function and decade

	1960s	1970s	1980s	1990s
	% of total shares			
Health	3	2	2	2
Education	2	3	2	2
Public administration	5	4	4	5
Defence	4	2	3	2
Total manufactured goods	**14**	**11**	**11**	**11**

Source: Statistics Canada, Input-Output Division

Table 9: Total government sector – information technology-related inputs, by decade

	1960s	1970s	1980s	1990s
	% of total shares			
Information technology supplies	0.1	0.0	0.1	0.1
Software and other services	0.3	0.6	0.6	0.6
Capital consumption	0.2	0.2	0.5	0.9
Total information technology-related inputs	**0.6**	**0.8**	**1.2**	**1.6**

Source: Statistics Canada, Input-Output Division

Table 10: Total government sector – energy-related inputs, by decade				
	1960s	1970s	1980s	1990s
	% of total shares			
Petroleum and coal products	0.94	1.05	1.00	0.67
Mineral fuels	0.25	0.34	0.39	0.24
Electric power	0.97	0.96	1.10	1.05
Total energy-related inputs	**2.16**	**2.35**	**2.49**	**1.96**

Source: Statistics Canada, Input–Output Division

Table 10A: Distribution of energy-related inputs, by category and decade				
	1960s	1970s	1980s	1990s
	% of total shares			
Health	0.23	0.22	0.21	0.19
Education	0.53	0.71	0.72	0.63
Defence	0.47	0.26	0.28	0.15
Public administration	0.94	1.14	1.28	1.01
Total energy-related inputs	**2.16**	**2.35**	**2.49**	**1.96**

Source: Statistics Canada, Input–Output Division

Table 11: Summary of total inputs in government output, by decade				
	1960s	1970s	1980s	1990s
	% of total inputs			
Own Account Resources:				
Employee compensation				
Wages and salaries	54.55	52.82	48.80	45.33
Supplementary labour income	4.29	5.99	6.58	8.18
Total employee compensation	58.84	58.81	55.38	53.51
Capital consumption				
Computers	0.23	0.15	0.49	0.90
Other machinery and equipment	1.74	1.54	1.39	1.41
Subtotal of machinery and equipment	1.97	1.69	1.88	2.31
Construction	7.81	7.16	6.60	6.22
Total capital consumption	9.77	8.85	8.48	8.53
Sub-total: Own Account Resources	**68.61**	**67.66**	**63.86**	**62.04**
Dependent Resources:				
Services				
Health professional services	1.95	5.14	6.64	8.16
Computer services	0.27	0.57	0.62	0.62
Other professional and business	1.31	2.14	2.71	3.54
All other services	13.03	12.25	12.93	12.87
Total Services	16.56	20.10	22.89	25.20
Other inputs				
Raw materials	0.46	0.56	0.76	0.61
Manufactured goods	13.91	10.85	11.34	10.75
Pharmaceuticals	0.70	0.83	1.49	2.16
Energy products	2.16	2.35	2.49	1.96
Other	11.05	7.67	7.36	6.63
Indirect taxes	0.45	0.83	1.15	1.41
Total other inputs	14.82	12.25	13.25	12.76
Sub-total: Dependent Resources	**31.38**	**32.35**	**36.14**	**37.96**
Total	**99.99**	**100.00**	**100.00**	**100.00**
Selected Additional Data:				
Health professional services and pharmaceuticals	2.61	5.97	8.13	10.32
Energy related inputs	2.16	2.35	2.49	1.96
Computer inputs	0.60	.080	1.20	1.60

Source: Statistics Canada, Input–Output Division

Table 11A: Summary of Own account Resources and Dependent Resources, by decade (Source: Table 11 of this paper)				
	1960's	1970's	1980's	1990's
	% of total inputs			
Own Account Resources:				
Total Government sector	63.61	67.66	63.86	62.04
Of which:				
Health	11.18	11.70	12.08	12.11
Education	21.23	22.44	19.75	19.63
Defence	8.69	4.51	3.58	3.02
Public Administration	27.51	29.01	28.45	27.28
Dependent Resources:				
Total Government sector	31.38	32.35	36.14	37.96
Of Which:				
Health	3.88	3.19	3.64	4.11
Education	5.01	5.45	5.09	5.21
Defence	5.31	2.43	3.41	2.40
Public Administration	17.18	21.28	24.00	26.24
	Row Total	99.99	100.01	100.00	100.00

Source: Statistics Canada, Input-Output Division

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